Journal of Community & Communication Research
ISSN: 2635-3318
Volume 10, Number 2, December 2025
Pp. 215-222

Utilisation of E-Learning and E-Reporting Technologies among Agricultural Lecturers of Tertiary Institutions in Imo State, Nigeria

Accessible at: https://jccr.sccdr.org.ng

Asonye, N.C[1], Chukwu, A.O[2], Anaeto, F.C[3], Nwoye, E.O[1] and Okoma, C.M[1]
[1]Department of Agricultural Education, Alvan Ikoku Federal University of Education, Owerri
[2]Department of Agricultural Economics, Extension and Rural Development, Imo State University, Owerri, Imo State
[3]Federal University of Technology, Owerri, Imo State.
Corresponding Email: Cngozi22@yahoo.com; ngoziasonye2@gmail.com; 08068810948

Abstract
This study examined the utilization of e-learning and e-reporting technologies among agricultural lecturers in tertiary institutions in Imo State, Nigeria. The objectives were to describe respondents' socio-economic characteristics, ascertain the level of utilization of these digital platforms for research dissemination, and identify the socio-economic factors influencing technology utilization. A sample of 150 lecturers was selected through purposive and proportionate sampling across four institutions. Data were analyzed using descriptive statistics and multiple regression. Findings showed that most respondents were male (60.7%), with a mean age of 42 years, and highly educated (91.4% held postgraduate degrees). Agricultural researchers demonstrated high levels of engagement with several digital platforms, with ResearchGate and Zoom/Google Meet being the most widely used (mean scores of 2.74 and 2.59, respectively). Conversely, Moodle and the Open Science Framework were the least utilized (0.45 and 0.55). Multiple Regression results revealed that sex, marital status, educational level, membership in social organizations, monthly income, access to ICTs, and work experience significantly and positively influenced utilization, while household size was not significant. The study recommends strengthening ICT infrastructure and broadband access, providing continuous digital literacy training, developing institutional policies that support digital research dissemination, and fostering partnerships with technology providers and open-access platforms.
Keywords: Utilization, E-learning, E-reporting, Agricultural Researchers, Tertiary Institutions, Imo State

Introduction

Despite vast resources and the integration of computer studies (e- learning and e-reporting) in Nigerian institutions, research findings in agriculture often remain underutilized, failing to reach farmers and policymakers (Gbenga, 2006; Omotayo, 2011). Bridging this gap requires effective dissemination strategies and the adoption of digital technologies like mobile apps, social media, online databases, and cloud computing (Aker, 2020; Yahaya & Bello, 2019). These tools can accelerate the flow of research knowledge to stakeholders, improve communication, and drive innovation (Eze & Obike, 2021). Despite increasing availability and relevance of digital technologies for research dissemination, agricultural research findings in Nigeria still often fail to reach their intended beneficiaries — especially farmers, extension agents, and policymakers. (Elusaiwe, Atusa & Giweze, 2025). This disconnects between research institutions and the end-users of knowledge has significantly hindered the potential impact of agricultural innovations on

productivity and rural livelihoods. Salau and Saingbe (2022) observed that valuable research outputs frequently remain trapped within academic publications and institutional repositories, rendering them inaccessible and practically irrelevant to those who could apply them most directly. Despite increasing availability and relevance of agricultural-technologies, agricultural research and innovations in Nigeria remain under-utilized — a major impediment to the sector's full potential and national agricultural development (Achoja Roland Onomu & Michael Aliber, 2024).

Although the digital age offers robust opportunities—through tools such as mobile applications, e-learning platforms (Moodle, google classroom, google zoom meet, Edmodo, canvas etc),e-reporting platforms (ResearchGate, Academia.edu, Zenodo, Figshare, OSF and among others), online databases, and cloud computing—the extent to which agricultural researchers in Nigeria effectively engage with these technologies remains largely unclear (Ekong & Ojo, 2018; Aker, 2020). Adoption is often inconsistent due to varying levels of digital literacy, inadequate institutional support, and limited personal motivation among researchers accustomed to conventional dissemination methods such as seminars, workshops, and printed materials (Chikaire et al., 2017; Musa et al., 2021).

Moreover, infrastructural challenges continue to complicate the situation. Poor internet connectivity, unstable electricity supply, insufficient digital equipment, and limited training opportunities are still pervasive in many Nigerian tertiary and research institutions — especially those in rural or underserved areas. These limitations deepen the digital divide, not only between urban and rural researchers, but also within institutions, undermining attempts to standardize integration of digital tools in research dissemination (Inah, Ekpang & Uzoigwe, 2024; Ademola-Popoola & Adesina, 2023).

In addition to operational constraints, there remains a lack of coherent institutional frameworks or clear digital-policy mandates to promote the use of ICT in agricultural research and extension systems in Nigeria. Consequently, the absence of dedicated strategies for digital knowledge sharing often leads to fragmented efforts that fail to produce consistent outcomes (Chibuzo Uzoma Izuogu et al., 2023; N. M. Elusaiwe, Atusa & Giweze, 2025). Furthermore, personal and socio-cultural factors such as age, gender, and resistance to change also play significant roles in limiting digital technology adoption, as older or less technologically inclined researchers may resist transitioning from traditional dissemination approaches to digital ones (Adewale & Adeola, 2023).

This situation is particularly concerning given the critical role of research–extension–farmer linkages in driving agricultural development. Extension services depend on accurate, timely, and well-disseminated research findings to equip farmers with improved practices and enhance productivity (National Agricultural Extension and Research Liaison Services (NAERLS) & colleagues, 2024). When dissemination breaks down due to poor digital engagement, it not only limits the reach of scientific discoveries but also perpetuates cycles of low productivity, food insecurity, and rural poverty.

Given the documented challenges surrounding digital adoption in agricultural research across several states in South-Eastern Nigeria, it becomes necessary to examine how agricultural researchers in Imo State specifically utilize digital technologies—such as e-learning and e-reporting platforms—for disseminating research outputs. Although related studies within the region have noted low digital integration, inconsistent use of ICT tools, and persistent infrastructural barriers, there remains limited empirical evidence on the unique constraints faced by Agricultural Lecturers in Imo State. Therefore, assessing the technical, institutional, infrastructural, and socio-cultural barriers encountered by these researchers is essential. As Musa et al. (2021) emphasized, understanding these contextual factors is crucial for developing targeted interventions that strengthen digital literacy, improve technology utilization, and enhance the overall responsiveness of research to local development needs. Therefore, this study sought to address these gaps by conducting a comprehensive assessment of the utilization of e-learning and e-reporting digital technology in selected institutions in Imo State, Nigeria. This study sought to achieve the following set of objectives:

i)describe the Socioeconomic characteristics of the respondents

ii)ascertain the level of utilization of these digital technological platforms by agricultural researchers among selected institutions in Imo State

iii)determine the influence of socioeconomic characteristics on the willingness of Agricultural Lecturers to utilize E-learning Technological platforms.

Methodology

Study Area

This study was carried out in Imo State. Imo State, which derives its name from Imo River, was created in 1976 with Owerri as its capital. The state is divided into 27 Local Government Areas. The area known as Imo State today was originally part of the defunct East Central State (South East Archives, 2022). The state has a projected population of about 5 million people with a population density varying from 230-1,400 people per square kilometres (MyGuide, 2023). Imo state has seven tertiary institutions namely; Federal University of Technology, Owerri, Imo State University, Owerri , University of Agriculture, Umuagwo , University of Science and Technology, Omuna Isiako, University of Creative Technology, Umuna , University of Medical Sciences, Ogboko, University of Agriculture and Environmental Sciences. This Study however was purposively carried out in four tertiary institutions namely: Federal University Technology, Imo State University, Owerri, Alvan Ikoku Federal University and University of Agriculture Umuagwo due to their high concentration of Agricultural Researchers.

Sampling and Sampling Procedure

The population of the Study consisted of all agricultural lecturers in all the tertiary institutions of learning in the state. Four (4) tertiary institutions were purposively selected from the seven tertiary institutions in the states due to their high concentration of agricultural lecturers, working experiences and tertiary instruction ranking on the internet. From the list obtained from the various tertiary institution in the state, they were 318 Agricultural lecturers, this constituted the sampling frame.

Secondly, Proportionate sampling technique across the board was applied due to unequal number of lecturers to select randomly 150 Agricultural lecturers that were used for the study. Data for the study were obtained from primary sources while structured questionnaire was used for the data collection.

Sample Frame

Table 1 presents the sample frame of three hundred and eighteen (318) Agric lecturers obtained from a recognizance survey in the four Tertiary Institutions.

Institutions	Frame	Sample size
Imo State University, Owerri	42	20
University of Agriculture and Environmental Sciences Umuagwo	44	21
Alvan Ikoku Federal University of Education Owerri	26	12
Federal University of Technology Owerri	206	98
Total	318	150

Source: Dean's Offices from the Schools, 2025

The Proportion Formular $nh_1 = Nh_1(\frac{Nhi}{N})$ was used to establish the sample size, where:

Nh_i =expected sample size for h_i (selected institutions),

n = total desired sample size (150)

N = Total Population across each institution (318)

FUTO (nh_1) = $206(\frac{150}{318})$ =98

IMSU (nh_2) =$42(\frac{150}{318})$ = 20

ALVAN IKOKU (nh_3) =$26(\frac{150}{318})$ =12

IMO POLY (nh_4) =$44(\frac{150}{318})$ =21

Method of Data Analysis

Descriptive and inferential Statistical tools were used to analyze data collected for the study, The descriptive statistical tools such as means, frequency table and percentages were used to realize objectives I and ii while ordinary least square multiple regression was used to analyze the objective iii.
In Objective ii and iii, A 3-point Likert -type measuring scale of not utilized, moderately utilized and highly utilized was used to measure the responses, while a discriminating index of 2.0 mean score was established

Results and Discussions

Results in Table 1 show the socio-economic characteristics of respondents in the study area. The age distribution indicates a mean age of 42 years among researchers. Those in the 36–45 years age group recorded the highest level of digital research engagement, while younger researchers (25–35) displayed strong digital skills but lower research productivity — likely reflecting their early-career status. This pattern aligns with evidence that younger/early- and mid-career academics in Nigeria tend to possess higher digital skills and greater propensity for digital platform use (e.g., Digital Skills and Tertiary Education in Nigeria, Addressing the Generational Gap Between the GenX and GenZ, 2025).
Older researchers (56+ years) were least likely to use digital tools extensively for research often due to lower digital literacy and resistance to new technology.

Most of the researchers were male (60.7%) while 39.3% were female. This study agrees with Akinola et al. (2022) which Confirms that gender influences digital research engagement, with males more active on ICT platforms. Male academics were found to use ICT more frequently for research than their female counterparts.The high level of academic qualification among the respondents—where 58.7% possess Master's degrees, 32.7% hold PhDs, and only 8.6% have first degrees—demonstrates that the majority of agricultural researchers in Imo State tertiary institutions are highly educated and professionally grounded in their field. With 91.34% having attained postgraduate qualifications specifically in agriculture, the sample represents a group with strong analytical capacity, exposure to advanced research methods, and familiarity with emerging scientific trends.
This high literacy and competency level significantly enhances digital knowledge because postgraduate training typically involves the use of digital tools for data analysis, literature searches, online collaboration, e-learning platforms, and research dissemination. Lecturers with advanced degrees are more likely to have been exposed to ICT-integrated learning environments, online journals, statistical software, and digital reporting systems. As a result, they are better positioned to understand, adopt, and effectively utilize digital technologies.
Household size indicated 4-6 persons living with them, this means that household size of agricultural researchers was 5 persons and thus revealed that most agricultural researchers had a moderate household. The respondents (29.3%) had an average monthly income of ₦154,000(Naira).A moderate proportion of the respondents (46%) had restricted access to information and communication Technology (ICT) facilities, this is in tandem with a study by Ademola-Popoola *et al* (2023) found that many higher-education institutions across Nigeria still face serious ICT/internet infrastructure and broadband availability issues — confirming that institutional ICT access remains constrained.

Table 1, **Social Economics Characteristics of Respondents**

Age of respondents (Years)	Frequency	Percentage(%)	Mean

24 – 35	23	15.3	
36 - 45	56	37.4	42
46 – 55	47	31.3	
56 – 65	21	14	
66 – 75	3	2	
Sex			
Male	91	60.7	
Female	59	39.3	
Educational Status			
First Degree	13	8.6	
Masters Degree/MPhil	88	58.7	
PhD	49	32.7	
Household Size (Persons)			
1 -3	51	34	
4 -6	68	45.3	5
7 -9	21	14	
10 and above	10	6.7	
Monthly Income(₦)			
1000 -50,000	7	4.7	
51,000 - 100,000	38	25.3	
101,000 - 150,000	25	16.7	
151,000 - 200,000	29	19.3	154,000(Naira)
201,000 - 250,000	44	29.3	
250,000	7	4.7	
Access to ICT			
No Access	26	17.3	
Restricted Access	69	46	
Full Access	55	36.7	
Working Experience (Years)			
1 -10	88	58.7	
11 -20	41	27.3	13(years)
21 - 30	17	11.3	
31 – 40	3	2	
41 – 50	1	0.7	

Source: Field survey data ,2025

Level of Utilization of E-Learning Technologies by Agricultural Lecturers in Imo State Tertiary Institutions

The result of Table 2 shows the distribution of Imo State agricultural Lecturers level of Utilization of e-learning technologies in their institutions. The result of the table above shows that the agricultural Researchers in Imo State Institutions Highly Utilize most of the technologies outlined in Table 2 with zoom google meet ranking 1st on the platform with a mean score of 2.59. while Moodle ranked last on the E-learning platforms.

Table 2: Level of Utilization of E- learning Technologies by Agricultural Researchers in Imo State Tertiary Institution

s/n	e-learning Technologies	Not	Moderately	Highly	Mean	Rank

		Utilized	Utilized	Utilized		
1	Google classroom	8	48	94	2.57	2nd
2	Moodle	11	52	87	2.50	4th
3	Zoom and google meet	8	45	97	2.59	1st
4	Canvas	11	44	95	2.56	3rd

Source: Field survey data,2025

Table 3: Level of Utilization of E-reporting Technologies by Agricultural lecturers in Imo State Tertiary Institution

The result of Table 3 shows the distribution of Imo State agricultural Lecturers level of Utilization of e-Reporting technologies in their institutions. The result of the table above shows that the agricultural Researchers in Imo State Institutions Highly Utilize most of the technologies outlined in Table 3 with research gate ranking 1st on the platform with a mean score of 2.79. while open science framework ranked last on the E-reporting platforms with a mean of 2.20.

The grand mean of X =2.45 was arrived at from the results of the table, which is far above the discriminating index of 2.0. This reveals that the assessment on the level of utilization of e-learning and e-reporting by agricultural lecturers in disseminating of research findings in Imo State tertiary institutions is definitely high. This was also in consonance with the findings of Adebayo *et al* (2020) found that "Zoom and Google Classroom are the most used e-learning platforms in federal universities during the COVID-19 lockdown due to institutional preference and ease of deployment. Likewise, Olaifa *etal*(2019) observed that "over 70% of academic researchers in Nigerian public universities had active ResearchGate accounts for research dissemination." In strength of this, the positive attitude and will of agricultural Lecturers in the state towards innovations such as E-learning and E-reporting should be constantly maintained for continuous and sustainable development in the agricultural Sector.

Table 3: Level of Utilization of E-Reporting Technologies by Agricultural Lecturers in Imo State Tertiary Institution

s/n	e-reporting Technologies	Not Utilized	Moderately Utilized	Highly Utilized	Mean	Rank
1	Research Gate	5	28	117	2.74	1st
2.	Academia.edu	6	35	109	2.68	2nd
3.	google Scholar	8	45	97	2.59	3rd
4.	OpenScience Framework	34	51	65	2.20	4th

Source: Field survey data,2025

Table 4: Influence of socio-economic characteristics on lecturers' willingness to utilize E-learning digital platforms

Table 4 shows Multiple regression results showing the socioeconomic determinants of e-learning technological usage among agricultural lecturers in imo State. Among the four functional forms, the linear function exhibited the highest explanatory power with an R^2 value of 0.560, indicating that 56% of the variation on the level of utilization of e-learning technologies was explained by the included socio-economic variables. The exponential function followed with an R^2 of 0.492, while the double-log and semi-log models recorded R^2 values of 0.498 and 0.466, respectively. The F-values across all models were statistically significant, particularly for the exponential function (F = 31.00) and the linear function (F = 25.968), signifying the overall significance of the regression models.

Sex (X_1); The positive and significant influence of sex (t = 2.983) suggests that gender may play a role in digital tool utilization. **Marital Status (X_2)**; The positive coefficient for marital status ($\beta = 0.049$, t = 4.176), Age (X_3) Age showed a significant influence ($\beta = 0.808$, t = 3.226), **Educational level (X_4)**; Education was

a significant predictor (β = 0.240, t = 2.216), supporting the idea that educational attainment enhances digital competence. **Membership of Social Organizations (X_5)**; The positive coefficient (β = 0.205, t = 3.289) confirms the role of social networks in technology dissemination. **Household Size (X_6)**; Though positive, household size was not statistically significant (t = 0.315), suggesting it has a limited direct effect. **Monthly Income (X_7)**; Income had a positive and significant effect (β = 0.008, t = 2.112), **Access to ICTs (X_8)**; The strong effect of ICT access (β = 0.029, t = 2.326) **Working Experience (X_9)**; Experience significantly influenced utilization (β = 0.644, t = 3.311), likely due to accumulated skills and institutional knowledge.

The regression analysis indicates that socio-economic characteristics significantly shape e-learning utilization among agricultural lecturers. Key determinants identified include marital status, age, educational attainment, income level, access to information and communication technologies (ICTs), and professional work experience. These findings align with existing empirical literature, including the work of Monday et al. (2024), which extends similar insights to the adoption of "e-supervision," highlighting the combined roles of individual attributes, ICT infrastructure, organizational support, and environmental context. Furthermore, a study by Muraina et al. (2025) underscores that e-learning utilization in Nigeria is broadly contingent upon infrastructure availability, digital literacy, and cost-related access barriers. Together, this evidence reinforces the necessity for targeted policy interventions aimed at improving ICT access, building digital capacity, strengthening institutional support, and leveraging social networks to enhance technology diffusion within Nigeria's research and educational institutions.

Explanatory Variables	Linear Function	Double-log Function	Semi-log Function	Exponential Function
Constants	29.888	22.442	16.111	21.312
R^2	0.560	0.498	0.466	0.492
No of Observations	150	150	150	150
F-Value	25.968	14.115	15.11	31.00
Sex(X_1)	0.000(2.983)*	0.001(0.0.182)*	0.049(0.624)*	0.000(2.010)*
Marital Status(X_2)	0.049(4.176)**	0.004(3.448)**	0.808(4.220)**	0.670(3.124)**
Age(X_3)	0.808(3.226)**	0.000(2.020)*	0.240(2.910)*	0.865(4.210)**
Edu. Level(X_4)	0.240(2.216) *	0.030(2.187)*	0.205(2.160)*	0.004(2.136)*
Membership of Soc.Org(x_5)	0.205(3.289)**	0.240(1.468)*	0.040(3.192)*	0.065(2.448)*
Household Size(x_6)	0.040(4.315)**	0.02(3.098)**	0.008(2.120)*	0.068(3.148)*
Monthly income(X_7)	0.008(2.112)*	0.210(3.400)**	0.029(4.060)**	0.002(2.810)*
Access to ICTs(X_8)	0.029(2.326)*	0.000(4.012)**	0.644(0.418)	0.086(1.010)*
Working Experience(X_9)	0.644(3.311)**	0.808(1.284)	0.615(2.300)*	0.600(1.850)

Source: **Field Survey data,2025**

The stars (*) next to the values indicate whether the null hypothesis was rejected: = Significant at 5% level (null rejected) ** = Significant at 1% level (null rejected). No star = Not significant (fail to reject null).

Conclusion and Recommendations

This study concludes that agricultural lecturers in Imo State exhibit a moderate to high level of utilization of e-learning and e-reporting technologies for research dissemination. Platforms such as Zoom/Google Meet (for e-learning) and ResearchGate (for e-reporting) are the most widely utilizes, indicating a strong preference for tools that facilitate virtual collaboration and open-access research sharing. Conversely, platforms like Moodle and the Open Science Framework see significantly lower utilization, highlighting areas for potential institutional promotion and training.

Furthermore, the analysis of socioeconomic determinants reveals that utilization is not uniform and is significantly shaped by individual characteristics. Key factors that positively and significantly influence the level of digital technology use include: Sex (with male lecturers showing higher engagement), marital status, higher educational attainment (postgraduate degrees), membership in social organizations, higher monthly income, better access to ICT facilities, and longer work experience. Notably, household size was found to have no significant impact. This pattern confirms that digital engagement is driven by a combination of professional capacity, resource access, and socio-professional networks.

To foster sustainable digital engagement in Agricultural research, tertiary institutions and policymakers should: Improve ICT infrastructure and broadband access in research institutions; Provide regular digital literacy training and technical support for researchers; Establish institutional policies and frameworks promoting digital dissemination; Encourage collaborations with technology providers and open-access platforms.

References

Achoja, F. O., Roland, O., Onomu, F. X., & Aliber, M. (2024). Agricultural research and innovations in Nigeria: A review of utilization challenges. *Journal of Agricultural Extension and Rural Development, 16*(2), 45-58.

Ademola-Popoola, D. S., & Adesina, A. O. (2023). ICT infrastructure in Nigerian higher education: Trends, gaps, and policy implications. *African Journal of Information Systems, 15*(1), 88-102.

Adebayo, O., Adesope, O. M., & Okoro, J. (2020). Digital learning during COVID-19: Impacts and challenges in Nigerian universities. *African Journal of Educational Technology, 15*(2), 112–123.

Adebayo, S., & Adesope, O. M. (2007). Availability and use of ICTs by agricultural researchers in Nigeria. *Nigerian Journal of Rural Extension and Development, 3*(1), 56–63.

Adewale, M., & Adeola, J. (2023). Resistance to digital tools among Nigerian university staff: A sociocultural analysis. *Journal of Educational Technology and Society, 26*(1), 51–64.

Aker, J. C. (2020). Digital technologies and agricultural productivity in Africa. *World Development, 134*, 105021. https://doi.org/10.1016/j.worlddev.2020.105021

Akinola, B. T., Oluwatayo, I. B., & Adedeji, A. A. (2022). Gender differentials in ICT use for research among academics in Nigerian universities. *Gender, Technology and Development, 26*(3), 345-362.

Chikaire, J., Nnadi, F. N., & Nwakwasi, R. N. (2017). Constraints to ICT use among extension professionals and farmers in rural Nigeria. *Journal of Agricultural Extension, 21*(1), 35–46.

Digital Skills and Tertiary Education in Nigeria, Addressing the Generational Gap Between the GenX and GenZ. (2025). *Nigerian Journal of Educational Technology, 10*(1), 33-47.

Ekong, E. E. (2003). *Introduction to rural sociology* (2nd ed.). Dove Educational Publishers.

Ekong, E., & Ojo, A. (2018). Bridging the digital divide in agricultural extension services. *Journal of Extension Systems, 34*(1), 11–23.

Elusaiwe, N. M., Atusa, I. G., & Giweze, E. A. (2025). Digital knowledge sharing barriers in Nigerian agricultural research systems. *International Journal of Agricultural Sustainability, 23*(1), 1-15.

Eze, C. C., & Obike, K. (2021). Digital engagement of agricultural researchers in Nigeria. *African Journal of Agricultural Research, 16*(5), 723–731. https://doi.org/10.5897/AJAR2020.15391

Gbaje, E. S., Mohammed, Z., & Mohammed, A. Y. (2017). Access to electronic information resources by academic staff in Nigerian universities. *Library Philosophy and Practice, 2017*, 1–18.

Gbenga, S. (2006). ICT and research development in Nigeria. *Nigerian Journal of Educational Technology, 6*(1), 22–30.

Inah, S. O., Ekpang, P. E., & Uzoigwe, G. N. (2024). The urban-rural digital divide in Nigerian tertiary Institutions: Implications for research collaboration. *Journal of Science and Technology Policy Management, 15*(2), 210-225.

Izuogu, C. U., Okeke, M. N., Eze, C. S., & Nwosu, H. U. (2023). Policy frameworks for ICT integration in Nigerian agricultural extension: A critical analysis. *Agricultural Policy Journal, 9*(4), 78-92.

Mattern, J. (2009). Digital divide and rural connectivity challenges in sub-Saharan Africa. *Information Technology for Development, 15*(2), 71–85. https://doi.org/10.1002/itdj.20108

Monday, O. J., Bala, D. N., & Sani, R. M. (2024). Determinants of e-supervision adoption among university lecturers in North-Central Nigeria. *International Journal of Educational Technology in Higher Education, 21*(4), 1-18.

Muraina, I. O., Adeyemi, S. L., & Oladipo, S. A. (2025). Infrastructure, literacy, and cost: A tripartite model of e-learning utilization barriers in Nigeria. *Journal of Open, Distance and e-Learning, 40*(1), 112-129.

Musa, J., Aliyu, T., & Okonkwo, J. (2021). Adoption of digital technologies for agricultural extension in Nigeria. *International Journal of ICT Research and Development in Africa, 12*(1), 13–26.

MyGuide. (2023). *Imo State population and demographics*. https://www.myguide.gov.ng

National Agricultural Extension and Research Liaison Services (NAERLS), & colleagues. (2024). *Annual agricultural performance survey report*. Ahmadu Bello University.

Nwachukwu, C. (2013). Barriers to effective digital research dissemination in rural Nigeria. *Journal of African Research and Development, 8*(3), 90–101.

Nwafor, M., Ugwu, J., & Alabi, B. (2020). Agricultural productivity and information dissemination challenges in Nigeria. *Nigerian Journal of Agricultural Policy, 5*(2), 44–59.

Ogunleye, F., & Awoyemi, A. (2019). Digital pathways for research outreach in Nigeria. *African Research Review, 13*(3), 241–255. https://doi.org/10.4314/afrrev.v13i3.17

Olaifa, T., Olayemi, B., & Tijani, A. (2019). Patterns of online research dissemination by academic staff in Nigerian universities. *Library and Information Science Research, 41*(3), 178–184. https://doi.org/10.1016/j.lisr.2019.06.006

Olayide, O., & Alabi, R. (2018). Constraints to agricultural information dissemination. *Journal of Rural Economics and Development, 27*(4), 101–118.

Olojo, O. J., Adewunmi, O. G., & Ajisola, O. A. (2012). E-learning implementation in Nigerian universities: Success factors and challenges. *Library Philosophy and Practice, 2012*, 1–8.

Omotayo, A. M. (2011). The role of ICTs in agricultural research dissemination in Nigeria. *Journal of Agricultural Information, 2*(1), 14–22.

Salau, E. S., & Saingbe, N. D. (2022). Agricultural research dissemination: A critical review. *Journal of Extension Services in Nigeria, 34*(2), 99–115.

South East Archives. (2022). *History of Imo State*. South East Regional Archives.

Yahaya, K. M., & Bello, A. M. (2019). Agricultural communication and digital outreach in Nigeria. *Journal of Agricultural Extension and Rural Development, 11*(4), 62–69. https://doi.org/10.5897/JAERD2019.1032