

UTILIZATION OF ICT IN TEACHING AND LEARNING OF AGRICULTURAL SCIENCE IN SELECTED SECONDARY SCHOOLS IN GOMBE METROPOLIS

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Abstract

The study assessed the utilization of ICT in Teaching and Learning Agricultural science in some selected secondary schools of Gombe Metropolis. The study population comprised of teachers and students in all public secondary schools where ICT gadgets were installed. The sample size consists of three (3) purposively selected secondary schools where twenty (20) SS II agricultural science students were randomly selected and four (4) teachers each in those schools were used. Data were collected with the help of structured questionnaire. The data were analyzed using descriptive statistics such as mean, frequency and percentage. The result of the study revealed that ICT facilities are not available for teaching and learning agricultural science in secondary schools. Problems affecting ICT utilization in teaching and learning agricultural science includes; power failure, unskilled manpower, inadequate funding, poor maintenance of the ICT facilities, network irregularities. The following recommendations were made, Government should give priority to ICT in secondary schools, more funds should be provided to the schools so as to train staff on ICT and to also maintain the ICT facilities. Furthermore, alternative power source should be provided to ensure steady supply of electricity.

Keywords: Utilization, ICT, Teaching and Learning Agricultural science

Introduction

The explosion of Information and Communication Technology (ICT) in the last two decades has impacted the life of many people and the nature of jobs in all fields. Education as the main vehicle for human capital development needs to heed to the constant changes in the world of work. In line with the rapid development and usage of ICT in the workplace, it is important that the current generation of students need to be well-prepared with ICT knowledge and skills for them to face the tasks in the world-of-work in the future. In fact, ICT is the way of life for the majority of us and we should be fully prepared to live in the ICT world.

The emergence and advancement of Information and Communication Technologies (ICTs) have changed the way teaching and learning processes are

being conducted. ICTs facilitate immediate access to information resources needed for teaching and learning. According to Sife *et al.* (2007), ICTs have capabilities of improving information accessibility, facilitating communication via electronic facilities, enhancing synchronous learning and, increasing cooperation and collaboration. In the teaching and learning process, ICTs are known to be more cost effective as they facilitate collaborations among learners and tutors and enhance pedagogical improvement through simulations, virtual experiences and graphic representations. Information and Communication Technology (ICT) applications enhance an exchange of information between learner-tutor and learner-learner. This takes place through the use of different ICT tools including computers, radio, television, mobile phones and some other devices. These

tools provide suitable platform for the teaching-learning process. Current developments in ICTs have increased the level of interactivity and collaborations among learners and tutors. Advancements in web technology have brought about another opportunity for teaching and learning. Web based learning platforms are known to limit problems caused by distance between learners and tutors. Web-based learning is a form of e-learning supported by an internet browser (Tinio, 2003). It occurs through electronic mails, chats, web-based conferencing, message boards and web pages for sharing information resources. It provides a suitable instructional media, facilitates interactive and collaborative learning and enhances assessment during the teaching learning process (Wijekumar, 2005).

Within a very few years, Information and Communication Technology (ICT) has turned out to be an effective educational technology which promotes some dramatic changes in teaching and learning processes. Technologies allow students to work more productively than in the past, but the teacher's role in technology-rich classrooms is more demanding than ever (Keengwei *et al.* 2008). ICT has the potential to transform the nature of education (improving teachers' design work, enhancing the roles of students and teachers in the learning process and helping to create a collaborative learning environment, etc). Although ICT has the potential to improve the educational system to a great extent, developing countries are far from reaping these benefits because of certain barriers.

The integration of ICT into education has been assumed as the potential of the new technological tools to revolutionize an out modeled educational system (Albrini, 2006). In the last 20 years, initiatives, projects and implications related to use of Information and Communication Technologies (ICT) in education motivate teachers to gain necessary knowledge and

skills in using ICT in their instruction. Pelgrum (2001) has noted that ICT is "not only the backbone of the Information Age, but also an important catalyst and tool for inducing educational reforms that change our students into productive knowledge workers".

ICT plays a critical role in information societies' educational systems. In these societies, the stakeholders of educational policy, redesign and reconstruct their educational systems based on the new educational paradigms such as constructivist theory so that both teachers and students develop the necessary knowledge and skills sought in this digital age. Hence, most countries around the world are focusing on approaches to integrate ICT in learning and teaching to improve the quality of education by emphasizing competencies such as critical thinking, decision-making, handling of dynamic situations, working as a member of a team, communicating effectively (Anderson & Weert, 2002). Also governments especially in developing countries have tried to improve their national programs to integrate ICT into education. According to Benzie (1995) national programs have not been so successful to implement ICT into educational systems because they were formulated in non-educational realms and they were not supported with educational research (Albrini, 2006).

ICT has become an important component of education of many nations. In some schools ICT is taught as a subject and for the majority ICT is a teaching tool. ICT can do wonders in classroom if used wisely by well-trained teachers. ICT enhances teaching and learning process by increasing students' motivation. The use of ICT in classroom helps in the explanation of difficult concepts so students are able to easily under-stand those concepts. The integration of ICT in education can takes several forms such as information and computer networks, digital content,

internet sites, multimedia and others (Lloyd, 2005)

Human history is recounting on man's management of information and is not a surprise that, the economically rich nations are the richest in information and also the most technologically advanced nations. The present century has been described as the information age because of the high rate of information generation, usage and the corresponding high regard that the present development has for information (Ibidapo and Akintade, 2008). While the developing nations suffer from the scarcity of information, the developed countries are suffering from information overload (Okigbo cited in Ibidapo and Akintade, 2008).

Regardless of the information overload, the nature and quality of information bring about technological advancement, human capital development and reduce uncertainty in the economy of the world. The economy of the world in recent time is driven by information technology (IT). Ibidapo and Akintola (2008) reported that information is the "essence" of communication which indicates the functional and dynamic process by which we interact with each other, share concepts, ideas, theories, values, knowledge even failure and success.

Technology represents the application and adaptation of science (Ademosun cited in Ibidapo and Akintade, 2008). They further explained that technology refers to use of new machines, equipment and also ways of doing things that are based on modern knowledge and computers. Salami (2008) defines IT as a convergence of computer systems with the telecommunication network to acquire, process, store, retrieve and transmit data. ICT is an umbrella term that include any communication device or application such as radio, television, cellular phones, computer and network, hard and soft wares, satellite systems as well as various services and applications associated with them (Salami, 2008).

Teaching is a dynamic profession that requires continuous review in order to address some contemporary issues and challenges (National Commission for Colleges of Education (NCCE), 2010). In pursuance of development and keeping of pace with the dynamics and the demand of education, Federal Republic of Nigeria (FGN) through her national policy on education incorporated ICT into the secondary schools' curriculum (FGN cited in Ibidapo and Akintade, 2008). The integration of ICT in all facets of education, Vocational and Technical education is aimed at catching up with the rest of the world in technological advancement (FGN cited in Ibidapo and Akintade, 2008).

According to Ugodulunwa (2008) assessment is the process of measuring behaviour of an individual and using the result in taking relevant decisions about the individual, curriculum and instructions or a programme. Therefore, new potential for producing and distributing knowledge can only be assessed through modern technology, which fundamentally altered how we live and work, as well as how we learn and which have transformed the world into global community. A technologically-advanced workforce will require adequate skill in Information and Communication Technology. ICT have the potential to improve military technology and communications, media communication and high skill manpower in Nigeria and other parts of the world (Goshit, 2006).

Agriculture is the backbone of any stable economy and its importance particularly in developing nations like Nigeria cannot be over emphasized. Onete, Eyo and Ukan cited in Balogun (2003) stated that teaching and learning of Agricultural science is of great importance. He defines teaching as the passing of ideas, knowledge, skills, attitudes, beliefs and feelings to some with an aim of bringing about particular changes in the behaviour of that person. The delivery of vocational

agriculture at the senior secondary level should not be handled as a science per se but rather as a vocational subject for acquisition of practical skills for meaningful living (Ikeoji, Agwubkie and Disi cited in Obi, 2005).

Secondary schools today are in deplorable and pitiable state. There is a mass failure in senior Secondary Certificate Examination (SSCE) conducted by west African Examination Council (WAEC) and National Examination Council (NECO), because many students don't have adequate knowledge, skills and attitude expected of them; this calls for problem solving and practical approach to learning using of ICT or instructional materials. However, using ICT as a tool for teaching in schools has not gain much ground. This may be due to the fact that most of the teachers are not competent enough and that ICT gadgets are not provided in most schools. Agricultural science requires adequate instructional materials including ICT for effective teaching. This will reduce mass failure of students in external examinations and efficient skills acquisition in the subject. Therefore this study was to examine the effective use of ICT in teaching and learning of agricultural science as well as the constraints to the utilization of ICT in some selected secondary schools in Gombe metropolis.

Materials and Methods

The study was conducted in Gombe metropolis Area of Gombe State. Gombe

Result and Discussion

local Government is located between latitude 9° 30' and 12° 30' and longitude 8° 45' and 11° 45' east. It shares boundaries with Yamaltu Deba L.G.A. to the East, Akko L.G.A. to the South and Kwami L.G.A to the North. Gombe lies in the Sudan Savannah North Eastern geopolitical zone of Nigeria.

The population of this study comprises of all the agricultural science teachers and students of the 31 senior secondary schools within Gombe metropolis. Three (3) secondary schools were purposively selected for the study because of the availability of ICT facilities in the schools. The schools comprises of Government Science College, Doma, Government Science Secondary School, Gombe and Arabic Teachers College, Gombe. Random sampling technique was used to select 12 Agricultural Science Teachers and 60 students making a sample size of 72. The data were collected through structured questionnaires and were analyzed with the use of descriptive statistics such as mean, frequency and percentage. A 4 – point rating scale Strongly agreed= 4, Agreed= 3, Disagreed = 2. Strongly disagreed = 1 was used to rate the respondents on the use of ICT as well as the constraints to the utilization of ICT in teaching and learning Agricultural science. A mean value of 2.5 and above was use to judge the agreement with the statement, while below 2.5 indicates disagreement with the statement.

Table 1: Availability of Personal Computers

Responses	Frequency	Percentage
YES	18	27.7
NO	47	72.3
Total	65	100

Table 1 shows the availability of personal computers in teaching and learning agricultural science. The result revealed that 18 (27.7%) had personal computers, while 47(72.3%) do not have. This means that majority of the teachers do not have

personal computers for teaching. The finding is in line with that of Okwudishu (2005) who discovered that the unavailability of ICT components in schools hampers teachers' use of ICT.

Table 2: Availability of Laptop Computers

Responses	Frequency	Percentage
Yes	13	20
No	52	72.3
Total	65	100

Table 2 indicates the responses on the availability and use of laptops for teaching and learning agricultural science. The result indicates that 20% of the respondents have laptops for teaching in

their schools, while 80% of the respondents do not have. This means that majority of the schools do not have laptops for teaching and learning agricultural science.

Table 3: Availability of Internet Facilities

Responses	Frequency	Percentage
Yes	26	40
No	39	60
Total	65	100

Table 3 shows the responses on the availability of internet facilities for teaching agricultural science which indicated that 40% of the respondents have internet facilities in their schools, while, 80% of them do not have.

Table 4: Availability of Teaching Software

Responses	Frequency	Percentage
Yes	10	15.4
No	55	84.6
Total	65	100

Table 4 shows the responses on availability of teaching software for teaching agricultural science. The result revealed that 84.6% do not have software for teaching agricultural science in their schools, while, only 15% of them have.

Table5: Availability of Power Point Projectors

Responses	Frequency	Percentage
Yes	25	38.5
No	40	61.5
Total	65	100

Table 5 shows the responses on the availability of power point for teaching agricultural science. The result shows that about 61.5% of the respondents do have power point. While, only 38% of them have power point for teaching agricultural science in their schools.

Table 6: Availability of Wireless Public Address System

Responses	Frequency	Percentage
Yes	35	53.8
No	30	46.2
Total	65	100

Table 6 shows the responses on the availability of wireless public address system in teaching agricultural science. The result shows that 53.8% of the respondents have wireless public address system. While, 46.2% of them do not have.

Table 7: Availability of Wireless Internet Access

Responses	Frequency	Percentage
Yes	14	21.5
No	51	78.5
Total	65	100

Table 7 shows the responses on the availability of wireless internet access in teaching agricultural science in their schools. The result shows that 78% of the respondents do not have wireless internet access in their schools. While, only 21.5% have.

Table 8: Availability of Interactive Board

Responses	Frequency	Percentage
Yes	24	36.9
No	41	63.1
Total	65	100

Table 8 shows the responses on the availability of interactive board in teaching agricultural science in their schools. The result shows that 63% of the do not have interactive board. While, only 36 % of them have.

Table 9: Availability of Satellite Dish

Responses	Frequency	Percentage
Yes	49	75.4
No	16	24.6
Total	65	100

Table 9 shows the availability of satellite dish in their schools. The result revealed that 75% of the respondents have satellite dish in their schools. While, only 24% of the respondents do not have.

Table10: Accessibility to ICT facilities

S/NO	ITEM	S A	A	D A	SD A	MEA N
1	There are available and accessible ICT pool to enhance teaching and learning agricultural science in schools	32	54	22	28	2.0
2	There are ICT gadgets that enable both teachers and students to search for related agricultural science materials in the school	3 2	30	70	11	2.2
3	There are ICT facilities available for easy access to teachers and students of agricultural science	3 6	30	78	9	2.3

Table 10 shows the level of accessibility to ICT facilities in their schools. The result revealed that most of the schools do not have ICT pool and facilities for teaching and learning agricultural science, hence they do not have access to searching of materials through internet.

Table 11: Use of ICT Facilities in the Schools

S/NO	ITEM	SA	A	DA	SDA	MEAN
1	Personal computers	32	48	38	32	2.1
2	Laptop computers	44	24	74	9	2.3
3	Internet facilities	44	42	36	22	2.1
4	Teaching software	28	54	36	22	2.1
5	Power point Projectors	20	99	46	6	2.6
6	Wireless public address system	15	57	66	9	1.4
7	Wireless internet access	20	27	78	10	2.0
8	Interactive boards	24	27	76	13	2.1

Table 11 shows the use of ICT facilities required for effective teaching and learning of agricultural science. The result revealed that the ICT gadgets that are effectively used in the class rooms. Power point projectors (2.6), Laptop computers (2.3), Internet facilities (2.2), Teaching software (2.1). Wireless public address

system(1.4), Wireless internet access (2.0), Interactive board(2.1). The result is similar with the findings of Adedoyin (2011) who found that ICT equipment and other accessories are inadequate in many schools in Nigeria and this is affecting effective teaching and learning process

Table 12: Constraints to the Use of ICT in Schools

S/NO	ITEM	SA	A	DA	SDA	MEAN
1	Power failure affects the use of ICT in teaching and Learning agricultural science	144	60	2	3	3.2
2	Inadequate funding on ICT affects students performance in learning agricultural science	172	63	2	2	3.7
3	Inadequate skilled personnel affect teaching and learning of agricultural science	164	45	12	3	3.4

4	Inadequate knowledge in ICT affect teaching and learning of agricultural science	160	48	6	2	3.3
5	Inadequate maintenance of ICT facilities affect teaching and learning agricultural science	136	69	14	3	3.4
6	Network irregularity affect teaching and learning agricultural science	148	57	8	5	3.3

Table 12 shows the constraints to the availability and utilization of ICT facilities in schools. The followings were identified as the major constraints to the utilization of ICT in teaching agricultural science in school. Power failure (3.2), inadequate funding of ICT (3.7), Inadequate skilled personnel (3.4). Inadequate knowledge (3.3), Inadequate maintenance (3.4), Network irregularity. The result is in line with the findings of Aduwa-Ogiebean and Iyawu (2005) who observed that most secondary schools teachers lack the skill to utilized ICT in the implementation of secondary school curriculum; hence the traditional chalk and duster approach still dominate in many schools' pedagogy. They further explained that there is acute shortage of trained personnel in the areas of application of software operating systems, network administration and local technicians to service and repair ICT facilities.

Conclusion

From the findings of this study, it can be concluded that the use of ICT in schools have positive impact on teaching, learning and research. Despite the roles ICT can play in education. Secondary schools in Nigeria are yet to adopt ICT in teaching

and learning of agricultural science. The findings revealed that majority of the schools in the Gombe metropolis are deficient in ICT equipment and other accessories for effective teaching and learning agricultural science. Also, inadequate trained personnel, inadequate funding and irregular supply of electricity were identified as major challenges in the effective usage of ICT equipment and facilities in secondary schools.

Recommendations

Based on the findings of this work, the following recommendations are forwarded:

- i. Government should provide adequate ICT gadgets in secondary schools to ensure effective teaching.
- ii. Adequate funds should be provided to the schools to enable them embark on the training of staff on the use of ICT in teaching as well as to maintain the ICT facilities.

- iii. Alternative power source like the generators and solar inverter should be provided in schools to ensure steady supply of electricity.
- iv. Classrooms should be furnished with necessary ICT facilities such as interactive boards, power point projectors
- v Teachers should be provided with personal computers, laptops wireless internet access.

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