

**INVESTIGATING THE EXTENT OF ICT TRAINING FOR SCIENCE
AND TECHNOLOGY TEACHER EDUCATORS IN COLLEGE OF
EDUCATION WITHIN SOUTH EASTERN NIGERIA**

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Abstract

The purpose of the study was to determine the extent of ICT Training for Science and Technology teacher educators in colleges of education within Southeastern Nigeria. The study adopted a survey research design. The population of the study consisted of 554 science and technology teacher educators in Colleges of education within southeastern Nigeria. A sample of three hundred and twenty (320) science and technology teacher educators from two Federal, two State and two Private colleges of education was used for the study. A structured questionnaire was used for data collection. The instrument was subjected to face validation by three experts. The reliability coefficient of the instrument for the study was .98 calculated using Cronbach alpha reliability test. Two research questions were answered using mean and standard deviation, while one research question was answered using percentages. Two hypotheses were tested at .05 level of significance using Chi-square analysis and 2x2 ANOVA. Among the findings of the study, were that, there is low ICT training for science and technology teacher educators. Federal colleges of education received more ICT training more than their counterparts in State and Private Colleges of education. It was concluded among others that Government should help in providing intensive ICT training for science and technology teacher educators

Nigeria education policy makers and social planners, in recognition of its potentials for integrating tertiary education into a global digital society, have emphasized the adoption of Information and Communication Technology (ICT) by teachers of tertiary institutions. This was made clear as the policy states that in recognition of the

prominent role of ICT in advancing knowledge and skills necessary for effective functioning in the modern world, there is urgent need to integrate ICT into education in Nigeria (FRN, 2004).

The advent of ICT does not only make it possible for educational researchers to manipulate time and

distance by mere touch of a button, it also enables him to grasp and impart knowledge easily, faster and with great enthusiasm man was possible before (Nwidum, 2006). ICT refers to a whole range of facilities or technologies involved in information processing and electronic communication. In concrete terms, ICT enhances teaching and learning through its dynamic, interactive, flexible and engaging content. It provides real opportunity for individualized institution.

Accordingly, the application of ICT makes institutions more efficient and productive, thereby engendering a variety of tools to enhance and facilitate teachers* pedagogical activities. For instance, e-learning is becoming one of the most common methods of (using ICT to) teaching students both on and off campus by means of online teaching offered via web based system (Yusuf, 2005; Murtala, 2003). ICT training is the process of learning ICT knowledge and skills needed to do a job. According to Olelewe and Fakorede (2008), there are two categories of ICT training - training for general ICT skills and training for specific ICT skills. Training for general ICT skills involve training in computer appreciation, office application programmes, sending e-mail, use of internet to mention but a few.

While training for specific ICT skills involves how to use computers in subject based teaching, computer assisted instruction (CAI) packages and so on.

In Nigeria, studies carried out on teacher ICT adoption show teachers' ICT compliance to be below expectation (Yusuf, 2005; Olulube, Udogu and Ossai, 2006). Informal observation also reveals that there have been considerable (though uncoordinated) ICT training efforts both at personal and institutional level among teacher educators. The purpose of these training is making teacher educators ICT skilled both in personal activities and day-to-day professional practices (Jegede, 2009). The problem has been that these training do not impact the integration on ICT into teacher educators classroom especially science and technology teacher educators classroom. UNESCO (2002) clearly points out that teacher education institutions may either assume a leadership role in the transformation of education or be left behind in the swirl of rapid technology change.

School location and ownership are variables to be considered in this study. School location refers to a particular area where an institution is sited. Location of a school may either be in the rural or urban area. Federal Republic of Nigeria (2004) emphasizes equal education opportunity for all. Research studies (Adewole 1998; Friere, 1976) maintain that rural and urban schools are not treated alike; likewise their teacher and students. Ownership of institution refers to who owns and runs an institution. These can be federal, state, and private owned colleges of education. Ezeugbor (2008) in his study maintained that ICT competence level of teachers

varies across institutions and their ownership. It therefore becomes, imperative to consider school location and ownership in this study, as necessary **variables** to investigate their effect on ICT training for science and technology teacher educators.

Statement of the Problem

Nigeria must brace up to the new challenges and systems of education through deployment and use of ICT in science and technology instructions. However, studies have shown that Nigeria teacher educators can neither use the computer efficiently nor develop ICT programme or packages for instructional or other uses. Also, pre-service science and technology teachers for the primary and secondary levels of education, have been found to possess low competence in the use of computers and are not equipped with relevant ICT skills, in the use of ICT applications in teaching. Weak policy formation and implementation, high cost of system installation and maintenance, poor funding of education, lack of qualified ICT personnel, management's attitude, erratic power supply etc are major constraints which have slowed down ICT in Nigeria.

There is need therefore, to first determine the extent of preparedness of science and technology teacher educators in the colleges of education to impart ICT knowledge and skills to the pre-service science and technology teachers. The question therefore is what is the status of ICT training for science and

technology teacher educators in colleges of education within South Eastern Nigeria?

Research Questions

Three research questions were posed to guide for the study. They are:

1. What are the mean ratings and standard deviation of urban and rural colleges of education on ICT training for science and technology teacher educators within south eastern Nigeria?
1. What are the mean ratings and standard deviation of Federal, State and Private colleges of education on ICT training for science and technology teacher educators within south eastern Nigeria?
3. What are the percentage ratings on ICT training delivery for science and technology teacher educators in colleges of education within south eastern Nigeria?

Research Hypothesis

Two research hypotheses were also posed for the study, and were tested at .05 level of significance. They are as follows:

1. There is no significant difference in the nature and level of ICT training received by science and technology teacher educators in colleges of education within southeastern Nigeria due to location and ownership.
2. There is no significant effect of ICT training delivery on the ICT competence level of science and technology teacher educators in

colleges of education within south eastern Nigeria.

Research Method

A descriptive survey design was employed for the study. Descriptive surveys are those studies concerned with collecting data on, and describing in a systematic manner, characteristic features and facts about a given population (Uguugulu, 1998). The study was carried out in Southeastern Nigeria comprising five State of Nigeria namely - Enugu, Anambra, Imo, Abia and Ebonyi. The population of the study consists of all the science and technology teacher educators in college of education within southeastern Nigeria. The population of the study cut across federal, state and private colleges of education located within the zone of study. The population is therefore, five hundred and fifty four (554) science and technology teacher educators (NCEE statistical digest, 2007) in eleven (11) college of education within southeastern Nigeria. The choice for including private colleges of education was to ensure even representation of all government approved colleges of education in the area of study. The sampling for the study consisted of science and technology teacher educators from six colleges of education within southeastern Nigeria. The sampling technique employed was multistage. Stage one, purposive selection of state to be covered. In this case, Enugu, Anambra and Ebonyi states were selected as the sampled states. Stage two was also, purposive selection

of colleges of education within state chosen. The colleges of education selected were two federal, two state and two private college of education. Stage three was random selection of respondents using table of random numbers. A total of three hundred and twenty (320) respondents representing 58% of the population were selected in different department of science and technology in the sampled colleges of education. The rationale for these was to make the sample fully representative.

Data collection instrument as structured questionnaire entitled science and technology teacher educators' nature and level of ICT training received (STTENALOICTTR). The instrument was arranged in a 4-point ratings scale of very high extent, High extent, Low extent and very low extent. It consisted of eleven (11) questionnaire items, originally developed by the researchers. The instrument was validated by three experts, two from department of science and computer education, Enugu State University of Science and Technology (ESUT) Enugu, and a measurement and evaluation expert, from Federal College of Education, Eha-Amufu. The reliability index of .98 was obtained using Cronbach alpha. Mean and Standard deviation were used in answering research question 1 and 2 while percentages were used to answer research question 3. 2x2 AN OVA and T-test statistic were used to test the hypotheses at .05 level of significance.

Table 1: Mean Ratings and Standard Deviation of Respondents in Urban and Rural College of Education on ICT Training Received.

s/n	Item	Urban			R		I
		X	SD	Decision	X	SD	
13	Computer appreciation	2.74	2.76	High	0.87	0.89	I
14	Word-processing	2.70	2.65	„	0.85	0.89	„
15	Information retrieval using	2.63	2.49	**	0.90	0.96	-
16	Simple desktop	2.31	2.21	Low	0.94	0.88	I
17	Graphics and art	2.18	2.09	„	0.81	0.88	„
18	Drill and practice	2.17	2.18	„	0.76	0.89	„
19	Use of Multimedia	2.08	2.08	„	0.75	0.88	„
20	Use of interactive	2.09	2.22	„	0.75	0.9%	„
21	Use of internet	2.26	2.25	„	0.84	0.93	„
22	Overall development in	2.05	2.05	»	0.74	0.89	*
23	Power point	2.22	2.25	„	0.78	0.90	„
24	Use of computer	2.11	2.10	„	0.66	0.81	„
25	Use of computer to	2.03	1.9%	„	0.67	0.82	„
26	Use of ICT for co-operative	1.95	2.01	*	0.64	0.85	„
27	Use of ICT for	2.17	2.23	„	0.81	0.94	„
28	Evaluating	1.92	1.92	„	0.61	0.78	„
29	Use of SPSS	1.91	1.90	„	0.66	0.85	„
30	Use of Networking	1.90	1.92	„	0.63	0.89	T
31	Use of computer to	1.91	1.85	«	0.63	0.85	„
32	Evaluating students learning	1.93	1.98	»	0.58	0.82	-
33	Using spreadsheet	2.29	2.30	„	0.82	0.91	„
34	Use of Microsoft access	2.36	2.51	High for Rural	0.83	0.89	I

The data presented in Table 1 indicates that only questionnaire item 13 (computer appreciation), item 14 (word processing) and item 15 (information retrieval using CD-ROM, flash etc) obtained mean rating more than 2.50 in the Urban college of education. In the rural college of education; only questionnaire item 13 (computer appreciation), item 14 (word processing), and item 34 (use of Microsoft access) had mean rating above 2.50. The results in the table shows that although ICT training is going on gradually in colleges of education, there is generally low ICT training received by the respondents both in rural and in urban college of education. Also, the ICT training received have been on computer appreciation, word processing and information retrieval.

Research Question 2

What are the mean ratings and standard deviation of Federal, State and private college of education on ICT training for science and technology teacher educators within south-eastern Nigeria?

Table 2: Mean Ratings and Standard Deviation of Respondents in Federal, State and Private College of Education on ICT Training Received

ITEM	Mean			SD			Rmk
	Federal	State	Private	Federal	State	Private	
13 Computer appreciation	3.20	2.47	2.36	0.76	0.82	0.82	High for Federal
14 Word-processing operations	3.12	2.41	2.32	0.79	0.79	0.76	~
15 Information retrieval using CD-ROM, Flash and others	2.98	2.31	2.25	0.94	0.83	0.76	-
16 Simple desktop publishing	2.61	2.14	1.84	0.91	0.82	0.85	--
17 Graphics and art work	2.39	2.05	1.84	0.80	0.85	0.74	Low
18 Drill and practice activities	2.42	2.11	1.81	0.79	0.81	0.71	..
19 Use of Multimedia presentation	2.24	2.07	1.75	0.80	0.80	0.71	..
20 Use of interactive presentation	2.36	2.08	1.83	0.85	0.85	0.75	..
21 Use of internet facilities	2.63	2.06	1.90	0.85	0.82	0.79	High for Federal Low
22 Overall development in communication and information	2.16	2.07	1.79	0.79	0.83	0.76	..
23 Power point presentation	2.42	2.25	1.87	0.85	0.82	0.72	..

24	Use of computer assisted instruction	2.21	2.12	1.86	0.78	0.67	0.64	"
25	Use of computer to generate lesson plan	2.08	1.99	1.86	0.78	0.72	0.66	"
26	Use of ICT for cooperative learning and for peer interaction	2.16	1.89	1.77	0.75	0.72	0.64	"
27	Use of ICT for keeping student records	2.51	2.03	1.89	0.82	0.85	0.76	High for Federal
28	Evaluating technology based learning	2.05	1.89	1.70	0.69	0.69	0.63	Low
29	Use of SPSS packages	1.98	1.97	1.64	0.74	0.79	0.63	^
30	Use of Networking packages	2.00	1.93	1.57	0.79	0.76	0.53	..
31	Use of computer to evaluate students learning	2.00	1.85	1.68	0.76	0.71	0.69	---
32	Evaluating students learning from computer based	2.10	1.94	1.78	0.75	0.65	0.58	"
33	Using spreadsheet package	2.72	2.06	1.91	0.74	0.82	0.77	High for Federal
34	Use of Microsoft access	2.85	2.24	1.92	0.66	0.89	0.72	..

the respondents. The result in the table indicates that Federal college of education had more ICT training when compared with their counterparts in state and private colleges of education.

In Table 2 above, the above data presented shows that Federal colleges of education had mean rating 2.50 and above in some questionnaire items. The areas include, item 13 (computer appreciation) 3.20; item 14 (word processing) 3.12; item 15 (information retrieved using CD-ROM, flash and others) 2.98; item 16 (simple desktop publishing) 2.16; item 21 (use of internet facilities) 2.63; item 33 (evaluating students learning from computer based activities) 2.72 and item 34 (use of Microsoft access) 2.85. All the mean ratings in state and private colleges of education were less than 2.50, according to the data collected by

Research Question 3

What are the percentage ratings on source of ICT training delivery educators' colleges of education within south eastern Nigeria?

Table 3: Percentage Ratings of Respondents on Source of ICT Training Delivery.

S/N	Source	of	N	Percentage
1	Private firm	136		42.5
2	Formal Institution	58		18.1
3	Self	42		13.2
4	Peer	1		0.3
5	More than one	85		25.9

The data presented in Table 3 above, reveals that 136 respondents representing 42.5% respondent obtained their training from private firm. 58 respondents representing 18.1% of the respondents obtained their training from formal institution. Also, 42 respondents representing 13.2% of the respondents obtained ICT training by learning on their own. Only one respondent representing 0.3% obtained ICT training from peer. Lastly, 85 respondents representing 25.9% of respondents received ICT training from more than one source. This implies that many of the respondents (42.5%) obtained their training from private firm

Test of the Null hypotheses Null Hypothesis I

H₀₁: There is no significant difference in the nature and level of ICT training received by science and

technology teacher educators in colleges of education within southeastern Nigeria due to location and ownership.

Table 4: 2x2 ANOVA Analysis of Ratings of Respondents on ICT Training Due To Location and Ownership

Sources	Sum of	df	Mean	F	Sig
Location	617.16	1	617.16	3.89	0.049
Ownership	4359.86	2	2179.93	13.76	0.000
Location Ownership	595.94	1	595.94	3.76	0.053
Error	46116.56	291	158.48		

From the result of the 2x2 ANOVA in Table 8 above, it was observed that the calculated F value of 3.89 is slightly significant at 0.049 for location. This is less than the 0.05 probability level set for this study. Also the calculated F value of 13.76 is highly significant at 0.000 for ownership. The interaction effect of location and ownership had calculated F value of 3.76 and is not significant at 0.053. Whereas the main effects are significant, the interaction effect is not. However ownership is a more significant factor than location judging from the sum of squares. Whereas location has 617.16, ownership has 4359.85. The former is much less than the error sum of squares while the latter is not much different from the error sum of squares showing that the difference due to ownership is not spurious.

Null Hypothesis 2

H₀₂: There is no significant effect of source of ICT training delivery on the ICT

competence level of science and technology teacher educators in colleges of education within southeastern Nigeria.

Table 5: Chi-square Analysis of Respondents on Source of ICT Training Delivery

S/N	Items	Value	df	Sig
1.	Private firm	48.58	8	0.00
2.	Formal institution			
3.	Self			
4.	Peer			
5.	More than			

Table 5 above, shows that at calculated value of 48.54, at df of 8, is highly significant at 0.00. Therefore, we reject the null hypothesis and accept the fact that, there is a significant effect of source of ICT training delivery on the ICT competence level of science and technology teacher educators in colleges of education within southeastern Nigeria.

Discussions

It was found in Table 1 that science and technology teacher educators in colleges of education in both rural and urban areas, receive ICT training mainly in computer appreciation, word processing and information retrieval using CD-ROM flash to mention but the two. This shows that the level of ICT training received by science and technology teacher educators in college of education within

southeastern Nigeria is very low. Although ICT training is going gradually mainly in computer appreciation, word processing and information retrieval, more effort need to be added on the use of ICT in teaching and learning. This finding is in line with the findings of Nwagbo and Okoli (2008), Jegede (2009), Ezeugbor (2008), and Yildirim (2000). The findings in Table 2 also indicates that federal colleges of education had more ICT training when compared with their counterparts in state and private colleges of education. This is in line with the finding of Adewole (1989) and Okafor (2007). The finding is however contrary to that of Ezeugbor (2008), that state colleges of education perform significantly better than the other two groups (Federal and Private colleges of education). This would be as a result of Federal Government initiatives and policy on computer literacy campaign and provision of ICT training among Federal colleges of education teachers. Further investigation in Table 4 reveals that there is no significant difference in the nature and level of ICT training received by science and technology teacher educators in colleges of education within southeastern Nigeria due to location and ownership.

On the aspect of source of ICT training delivery for science and technology teacher educators in colleges of education within south eastern Nigeria, the result in Table 3 reveals that majority of the respondents (42.5%) obtained their training from private firm.

This is an ugly situation, as most of the private firms are not well rooted with the ICT knowledge and skills. This invariably would affect the competence levels of science and technology teacher educators as can be seen from the analysis of the null hypothesis on Table 5. That is there is a significant effect of source of ICT training delivery on ICT competence level of science and technology science educators in colleges of education within southeastern Nigeria.

Educational Implications

The findings of the study have far reaching implication for science and technology teacher educators, curriculum planners and government. Teaching and learning in the area of information and communication technology would be enhanced if proper training be provided for science and technology teacher educators in colleges of education. This will help science and technology teacher educators join in the pedagogical innovation brought about by information and communication technology. The findings of the study also have positive implication on the curriculum planners in science and technology education. They will be meant to know the need to include staff development programs in the curriculum such as staff training and retraining aimed at making science and technology teacher educators ICT compliance.

Recommendations

The following recommendations were proffered -

1. Management of institutions should help in organizing intensive ICT training for science and technology teacher educators in colleges of education.
2. Government should help organize and sponsor ICT seminar, workshop and conference on ICT pedagogical innovation for science and technology teacher educators in colleges of education.
3. Science and technology teacher educator should be given ICT study grant to enable them undergo formal ICT professional training courses aimed at making them ICT compliance.

Conclusion

Based on the findings of the study, the following conclusions are drawn that ICT training among science and technology teacher educators in colleges of education within southeastern Nigeria is very low.

The number of science and technology teacher educators who received ICT training from private firm is very high (42.5%). This would have contributed to the low ICT competence by science and technology teacher educators in colleges of education. There is also a significant effect of source of ICT training delivery on ICT competence level of science and technology teacher educators.

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