

# ASSESSMENT OF AVAILABILITY AND UTILIZATION OF INFORMATION AND COMMUNICATION TECHNOLOGY (ICT) EQUIPMENT ON ACADEMIC PERFORMANCE OF STUDENTS IN AGRICULTURAL SCIENCE IN SECONDARY SCHOOLS IN BAUCHI STATE, NIGERIA

BY

<sup>1</sup>**IBRAHIM ABUBAKAR**

(dalilibrahim426@gmail.com)

<sup>2</sup>**ALI M. A.**

(mohammedaliburra@gmail.com)

<sup>3</sup>**BAKOSHI AHMED MOHAMMED**

(ahmedmohammedbakoshi@yahoo.com)

<sup>4</sup>**IBRAHIM ALIYU ISAH**

(librahimaliyu@gmail.com)

&

<sup>5</sup>**MOHAMMED ABUBAKAR**

(mohammedabubakar20015@gmail.com)

<sup>1, 2, 3, 4</sup> Department of Agricultural Science Education

Aminu Saleh College of Education, Azare. Bauchi State, Nigeria

<sup>5</sup> Government Day Secondary School, Misau, Bauchi State Ministry of Education

## Abstract

This study aimed at assessing the availability and utilization of Information and Communication Technology (ICT) equipment on academic performance of students in agricultural science in secondary schools in Bauchi State, Nigeria. Two objectives, two research questions, and two null hypotheses were stated and tested at 0.05 level of significance. Related literature was reviewed with theoretical and conceptual framework based on the major variables of the study. Ex-post-factor research design was adopted for the study. The population of the study was 920 agricultural science students in secondary schools in Bauchi State. A sample size of four hundred and sixty (460) students representing 50% of the total population was used. The instruments used for data collection were checklist and structured questionnaire named "Availability and Utilization of Information and Communication Technology Equipment Questionnaire (AU ICTEQ). Mean and standard deviations were used to answer the stated research questions. Simple Regression Analysis was used to test the two null hypotheses. The summary of the findings showed that the availability and utilization of ICT equipment had effect on academic performance of students in agricultural science in secondary schools in Bauchi state. It is hence concluded that, provision of ICT equipment in schools can be one way by which teachers' efficiency, school learning situation and students' learning outcome can be improved. One of the recommendations were given, among which was that, in order to make teaching and learning of agricultural science better and to improve students' academic performance, Bauchi State governments should provide available ICT equipment in all secondary schools in the State for optimal utilization by teachers and students.

**Keywords:** Assessment, Availability, Utilization, ICT, Academic Performance,

## Introduction

Internet and Communication Technology (ICT) has brought into the system new and emerging technologies that have come to

replace or challenge the traditional methods involved in the teaching and learning process. There is need therefore for proper integration of ICT in instructional delivery for purposeful

and experimental learning to take place. This involves being able to seek out and use information stored in computers and other electronic-materials in order to be up-to-date. They have been proved to be very useful support materials in teaching and learning, that is why different governments globally made investment in ICT to improve teaching and learning in schools. For example, in United Kingdom (UK), the government spending on ICT in educational sector in 2008 2009 was \$ 2.5 billion, in United States the expenditure on “K 12” schools and higher education institutions was \$ 6 billion and 4.7 billion respectively and in New Zealand, the government spent over \$ 410 million every year on schools' ICT infrastructure (Charles, 2012). Nigerian government on her effort towards the development of Information Technology (IT), the National Policy for Information Technology (NPIT) was formulated in 2001 with a vision 'to make Nigeria IT capable country in Africa and a key player in the information, using IT as the engine for sustainable development, and global competitiveness' (Federal Ministry of Science & Technology, (FMST) 2001).

ICT has been seen by Adeosun (2010) as the emergence of tools of microelectronic and telecommunications that are used in the automatic acquisition, analysis, storage, retrieval, manipulation, management, control, movement, display, transmission, reception and interchange of quantitative and qualitative data. Ogunsola (2005) opines that ICT is an electronic based system of information transmission, reception, processing and retrieval, which has drastically changed the way we think, the way we live and the environment in which we live”. It can be used to access global knowledge and communication with other people. Students who use ICTs gain deeper understanding of complex topics and concepts and are more likely to recall information and use it to solve problems outside the classroom (Apple Computer, 2002).

ICT Equipment on one hand are all digital tools and machines used in teaching and learning which includes computer hardware and software, television, radio, data projector, overhead projector, digital camera and internet facilities, smart board, video slides, film strips, fax machine, scanning machine and telephone etc. In this study, availability means the condition with which teachers have access and make use of functional ICT Equipment for effective teaching of agricultural science to students in senior secondary schools. It refers to the quality, quantity, functionality and disposability of such ICT equipment to teachers at every point in time for effective utilization.

Utilization, going by this work, refers to the rate or how often ICT equipment in teaching agricultural science is put into use or services by agricultural science teachers in secondary schools. Utilization of ICT equipment depends on their availability in the school. Performance here is the outcome learning. It is the extent to which a student, teacher or institution has achieved their educational goals. To students, in particular, performance is the extent to which students achieved certain goals during their educational training (Annie, Stoker & Mildred, 2015). All the described variables constitute the background in which this study was conducted to assess the availability and utilization of ICT equipment on academic performance of students in agricultural science in secondary schools in Bauchi State, Nigeria.

### **Statement of the Problem**

The Joint Admission and Matriculation Board (JAMB) has since made their examination patterns on computer-based examinations (CBT). But yet, about 60% of public secondary schools' students have demonstrated difficulties particularly related to ICT operation. Hence, leading them to have mass failure in the UTME which might

affect their zeal to further education and blocking their chance of being admitted into tertiary institutions. This has led the researchers to ask what extent does ICT equipment are available and utilize in secondary schools in Bauchi State?

### Objectives of the Study

The main objective of this study is to examine the availability and utilization of ICT equipment on academic performance of agricultural science students in secondary schools in Bauchi State, the specific objectives of the study are to:

1. determine the effect of availability of ICT equipment on academic performance of students in agricultural science in secondary schools in Bauchi State;
2. determine the effect of utilization of ICT equipment on academic performance of students in agricultural science in secondary schools in Bauchi State;

### Research Questions

Based on the specific objectives of the study, answers to the following questions were provided:

1. what is the effect of availability of ICT equipment on academic performance of students in agricultural science in secondary schools in Bauchi State?
2. what is the effect of utilization of ICT equipment on academic performance of students in agricultural science in secondary schools in Bauchi State?

### Research Hypotheses

The following null hypotheses were postulated to guide this study:

**H<sub>01</sub>:** availability of ICT equipment has no significant effect on academic performance of students in agricultural science in secondary schools in Bauchi State.

**H<sub>02</sub>:** utilization of ICT equipment has no significant effect on academic performance of students in agricultural science in secondary schools in Bauchi State.

### Theoretical Framework

#### Integrative Model of Behaviour Prediction (IMBP)

Theoretical model of Digital Learning Materials (DLMs) usage can be best suited Integrative Model of Behaviour Prediction (IMBP). In the IMBP, dispositional variables are key determinants with respect to a specific behaviour, here teacher's usage of DLMs in education. Although the model considering organizational variables, the main focus of the IMBP is on individual level characteristics. Attitude, self-efficacy and perceived norm are the most important dispositional variables in the IMBP. When combined, these factors are conjectured to influence behavioural intention which, in turn, is related to the actual behaviour. According to the model, the intention-behavior relationship may be moderated by environmental variables (such as the non-availability of DLMs or the proper ICT infrastructure) and by teacher's actual ICT knowledge and skills. Furthermore, IMBP considers the positive and negative outcome beliefs teachers have should they use DLMs (for example, DLMs give more variations during class and DLMs require more class preparation) to be antecedent variables of attitude. The antecedent variables of subjective norm concern teachers' normative beliefs that important people (for example colleagues and parents) may think that they should use DLMs. Finally, self-efficacy antecedent variables concern the convictions (that is, the efficacy beliefs) teachers have that they can use DLMs and that they can overcome the impediments to use DLMs.

### Research Methodology

#### Research Design

This study adopted an ex-post factor research design. The design was chosen in order to allow the researcher to have the previous records of student's Mock examination for transition to SSS III, get an insight about feelings, opinions, perception, awareness and appreciation of agricultural

science students in the use of ICT equipment in teaching and learning in secondary schools in Bauchi State.

### Population for the Study

Population of this study comprised of nine hundred and twenty (920) students offering Agricultural science as a subject at senior secondary school three (SSS III) in the three education zones in Bauchi State. The Education zones are Bauchi zonal education office, Bauchi; Central zonal education office, Darazo and Katagum zonal education office, Azare, with a total population of three hundred and seventy-one (371); two hundred and fifty-three (253) and two hundred and ninety-six (296) respectively.

### Sample size and Sampling Technique

A sample size of four hundred and sixty (460) students was used in this study. Out of this number, one hundred and eighty-five (185) students were selected from Bauchi zonal education area, one hundred and twenty-seven (127) from Central education zone and one hundred and forty eight (148) from Katagum education Zone. The sampled sizes in the three education zones were drawn using proportionate sampling procedure since

each zone was considered as a stratum.

### Instrument for Data Collection

The instrument for data collection was a checklist adopted from Stephen (2013), a structured questionnaire titled “availability and Utilization of Information and Communication Technology Equipment Questionnaire (AUICTEQ)” developed by the researcher and a Record of students' performance in Mock examination.

### Data Collection and Analysis

Standardized Cronbach alpha reliability coefficient of 0.87 was obtained and used. Data collected were coded and analyzed using Statistical Package for Social Sciences (SPSS, version 23). The two (2) research questions were answered using mean and standard deviation, while all the null hypotheses were tested using simple regression analysis at 0.05 level of significance

### Answers to Research Questions

#### Research Question One:

What is the effect of availability of ICT equipment on academic performance of students in agricultural science in secondary schools in Bauchi State?

**Table 1: Mean and Standard Deviations on Effects of Availability of ICT Equipment on Academic Performance of Students in Agricultural Science in Secondary Schools in Bauchi State**

S/N	Check list items	N	Mean	Std.	Decision
1.	There are available computer hardware in my school.	460	1.35	0.49	Available
2.	There are available computer software in my school.	460	2.00	0.41	Readily Available
3.	There are available data projectors in my school.	460	1.55	0.63	Available
4.	There are available digital cameras in my school.	460	1.10	0.14	Not Available
5.	There are available internet services for browsing in my school.	460	1.40	0.56	Not Available
6.	There are available smart board in my school.	460	1.37	0.29	Not Available
7.	There are available TV/Radio in my school.	460	1.55	0.63	Available
8.	There are available fax machine in my school.	460	1.20	0.16	Not Available
9.	There are available scanning machine in my school.	460	1.55	0.49	Available
10.	There are available telephones in my school.	460	1.70	0.42	Readily Available
11.	There are available E-mail services in my school.	460	1.90	0.27	Readily Available
12.	There are available Satellite services in my school.	460	1.05	0.15	Not Available
13.	There are available LAN services in my school.	460	1.14	0.04	Not Available
14.	There are available Video Conferencing facilities in my school.	460	1.46	0.66	Not Available
	Cumulative Mean		1.45		

Source: Field Study, 2022



Table 1 showed the means and standard deviations of the assessment of the effects of availability of ICT equipment on academic performance of students in agricultural science in Secondary Schools in Bauchi State. The analysis showed that questionnaire item 2 (*computer hardware and software*) had the highest mean score of 2.00 with relatively closer standard deviation of 1.41, while questionnaire item 12 (*available satellite*) which did not meet the prior expectation of this research had mean score of 1.05.

However, it was observed that, the results revealed that most of the ICT equipment were not available with an aggregate mean of 1.45 which is less than the bench mark of 2.00. This implies that availability of ICT equipment had no effect on performance of students in agricultural science in senior secondary schools in Bauchi State.

**Research Question Two:** what is the effect of utilization of ICT equipment on academic performance of agricultural science students in secondary schools in Bauchi State?

**Table 2: Mean and standard deviations on effects of utilization of ICT equipment on academic performance of students in Agricultural science in secondary schools in Bauchi State**

S/N	Questionnaire items	N	Mean	Std.	Decision
1.	I am using computer hardware available in my school	460	1.60	0.90	Occasionally Utilized
2.	I am using computer software available in my school	460	1.91	0.91	Always Utilized
3.	I am using projector available in my school to teach agricultural science	460	1.50	0.41	Utilized
4.	I am using digital camera available in my school for capturing some agriculture related pictures	460	1.18	0.08	Not Utilized
5.	I am using internet for browsing available in my school	460	1.41	0.18	Not Utilized
6.	I am using smart board available in my school for teaching agricultural science	460	1.10	1.01	Not Utilized
7.	I am using TV/Radio available in my school to ease agricultural lessons	460	1.50	1.39	Utilized
8.	I am using fax machine available in my school for printing some agricultural science related information	460	1.00	0.08	Not Utilized
9.	I am using scanning machine available in my school for demonstration of some scanning activities related to teaching of agricultural science topics	460	1.50	0.90	Utilized
10.	I am using telephone available in my school for communication concerning the effectiveness of teaching agricultural science	460	1.87	0.90	Always Utilized
11.	I am using e mail services for receiving and retrieving students' assignment in Agricultural science	460	1.77	0.83	Always Utilized
12.	I use to watch satellite for more information on agriculture related programmes which help me in appropriate teaching of agricultural science	460	1.07	0.64	Not Utilized
13.	I use the available LAN services with my laptop for browsing agricultural science related materials for proper examples	460	1.19	0.22	Not Utilized
14.	I am using Video Conferencing facilities in my school for interaction with students in other professionals in agricultural science related matters	460	1.20	0.24	Not utilized
<b>Cumulative Mean</b>			<b>1.41</b>		

Source: Field Study, 2022

Table 2 showed the means and standard deviations of the assessment of the effects of accessibility of ICT equipment on academic performance of students in agricultural science in Secondary Schools in Bauchi State. The analysis showed that questionnaire item 2 (I am using computer software available in my school) had the highest mean score of 1.91 with relatively closer standard deviation of 0.91, while questionnaire item 8 (I am using fax machine available in my school for printing some agricultural science related information) which did not meet the prior expectation of this research had mean score of 1.00 with a standard deviation of

1.08. However, it was observed that, the results revealed that the ICT equipment were not utilized with an aggregate mean of 1.41 which is less than the bench mark of 2.00. This implies that utilization of ICT equipment had no effect on performance of students in agricultural science in senior secondary schools in Bauchi State.

### Test of Hypotheses

**Null Hypothesis One:** Availability of ICT equipment has no significant effect on academic performance of agricultural science students in secondary schools in Bauchi State.

**Table 3: Regression Analysis on effects of availability of ICT equipment on academic Performance of students in agricultural science in secondary school in Bauchi State**

Variables		SE	T	R <sup>2</sup>	Adj. R	Sig.
Constant	3.783	0.465	8.135	0.797	0.792	0.000
Availability of ICT equipment	0.530	0.086	6.123	0.512	0.497	0.001

P < 0.05

The regression analysis in table 3 presents the effects of availability of ICT equipment on academic performance of agricultural science students in secondary school students in Bauchi State. The results revealed that the coefficient of determination (R<sup>2</sup>) which shows the total contribution of the independent variable to the dependent was 0.797 or 79%. The coefficient of the independent variable (available ICT equipment) was 0.530 indicating that one unit increase in the availability of ICT equipment will increase students' performance in agricultural science

by 53%. The result further indicated that the calculated p-value of 0.001 was less than the *a priori* alpha-value ( $\alpha$ ) of 0.05 level of significance ( $P = 0.001 < \alpha = 0.05$ ). Hence, the null hypothesis that says availability of ICT equipment has no significant effects on academic performance of students in agricultural science was therefore, rejected.

**Null Hypothesis Two:** Utilization of ICT equipment has no significant effect on academic performance of agricultural science students in secondary schools in Bauchi State.

**Table 4: Regression Analysis on effects of utilization of ICT equipment on academic performance of agricultural science students in senior secondary school students in Bauchi State,**

Variables		SE	T	R <sup>2</sup>	Adj. R	Sig.
Constant	2.360	0.179	13.184	0.364	0.360	0.000
Utilization of ICT equipment	0.534	0.152	3.513	0.563	0.560	0.002

P < 0.05

The regression analysis in table 4 presents the effects of utilization of ICT equipment on academic performance of agricultural science students in secondary school students in Bauchi State. The results revealed that the coefficient of determination ( $R^2$ ) which shows the total contribution of the independent variable to the dependent was 0.364 or 36%. The coefficient of the independent variable (utilization of ICT equipment) was 0.534 indicating that one unit increase in the utilization of ICT equipment will increase students' performance in agricultural science by 53%. The result further indicated that the calculated p-value of 0.002 was less than the a priori alpha-value ( $\alpha$ ) of 0.05 level of significance ( $P = 0.002 < \alpha = 0.05$ ). Hence, the null hypothesis that says utilization of ICT equipment has no significant effects on academic performance of students in agricultural science was therefore, rejected.

### Discussion of Findings

The findings from null hypothesis one revealed that, availability of ICT equipment had significant effects on academic performance of students in agricultural science in secondary schools in Bauchi State ( $p = 0.001$ ). This finding is in contrast with that of Idoko and Ademu (2010) found that, ICT facilities were not available in secondary schools in Kwara State. In line with this finding, Akingbade, (2013) found that computers were available in most schools. The findings also showed that there is no significant difference in the availability of ICT facilities in public and private secondary schools, and that students in private schools are more exposed to ICT than their counterparts in public schools.

The findings from null hypothesis two

revealed that, utilization of ICT equipment had significant effects on academic performance of students in agricultural science in secondary schools in Bauchi State ( $p = 0.002$ ). This finding is contrary with that of Zubairu (2014) established that lecturers in federal colleges of education in Nigeria are not proficient in the utilization of ICT resources in content delivery. In line with the finding of this study, Kiptalam and Rodrigues (n.d) found that, In general, teachers broadly agreed that with the use of Internet and technology, their lesson plans are richer to 55%. BEE and Chia (2008) found that teachers were receptive to ICT and reported a high extent of ICT use in teaching and professional job

From the facts of the findings, the availability and utilization of ICT equipment had effect on academic performance of students in agricultural science in secondary schools in Bauchi state.

### Recommendations

Based on the outcome of the study, the following recommendations were made.

1. In order to make teaching and learning of agricultural science effective and improved students' academic performance, the Bauchi state government should provide available ICT equipment through the ministry of education in all the state owned secondary schools in Bauchi state.
2. In order to promote teaching and learning of agricultural science in secondary schools in Bauchi State, the Bauchi state government in collaboration with schools' principals and other educational stakeholders should ensure proper utilization of the ICT equipment not to be dumped by the teachers in schools.

### References

- Adeosun, O. (2010) Quality basic education development in Nigeria: Imperative for use of ICTICE Hiroshima University, *Journal of International Cooperation in Education*, 13 (2), 193-211.

- Akingbade, J. S. (2013). Students' Perception of the Availability and Utilization of Information and Communication Technology (ICT) in the Teaching and Learning of Science Subjects in Secondary Schools in Ekiti State, Nigeria. *International Journal of Education and Literary Studies*. 1(1). 5-8.
- Annie, W., Stoker W. S., & Mildred, M. (2015). "Achievement and Ability Tests - Definition of the Domain", *Educational Measurement 2*, University Press of America, Pp. 25, ISBN 978-0-7618-0385-0
- Apple Computer, (2002). *The impact of Technology on Students' Achievement*: Article/main. P.17.
- Bee T. L., and Chia. H. S. (2008). Exploring the extent of ICT adoption among secondary school teachers in malaysia. School of Computing and Design, Swinburne University of Technology Sarawak Campus, Malaysia. *International Journal of Computing and ICT Research*. 2 (2), 19
- Charles, B.A. (2012). Factors Influencing Teachers' Adoption and Integration of Information and Communication Technology in to teaching: *International Journal of Education and Development*, Using Information and Communication Technology (IJEDICT), 8 (1), 136-155.
- Fakeye, D. (2010). Assessment of English language teachers' knowledge and use of Information Communication Technology (ICT) in Ibadan Southwest Local Government of Oyo State. *American-Eurasian Journal of Scientific Research*, 5(4): 270-276.
- Federal Ministry of Science and Technology, (2001). *National Policy for Information Technology*. Retrieved from <http://www.nitda.gov/docs/policy/ngitpolicy.pdf> on 21st November, 2016
- Idoko, J.A., and Ademu, A. (2010). The Challenges of Information and Communication Technology for Teaching-Learning as perceived by Agricultural Science Teachers in Secondary Schools in Kogi State. *Journal of Educational Innovators*. 3(2). 43-49.
- Kiptalam, G.K. and Rodrigues, A.J (n.d.). *Accessibility and Utilization of ICTS among Secondary School Teachers in Kenya*.
- Ogunsola, L.A. (2005). Information Communication Technologies and the effects of Globalization: Twenty-first century "Digital Slavery" for Developing Countries-Myth or Reality? *Electronic Journal of Academic and Special Librarianship*, 1 10.
- Stephen, U.S. (2013). Availability, accessibility and utilization of information and communication technology in physics teaching in Akwa Ibom State, Nigeria West Africa. *Modern Applied Science*; 1(7); 57 62. Canadian center of Science and Education
- Zubairu, S.A. (2014). *Assessment of Availability, Accessibility and Utilization of Information and Communication Technology (ICT) Resources in Content Delivery among Lecturers in Federal Colleges of Education in Nigeria*. Unpublished Ph.D. Dissertation Submitted to Educational Foundation Department, Ahmadu Bello University, Zaria.