Teachers' Self-Efficacy in the Use of Information and Communication Technology for Teaching Basic Technology in Ilorin Metropolis

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Abstract

This study examined the teachers' self-efficacy in the use of information and communication technology for teaching basic technology in Ilorin metropolis. The study was a descriptive type using the survey method. Researcher designed questionnaire was used to elicit the views from the respondents. Sample comprised 262 Basic Technology teachers in upper basic schools in Ilorin. Data were analysed using mean to answer research questions 1 and 4 and t-test was used to test research hypothesis 1. The findings of the study showed that; basic technology teachers always use the basic ICT tools for teaching with Grand Mean of 2.83, the self-efficacy level of basic technology teachers in the use of ICT is moderate in teaching basic technology with Grand Mean of 2.93, basic technology teachers are perceived to possess strong self-efficacy in the use of ICT with a grand mean of 2.71, ICT adds value to teaching of Basic Technology with a grand mean of 3.12, there was no significant difference between male and female Basic Technology teachers' in their self-efficacy in the use of ICT with t (260) = 0.49, p > 0.05. The study concluded that basic technology teachers are skilled in the use of ICT for teaching. It was recommended among others that Government, NGOs and individuals should also make available facilities needed to access ICT, either by reducing the price or making it free of charge.

Keywords: ICT, Teachers, Technology, Self-Efficacy and Basic Technology

Introduction

The need, sometimes the pressure, to prioritize teaching with technology considering teachers' level of preparedness has become more demanding due to the rapid advancements in the educational use of technology. Technology refers to the collection of tools, including machinery, modifications, arrangements and procedures used by humans. Basic Technology is an essential skill, knowledge or method applied to a subject or an

activity. Jimoh, Amao, Olaseyinde and Musa (2003) defined technology as the product of science; it is the application of scientific, laws and principles to satisfy human need. Technology is a new wave of Information and Communication Technology (ICT) which includes Internet -based communication and transaction systems, mobile devices, computer integrated telephony, workflow and multimedia.

ICT stands for information and communication technology. It can also be seen as technologies being used for processing information and communication. Educators use the term "technology" or "information technology "instead; however, this appears to be changing to include ICT. ICT is dynamic and continuously changes with the creation of new technologies. Evoh (2007) defined "ICT as a collection of techniques, and tools to help in reserving, processing, retrieving and receiving information. Penetration of the new ICTs in the field of education has changed teacher-student interaction.

Bandura, (2016) defined self-efficacy as one's judgments of their capabilities to organize and execute courses of action in alignment with desired goals. The focus is not on the skills one has but on the judgments one has of what one can do with whatever skills one possesses. Bandura also affirmed that self-efficacy beliefs develop in response to four sources of information. Self-efficacy beliefs can be used to explain technology usage behaviours. Basic Technology is defined as the aspect of education which leads to acquisition of practical and applied skills as well as basic scientific knowledge. It is also a subject that deals with the fundamentals of engineering and technology and its components include: Woodwork, Metalwork, Building Construction, Electrical/Electronics, Computer, Mechanics, Technical Drawing, and so on (The National Policy on Education NPE, 2009).

Basic Technology is before known as ''Introductory Technology'' was structured to assist learners to develop interest in technology. The aim is that at the end of junior secondary school, technological appreciation would have been attained and solid foundation laid for students' entrance into a vocation of their choice. This is in consonance with the statement in the (Federal Republic of Nigeria FRN, 2009). The curriculum is designed for a minimum use of equipment; teaching and learning are therefore to be facilitated by the use of real life experiences through industrial visit, use of information and communication technology (ICT), instructional resources and audio-visual aids. Basic Technology cannot be taught without equipment because it is essentially practical; the

theory is minimal and largely consists of simple explanation or description of how certain simple results are to be obtained with tools and equipment (NERDC, 2010).

Basic Technology which is one of the core subject offered at the junior secondary school level is practical oriented and will play significant role in the development of the Nation. It is hoped that the possessor of such relevant education will be able to uplift the Nation technologically. Jekayinfa and Kolawole (2005) said the singular purpose of education is to produce a useful citizen. Basic Technology is a system that is geared towards the acquisition of scientific knowledge and technological skills especially practical skills needed for the country's industrialization. This gave birth to a new system to replace the old 6-3-3-4 system with the 9-3-4 basic educational system.

Many Nigerian teachers have been unable to find effective ways to use technology in their classrooms or any other aspect of their teaching and learning life. The possible explanation for this lack of success by teachers is that the use of technology in the classroom has not been encouraging and teachers are not well trained in using ICTs in teaching as a means for educational sustainability (Ololube, 2018), notwithstanding the specifications in the National Policy of Education by the (Federal Government of Nigeria, 2009). Nigeria as a nation came late and slowly into the use of ICT in all sectors of the nation's existence more especially in teacher education. This is as a result of chronic limitations brought about by economic disadvantages and government policies. These factors have direct consequences on the nation's educational development.

In a study conducted by the Global Information Technology (2005), the report used the Networked Readiness Index (NRI), covering a total of 115 economies in 2005-2006, to measure the degree of preparation of a nation or community to participate in and benefit from ICT developments. Nigeria was ranked 90th out of the 115 countries surveyed. United States of America topped the list, followed by Singapore, Denmark, Iceland, Finland, Canada, Taiwan, Sweden, Switzerland and the United Kingdom and so on. Also, Nigeria was ranked 86th out of 104 countries surveyed in 2004 (Global Information Technology, 2004). This shows a decline in Nigeria's preparedness to participate in and from ICT development globally. Fundamentally, the slow access to basic ICT equipment, low internet connectivity and computers, and the inadequacies in the use of audio-visual materials and equipment including films, slides, transparencies, projectors, globes, charts,

maps, bulletin boards, plus programmed materials, information retrieval systems and instructional television in teacher education programs are barrier to the effective and professional development of teachers in Nigeria (Ololube, 2018).

The concepts self-efficacy is considered as among the factors which have a great impact on teaching and learning processes. Self-efficacy is defined by Bandura (2016), the originator of self-efficacy theory, as people's beliefs about their capabilities to produce designated levels of performance that exercise influence over events that affect their lives. Self-efficacy beliefs determine how people feel, think, behave and function as an important set of proximal determinants of human affection and action. As cited by Bandura, (2016), people's beliefs in their efficacy influence them in various ways, such as the actions they take, the choices they make, how much effort they put in their struggles, how long they will persist against obstacles and failures, their flexibility for adversity, how much stress and depression they experience in coping with environmental demands and the level of accomplishments they ultimately achieve.

Information and Communication Technology (ICT) has no doubt been recognized as a potent force that can transform the development pace and status of a country (United Nation Development Programme, UNDP, 2014). For longer than a decade, one of the key challenges to the professional development of teachers has been to help the integration of ICT into education (Kalle, Jari, Maija, & Veija, 2009). Saverinus (2012) stated some of the aims and objectives of implementing ICT in education: To implement the principle of lifelong learning and education, to increase a variety of educational service and medium/method, to promote equal opportunities to obtain education and information and to develop a system of collecting and disseminating educational information. However, most studies and literature on teachers' self- efficacy on the use of ICT were conducted in advanced countries and those conducted within Nigerian environment were either on university lecturers or undergraduates. This calls for this study to investigate teachers' self-efficacy in the use of ICT for teaching Basic Technology in Upper Basic Schools in Ilorin Metropolis.

Purpose of the Study

The main purpose of this study was to investigate teachers' self-efficacy in the use of ICT for teaching Basic Technology in Upper Basic Schools in Ilorin Metropolis. Specifically, this study:

1. Determined the usage of ICT tools by basic technology teachers
2. Investigated basic technology teacher's self-efficacy in the use of ICT for teaching
3. Examined the skills possessed by basic technology teachers in the use of ICT
4. Established the influence of gender on basic technology teacher's self-efficacy in the use of ICT in teaching basic technology

Research Questions

The following research questions were answered:

1. Do basic technology teachers use basic ICT Tools?
2. What is the self-efficacy level of basic technology teachers in the use of ICT for teaching?
3. What are the skills possessed by basic technology teachers in the use of ICT?
4. Does gender have influence on basic technology teachers' self-efficacy in the use of ICT for teaching basic technology?

Research Hypothesis

The following hypothesis was tested in the study:

H_{O1}: There is no significant difference between the self-efficacy of male and female Basic Technology teachers in the use of ICT.

Methodology

This research was descriptive research of the survey type. It was aimed at assessing the teachers' self-efficacy in the use of ICT for teaching basic technology. Survey was used for this study to describe the situation of teachers' self-efficacy in the use of ICT for teaching basic technology. The population for the study consisted of all secondary school teachers in Kwara State. The target population for this study was all basic technology teachers in Ilorin metropolis. 300 basic technology teachers were involved from 100 randomly selected upper basic schools offering basic technology from the three local governments in Ilorin. A researcher-designed questionnaire titled "Teachers' Self-efficacy

in the Use of ICT for Teaching Basic Technology in Ilorin Metropolis" was used to gather information for this study. Corrections and suggestions were made where and when necessary, by the researcher. Completed questionnaire was collected immediately from the respondents.

Results

Table 1: Demographic Data of Respondents

Variables	A	N	%	B	N	%	Total
Gender	Male	139	53.1	Female	123	46.9	262
Experience	Experienced	198	75.6	Less Experience	64	24.4	262
Qualification	Qualified	184	70.2	Unqualified	78	29.8	262

Table 1 shows the distribution of the respondents by gender, experience and qualification. It indicated that 139 (53.1%) of the respondents were male while 123 (46.9%) were females. The table also revealed that 198 (75.6%) were teachers who are experienced in teaching Basic Technology, while 64 (24.4%) were teachers less experienced in teaching Basic Technology. The table further revealed the teachers' teaching qualification, 184 (70.2%) of the respondents were qualified while 78 (29.8%) were unqualified.

Research Question 1: Do basic technology teachers use basic ICT Tools?

Table 2: Basic Technology Teachers' Use of the Basic ICT Tools

S/N	ICT Facilities	Mean
1	Desktop Computers	2.41
2	Laptop Computers	1.97
3	Notebook Computers	2.12
4	Auto card Software	1.87
5	Corel Draw Software	1.98
6	Graphic Software	2.03
7	Scanners	2.18
8	Printers	2.37
9	Internet connectivity	2.24
10	Email	2.08

S/N	ICT Facilities	Mean
11	Word processing	2.43
12	Presentation software	2.16
13	Flash drive	2.32
14	Digital Video Camera	2.03
15	Cd players/Writer	2.17
16	Telephone	3.14
17	Public address system	2.56
18	Multimedia projector	1.92

Table 2 shows that desktop computer; Laptop computer and Notebook computer had a mean of 2.41, 1.97 and 2.12 respectively. The use of Auto card software, Corel Draw software and Graphics software had a mean of 1.87, 1.98 and 2.03. More so, the use of other hard wares such as scanners, printers, Flash drive and CD writer all have a mean of 2.18, 2.37, 2.32 and 2.17. Telephone had a mean of 3.14, Public address system had 2.56 and the multimedia projector had a mean of 1.92. This shows that Basic Technology teachers make use of the Basic ICT tools for teaching. More so, the table revealed that teachers make use of both the hardware and software to teach basic technology.

Research Question 2: What is the self-efficacy level of basic technology teachers' in the use of ICT for teaching basic technology?

Table 3: Basic Technology Teacher's Self-efficacy in the use of ICT for Teaching

S/N	Items	Mean
1	Boot a computer/start a computer	3.07
2	Display the directory of a disc	2.60
3	Format a diskette/ flash drive/ memory card	2.89
4	Adequate keyboard skill	2.63
5	Copy from one disc to another	2.53
6	Insert and eject floppy disc and CD ROM	2.52
7	Start an application and create document	2.64
8	Use printing options	2.68
9	Create name on files and folders	2.81
10	Rename directory	2.66

S/N	Items	Mean
11	Identify windows menu	2.75
12	Use windows menu	2.79
13	Operate word processing	2.71

Table 3 shows the self-efficacy of Basic Technology teachers on the use of ICT. Booting a computer/ Starting a computer, display the directory of a disc and formatting of a diskette/flash/ memory card had a mean of 3.07, 2.60 and 2.89. More so, adequate keyboard skill had a mean of 2.63, coping from one disc to another had a mean of 2.53 and insert and eject floppy disc and CD ROM had a mean of 2.52. Start an application and create document had mean of 2.64, Use printing options 2.68, Create name on files and folders had 2.81, Renaming directory had a mean of 2.81 and Operate word processing had a mean of 2.71. This implies that basic technology teachers' self- efficacy in the use of ICT tools is strong.

Research Question 3: What are the skills possessed by basic technology teachers in the use of ICT?

Table 4: Skills Possessed by Basic Technology Teachers in the use of ICT

S/N	ITEMS	Mean
1	Setting up a computer workstation	2.78
2	Identifying various ways on how to use different software programmes	2.46
3	Integrating technology into physical environment of the classroom to support different learning activities	2.54
4	Using specific search strategies to locate information	2.45
5	Teaching students how and why to use ICT technology	2.59
6	Helping colleagues learn different ICT technologies for their personal use	2.54
7	Helping colleagues learn different ICT technologies for instructional use	2.50
8	Using the internet to find instructional resources	2.52
9	Using internet to expose students to diverse viewpoints	2.48
10	Using ICT technology to support students' cooperation and	2.54

S/N	ITEMS	Mean
	collaboration	
11	using ICT technology to support problem-solved or case-based learning	2.83
12	Using ICT technology to help students with special needs	2.50
13	Using ICT technology to communicate with parents about school day	2.29
14	Ensuring students use the web safety	2.41
15	Creating assessment tools (checklist matrices) for evaluating students work	2.41

Table 4 revealed that setting up a computer work station had a mean of 2.78, Identifying various ways on how to use different software programmes had a mean of 2.46, integrating technology into physical environment of the classroom to support different learning activities had a mean of 2.54, using specific search strategies to locate information had a mean of 2.45 and Teaching students how and why to use ICT technology had a mean of 2.59. The table also revealed that helping colleagues learn different ICT technologies for their personal use had a mean of 2.54 and helping colleagues learn different ICT technologies for instructional use had a mean of 2.50. This implies that Basic Technology teachers possess adequate skills needed for the use of ICT tools in teaching. In determining whether there is any difference between male and female Basic Technology teachers in their self-efficacy in the use of ICT, data was analysed using *t*-test as shown in Table 4.

Table 5: Basic Technology Teachers' Self-efficacy in the use of ICT based on Gender

Variables	N	Mean	SD	df	t-value	Sig	Remark
Male	138	35.55	9.56				
				260	0.49	0.63	accepted
Female	123	34.98	9.59				

*Significance @ 0.05

Table 5 revealed that there was no significant difference between male and female Basic Technology teachers' self-efficacy in the use of ICT. This is reflected in the result; t (260) = 0.49, p>0.05. The hypothesis is hereby accepted. This shows that there is no

significant difference between the mean score of male and female Basic Technology teachers' self-efficacy in the use of ICT at 0.05 alpha level. This implies that the male Basic Technology teachers' self-efficacy is not different from that of the female teachers.

Discussion of findings

The analysis on the self-efficacy of basic technology teachers in the use of ICT revealed that the teacher seemed to demonstrate the use of the basic ICT tools. This statement is true as they claimed to make use of both hard and software ICT tools always. This finding of this study is in consonance with Demiralay and Karadeniz, (2010) resulted in the positive effect of computer use, experience, level of computer use, skills, frequency of use and access (both computers and Internet) on the student teachers' perceived information literacy. Similarly, the finding of the study also confirms Goktas and Demirel, (2012) that using ICT tools for teaching purposes contributes to ICT skills as in the form of keeping blogs during which you need to stay online and practice.

In the same vein, Adeogun (2011) discovered a very strong positive significant use of ICT tools for teaching based on the skills of the teachers. This was why he posited strongly that basic ICT tools must be present in the classroom for an effective teaching/learning to take place, during the teaching-learning process. It was discovered that there was no significant difference in male and female Basic Technology teachers' self-efficacy in the use of ICT for teaching. This revealed that the teaching of Basic Technology with ICT is no respecter of gender. Teachers of both genders were found with a moderate self-efficacy in the use of ICT for teaching.

This finding seemed to agree with Llewellyn-Jones (2005) assertion that a woman can succeed in most activities as well as a man; she can equal him in psycho motoric and cognitive stamina. Thus, gender has no direct influence on a teacher's standard in the classroom (Adeshina, 2011), most especially in the use of ICT in teaching. It was discovered that there was no significant difference in qualified and unqualified basic technology teachers' self-efficacy in the use of ICT for teaching. This seemed to depict that basic technology teacher's self-efficacy in the use of ICT for teaching does not differ based on qualification. This implied that both qualified and unqualified teachers' self-efficacy in the use of ICT tools for their teaching is moderate.

This is at variance with Okon (2005) findings that qualification had a significant influence on teachers' standard in the classroom. It also negated the Federal Republic of Nigeria's (2004) statement in the National Policy on Education that qualified teachers will be more committed in the teaching profession. From the foregoing, it is glaring that qualification has no role to play in teachers' self-efficacy in the use of ICT. This is true as most teachers are often tempted by laziness and procrastination in their selection and use of ICT tools for teaching basic technology.

Conclusion

This research examined the basic technology teachers' self-efficacy in the use of ICT for teaching. The result obtained from the data gathered and analysed in this study indicated that the basic technology teachers always use ICT for teaching. The findings of this research also established that basic technology teachers' self-efficacy in the use of ICT is moderate. Basic Technology teachers are proficient in their skills possessed in the use of ICT. Basic Technology teachers' derived benefits from the use of ICT for teaching. The result showed that there was no significant difference on the influence of gender on basic technology teachers' self-efficacy in the use of ICT for teaching, there was no significant difference on the influence of basic technology teachers' qualification on their self-efficacy to the use of ICT for teaching; and there was no significant difference in the influence of basic technology teachers' teaching experience on their self-efficacy to the use of ICT for teaching. This signified that teachers will adopt the use of ICT for instruction if introduced into the education system.

Recommendations

Based on the findings and conclusions of this study, the following recommendations were hereby made;

1. Basic Technology teachers should be encouraged in the use of ICT for teaching.
2. The Government and NGOs should organize conferences, trainings, and capacity building workshops to educate teachers on the benefits of ICT generally for teaching.
3. Teachers should be trained on the use of ICT for teaching to enhance their competency.

References

Abe, E. A. (1991). Reading Problems at the Tertiary Level and their Solutions. In E. Adegbija (Ed.), *Effective Communication Skills in Teaching and Learning: Basic Principles.* Ilorin: General Studies Divisions, University of Ilorin.

Adeshina, T. O. (2011). *An Analysis of Reading Comprehension Instructional Needs of English Language Teachers in Secondary Schools in Kogi State, Nigeria.* (Unpublished Masters Dissertation) University of Ilorin, Ilorin.

Adeogun, A. A. (2011). The principal and the financial management of public secondary schools in Osun State. *Journal of Educational System and Development,* 5(1), 1-10.

Bandura, A. (2016). *Social foundations of thought and action: A Social Cognitive Theory.* Englewood Cliffs, New Jersey: Prentice-Hall.

Demiralay, R. & Karadeniz, S. (2010). The effect of use of information and communication technologies on elementary student teachers' perceived information literacy self-efficacy. Kuram ve Uygulamada Eğitim Bilimleri *Educational Sciences: Theory & Practice*, 10(2), 841-851.

Evoh, C. J. (2007). Policy networks and the transformation of secondary education Through ICTs in Africa: The prospects and challenges of the NEPAD E-schools Initiative. *International Journal of Education and Development Using Information and Communication Technology (IJEDICT)* 3(1), 64-84. Available:http://ijedict.dec.uwi.edu/include/getdoc.php?id=2198&article=272&mode

Federal Republic of Nigeria (2009). "National policy on education" (4th edition). Abuja: NERDC Press.

Global Information Technology Report (2004). "*The Networked Readiness Index Rankings 2005".* Goktas, Y. & Demirel, T. (2012). Blog-enhanced ICT courses: Examining their effects on prospective teachers' ICT competencies and perceptions. Computers & Education, 58, 908-917.

Jekayinfa, A. A. & Kolawole, D. O. (2005). *Perspective on History of Education in Nigeria.* Ibadan: Author.

Jimoh, A. T. Amao, J. O. Olaseyinde, K. J. & Musa, O. D, (2003). *Science and Technology in Society:* Ilorin. Author

Kalle, J., Jari, L., Maija, A. & Veija, M. (2009). Adoption of ICT in education: a case study of communication channels in a teachers' professional development project. *EURASIA Journal of Mathematics, Science and Technology Education,* 5(2), 103-118.

Okon, D. E. (2005). Educational Qualification and years of experience as correlates of teachers' knowledge of problem-based learning. *International Journal of Education Research*, University of Nigeria Nsukka, 1(1), 101-108.

Ololube, N. P. (2018). "Teachers Instructional Material Utilization Competencies in Secondary Schools in Sub-Saharan Africa: *Professional and non-professional teachers' perspective*". In Conference Proceedings of the 6th International Educational Technology Conference EMU, 19-21

Llewellyn-Jones, D. (2005). *Everywoman: A Gynaecological Guide for Life*. Ibadan: Safari Books (Export) Limited with Spectrum Books Limited.

Saverinus, K. (2012). *The role of ict in education sector from* http://verykaka.wordpress.com/2008/07/25/the-role-of-ict-in-education-sector/