

# Incorporating ICT in Extension Education: A Recipe for Enhanced Dissemination of Improved Agricultural Practices in Rural Area

Edwin Idenyi Otozi <sup>1</sup>, Nwankwo Clara Ukamaka <sup>2</sup>, Michael Onwumere <sup>3</sup>, Adeolu Adewale Iyaniwura <sup>4</sup>,  
Ojemuyide Chidiebere C <sup>5</sup>,  
Catherine Mbana Okara <sup>6</sup>, Nwosu Phina Ifeyinwa <sup>7</sup>, Ogochukwu Faith Igu <sup>8</sup>

<sup>1</sup> (PH.D) Department of Vocational and Technical Education, Alex-Ekweme Federal University Ndufu-Alike Ikwo, Ebonyi State, Nigeria. Email: Otoziedwin@gmail.com

<sup>2</sup> (PH.D) Agricultural Education Department, University of Nigeria Nsukka, Nigeria

<sup>3, 5, 6, 8</sup> (PH.D) department of Vocational and Technical Education, Faculty of Education, Alex Ekwueme Federal University,  
Ndufu-Alike Ikwo, Ebonyi State, Nigeria

<sup>4</sup> (PH.D) Department of Animal Science, Faculty of Agriculture, Alex Ekwueme Federal University, Ndufu-Alike Ikwo,  
Ebonyi State, Nigeria

<sup>7</sup> (PH.D) Vocational, Technological and Entrepreneurship Education, Faculty of Education, Enugu State University of Science and Technology, Enugu, Nigeria

## Abstract

The study investigated incorporation of ICT in extension education for enhanced dissemination of improved agricultural practices in rural area of Ebonyi. The study concentrated on the challenges, benefits of incorporating ICT in extension and identified ICT compliance skills for effective extension services. The study was guided by three (3) purposes, three research questions and three null hypotheses. A descriptive survey research design was used in carrying out the study. The population of the study was 157 respondents, comprising 130 extension officers, 27 lecturers in the three tertiary institutions studied. The instrument for data collection was structured questionnaire developed by the researcher and validated by three experts (lecturers). The reliability of the instrument was determined using Cronbach Alpha technique which yielded reliability co-efficient of 0.89. The data collected was analyzed using mean with standard deviation for answering the research questions. The hypotheses were tested with ANOVA statistic at 0.05 level of significance. Based on the analysis, among the findings from the study includes the 11 item statements investigated that were all challenges of incorporating ICT in extension education for enhanced dissemination of agricultural innovation to rural farmers in Ebonyi state. It was recommended that researchers in various research institutes should undergo retraining program for purposes of updating their knowledge in ICT competency.

**Keywords:** Incorporating ICT in agriculture, Extension education, Dissemination, agricultural practices, rural area.

## 1. Introduction

The dissemination of improved agricultural practices as an aspect of teaching activities in agriculture education at all level especially at tertiary level could be enhanced with the use of ICT facilities. ICT has proved to be very useful in facilitating and improving the production of goods

and serves in other sectors of the economy. ICT is an indispensable part of the contemporary world and an important factor in the global socio-economic, cultural development of the society.

Information and communication technology (ICT) is an electronic based system of information transmission, reception, processing, retrieval,

which has drastically changed the way people live and the environment in which people live. Ndem, Eze, Otozi, and Bethel (2025), opined that ICT includes electronic technologies used for accessing, processing, gathering, manipulating, presenting and communicating information. It is a Computer-based tools used by people to work with information, communication and processing needs of an organization. Further it encompasses computer hardware and software, the network and several of other devices that convert information (text), images, sound, motion and so on into common digital form and make such available to people in both rural and urban settlement.

Ndem et al (2025) assert that rural area is the major agrarian settlement in Nigeria and a principal source of food (live hood) for greater proportion of Nigerians. It is demographically the broadest economic sector and plays a leading role in overall socio-economic fabric in Ebonyi State. Agriculture is known as the backbone of rural household as majority ears their living from agriculture. But the contribution of agriculture to the national economy as well as the economic condition of the farmers is not what they should have been in this era of technology due to poor integration of the current technological development, especially ICT (information and communication technology) package in providing agricultural services to farmer, business in agriculture and would be farmers and agriculture education students.

Ebonyi State Agricultural system regularly encounters numbers of shortcomings which put significant impacts on dissemination of agricultural attitude, information, knowledge, practice, skills and products for global consumption hence, the expected levels of improvement in the overall agricultural development were not yet meant leading to the present food insecurity and crisis threat in Nigeria. This scenario manifests on the current geometrical rise in the prices of food items coupled with its subsequent scarcity in quantity and quality and its multiplier effect on prices of other goods and service in threat to human basic needs. ICT as a promising strategy to overcome this envisaged threat is virgin approach to viable development in agriculture toward achieving food security in Nigeria in general and Ebonyi State in

particular. ICTs are currently gaining ground and touch almost every nook and cranny of economic and education development globally. It is the most attractive tool for successful information and knowledge delivery within shortest time interval.

This technology refers to all devices, net workings components and applications when combined help people and organizations interact in the digital world. This technology is highly automated and enables transaction such as internet shopping, telemedicine, and social media that provides users more choice in how the technology is utilized in solving societal problems including agricultural transformation. Hence, the drive to incorporate ICT in agriculture for sustainable extension education with special reference to dissemination of improved agricultural practices and innovation to farmers in rural areas.

Incorporating ICT in extension education simply mean absorbing ICT tools and technology into extension education to advice digital skills, promote critical thinking, problem solving abilities, and enhance lifelong learning that will sustain the rural farmers in the workforce environment. AL-Sabbath (2019) argued that integrating ICT in education (learning), can enhance students digital skills, critical thinking, competencies, and problem solving abilities in digital age, resulting to workforce that is better prepared for the demand of the digital era. Aliyu, Abdullahi &Waziri (2020) opined that integrating ICT in business be it farm business or convectional business would bridge the digital divide and equip receiptant with skills to the contemporary workface, thereby enhancing Nigeria's economic growth and development. John (2020) suggests that ICT tools and platforms can provide opportunities for experiential learning, online resources, collaboration and real life simulations to develop entrepreneurship skills, which can equip the receipting to the dynamic farm environment.

Moreso, ICT is a crucial component of extension education for sustainable workforce development. It is a viable instrument for improving teaching and learning methods, increase learners engagement and motivation, and create a more flexible and accessible learning environment. By incorporating ICT in extension education would enhance graduate

employability since it ease farm skills and knowledge acquisition and enable would be formers (graduates) to effectively contribute to Nigeria's economic growth and development. However, there is need for curriculum re-design and teacher training to empower teachers to effectively incorporate ICT tools and technique in extension education for sustainability of workforce development in Ebonyi states, thereby creating sustainable and adaptable workforce in agriculture .so incorporating ICT in dissemination of agricultural innovations (extension education) will enhance farm workers' communication skills for onward extension service to wide society.

Meanwhile, information and communication technology involves all that is required in gathering, processing information through computer and other related equipment or tools to reach the desired places and people at reasonable cost and time to the overall benefit of mankind. It encompasses computer hardware and software, telecommunications, infrastructure as well as content and application and a potential in extending educational opportunities like extending agricultural innovations to farmer in rural area, distance education programme among other.

However, researchers in agriculture at various research institutes regularly engage in research and the finding/innovations in the field of agriculture are made known (extended) to farmer improve on methods, and practices of farming for enhanced productivity in ensuring food security. This is through extension education as educational process that provides knowledge, skills and attitude to the rural people about the improved practices in a convincing manner and helps them to take decision within their specific local condition. Therefore, researchers need to adapt ICT tools in the extension services to rural people. This devices have the capacity to prepare knowledge and innovation in transcend time and space. More so, it is the sole function of extension education to stretch out into the villages and field beyond the limit of the research centre where the new practice emanates.

**Statement of the Problem:**

It is surprise to witness with dismay that most research findings and innovations emanating from research institutions (centre) do not get to the rural people in the villages and field (agrarian settlement) where adoption processes are carried out (trials). This scenario probably results from the fact that research institutes lack the enabling facilities, fund, required skills, on the part of practitioners and technology to implement the mandate of the research institute. Even when the extension services is being carried out, it usually ends within the urban settlement (area), which is far from being agrarian settlement for the trials of the new practice so developed by researchers. This makes the research findings moribund and wasted efforts.

These endemic challenges of dissemination research finding may be addressed through the installation of certain ICT machinery or equipment/tools with ICT component and functional researchers in research institutes. Unfortunately, most research centres (institutes) and tertiary institutions suffer from paucity or dearth of readymade sophisticated ICT faculties. These conditions identified are posing hindrances in the researchers' exposure to the services of the technology and its utilization, hence the need to incorporate ICTs in extension education delivery in the study area.

**Purpose of the Study:**

The central purpose of the study was to investigate the impact of ICT in extension education for enhanced dissemination improved agricultural practices in rural area of Ebonyi State. Specifically, the study sought to:

1. Examine the challenges of incorporating ICT in extension education.
2. Determine the benefit of incorporating ICT in extension education
3. Determine ICT compliance skill required for effective extension services.

**Research Question:**

The following research questions guided the study:

1. What are the challenges of incorporating ICT in extension education?

2. What are the benefits of incorporating ICT in extension education?
3. What are the ICT compliance skills required for effective extension services?

#### **Hypothesis:**

The following null hypotheses test at 0.05 level significance guided the study.

Ho<sub>1</sub>: There is no significant difference among the mean responses of the agricultural education lecturers, computer education lecturers and extension officers on the challenges of incorporating ICT in extension education.

Ho<sub>2</sub>: Significant difference does not exist among the responses of agriculture education lecturers, computer education lecturers and extension officers on the benefit of incorporating ICT in extension education.

Ho<sub>3</sub>: There is no significant difference among the responses of agricultural education lecturers, computer lectures and extension officers on ICT compliance skills required for effective extension services.

## **2. Methodology**

The study adopted a descriptive survey research design. This design was considered appropriate because questionnaire was carefully structured and was used to obtain data directly from the field and the data collected are presented as they are without drawing inferences. The study was carried out in the three tertiary institutions offering agricultural education in Ebonyi State which include Ebonyi State University, Alex-Ekweme Federal University, and Ebonyi State College of education with the population of 11,4 and 12 lecturers respectively. Extension officers of the State ministry of agriculture were also incorporated in the investigation with total member of 192 officers working with Agricultural Development Programme (ADP). The population of the study therefore was 219 and all the 27 lecturers in the three institutions were all involved in the study, whereas 130 extension officer was sampled using Yaro Yamani formula, making a total of 157 respondents for the study. The items in the questionnaire were generated based on oral interview and information

gathered from the review of related literature. The questionnaire was structured on four point of strongly agree (SA), = 4 Agree (A) = 3, Disagree (D) = 2 and strongly disagree (SA) = 1 for research question 1 and 2 while highly required (HR) = 4, moderately required (MR) = 3 less required (LR) = 2 and not required (NR) = 1 was designed for research questions 3. The instrument was subjected to face validation by three experts one from department of technology and vocational education, one from department of computer and science education while one from department of measurement and evaluation of Enugu State University of science and technology, Enugu. Each of the validators was served with a copy of the instrument for validation. Amendments were made on the instrument based on their constructive criticism and suggestions before final copy of the instrument was produced and used for the study.

Twenty copies of the questionnaires were administered to 20 pilot respondents from Enugu State University and Enugu state Ministry Agriculture (ADP unit) to establish its reliability. The reliability coefficient of 0.87 was obtained using Cronbach Alpha ( $\alpha$ ) method, which indicated internal consistency of the instrument.

The total of 157 copies of the questionnaires were distributed to the respondents by hand with the help of one research assistance trained for the purpose and collected back on the spot after completion, thereby achieving 100% return rate.

Data collected were analyzed using mean with standard deviation in answering the research questions, whereas ANOVA was used to test the null hypotheses at 0.05 error limit. Decision was reached using lower and upper limit of means regarding research question 3. And 2.50 cut off point for research question 1 and 2. The null hypotheses were rejected when the calculated F-value is more than the table value (F-critical) and is significant, otherwise do not reject.

## **3. Results**

The results of the analysis of the data collected are presented in tables below according to the research questions and hypotheses.

**Table 1: Mean and standard deviation of the responses of agricultural education lecturers, computer education lecturer and extension offices on challenges of incorporating ICT in extension education**

S/N	CHALLENGES	AGRIC EDU. LECTURER		COMP EDU. LECT		EXTEN. OFFICER		OVERAL		DEC
		x1	SD	x2	SD <sub>2</sub>	x3	SD <sub>3</sub>	x4	SD <sub>4</sub>	
1	Lack of resources, infrastructure, and Connectivity	2.86	1.09	2.85	0.91	2.76	0.76	2.82	0.93	A
2	Resistance to change	3.14	0.73	3.09	0.75	2.72	2.72	2.98	0.77	A
3	Capacity building, training and skills gap	2.87	0.95	2.82	0.83	2.83	2.83	2.84	0.83	A
4	Cost of ICT implementation (funding)	2.95	0.86	2.90	0.87	2.98	2.98	2.94	0.88	A
5	Inappropriate content Development	2.89	0.90	2.70	0.81	2.72	2.73	2.77	0.83	A
6	Technological Obsolescence	2.69	1.03	2.72	0.95	3.07	3.07	2.93	0.93	A
7	Poor standardization and adaptability in ensuring Consistency	2.54	1.04	2.91	0.89	2.89	2.89	2.78	0.92	A
8	Poor curriculum planning	2.70	1.07	2.63	1.05	2.79	2.79	2.72	0.96	A
9	Cyber security and privacy	2.63	0.98	2.71	1.03	3.12	3.12	2.82	0.91	A
10	Inappropriate monitoring and evaluation procedure	2.93	1.09	2.61	0.92	2.74	2.74	2.76	0.88	A
11	Poor pedagogical Approach	2.93	0.93	2.77	0.89	3.06	3.06	2.88	0.84	A
	<b>Cluster mean</b>	<b>2.82</b>	<b>0.98</b>	<b>2.80</b>	<b>0.92</b>	<b>2.88</b>	<b>2.88</b>	<b>2.83</b>	<b>0.88</b>	<b>A</b>

Table 1 revealed that the 11 item statements investigated in this cluster were found to be serious challenges of incorporating ICT into extension education programme. This was shown by the mean which ranged between 2.54-3.14 and were all

above the benchmark for accepting an item as challenge. The closeness of the standard deviation indicates uniformity in the responses of the three categories the respondents.

**Table 2: mean and standard deviation response of agricultural education lecturers, computer lectures and extension officers on benefit of incorporating ICT in extension education.**

S/N	CHALLENGES	AGRIC EDU. LECTURER		COMP EDU. LECT		EXTEN. OFFICER		OVERAL		DEC
		x1	SD	x2	SD <sub>2</sub>	x3	SD <sub>3</sub>	x4	SD <sub>4</sub>	
1	ICT tools provides access to vast and update information from various Source	2.56	0.97	2.76	0.70	2.86	0.74	2.73	0.80	A
2	Communication and collaboration are made Easier	3.01	0.79	2.72	0.85	3.02	0.74	2.92	0.79	A

3	Promote critical thinking and problem-solving skills	2.86	0.84	2.83	0.78	2.85	0.89	2.85	0.84	A
4	Promote efficiency and Productivity	2.79	0.73	2.98	0.82	2.93	0.86	2.90	0.80	A
5	Enhances creativity and Innovation	2.74	0.95	2.75	0.71	2.84	0.98	2.78	0.88	A
6	Connects learners and professionals with various culture, perspective and global business practices	2.69	0.93	3.04	0.90	2.70	0.97	2.81	0.93	A
7	Promote technical skills of participants.	3.03	0.81	2.89	0.73	2.80	1.02	2.91	0.85	A
8	Encourages flexibility of Participants	2.89	0.72	2.78	0.84	2.77	0.95	2.82	0.84	A
9	Save items	2.74	0.86	2.74	0.74	2.86	0.88	2.78	0.83	A
10	Problems of distance are minimized adequately.	2.68	0.84	3.03	0.69	2.64	0.97	2.78	0.82	A
11	<b>Cluster mean</b>	<b>2.80</b>	<b>0.77</b>	<b>2.85</b>	<b>0.78</b>	<b>2.83</b>	<b>0.90</b>	<b>2.83</b>	<b>0.82</b>	<b>A</b>

The result in table 2 above showed that the mean scores ranged between 2.56-3.04 for the individual groups of the respondents and overall cluster mean indicating that the item statements investigated were viable benefit of incorporating ICT into the extension education programme for enhanced

dissemination of improved agricultural practices and innovation. The closeness of standard deviation showed homogeneity in the responses of agricultural education lecturers, computer teachers and extension officers with respect the benefit of integrating ICT in extension education.

**Table 3: Mean and standard deviation responses of agricultural education lecturers, computer education lectures and extension officers on ICT compliance skills required for effective extension services.**

S/N	CHALLENGES	AGRIC LECTURER		EDU. COMP LECT		EDU. EXTEN. OFFICER		OVERAL		DEC
		— x1	SD	— x2	SD <sub>2</sub>	— x3	SD <sub>3</sub>	— x4	SD <sub>4</sub>	
1	Ability to make improved Decision	3.52	1.02	2.65	0.70	2.84	0.90	3.00	0.87	A
2	Ability to identify and utilize extension skills	3.14	1.11	2.87	0.68	3.10	0.76	3.04	0.83	A
3	Ability to access Information	3.20	1.02	2.70	0.82	2.88	0.83	2.93	0.90	A
4	Ability to use different digital tools	2.96	1.00	0.70	0.70	2.91	0.81	2.94	0.84	A
5	Ability to create better working space	2.97	1.07	0.75	0.75	2.89	0.69	3.07	0.84	A
6	Ability to package and process information for onward dissemination globally	3.95	1.11	0.78	0.78	2.66	0.78	2.78	0.89	A
7	Ability to unlock the potentials in the new market place globally (internet)	3.30	.96	0.82	0.82	2.71	0.83	2.94	0.87	A

8	Ability to bring scientific information to the people in convincing manner	3.35	1.02	0.64	0.64	2.63	0.92	3.01	0.86	A
9	Ability synthesize the problems of rural people	3.23	1.07	0.75	0.75	2.84	0.89	2.95	0.90	A
10	Ability to take farming problem of rural people to research institution for solution.	3.03	1.00	0.73	0.23	2.86	0.86	3.03	0.86	A
11	<b>Cluster mean</b>	<b>3.17</b>	<b>1.03</b>	<b>2.83</b>	<b>0.74</b>	<b>2.83</b>	<b>0.83</b>	<b>2.94</b>	<b>0.86</b>	<b>A</b>

The result as shown in table 3 revealed that all the 10 items had their mean ranged between 2.63-3.36 which were all above the criterion mean of 2.50. These mean values indicated that all skills identified

in this were viable ICT compliance skills for effective and efficient extension education for enhanced dissemination of improved agricultural practices in rural area of Ebonyi State

**Table 4: analysis of variance (ANOVA) on the mean responses of the three groups of the respondents on the challenges of incorporating ICT in extension education.**

Source variation	of Df	Sum of square (SS)	Mean square (MS)	F-cal	Critical value of F	Significance	Decision
Between group	2	4.36	2.18	2.45	3.00	NS	Do not reject
Within group	154	138.93					
Total	156	143.29					

The opinions of agricultural education lecturers, computer education lecturers and extension officers on challenges of incorporating ICT in extension education are compared using analysis of variance (ANOVA) and the summary of the data was presented on table 4. The result of the analysis showed that the calculated F-ratio value of 2.45 is

less than F-critical value (table value) of 3.00 with 2 and 154 degree of freedom at

0.05 level of significance. Since the computed value of 2.45 is less than the critical value of 3.00, there is a good reason not to reject the null hypothesis ( $H_0$ ). The respondents therefore do not differ in their opinions.

**Table 5: analysis of variance (ANOVA) on the responses of the three groups of respondents on the benefits of incorporating ICT in extension education**

Source variation	of Df	Sum of square (SS)	Mean square (MS)	F-cal	Critical value of F	Significance	Decision
Between group	2	0.023	0.011				
Within group	154	96.72	0.641	0.018	3.00	NS	Do not reject
Total	156	96.743					

The result of ANOVA analysis in table 5 showed that the calculated F-ratio is 0.018 at 0.05 level of significance and 156 degree of freedom while the critical value is 3.00. As the F-cal is less than the

table value (critical value). The null hypothesis was not rejected because the opinion of the agriculture education lecturers, computer education lectures and extension officer do not differs. Therefore,

there is no significant difference among the three groups of respondents with respect to the benefit of incorporating ICT in extension education.

**Table 6: Analysis of variance (ANOVA) on the Responses of the three groups of respondents on ICT compliance skill required for effective extension services.**

Source of variation	Df	Sum of square (SS)	Mean square (MS)	F-cal	Critical value of F	Significance	Decision
Between group	2	2.834	1.417				
Within group	154	143.7	0.964	1.47	3.00	NS	Do not reject
Total	156	146.534					

The ANOVA analysis summarized in table 6 revealed that the calculated F-ratio is 1.47 which is less than the F-critical ratio of 3.00 at 0.05 level of significant with appropriate degree of freedom (156). Hence, the null hypothesis was not rejected since the result of the analysis is not significant.

**4. Discussion of Findings**

The findings of the study are discussed as follows:

One of the findings was that lack of resources, infrastructure and connectivity, resistance to change, cost of funding ICT, poor pedagogical approach, capacity building, training and skill gap and others were existing challenges in incorporating ICTs into extension education for increased efficiency in dissemination of agricultural knowledge and practices in rural area of Ebonyi State. This finding is consistent Ituma (2024) and Ndem et al (2025), who reported that basic barriers to the use of ICT in education are shortage of ICT facilities, poor pedagogical approach and inadequate funding. The authors further explained that adequate provision of ICT facilities promotes teaching and learning.

Secondly, the study found that ICT tools provide access to vast amount of information, enhances communication and collaboration, promote critical thinking and problem-solving skills, and encourages flexibility in learning and others. This finding is in line with the findings of Cochrome & Narayan, (2017) and Koopmans, Marten & de Jong (2019), who found that critical thinking and problem-solving skills, increased flexibility in learning and improved communication and collaborations are

essential supporting student learning and productivity. The authors also emphasized that ICT enable learners and professionals to communicate and collaborate easily with their peers, mentors and industrial experts worldwide. Furthermore, it was reported by the authors that ICT tools process and improve overall efficiency and productivity.

Moreso, the study identified ten ICT compliance skills for effective extension services in promoting knowledge and skills transfer to include improved decision-making, ability access information, ability to use different digital tools, ability to create better working space, ability to package information and disseminate same globally and others. This finding is in conformity with the finding of Bar are (2017) who maintained that today needs new sets of skills for marketing products, for implementing new practices for improved production and in promoting activities necessary for setting-up effective management strategies. The authors further explained that learners and farmers need full range of such ICT skills in order to meaningful participate in the 21<sup>st</sup> century global economy; and pointed out that skills acquisition has become a lot easier these days because someone has made the process and upload it on the internet. This becomes advantageous to ICT skill compliant students and users generally.

**5. Conclusion**

The importance of ICT in packaging information and dissemination of innovations and research findings is something to be encouraged. The study found the basic challenges and benefits of incorporating ICT in extension education. And also identified ICT

compliance skills for effective and efficient extension services. The major concern of extension education is to stretch out into the villages and field beyond the limits of schools and colleges, improved agricultural practices and innovation in agriculture for the purpose trail and possible adoption of the new practice. In so doing, incorporating ICT in extension education becomes imperative. The incorporation of ICT in agriculture extension will remain grossly beneficial to the program considering the indomitable, and proven assertion that ICT possess the potency to ameliorate the numerous challenges facing it.

## **6. Recommendations**

1. Government should provide ICT basic resource, infrastructure and connectivity in all research institutes for easy implementation of research findings.
2. Agricultural research at tertiary institutions and agricultural research institute should be exposed on regular basis to ICT competency training for knowledge update.
3. Curriculum planners/developers should ensure regular review of agricultural education curriculum to incorporate recent technologies in educational practices.

## **References**

- [1] Aliyu, S.B, Abdullahi, I.O, & Waziri, A.J (2020). The role ICT in Business education delivery-A focus on sustainable workforce Development in Nigeria. *International Journal of Multidisciplinary Research and Publication*, 8(7), 91-98.
- [2] AL. Sabbath, K.S (2019).The impact of ICT integration in Busines education on students employability for the digital age. *World Journal on Education Technology*. Current Issue, 11(2), 123-134.
- [3] Barbara, K (2017). Teaching 21<sup>st</sup> Century skill for 21<sup>st</sup> success required. An Eco System approach (Blong Post).
- [4] Cochrane, T. & Narayan, W. (2017). Disrupting learning spaces. Developing the ICT framework. In *disrupting education. Technology and telling the story of the future* (pp. 111-137) supringer.
- [5] Deborah, M & Charles (2023). *Understanding computer today and tomorrow* 4<sup>th</sup> edition.
- [6] Itum, S.K (2024). A recipe for sustainable workforce development in Nigeria. *Journal of Association of vocational and technical education of Nigeria* 1(1) 253-265.
- [7] John, R.S (2020). Integrating ICT in Business Education for sustainable workforce development. 1(1), 48-59.
- [8] Koopmans, R; Marten, R.L & de-Jong, T (2019). Computer supported Collaboration and higher order thinking skills in problem based learning. *Interactive learning environment*, 27(1), 109-127.
- [9] Nde, J.U., Eze, M.O., Otozi, E.O & Bethel J.I (2025). Adequcy and utilization of ICT facilities for teaching and learning of Agricultural educaiotn in tertiary institutions for achieving food security in cross River State. *Journal of Agricultural education Teacher's Association of Nigeria*, 9(2), 89-97s.