

## **An Analysis of Supply and Utilization of Ict as Predictors of Ict Literacy among Secondary School Teachers in Oyo State, Nigeria**

\* Muraina Monsuru Babatunde<sup>1</sup> and Muraina Kamilu Olanrewaju<sup>2</sup>

<sup>1</sup>*Department of Arts and Social Sciences Education, Al-Hikmah University, Nigeria.*

<sup>2</sup>*Department of Guidance and Counseling, University of Ibadan, Oyo State, Nigeria.*

<sup>1</sup>*murainamonsuru@gmail.com*

<sup>2</sup>*muraina\_kamilu@yahoo.com*

\*Corresponding author

### **Abstract**

*This study investigated the analysis of supply and utilization of ICT as predictors of ICT literacy among secondary school teachers in Oyo State, Nigeria. Descriptive research design of ex-post-facto type was used in the study. One thousand six hundred (1,600) participants were selected through stratified random sampling technique. The respondents were measured with relevant adopted standardized scale (instruments) and the data obtained was analyzed using the Pearson Product Moment Correlation (PPMC) and Multiple regression statistical analysis of the Statistical Package for the Social Science (SPSS). Three research Questions were raised and answered in the study. The findings showed that teachers' ICT literacy is significantly correlated with: (1) Supply of ICT ( $r = .783$ ;  $p < .05$ ) and (2) Utilization of ICT ( $r = .513$ ;  $p < .05$ ), the independent variables (ICT supply and utilization) when pulled together have significant effects on teacher literacy level ( $R$  (adjusted) = .836 &  $R^2$  (adjusted) = .675) and each of the independent variables made a significant contribution to the prediction of teacher ICT literacy level. In term of magnitude of contribution, demand of ICT made the most significant contribution ( $Beta = .141$ ;  $t = 4.45$ ;  $P < 0.05$ ) to the prediction follow by utilization of ICT ( $Beta = .138$ ;  $t = 5.61$ ;  $P < 0.05$ ). In view of these findings, the study recommended that the curriculum planners should inculcate into the teacher training the ICT demand, supply and utilization during the course of training. This will help in increasing their level of ICT literacy in the school.*

**Keywords:** *ICT demand, ICT supply, ICT utilization, ICT Literacy and Students*

### **1. Introduction**

Global concerns for education have never been in doubt as it has always been viewed as the means and source of life. International Bank for Reconstruction and Development (IBRD, 2007) further highlighted growing trends in education and its provision by explaining the role of the Information and Communication Technology (ICT) in modern educational setting. In recent times, scholars have viewed the roles of ICT from various dimensions. For example, Nnebe (2008) viewed the roles of ICT from various needs in Nigeria. He also observed that ICT is synonymous with computerization and as such, one of the components of modern education. Babalola (2008) and Babalola (2009) explained that digitalization can no longer be divorced from the field of education.

Several scholars have described the changing phases in education as a matter of necessity and that the changes should involve the introduction of ICT. For example, Nnebe (2008) saw ICT as an innovation for all nations. Smith and Irving (2009) agreed to the rapid changes currently influencing the educational system due to the arrival of the

ICT. In spite of the changes going on globally, there are transformations going on locally on education at home here in Nigeria and these are propelled by policies. For example, Federal Republic of Nigeria (FRN, 2000) on Information Technology (IT) policy specifies among others that; by the year 2000, all civil servants and teachers in Nigeria should be computer literate. The FRN (2000) document further explained that Nigeria should be among Global IT nations by the year 2005.

Though the policy earlier described is yet to be effective, it is clear that not all civil servants in Nigeria are computer literate including teachers. The case of the teacher has become worrisome than those of the civil servants because the teacher is the custodian of social value (Babalola, 2011 & Obanya, 2010). FRN (2004) explained that no nation can be greater than the level of its teachers. Again, Omolewa (2008) pointed out that despite all research findings, no suitable alternative have been discovered to replace the teacher. Several emerging terminologies in educational lexicon today include; e-learning, virtual learning, e-mail etc. This shows that learning, studying, banking, warfare, profit, loss, marketing and competitive advantages etc have gone electronic. It becomes suicidal to remain at the same level of manual operations in the national system while the world rushes on. Scott and Rarieya (2011) explained that there is the need for professional development of school leaders especially as it relates to the preparation of school teachers and leaders. Scott and Rarieya (2011) also explained that learning must be linked to real school contexts, substantial involvement of trained and experienced teachers, flexibility to meet diverse needs, multiple opportunities for reflection and cohort bondings and networking.

Deriving from the above, there is need to develop and reposition Nigerian teachers to the new wave of ICT. According to Babalola (2010), a major limitation to the development of ICT in Nigeria is the non-availability of hardware and software. The changing school environment which was hitherto manual has become automated. For example, most private schools in urban areas have computer laboratories, VSAT communication gadgets, operation of the computerized Management Information System (MIS), electronic school registers and teacher registers, biometric identification system etc which are all fall outs of the new ICT environment. With the identified changes, government cannot allow teachers to remain at the same level.

Again, it is observed that ICT equipment in Africa cost quite more than those in the advanced nations of the world (Babalola, 2011). The Federal and state Governments have expended and are still expending heavy amount of money in providing ICT equipment for primary, secondary and tertiary schools in Nigeria. These acquisitions can further be categorized into hardware and software equipment. The computer software are usually programs designed to keep the hardware functioning. They are complementary goods. Therefore, the more the demand for ICT hardware, the more the demand for ICT software. It is evident that both acquisition and utilization cannot perform optimally without the human element, hence, the issue of computer literacy. With the evolving turned in the ICT world, teachers need training, retraining, development etc. There is the need to effectively increase capacity.

ICT supply involves the actual arrival of the hardware and software in schools. Since there is no payment of tuition fees in most if not all public schools, government is the sole supplier of the equipment. ICT literacy is in most time a function of the preparedness of teachers to apply knowledge and skills acquired over the years. It involves ability to utilize the equipment and the extent to which such skills can be put into use. Tella, Tella, Toyobo, Adika & Adeyinka (2007) examined Nigerian secondary school teachers' uses of ICTs and implications for further development of ICT use in schools using a census of 700 teachers. The findings showed that most teachers perceived ICT as very useful and as making teaching and learning easier. It was recommended that professional development policies should support ICT-related teaching models, in particular those that encourage both students and teachers to play an active role in teaching activities. Additionally,

emphasis should be placed on the pedagogy underlying the use of ICTs for teaching and learning.

Attempts to measure or assess the utilization of ICT in Nigeria have been hampered by insufficient empirical data to indicate any impact of ICT on sector productivity and lack of cross-country evidence. In some cases, the evidence has been non-existent due to recent developments, the rapid revolution of ICTs and methodological challenges that include a deficiency of assessment variables and models of causality. Most of the studies undertaken have focused on information infrastructure issues, while few have been undertaken to measure the extent of ICTs in Africa, particularly in education (Nigeria SchoolNet, 2008). The use of ICT in education has the potential to enhance the quality of teaching and learning, the research productivity of teachers and students and the management and effectiveness of institutions (Kashorda et al., 2007).

However, opportunities for realizing the benefits of using ICT in education face a number of challenges in the developing countries. Access to ICT facilities is a major challenge facing most African countries, with a ratio of one computer to 150 students against the ratio of 1:15 students in the developed countries. In Nigeria, the ratio for universities and colleges is 1:45 while access at the primary school level is much more limited at 1:250 (Ministry of Education, Nigeria, 2006). The Education Management Information System (EMIS) survey of 2003/2004 indicated that over 70 per cent of the secondary schools in Nigeria required functional telephones. Furthermore, 90 per cent of such schools needed to establish Local Area Networks (LANs) in order to improve sharing of learning resources. As at 31<sup>st</sup> December, 2008, there were 6,566 secondary schools in Nigeria, of which 4,261 were publicly funded and the rest 2,305 privately funded with a total student enrolment of 1,382,211 and total teaching staff of 43,016 (Nigeria National Bureau of Statistics, 2009).

Idoko and Ademu (2010) in an investigation of the challenges of ICT for teaching/learning as perceived by agricultural science teachers in 210 secondary schools from the three educational zones in Kogi State also found that ICT facilities were not available in secondary schools. Similarly, Fakeye (2010) also investigated English language teachers' knowledge and use of ICT in Ibadan Southwest Local Government Area of Oyo State and found that availability of computers and their connectivity to the internet was non-existent in virtually all the schools studied and utilization, which is dependent on availability and because availability is poor, thus, usability was also found to be poor. Teachers need to be supported to get the most from using ICT in classrooms. Particularly, where resources are limited, as it is common in Nigeria, ICT initiatives need to be driven by the provision of appropriate technological solutions for the challenges faced by communities, rather than by an interest purely in these physical technologies themselves. Those implementing technological solutions need to ensure they are context-specific and adapted to local needs and conditions. It is also imperative that ICT initiatives are sustainable or effective by ensuring that the technologies embedded within them meet the demands of users in appropriate ways. It is essential that potential users have a sound understanding of how to use new ICTs beneficially and a cultural view of the relationship between learning and technology (Leach, Ahmed, Makalima, & Power, 2009).

In view of this, the present study investigates an analysis of supply and utilization of ICT as predictors of ICT literacy among secondary school teachers in Oyo State, Nigeria.

### **Statement of the Problem**

The importance ICT can be understood from the development of such acronyms as e-learning, e-mail, e-library, e-education, virtual library etc. The simple indicator is that ICT has turned the world into a global village. Communication has been enhanced and education has gone technological. Though these are very common in the developed world, the developing world like Nigeria is facing challenges that majorly include: absence of

ICT infrastructure (hardware and software), poor capacity development (teachers) and underutilization of available ICT resources among others. Again, the cost of these ICT resources make them inaccessible coupled with ancillary infrastructure as electricity. This study focuses on an analysis of supply and utilization of ICT as predictors of ICT literacy among secondary school teachers in Oyo State, Nigeria.

### **Research Questions**

1. What is the relationship among the independent variables (supply and utilization of ICT) and secondary school teachers' literacy level?
2. What is the joint effect of independent variables (supply and utilization of ICT) and secondary school teachers' literacy level?
3. What is the relative effect of independent variables (supply and utilization of ICT) and secondary school teachers' literacy level?

## **2. Methodology**

### **Research Design**

The research design used in this study is descriptive study.

### **Population**

The population for the study comprises of all secondary school teachers in Oyo state, Nigeria.

### **Sample and Sampling Procedures**

The sample for this study comprises one thousand six hundred and fifty (1600) participants which were randomly selected from thirty three (33) Local Government Area of Oyo State, Nigeria. This consisted of both male and female. These consisted of nine hundred (900) males and seven hundred (700) females.

### **Research Instrument**

In an attempt to measure the supply and utilization of ICT on literacy level among secondary school teachers in Oyo state, the researchers used a self developed questionnaire. The instrument consisted of thirty (30) items anchored base on the four point Likert scale of Strongly Agree (4), Agree (3), Disagree (2) and Strongly Disagree (1).points. The research instrument consists of section A to D. Section A measures the teachers' demographical variables such the sex, age, experience and educational qualification among others. Section B measures the supply of ICT for the schools. Section C measures the utilization of ICT by the teachers and Section D measures the literacy level of ICT by the teachers.

### **Validity of Instrument**

Content and face validity was used for the study. In that, the researchers gave the instrument to experts in the field of Education and experts in the area of Research and Statistics. After all these people had given their suggestions and made necessary corrections on the instrument, the researchers then incorporated the suggestions into the final copy before the instrument was finally and subsequently administered.

### **Reliability of Instrument**

After the content and face validity of the instrument had been ensured, the instrument was administered to fifty teachers in order to test its reliability. The cronbach alpha technique was then used to test the reliability to ensure that it is consistent in measuring what it was designed to measure. The results from the analysis carried out yielded 0.76.

### Procedures of Administration

The instrument was administered to the respondents on the day approved by the school authorities for the exercise. The researchers were assisted by trained research assistants in the administration and collection of the questionnaire copies.

### Method of Data Analysis

The Pearson Moment Correlation (PPMC) and Multiple regression Statistical analysis (SPSS) were used to analyse the data collected.

## 3. Results

**Research Question One:** What is the relationship among the independent variables (supply and utilization of ICT) and secondary school teachers' literacy level?

**Table 1. Descriptive Statistics and Inter-Correlations among the Variables**

Variables	N	Mean	SD	ICT Literacy Level	Supply of ICT	Utilization of ICT
ICT Literacy	1600	55.54	28.37	1.00		
Supply of ICT	1600	31.44	10.50	.783	1.00	
Utilization of ICT	1600	20.94	15.63	.513	.514	1.00

*Correlation is significant at the 0.05 level (2-tailed)*

Table 1 contains descriptive statistics and inter-correlations among the study variables. As shown in the table 1, teachers' ICT literacy is significantly correlated with: (1) Supply of ICT ( $r = .783$ ;  $p < .05$ ) and (2) Utilization of ICT ( $r = .513$ ;  $p < .05$ ). There were also significant correlations among the independent variables. In line with this study, Fakeye (2010) also investigated English language teachers' knowledge and use of ICT in Ibadan Southwest Local Government Area of Oyo State and found that availability of computers and their connectivity to the internet was non-existent in virtually all the schools studied and utilization, which is dependent on availability, and because availability is poor, thus, usability was also found to be poor. Teachers need to be supported to get the most from using ICT in classrooms. Particularly where resources are limited, as it is common in Nigeria. ICT initiatives need to be driven by the provision of appropriate technological solutions for the challenges faced by communities, rather than by an interest purely in these physical technologies themselves. Those implementing technological solutions need to ensure they are context-specific, and adapted to local needs and conditions. It is also imperative that ICT initiatives are sustainable or effective by ensuring that the technologies embedded within them meet the demands of users in appropriate ways. It is essential that potential users have a sound understanding of how to use new ICTs beneficially, and a cultural view of the relationship between learning and technology (Leach, Ahmed, Makalima, & Power, 2009).

**Research Question Two:** What is the joint effect of independent variables (supply and utilization of ICT) and secondary school teachers' literacy level?

**Table 2. Multiple Regression Analysis on Teachers' Literacy Level Data**

Multiple R(adjusted)=.836 Multiple R <sup>2</sup> (adjusted)=.675 Standard error of estimate=5.55				
Analysis of variance				
	Sum of square (SS)	DF	Mean square	F
Regression	5893.72	2	2946.86	55.16
Residual	7974.19	1597	4.99	
Total	13867.91	1599		

The table above shows that the independent variables (ICT supply and utilization) when pulled together have significant effects on teacher literacy level. The value of R (adjusted) =.836 and R<sup>2</sup> (adjusted) =.675. The analysis of variance performed on the multiple regressions yielded an F- ratio value of 55.16 and was found to be significant at 0.05 level. In line with this study, Idoko and Ademu (2010) in an investigation of the challenges of ICT for teaching/learning as perceived by agricultural science teachers in 210 secondary schools from the three educational zones in Kogi State also found that ICT facilities were not available in secondary schools. Most of the studies undertaken have focused on information infrastructure issues, while few have been undertaken to measure the extent of ICTs in Africa, particularly in education (Nigeria SchoolNet, 2008). The use of ICT in education has the potential to enhance the quality of teaching and learning, the research productivity of teachers and students, and the management and effectiveness of institutions (Kashorda et al., 2007). However, opportunities for realizing the benefits of using ICT in education face a number of challenges in the developing countries. Access to ICT facilities is a major challenge facing most African countries, with a ratio of one computer to 150 students against the ratio of 1:15 students in the developed countries. In Nigeria, the ratio for universities and colleges is 1:45 while access at the primary school level is much more limited at 1:250 (Ministry of Education, Nigeria, 2006).

**Research Question Three:** What is the relative effect of independent variables (supply and utilization of ICT) and secondary school teachers' literacy level?

**Table 4.9. Relative Contribution of Independent Variables to the Prediction**

Model	Unstandardized coefficients	Standardized coefficients		T	P
	B	Standard error	Beta		
Constant	5.820	.434		10.83	P<0.05
Demand of ICT	.108	.024	.141	4.45	P<0.05
Utilization of ICT	.159	.032	.138	5.61	P<0.05

The table above shows that each of the independent variables made a significant contribution to the prediction of teacher ICT literacy level. In term of magnitude of contribution, demand of ICT made the most significant contribution (Beta= .141; t= 4.45; P<0.05) to the prediction follow by utilization of ICT (Beta= .138; t= 5.61; P<0.05). In collaboration with this finding, Tella, Tella, Toyobo, Adika & Adeyinka (2007) examined Nigerian secondary school teachers' uses of ICTs and implications for further development of ICT use in schools using a census of 700 teachers. The findings showed that most teachers perceived ICT as very useful and as making teaching and learning

easier. It was recommended that professional development policies should support ICT-related teaching models, in particular those that encourage both students and teachers to play an active role in teaching activities. Additionally, emphasis should be placed on the pedagogy underlying the use of ICTs for teaching and learning. Attempts to measure or assess the utilization of ICT in Nigeria have been hampered by insufficient empirical data to indicate any impact of ICT on sector productivity and lack of cross-country evidence. In some cases the evidence has been non-existent due to recent developments, the rapid revolution of ICTs and methodological challenges that include a deficiency of assessment variables and models of causality.

#### 4. Conclusion and Recommendations

Base on the findings of this study, it was concluded from this study that supply and utilization of ICT have a great impact on the teachers' literacy level. This means that low level of ICT demand, supply and utilization will definitely have a negative effect on teachers' literacy level. By implication, teachers' literacy level can be improved through adequate supply and efficient utilization of ICT in the school system. Therefore, these factors are to be improved on in our schools for us to have efficient and improved teachers' literacy level in Oyo State. There is hope that with the improvement of some factors (e.g. supply and utilization of ICT among others), the situation can be changed for the better. As such, it is very crucial to improve these factors (supply and utilization of ICT) so as to eradicate the persistent occurrence of low literacy level of ICT by teachers.

The public and private schools should endeavour to provide enabling environment for the staff of the schools, so as to enhance their ICT literacy level and productivity. The teachers should be enlightened on the effects of ICT supply and utilization on literacy level. This will help in suggesting appropriate solutions to the low ICT literacy level of teachers.

Teachers are to be trained on how to improve their ICT demand, supply and utilization, because the level of teachers' ICT demand, supply and utilization have influence on the literacy level in the school. Curriculum planners should inculcate into the teacher training the ICT demand, supply and utilization during the course of training. This will help in increasing their level of ICT literacy in the school. School counselors should intensify their efforts to organize seminars/conferences on the implications of these factors (ICT supply and utilization and others) on the teachers' effectiveness and ICT literacy. The school management should cooperate with the teachers on the improvement of teachers' ICT literacy through effective ICT demand, supply and utilization.

#### References

- [1] S. Aceto, C. Dondi and W. F. Kugemann, "Technologies for the Knowledge Society & Lifelong Learning, Key Findings & Suggestions for Action", POLE project report, MENON Network EEIG, Brussels, <http://www.education-observatories.net/eduobs>, (2009).
- [2] J. O. Afe, "Reflections on becoming a Teacher and the Challenges of Teacher Education", Paper presented at the Inaugural Lecture Series 64 of the University of Benin, (2007).
- [3] J. Anderson, "Integrating ICT and Other Technologies in Teacher Education: Trends, Issues and Guiding Principles [Electronic Version]", Infoshare: Sources and Resources Bulletin, (2007), pp. 33-35.
- [4] B. O. Babalola, "The demand of ICT among Secondary school teachers", Unpublished Lecture Book, University of Ibadan, (2008).
- [5] B. O. Babalola, "The demand and Supply of Computer to schools in Oyo State", Unpublished Lecture Book. University of Ibadan, (2009).
- [6] B. O. Babalola, "ICT and Teachers Literacy Level", Unpublished Lecture Book, University of Ibadan, (2010).
- [7] B. O. Babalola, "The ICT literacy Level among teachers", Unpublished Lecture Book, University of Ibadan, (2011).
- [8] O. A. Fakeye, "The demand of ICT among Secondary school teachers in Oyo State", International Journal of Research, vol. 1, no. 3, (2010), pp. 112-168.

- [9] Federal Republic of Nigeria, "Implementation guidelines for the UBE programme", Federal Ministry of Education, Abuja, (2000).
- [10] Federal Republic of Nigeria, "National Policy on Education" Abuja: NERDC, (2004).
- [11] G. R. Idoko and L. W. Ademu, "Using video stimulated reflective dialogue to support the development of ICT based pedagogy in mathematics and science", *Welsh Journal of Education*, vol. 14, no. 2, (2010), pp. 63-77.
- [12] G. Kashorda, R. Kozma, R. McGhee, E. Quellmalz and D. Zalles, "The PanAfrican Research Agenda on the Pedagogical Integration of Information and Communications Technologies: Phase 1 National Reports", Ottawa: IDRC, (2007).
- [13] J. Leach, A. Ahmed, S. Makalima and T. Power, "DEEP IMPACT: an investigation of the use of information and communication technologies for teacher education in the global south", London: DFID, (2009).
- [14] MCEETYA, "National Report on Schooling in Nigeria", Ministerial Council on Education, Employment, Training and Youth Affairs (MCEETYA), Melbourne. <http://cms.curriculum.edu.au/anr2002/index.htm>, (2007).
- [15] MCEETYA, "National Data on Participation in VET in Schools Programs & School-based New Apprenticeships for the School Year", MCEETYA Taskforce on Transition from School, <http://www.mceetya.edu.au/public/national.htm>, (2008).
- [16] MCEETYA, "Joint Statement on Education and Training in the Information Economy", Ministerial Council on Education, Employment, Training and Youth Affairs (MCEETYA), Commonwealth of Nigeria, <http://www.dest.gov.au/ministers/images/js.pdf>, (2009).
- [17] MCEETYA, "Joint Statement on Education and Training in the Information Economy", Ministerial Council on Education, Employment, Training and Youth Affairs (MCEETYA), Melbourne, <http://www.mceetya.edu.au/public/pub.htm>, (2010).
- [18] MCEETYA, "National Report on Schooling in Nigeria", Ministerial Council on Education, Employment, Training and Youth Affairs (MCEETYA), Melbourne, <http://cms.curriculum.edu.au/anr2001/index.htm>, (2011).
- [19] Ministry OF Education, Nigeria, "National Information and Communication Technology (ICT) Strategy for Education and Training", The Government Press, Nairobi, (2006).
- [20] Ministry of Education, Science & Technology, "ICTs in Educations Options Paper", The Government Press , Nairobi, (2009).
- [21] H. Nnebe, "Skilling People for an Information Society", New South Wales ICT Skills Action Plan, NSW Government, New South Wales, <http://www.oit.nsw.gov.au/content/1.4.2.ICT-Skills.asp>, (2008).
- [22] J. L. Obanya, "The effectiveness of ICT in schools: Current trends and future prospects discussion paper", Paper presented at the OECD Japan Seminar: Teachers, teacher policies and ICT, (2010).
- [23] H. B. Omolewa, "Information and communication technologies in teacher training and professional development in Nigeria", *Turkish Journal of Distance Education TODJE*, vol. 8, no. 1, (2008), pp. 133-142.
- [24] H. Scott and E. Rarieya, "Portfolio as a tool for academic education and professional development: problems and challenges", IVLOS Institute of Education, Utrecht University, <http://www.teLearning.nl/papereportfoliocambridge.rtf>, (2011).
- [26] J. Smith and S. Irving, "Position paper: statement of basic principles and suggested actions ('Ames White Paper')", [Electronic Version] from <http://site.aace.org/position-paper.html>, (2009).
- [27] A. Tella, A. Tella, O. M. Toyobo, L. O. Adika and A. A. Adeyinka, "An Assessment of Secondary School Teachers Uses of ICTs: Implications for Further Development of ICT's Use in Nigerian Secondary Schools", *Online Submission*, vol. 6, no. 3, (2007).