

Factors Influencing Information and Communication Technology Use by Women Research Scientists in Universities of Agriculture in Nigeria

<http://dx.doi.org/10.4314/jae.v21i1.10>

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Abstract

Information and communication technology (ICT) is a veritable tool for sustainable agricultural development in Nigeria. This paper analyzed the factors that influenced ICT use by women research scientists in the Universities of Agriculture in Nigeria. Simple random sampling technique was used to select 40 respondents per university from a population of 300 women research scientists across the three universities. This gave a total of 120 women scientists for the study. Data were generated using questionnaire and presented with descriptive statistics and Logit regression. Major findings show that the mean age of the respondents was 40 years 77% were married with mean household size of 4 persons, while a good number (46%) possessed MSc degree. The respondents spent between 1-4 hours in accessing ICT while, Global System of Mobile Communication ($\bar{x}=3.49$) and use of modem ($\bar{x}=3.27$) were most preferred channels of ICTs used. Respondents' educational level (0.190), primary assignment (0.151), year of working experience (0.097) and training on ICT (0.315) were significant and positively related to ICT uptake, at 1% level of probability. Respondents' major challenges in accessing ICT were time ($\bar{x}=3.27$), Network error ($\bar{x}=3.08$) and too many family problems ($\bar{x}=3.08$) respectively. The study recommends that researchers should restructure their work schedule to accommodate ICT practice and use in order to enhance ICT use.

Keywords: *Factors of ICT uptake, Use of ICT infrastructure by research scientists.*

Introduction

Sustainable agricultural development cannot be successfully achieved without having correct and current information and technologies to meet up with globalization and its concomitant rapid changes in technology. This is because information is pivotal for the development of any society and success for human endeavour (Iheanacho *et al.*, 2015, Sokoya *et al.*, 2014). Access to information is one of the human rights and the use is dependent on the capacity of the users to access and later use it. This capacity is dependent on certain cultural, socio-economic personal, political and geographical variables (Anita, 2005; Yahaya, 2009, Sokoya *et al.*, 2014). Information and Communication Technology can be broadly defined as technologies that facilitate communication, through processing and transition of information by electronic means (Sulaiman, Michael, Yetunde and Rabi, 2015). The search for an effective strategy for development calls for adequate use and application of ICTs which gives a faster, accurate and timely information. Thus, Adepetun, (2012) saw ICT as a critical tool and essential spice for sustainable development which has the potential to reduce poverty and improve livelihoods by empowering users with timely knowledge, reducing transaction costs and providing appropriate skills for increasing productivity. Agwu and Chah (2007) earlier affirmed that ICT has become the most effective method of training, informing and disseminating proven technologies

However, Okeke *et al.*, (2015) confirmed that various forms of ICT devices abound in Nigeria today and are used in various sectors because of the need to cope with information explosion. Similarly, Mukesh, Deepati and Kanini (2010) grouped ICT into three parts – Broadcast Technology- media; such as radio, projectors, media van, among others; Print technology such as newspapers, magazines, newsletters, leaflets, while Telecommunication/computer technology include global system and telephones, computers, fax and internet. Furthermore, educational institutions give top priority to implementation of ICT services in partnership with some developmental partners like Zinox technologies Ltd, AfriHub of USA, CISCO and others.

The productive level of these researchers, especially women, depends largely on the kind and timely information available to them. However, multiple channels of getting vital information have become integral parts of agricultural development globally (Adeyanju and Mbibi, 2005) and numerous and significant factors have been identified as influencing ICT use such as education, training, time, age and other social and economic factors (Thas *et al*, 2007).

The increasing pace of life occasioned by such factors as growing competition in all spheres, including agricultural activities and political space, is creating increased time pressure on mankind. This pressure has been expressed by doing things faster, contracting time expenditure and compressing actions. For instance, making a phone call while eating (Garhammer, 2002). This situation is even worse with women (especially mothers) many of whom have to cope with compliance with workplace schedule combined with household needs (Odumeru, 2013). Thus, Morgenstern, (2004) observed that managing work and home responsibilities under the same roof takes a special type of time.

In spite of this, evidence shows that researchers with similar background share the same access and use of ICT (Alison *et al*; 2010), while the difference in them may be on time expenditure and avenue of accessing ICT. The purpose of this study - therefore was to determine the factors that influence ICT use by women research scientists in the Universities of Agriculture, Nigeria. In pursuance of the above goal, the following specific objectives were addressed:

1. describe the socio-economic characteristics of the women research scientists in the study area;
2. ascertain the time (number of hours) spent in ICT access by the respondents;
3. identify avenues or channels preferred by the respondents; to access ICT;
4. examine the factors influencing the level of ICT uptake by the respondents;
5. identify challenges encountered by the respondents in accessing ICT.

Methodology:

The study was conducted in the three Universities of Agriculture in Nigeria having a total number of 300 women research scientists. These three Universities of Agriculture in Nigeria are Michael Okpara University of Agriculture, Umudike (80), Federal University of Agriculture Abeokuta (150) and Federal University of Agriculture, Makurdi (70) as at the period of the study. A list of women research scientists was obtained from each of the universities, while simple random sampling technique was adopted to select 40 women e researchers from each university. This gave a grand sample size of 120 respondents. Data were collected with questionnaire and analyzed with descriptive statistics and Logit regression model. Specifically, objective 1 (socio-economic characteristics was realized using frequency counts, percentages and means. Similarly, objective 2 (Time spent on ICT access) was realized by calculating the number of hours spent accessing ICT. The frequency and percentage for different classes were calculated. To ascertain ICT channels preferred (objective 3) a 4- point Likert- type scale of: very high access (4), high access (3), low access (2) and very low access (1) was employed. Responses were classified and mean calculated as: $(4+3+2+1)/4 = 2.5$. Any mean of 2.50 and above was regarded as the most preferred channel of ICT resources.

To ascertain challenges in accessing ICT among researchers (objective 5), a 4 - point Likert- type scale of: strongly agree (4), agree (3) disagree (2) and strongly disagree (1) was used. Responses were classified and mean calculated as: $(4+3+2+1)/4 = 2.5$ which was used as a bench mark for decision rule. Decision rule for serious and not too serious challenges.

Furthermore, data collected to address Objective 4 was analyzed with logit regression.

The model is stated as:

$$\left[\frac{\log P_i}{1 - P_i} \right] = \beta_0 + \beta_1 X_1 + \dots + \beta_n X_n$$

Where:

P_i = probability of ICTs uptake, and $1-P$ = probability of non-ICT uptake by the i th respondents.

β =Coefficient of the independent variables

β_0 = Intercept

X_1 = attribute of i -th respondent

Thus the variables measured were:

X_1 = Age of respondent (Number in years)

X_2 = Marital status = (Married = 1; Not married =0)

X_3 = Educational level = (Level of formal education attainment/ Number of years spent in school)

X_4 = Household size = (Number of persons living in the same house under one headship/ feeding from one pot)

X_5 = Income Level (Annual income in Naira from primary assignment)

X_6 = Primary assignment (Lecturer =1, Technical staff = 0)

X_7 = Working experience (Number of years in service)

X_8 = Training experience on ICTs (Training = 1, No training =0)

Results and Discussion:

Socio-economic Characteristics of Respondents

The mean age of the respondents was 40 years. This shows that younger women were mostly being employed into the system which is an indication of a system that is functional. Majority (77%) of the respondents were married with household size between 4-6 persons. Marriage is valued and culturally acceptable in the study area. A good proportion of the researchers had educational degrees of M.Sc (46%) and Ph.D (31%). This representation shows a tendency to educational growth by the scientists and high perception over the ICT use which will raise their social status in their research work.

Preferred Channels to ICT Access

Table 1 confirms Use of modem, use of Global System of Mobile telecommunication (GSM), personal office and services from commercial cyber café as the major

channels to access ICT. The pooled mean scores show that use of GSM (\bar{x} =3.49) and Modem (\bar{x} =3.27); were the most preferred ICT channels used by the respondents. This implies that Global System of Mobile Telecommunication (GSM) and Individual home – use of modem were better options in accessing ICT. The reason could be due to their affordability, comfort, convenience (time), fastness to access and very safe for the respondents. The women need not to travel or go outside their immediate vicinity for access the facilities at the expense of performing their home chores. However, Hafkin and Taggart (2001) had observed that women who need to take care of the families may not be able to access facilities in public places. Furthermore, cell-phones (GSM) have given a recent transformation in access to internet (Hajara and Mustapha 2013). On the other hand, library, departmental office, seminar/workshops and IPAD were not regarded as good channels to access ICT by the respondents.

Table 1: Mean score distribution of respondents based on preferred Avenues or channels to ICT access

S/N	Avenues or Channels	Mean Scores			Pooled mean scores
		MOUAU	FUAAB	UAM	
1.	Commercial cyber cafe	2.73	2.29	2.95	2.66
2.	University library	2.05	2.48	2.50	2.34
3.	Personal office	2.63	3.16	2.44	2.74
4.	Departmental office	1.94	2.38	2.38	2.23
5.	Individual home-use of modem (laptops)	3.39	3.32	3.11	3.27
6.	Use of global system of mobile telecomm. (GSM)	3.76	3.48	3.22	3.49
7.	Seminars/workshops on ICT	2.31	2.41	1.55	2.09
8.	IPAD	1.65	2.45	1.55	1.88
9.	Grand Mean	2.56	2.73	2.46	2.58

Source: Field Survey, 2015

Time Spent (Number of hours per day) in Accessing ICT by the Respondents.

Table 2 shows the time spent (number of hours per day) to access ICT by the respondents. The result reveals that the majority (70.8%) of the respondents spent between 1- 4 hours accessing ICT. However, comparing the number of hours the respondents used per day with the approved 8 hours' official man days, it could be said that they spent average time per day. Also, in considering the enormous work schedule that needs time of the women, the result is considerable good because managing work and home responsibilities under the same roof; demand prudent time management. Despite the work schedule, respondents may concentrate on needed personal information due to short duration of time.

Table 2: Distribution of respondents based on number of hours spent daily in ICT access

Time spent (hours)	Percentage
1-4	70.8
5-8	20.8
9-12	8.3
13-16	-
17-20	-
21-24	-
Total	100

Source: Field survey, 2015

Factors that Influence the Use of ICTs by Respondents

Table 3 shows the regression analysis of the socio-economic factors that influence ICT use. The coefficients of level of education, primary assignment, years of working experience and training on ICT were significant and positively related to ICT use, while age, marital status and household size were significant, but negatively related to ICT use. On the other hand, level of income was not significant with ICT use.

In other words, the coefficient of level of education (0.109) was statistically significant at 1% level of probability, and positively related to ICT use. This means that as the

level of education of the respondents' increases, their level of ICT use increases. This confers interest, confidence and security which help them to access information whether it is true or not, of value or not, in order to adapt it to their particular needs and circumstances. The result is in line with Oyesola and Oladeji (2009) that education will spur respondents to its usage and provide a means of narrowing the information gap.

Primary assignment (0.151) was significant at 1% level of probability and positively related to ICT use; showing that the more women engage in primary assignment the higher the need for ICT use. More of primary assignment can help in closing the long-lasting gender gap, while they have ability to participate in development.

Years of working experience (0.097) was significant at 1% level and positively related to ICT use. It implies that as the respondents increase in working experience (skill and knowledge), their ICT use would increase. Thus the respondents' practical knowledge and exposure to ICT-based facilities is enhanced. The accumulation of research knowledge and skill will help them become active researchers and learners. This result is in agreement with Yusuf (2009) that it will increase networking and reduce isolation of researchers.

Training received (0.315) was positive and significantly related to ICT use at 1% level of probability. It implies that training facilitated understanding and use of more sophisticated IT applications, as well as gives insight to future IT-facilitated changes and development.

On the other hand, age and household size were significant and negatively related to ICT use, each at 1% level of probability. This means that any increase in each of the variables, causes a decrease in ICT use. Advancement in age may lead to lack of interest caused by long hours of working with the computer. Moreover, monotonous work routines associated with ICT may be injurious to women's health, family responsibilities, as well as many mouths to feed, thus, creating more problems which may need additional sources of income. In contrast, however; no significant relationship existed between income and ICT use among the women respondents.

Table 3: Regression Result of socio-economic variables influencing the use of ICTs by respondents

Parameter	Coefficients	Std Error	Z-values
Age	- 0.190	0.002	- 105.109***
Marital status	- 0.387	0.023	- 16.710***
Household size	- 0.245	0.006	- 41.570***
Level of education	0.109	0.002	65.117***
Income level	0.000	0.000	.214
Working experience	0.097	0.002	48.879***
Training on ICT	0.315	0.037	8.510***
Primary assignment	0.151	0.023	6.577***
Intercept	0.316	0.097	3.266** ⁸
Chi-Square	20258.555		
Df	78		
P < 0.01	0.000		

- **P ≤ 0.01. Source: Field Data, 2015**

Challenges Faced by Women Research Scientists on ICT Access

Table 4 reveals challenges faced by the respondents in the study area. The grand mean score of 2.84 shows that there are challenges facing these universities which women encounter in the process of ICT use. This is in line with the findings of Sife *et al* (2007) who observed a number of challenges facing universities in developing countries. The reason could be adduced to the way women see and apply to technology especially in the access and use of ICT. Time constraint ($\bar{x} = 3.27$), poor network coverage ($\bar{x} = 3.08$), too many family problems ($\bar{x} = 3.08$) and incessant power failure ($\bar{x} = 3.07$) posed as challenges to the women researchers.

In order words, the increasing pace of life, occasioned by such factors as agricultural activities, social and political space which are growing competition in all spheres is creating increased time pressure on mankind (Odumeru, 2013). In addition, poor network which manifests in connectivity and reception problems among telephone

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Abstracted by: EBSCOhost, Electronic Journals Service (EJS),
Google Scholar, Directory of Open Access Journals (DOAJ),
Journal Seek, Scientific Commons,
Food and Agricultural Organization (FAO), CABI and Scopus

Journal of Agricultural Extension

Vol. 21 (1) February, 2017
ISSN(e): 24086851; ISSN(Print): 1119944X
<http://journal.aesonnigeria.org>
<http://www.ajol.info/index.php/jae>
Email: editorinchief@aesonnigeria.org

and internet providers were also experienced. Ibezim (2011) also confirmed that electricity problems (non-availability, epileptic power supply and load shedding) seriously heightened the interconnectivity problem associated with telephone networks in Nigeria and as well hindered access to ICT. The implication of this result is that if conducive environment is provided for contemporary ICT resources, use of ICT will be easy and interesting.

Table 4: ICT Challenges faced by women research scientist

Challenges	Mean Scores			
	MOUAU	FUAAB	UAM	Pooled Mean Scores
Limited access to ICT facilities/resources	3.36	2.67	3.22	2.44
Apathy by management	2.52	2.41	2.50	2.48
Time constraint because of academic commitments	2.94	2.77	3.16	3.27
Less impact from professional bodies	2.71	2.38	2.66	2.58
Techno-phobia (fear of use of technology)	2.13	2.06	2.88	2.36
Incessant power failure	3.00	2.77	3.44	3.07
Lack of technical skills	2.92	2.45	3.22	2.86
Low knowledge of ICT usage (eg. Surfing the web)	3.26	2.41	3.05	2.90
High cost of software	3.10	2.70	3.38	3.01
Network error problem(poor network coverage)	3.23	2.83	3.38	3.08
Constant breakdown of the equipment	2.84	2.58	3.05	2.82
High cost and poor quality of ICT service/gadgets	3.10	2.67	3.16	2.98
Inadequate telecommunication Infrastructure	3.07	2.61	3.22	2.94
High maintenance cost	2.94	2.58	3.16	2.89
Office accommodation not conducive	2.73	2.77	3.00	2.83
Age of technology	2.65	2.48	2.94	2.69
Too many family responsibilities	2.65	1.93	2.74	3.08
Lack of personal fund	2.73	2.61	3.05	2.80
Grand mean	2.88	2.54	3.07	2.84

Source - Field Survey 2014

≥ 2.5 = major challenges to uptake of ICT

Conclusion and Recommendations

The findings revealed that women research scientists spent 1 to 4 hours per day to access ICT. Level of education, primary assignment, Years of working experience and training on ICT were some socio-economic factors that influenced the use of ICT by the scientists in the Universities of Agriculture. Also challenges such as time constraints due to academic work, incessant power failure, poor network failure, too many family responsibilities and high cost of software retarded of ICT use. Therefore, the study recommends that researchers should restructure their work schedule to accommodate ICT practice and use while government should look into solving the problem of power supply and reducing the high tariffs place in the cost of software in other to make it affordable.

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