INTEGRATING INFORMATION AND COMMUNICATION TECHNOLOGY IN TEACHING AGRICULTURE IN SECONDARY SCHOOLS IN ENUGU STATE

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Abstract
The paper was on determination of the constraints and benefits of integrating information and communication technology in teaching of agriculture in secondary schools in Enugu State survey design method was used. Two research questions guided the study. A structured questionnaire made up of 25 items was the instrument used for data collection. The population for the study was 146, comprising 77 teachers and 69 students randomly sampled from two schools in two education zones under study. During and organized seminar for schools in Enugu State. The instrument was subjected to face validation by three experts. The reliability of the instrument was tested using a reliability index developed by Cronbach Alpha. A reliability index of 0.88 was obtained. Mean with standard deviation were used to answer the research questions. The result indicated that respondents agreed that integrating ICT in agricultural teaching in secondary schools will enable students meet with the global standard in agricultural production. It was recommended that teachers should integrate ICT in teaching of agriculture in sec schools in Enugu state.

Keywords: *Integrating, Information and Communication Technology, Agriculture, teaching, learning and devices.*

Introduction
The fast rate of globalization has put Nigeria as a nation into establishing high standard of means of educating her citizens to meet the global standard. To meet this global standard Nigerian citizens need to be Information and Communication Technology (ICT) compliant. Information and communication Technology which emerged in the 21st century are those modern communication system which are used in transferring information. Osinem (2008) described ICT as computer propelled tool used by man to process, package and store information. Oliaguju in Okenwa (2010) described ICT as the integration of computer technology mainly in the form of internet and information management to help the users organize process, analyze, store and retrieve information for use when desired. It uses communication devices such as cellular phone, radio, computer and network, hard and soft ware, satellite systems as well as various applications

associated with them. This study describes ICT as 21st century technology CD ROM, Floppy diskettes, flash drive and internet managed information. Advancement in the use of ICT has brought commendable improvement in political, social, economic and educational sector of the nation.

ICT is a globally discussed issue in contemporary education policy. The technologies in ICT are very crucial in instructional delivery to enable the students meet up with standard found in other parts of the developed world. Ezekoka (2011) stated that use of ICT in education provide effective way of passing academic instruction, storing, retrieving, coding and pass instructions by teachers. Atiku (1999), at Kangiwa square in Sokoto during the inauguration of the blue print for implementation of Universal basic education for all Nigerians stated that it is relevant to integrate ICT in education starting from the basic level and based on that, computer education committee was inaugurated. The committee resulted to have the National Policy on computer education, and the policy stated that computer should be taught at all levels of education and that facilities for the implementation should be made available for implementers (teachers).

Iperen in Ugboaja (2011) enumerated some of the information technologies needed for school management to include desktop, laptop, virtual library, printers, internet, school websites, e-mail services, overhead projectors, multimedia examination scoring power points projectors, opaque projectors, machine, other include radio, tape recorder, video tapes and recorder television, telephone cell phone, and calculators. These are required to be adequate so as to enable every student have access to them for learning.

Information and communication Technology is the practical application of knowledge, especially in a particular area hence the need for integrating ICT in teaching of agriculture in schools cannot be undermined. The modern age is doubtless characterized by amazing technological advancement in information and communication technology (ICT), science, education and technology, the smartphone, tablet, computer, internet and social media are prominent (Uwah, 2016). Education had been relatively made easy in this modern time with online resource, academic programmes and materials such as online degree programme, distant learning, e-classes, e-books and portable document format (pdf) (womenmirror.hg@deeperlifeonline.org). It has been claimed that of all the technology development of the modern world, information and communication technology (ICT) seems to be the most notable and widespread (Udensi, 2003). It affects every sphere of life including education, banking, trading, entertainment, government, military and gospel. Teaching of agriculture and practicing of agriculture should not be left out of the use of ICT, because ICT has made the world a global village. Teaching and practicing of agriculture would be made a lot easier with the tremendous benefits of the internet and its World Wide Web component (www). Students can access information through the internet, especially the social media, e-mail, Youtube, Instant messaging, Blogging, Facebook, Instagram, Twitter, Video conferencing, using hand sets (Christ Women Mirror (2016).

Teaching of agriculture in Enugu State at all levels is apparent using ICT, because since the Pressey's epoch-making development of the first teaching

machine, other advanced teaching aids like audio and videotape recorders, overhead projectors, video projectors, computer and video scope have been developed. According to Beintema and Pardey, (2003), distance learning in various places was made possible through these devices. Using ICT in teaching and learning is a lot easier and time saving to assess. Students with computer software and even with students having disabilities acquiring education is formal in the face of assistive technologies like mechanical and non mechanical, electronic and non electronic aids among other specialized instructional materials.

Information and Communication Technology has equally provided useful storage devices like internal and external Hard Disk (HD), USB drive, memory card especially the micro SD card, and the cloud storage, this is an unpredictable or unidentifiable part of a network through which data passes, Eicher (2004). The world has also moved away from the use of cassette with its players to DVD, VCD, CD and their receptive players. The latest audio and video players play media files, High Definition materials as MP3 player, iPod the computer and cell phone, which also make mass storage of data easier.

Everson (2001) opined that integrating agriculture information and communication technology in teaching of agriculture in secondary schools would be a lot easier with the introduction of Smartphone having an advanced mobile operating system (OS) such as android, iphone, iPad and running third-party software components called applications ("apps" for short) and various apps can be downloaded. The e-learning platform has made room for use of e-maps, e-encyclopedia, e-books, audio and video players and offices for conveyance of knowledge and technology in agriculture.

The objective of computer education at secondary school enshrined in the policy include inculcating in learners knowledge and ability to use and develop soft ware package, ability to utilize and programme computer packages, understanding of the structure and operation of computer, appreciate the economic, social and psychological need of computer, knowledge and history of computer and, the use of computer in problem solving (FRN 2013). The objectives of ICT in teaching and learning could only be realized if teachers are able to manipulate information and computer technologies and use them effectively in teaching.

In teachers of agriculture the teachers who are meant to impart the knowledge and skills of farming of students are required to be computer literate to enable them produce student who can communicate to farmers locally and intentionally. They are required to be competent enough to the technologies like laptops, internet services, CD Rom to demonstrate skills, give assignment, store information, organize learning materials etc. Osinem (2008) stated that the use of ICT teaching in agricultural science would assist teachers and students. It will help teachers in;

Preparing teaching materials, to demonstrate experiment and concepts in agriculture, to apply computer aided instruction (CAI) models, support students with primary data during investigation and practical work, help teachers in evaluation of students' progress in agriculture. Agricultural instructions are an organized theory and practical/skill information to be communicated by the teacher to the learners, the teachers of agriculture is expected to be conversant with the new

trends in farming and this could be enhanced through regular assessing of internet, using computer, flash, CD Rom etc. The information must be organized to make the students benefit from it. If the ICT are integrated in agricultural instructions, the students of agriculture could develop themselves and overcome state of isolation and excommunication which hinder development of acceptable knowledge and skills involved in farming. Curriculum co-operative and National Information Technology Development Agency (NITADA 2006) emphasized that the compliance of the government in making resources readily available, will guarantee the users to benefit maximally and all aid teacher to integrate the technologies in teaching agriculture.

Integrating as a word was described by Hornby (2006) as the act or process of combining two or more things so that they work together. Such combination brings a desirable result especially among farmers who need to be conversant with new innovations in farming. For one to make use of something, especially in the sector of education, it must be relevant and of benefit to the user. NITADA (2006) noted that the use ICT in instructional delivery (agriculture) would enable the students to produce creative solution to support learning, and develop understanding, communicate, share ideas and in collaboration with local and global environment, and use digital information to assist investigation, decision making and problem solving. Youth of contemporary society especially those at secondary school level are interested in learning especially when it involves giving them assignment that will lead them to browse the interest for solution. The teachers can make the students of agriculture use ICT by giving them assignments which are accessible in the internet. This will widen their scope in agriculture. Osinem (2008) noted that use of ICT by students of agriculture can be enhanced by the method of teaching adopted by the teachers to make students learn. The author stated that ICT can help students ask questions, predict and hypothesize, observe, measure, record and manipulate variables. Apart from helping the students, the use of ICT by the teacher of agriculture in instruction delivery will enable teachers to be competent in the usage, thus become current with new innovations in agriculture.

But studies have shown that most teachers do not integrate ICT in their teaching. For instance, Etonyeaku (2010) observed that most of the teachers including agricultural science teachers are not computer complaint and prefer to use conventional method of teaching. Alio and Aneke (2015) noted that ICT plays significant roles in the development of the nation politically, economically, socially and educationally. A nation without over 90% of her populace being ICT complaint will find it difficult to meet up with global standard. In secondary schools teachers of agriculture are expected to teach students using ICT and to expose them to use it yet most teacher who are to use them in teaching do not. This may be because of their low level of knowledge of ICT. A situation such as non-integration of ICT in teaching of agriculture may hinder knowledge required in the new techniques of farming by the students and will lead to producing man-power that could not the meet global standard. Hence the study “Integration of ICT in teaching of agriculture in secondary

schools" is a panacea for acquiring new innovation in farming in Enugu State.

Specifically, the study sought to:

1. constraints to integrating ICT in teaching/agriculture in secondary schools.
2. determine the benefits of use of ICT in teaching of agricultural science in secondary school;

Research Questions

The following research questions guided the study:

1. What are the constraints to integrating ICT in teaching of agricultural science in secondary school?
2. What are the benefits of integration ICT in teaching of agricultural science in secondary school?

Research Method

The study adopted a survey design method. The study was carried out in Enugu state. Two out of six education zones of Enugu state thus Agbani and Awgu were purposively sampled and used for the study. The secondary schools in these zones have many students studying agricultural science. The population for the study was 146, which are 77 and 69 teachers and students of agriculture respectively in Agbani and Awgu zones. The entire population was used because it was small. A questionnaire containing 25 items, developed from the literature was the instrument used for data collection. Two research questions guided the study. The instrument was subjected to face validation by three experts. Two from Department of Technology and Vocational Education (ESUT) Enugu and one from Ebonyi State University Abakaliki. The internal consistency of the instrument was determined using Cronbach Alpha. A reliability co-efficient index of 0.71 was obtained. Response categories with values such as Strongly agree (SA)-4, Agree (A) -3, Disagree (D) -2, strongly disagree (SD)-1 were provided for the response. Mean with standard deviation were used to answer the two research questions while t-test was used to test the null hypothesis. The consideration was appropriate because four points scale was used. The corresponding mean scores were interpreted as follows: any mean whose value was 2.50 and above was regarded as agree, if the mean score was below 2.50, such statement was regarded as disagree. Items with a standard deviation less than 1.96 was regarded as very close to mean, since statically, + 1.96 as close to mean in a normal curve tail test is accepted.

Results

Research Question 1

What are the constraints to teachers integrating of the ICT resources for agricultural instructions in secondary schools in Enugu State?

Mean with standard deviation of respondents on constraints of integrating ICT in agricultural instruction in secondary schools.

S/N	Constraints	X	SD	Decision
1	Constant power failure	3.51	0.43	A
2	High cost of ICT resources	3.77	0.52	A
3	Poor/inadequate ICT information	3.04	0.58	A
4	Teachers lack knowledge of use of ICT technologies.	2.68	0.71	A
5	High rate of computer illiteracy	3.44	0.52	A
6	Learners inability to operate ICT technologies	2.49	0.55	A
7	Lack of interest of supervisors on enforcing teachers to use it.	3.01	0.69	A
8	Low interest of teachers resulting poor skill integrate ICT	2.73	0.61	A
9	Poor internet service in schools	3.14	0.51	A
10	Inadequate ICT facilities for teaching in school	3.54	0.44	A
	Grand mean	3.13	0.55	A

The data on Table 1 above revealed that the 10 items on the table are constraints to the utilization of ICT resources in agricultural instruction by teachers of agriculture. The 10 items have mean scores of above 2.50. The grand mean of 3.13 shows that the identified statements are problems to use of ICT in teaching agriculture in secondary schools. The standard deviations also exhibit closeness.

Research Question 2

What are the benefits of integrating ICT technologies of agricultural science instruction in secondary schools in Enugu State?

Mean with standard deviation of respondents on benefits of integrating ICT in agricultural instructions in secondary schools.

S/N	Integrating ICT Technologies	X	SD	Decision
11	Assist the teacher with preparing teaching materials for agriculture.	3.46	0.58	A
12	Help the teacher use computer aided instruction.	3.26	0.49	A
13	Help the teacher evaluate his agric science students.	3.50	0.66	A
14	Enable the teacher keep students performance record.	3.28	0.55	A
15	Enable the students communicate, share ideas in local and global environment concerning agriculture.	3.71	0.38	A
16	Develop creative abilities of students.	3.52	0.62	A
17	Enable both the teacher and students use digital information to assist investigation, on agricultural matter.	3.11	0.46	A
18	Help the students to solve personal problems concerning agriculture using internet and other ICT technology.	3.55	0.58	A

19	Help students and teacher to be abreast with current with information in agriculture.	3.26	0.52	A
20	Enable teachers use ICT technologies to contribute in decision making on agricultural issues.	3.32	0.61	A
21	Help teachers make delivery of instruction easy.	2.64	0.77	A
22	Help students get timely information Enable users to store relevant information.	3.61	0.39	A
23	Enable student learn how to market agric produce. Enable teachers and students to publish and present software information on agriculture.	3.55	0.71	A
24	Help student share problems with others students	2.87	0.61	A
25	Enable student to store relevant agricultural information	3.61	0.48	A
	Grand mean	3.33	0.54	A

The data analyzed in Table 2 shows that the respondent had mean ratings of 2.50 and above in all the 15 items This shows that they agree that the statement in the items are benefits of integrating ICT technologies in teaching agriculture in secondary schools in Enugu State items. The grand mean of 3.33 is in conformity that benefits are in the use of ICT in teaching agriculture. The scores of the standard deviation range from 0.38-0.77 indicating that the respondents are homogenous.

Discussion

The findings on research question one revealed that the respondents agree that integrating ICT in agricultural instruction will assist teachers in; preparing teaching materials, monitor and deliver his instructions, evaluate his instruction, and keep students performance record. It will enable students communicate, share ideas in local and global environment agricultural matters and store relevant information on agriculture. These findings are in tandem with the findings of Oduaran (1998) in Ebirim (2010) who noted that computer and other ICT will make it virtually easy to keep very difficult records and for one to interact with those services provided by ICT. In another development, Etonyeaku (2010) found that the ability to improve personal understanding and analyze marketing skill and job performance in agriculture is paramount to the extent students are exposed to use of ICT. The study of Etonyeaku also found that integrating ICT in agricultural instructions will advertise and market agric products. The present study also found that ICT such as, the use of computer could help students and teachers to access information timely. The findings are in line with the findings of Baker (2009) who emphasized that timely information in educational and research section could be enhanced with the use of information and communication technologies. Similarly MDG monitor in Ugboaja (2011) agrees with the present findings that ICT initiative was geared toward globalization of education, economic and social activities across the geographical boarder.

The findings on research question two revealed that some constraints hinder the integration of ICT in agricultural instruction. These include constant power failure, high cost of ICT gadgets, inadequate ICT technology, inadequate trained ICT man power, leaner's inability to utilize the technologies among others. The findings are in consonance with Chinedu (2014) who noted that constant power failure affects political, economic, social and educational sectors in

development that will enhance national economy. For instance craft men and technicians who use electricity to work usually remain redundant when there is power failure. If these craft men continue to experience power failure, they may not be able to earn a living that will improve their standard and timely information either locally or globally will not be met, thus making the nation to be backward in globalization.

Conclusion

The integration of ICT by agricultural science teachers during teaching will help to produce youths of high intelligence. It was therefore, concluded that teachers of agricultural science should integrate ICT in agricultural instruction to keep students abreast with the global information on agricultural production.

Recommendations

Based on the findings, the following recommendations were made:

1. Teachers who are computer literate integrate ICT in teaching of agriculture in secondary school in Enugu State Nigeria.
2. Government should improve on power supply to enable teachers and students utilize ICT since they cannot work without electricity.
3. Teachers who are already in the teaching field should be retrained in the use of ICT.
4. ICT gadgets should be sold to students and provided in schools at subsidized rates.

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