TIMBOU-AFRICA PUBLICATION INTERNATIONAL JOURNAL AUGUST, 2025 EDITIONS.

INTERNATIONAL JOURNAL OF EDUCATIONAL RESEARCH AND LIBRARY SCIENCE
VOL. 9 NO. 8 E-ISSN 3026-8478 P-ISSN 3027-186X

# CONSTRAINTS IN THE USE OF ICT IN TEACHING–LEARNING PROCESSES IN SECONDARY SCHOOLS IN NASARAWA STATE, NIGERIA

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**DOI:** https://doi.org/10.70382/tijerls.v09i8.044

## ABSTRACT

The study assessed the ability of secondary school teachers to utilize ICT in the teaching and learning process in Nasarawa State. The study adopted a descriptive survey research approach. The proportionate stratified random sampling technique was used to obtain 160 respondents from public secondary schools in Lafia, Akwanga and Keffi areas of the State. The reliability coefficient of the instrument was determined using Cronbach Alpha reliability test, and

## Introduction

The rapid expansion of information is one of the fundamental features of the twenty-first century. Developing and updating the skills of individuals in information-based occupations is crucial in such an environment. Otherwise, their prestige, expertise, and professional abilities can be in doubt or come under public scrutiny. "Teachers' teaching ability," "world knowledge," and "subject knowledge" are considered to be the fundamental talents of teaching, one of these professions. The dynamic nature of skills in each of these areas means that pre-service education alone is no longer sufficient. It is the ICT that is of great help with adaptation to this dynamism hence, ICT provides an environment to create, transfer and share any form of information (Tinio, 2002). ICT has been defined in several ways by scholars. Khan (2015) asserts that ICT is a general word that encompasses all forms of communication

a value of 0.84 obtained. The data collected were analyzed using inferential statistics. Three research questions guided the study. The results of the findings revealed that, ICT ability of secondary school teachers in Nasarawa State is very low. It is within the average percentage of 27.8% which falls within levels 0 and 1of the Personal Capability Maturity Model (PCMM). Level 0 means that, majority of the teachers do not know at all and do not care about the importance of ICT while Level 1 means that, some of the teachers have had one or two experiences, where information is an important component for achieving their desires and solving problems, and have involved information technology to look for it. The study also revealed that, there was a significant difference between the ICT ability of male and female teachers. The male teachers were discovered to be more open and enthusiastic towards new media than the female teachers. Also, based on age, the ICT ability of the teachers was inversely proportional to their age. The older the age of the teacher, the lower his ability in ICT, and the younger the age of the teacher, the higher his ability in ICT. The study recommends that the Nasarawa State Government should, among others, regularly organise in-service ICT training for teachers, make ICT literacy a key recruitment requirement, provide adequate ICT facilities in schools, and encourage all teachers, especially females, to embrace emerging educational technologies with a positive and open mindset.

**Keywords:** Secondary education, Nigeria, ICT adoption, Technology integration.

devices, including satellite systems, computers, televisions, cell phones, and radios, as well as a variety of services and their uses, including distance learning and video conferencing. Additionally, ICT is a combination of computers and telecommunication systems that enhances research, teaching, learning, and communication by collecting, processing, storing, linking, analyzing, and disseminating information (Abiodum and Omotayo, 2012). Ogunsola (2005) defined ICT as an electronic based system of information transmission, reception, processing and retrieval, which has drastically changed the way we think and live. Moreover, according to Yong, Pugh, Sheldon and Byers, (2002), ICT is a tool or resource that could be used to process, store, perverse, retrieve and disseminate information with ease.

The definitions mentioned earlier align with the United Nations Educational, Scientific and Cultural Organization (UNESCO), which describes ICT as the tools and processes used to electronically access, retrieve, store, organize, manipulate, produce, present, and

exchange information. This encompasses hardware, software, and telecommunications devices such as personal computers, scanners, cameras, phones, faxes, modems, CD and DVD players and recorders, digitized video, radio and TV programs, databases, and multimedia programs (UNESCO, 2014). ICT plays a crucial role in human development by providing a variety of tools that transform teaching methods from a closed, rigid, teacher-focused approach to a stimulating and interactive educational model centered on learners (Wentworth, 2014). Additionally, ICT explains the classification of the world into developed, developing, and underdeveloped nations. The availability and use of ICT benefits elevate some countries above others. While developed nations are breaking new grounds in terms of technological development, as a result of developed ICT, developing nations are grappling with the crumbs of technology (Williams & Sawyer, 2005). Education has changed drastically within the last few decades. Even in the past 10 years, we as a society have seen technology not only influence school curricula but enter the classrooms as new learning tools (Flavin, 2012). In the light of this, Serdyukov (2017) posits that teaching in 21st century is an altogether a different phenomenon; never before could learning be happening the way it is now everywhere, all the time, on any possible topic, supporting any possible learning style or preference.

Now, the big question is, what does being a 21st century teacher really mean? According to Palmer (2015), a 21st century teacher is a teacher that is in-tune with the dynamics of digital technology, goes global, smart and uses smartphones, goes digital or paperless, collaborates, connects with like-minded individuals, practices project-based learning, builds positive digital footprint, is innovative and keeps learning. The success of integrating ICT in Education depends on the ability and attitude of the teachers. The fundamental issue is whether the teachers have the technical know-how to apply ICT in teaching and learning (UNESCO, 2014). Most teachers are not prepared to apply ICT in Education because they received their education "BC"(before computers). Now they discover they need adequate ICT abilities or literacy as part of their jobs (Martin & Heller, 1982). According to Akarowhe (2017), ICT-literate teachers will certainly reap greater benefits than their counterparts who lack the knowledge not only in getting the information but also making the learning and teaching process more effective. The supposed level of skills of a teacher to utilize ICT in education as the case may be, is described as “ICT Ability”.

One of the benefits of ICT in education according to Abolade and Yusuf (2005) is its potentials of meeting individual learning needs, promotion of equality of educational opportunities; increased self-efficacy and independence of learning, and improves teachers’ professional development. Another vital benefit of ICT is that, it offers a paradigm shift from the traditional arrangement to a new era of electronic classrooms.

To operate successfully in the new e-learning environment, Lau and Sim (2008) opined that, ICT technical know-how is very important for teachers and even students alike. Recent studies have also shown that, there is correlation between ICT skills and its application to teaching and learning. To buttress this, Oni and Adebisi (2011) posit that, a person without the working knowledge of ICT in the modern technological era will not be able to go far in his career; this is because nothing is there in this era that does not involve ICTs.

The employers of labour in the ICT driven societies are now demanding adequate ICT literacy as one of the requirements for employment. In agreement with this, Adomi and Kpangban (2010) emphasized that, even employees have realized that ICT enhances job efficiency and equally constitute a threat to their jobs, and the only way out is to become ICT literate. The application of ICT in education has brought about a shift in the approaches of teaching and learning in 21st century classrooms. This shift according to Zhang (2007) is driven by the plethora of new information and communication gadgets now increasingly available to students in schools and at home, each of which offers new affordances to teachers and students alike for improving students' achievement and for meeting the demand of 21st century skills.

In recent times, researchers have conducted investigations to identify the different types of ICTs present in modern digital classrooms. Following this, Tella (2011) highlighted that the ICTs found in classrooms encompass simple tool-based applications like word processors, online scientific data repositories, primary historical documents, handheld computers, closed-circuit television channels, and interactive distance learning classrooms. Although the educational advantages of ICT are evident, studies indicate that its learning potential is often underutilized because many educators lack full ICT proficiency. Supporting this, Lau and Sim (2008) emphasized that the benefits of ICT in education can only be fully realized when users are skilled in its application. In Nigeria, the education system remains traditional (using chalkboards), but ICTs can enhance teachers' performance. Teachers also recognize that their effectiveness is now measured not only by students' academic success but also by their adept use of materials, with ICT acting as a catalyst for achieving this optimal goal.

**Objectives of the Study**

The primary aim of this study is to assess the ability of teachers to apply ICT in the teaching and learning process in secondary schools. Specifically, the study seeks to determine:

i. the ability of the teacher's to use ICT in the teaching and learning process;
ii. whether the teachers' ability to use ICT vary based on gender; and
iii. whether the teacher's ability to use ICT vary based on age.

**Research Questions**

The following research questions were posed:

1. What is the ICT ability of the teachers?
2. Does the teachers' ability to use ICT in the teaching and learning process vary based on gender?
3. Does the teachers' ability to use ICT in the teaching and learning process vary based on age?

**Methodology**

The study employed a descriptive survey research design, utilising a structured questionnaire to collect data on teachers' competence in applying information and communication technology (ICT) in the teaching and learning process. The population for this study consists of 576 teachers in public secondary schools in Nasarawa State. The teachers were selected, through a stratified random sampling technique and a sample size of 160 teachers was selected from three local governments namely, Akwanga, Keffi and Lafia. The breakdown and sample selection can be seen in Table 2. The instrument used for data collection was developed by the researchers. Two experts in computer science and measurement and evaluation were engaged to examine the content validity of the test items. This was done to ensure that all the items were directly related to the contents and no unrelated items were included in the test. The reliability of the instrument was done using Cronbach Alpha reliability test and a reliability coefficient of .84 was obtained. The instrument had two sections, A and B. Section A captured the demographic variables of the teachers while section B contained 13 items measuring the ICT ability level of the teachers. The items were measured on four-point Likert type scale from Never =1, Not Often = 2, Often = 3 and Very often = 4. The result of the analysis was compared with Personal Capability Maturity Model (P-CMM) proposed by Islami(2019) to determine the ICT ability level of the teachers which according to Islami et al. (2019) is one of the best models for measuring ICT literacy or ability in a community and The PCMM Model is suitable for assessing ICT constraints in secondary schools because it provides a structured framework for identifying and categorizing obstacles, such as insufficient technical support, budget limitations, and inadequate teacher training . The model can be seen in Table 1.

**Table 1:** ICT ability model.

| Level | Statements |
|---|---|
| Level 0 | If an individual does not know at all and does not care about the importance of ICT for life |
| Level 1 | If an individual has had one or two experiences, where information is an important component for achieving a desire and solving problems, and has involved information technology to sort for it. |
| Level 2 | If an individual has repeatedly used technology to help with daily activities and has a pattern of repetition in its usage. |
| Level 3 | If an individual has a standard of mastery and understanding of information and technology that is needed, and consistently uses these standards as a reference for carrying out daily activities |
| Level 4 | If an individual has been able to improve the performance of daily life activities through the use of information technology. |
| Level 5 | If an individual has considered information technology as an inseparable part of his daily activities and it has directly or indirectly influenced his behaviours and culture of life. |

**Results and Discussion of Findings**

The results of data collection conducted by distributing questionnaires collected as many as 160 respondents spread across 3 areas. The percentage of data is grouped by age and gender which can be seen in table 2.

**Table 2:** Demographic characteristics of the teachers.

| *Areas* | *No. of Resp* | *Gender* | | *Age range* | | | | |
|---|---|---|---|---|---|---|---|---|
| | | Male | Female | 21-25 Years | 26-35 Years | 36-45 Years | 46-55 Years | 56-60 Years |
| | | 37 | 27 | 8 | 17 | 25 | 10 | 4 |
| Lafia | 64 | 23.1% | 16.9% | 5.0% | 10.6% | 15.6% | 6.2% | 2.5% |
| | | 22 | 18 | 5 | 12 | 17 | 3 | 3 |
| Akwanga | 40 | 13.8% | 11.2% | 3.1% | 7.5% | 10.6% | 1.9% | 1.9% |
| | | 32 | 24 | 7 | 13 | 23 | 11 | 2 |
| Keffi | 56 | 20.0% | 15.0% | 4.4% | 8.1% | 14.4% | 6.9% | 1.2% |
| | | 91 | 69 | 20 | 42 | 65 | 24 | 9 |
| **Total** | 160 | 56.9% | 43.1% | 12.5% | 26.2% | 40.6% | 15.0% | 5.7% |

Note: Resp= respondents

Table 2 presents the total count of respondents from each region. The variation in respondent numbers across these areas is attributed to the differing concentrations of secondary schools. Additionally, the gender breakdown of respondents indicates that there are more male secondary school teachers, with 91 (56.9%), compared to 69 (43.1%) female teachers in the sampled schools. Furthermore, the age distribution of respondents shows that the teachers are predominantly within the age range of 21 to 60 years and that, majority of the teachers are aged between 36-45 years, 127 representing 79.3%. While teachers between 46-60 years are 33 representing 20.7%.

**Research Question 1**: What is the ICT ability of the teachers?
In order to answer this research question, responses of the teachers to the 13 items that measured their ability level were computed through percentage. That is the number of teachers that responded as 'very often' and 'often' were added together and divided by the total number of teachers and multiply the result by 100 to arrive at the percentage value. The results can be seen in Table 3.

**Table 3:** Teachers' ability in ICT

| S/N | Statements | % Value |
|---|---|---|
| 1 | Use a computer: start a computer, shut-down a computer, load applications, use keyboard and mouse. | 45% |
| 2 | Print documents using a printer. | 30% |
| 3 | Use a projector to display teaching material. | 10% |
| 4 | Save files to a computer or transfer files between storage media | 15% |
| 5 | Use Microsoft Word from version 2007 to version 2019 | 25% |
| 6 | Use Microsoft PowerPoint application to create multimedia presentations. | 15% |
| 7 | Use Microsoft Excel package to process data | 10% |
| 8 | Use mobile phones to communicate with students and parents via SMS and call. | 89% |
| 9 | Search for information online using Google chrome, Mozilla Firefox or internet explorer | 18% |
| 10 | Download files from the internet to a computer system | 10% |
| 11 | Use social media platforms like Facebook, Whatsapp, BBM, telegram, Etc. for communication between students and parents. | 56%<br>26% |
| 12 | Use Email application: Compose, attach files, read, send and receive emails using Gmail or Yahoo mail. | 12% |
| 13 | Use scanner: Scan and upload documents from a PC to the cloud storage like Google drive or Dropbox. | |
| **Mean** | | **27.8%** |


TIJERLS E-ISSN 3026-8478
P-ISSN 3027-186X

Table 3 shows that, majority of the teachers are conversant with the use of mobile phones to communicate with students and parents via SMS and calls with the highest percentage of 89. Moderate percentage (56) of the teachers uses social media platforms like Facebook, Whatsapp and telegram to communicate with parents and students. In the areas of teaching and learning using ICTs, the teachers are far behind and can be seen in item statements number 3, 6, 7,9, 10 and 12with10%, 15%, 10%, 18%, 10%, and 13% respectively. The mean percentage value of the teachers' ICT ability is 27.8% which shows that, the teachers still have about 72.2% percentage miles to go, as far as ICT ability is concerned.
Comparing the results with the Personal Capability Maturity Model of ICT ability, mean range between 0-16.66 is in level 0; mean range from 16.17-33.32 belong to level 1; mean range from 33.33-49.98 belongs to level 2; mean range from 49.99-66.65 belongs to level 3; mean range from 66.66 – 83.32 belongs to level 4 and mean range from 83.32 – 100 falls to level 5. Hence, the average value of 27.8% is in level 1 of PCMM of ICT. Level 1 means that, some of the teachers have had one or two experiences where information is an important component for achieving their desires and solving problems, and have involved information technology to look for it.

**Research Question 2:** Does the teachers' ability to use ICT in the teaching and learning process vary based on gender?
After knowing the level of the teacher's ability to use ICT, the researchers wanted to find out more about the differences in the ability to use ICT by the teachers based on gender. The results can be seen in table 4.

**Table 4:** Mean of ICT ability of the teachers based on gender

| Gender | No. of Teachers | (%) Value |
|---|---|---|
| Male | 91 | 29.4 |
| Female | 69 | 26.2 |

Table 4, indicated that, there is a variation in the ICT skills of teachers based on gender, though the percentage difference is not substantial. The research found that male teachers possess greater ICT skills compared to their female counterparts. This is attributed to male teachers' eagerness to learn about new media and their positive attitudes towards it. In contrast, female teachers require more time to familiarize themselves with new media, and it takes them longer to develop a positive outlook on computers and the internet (Broos, 2005). Additionally, female teachers often experience more anxiety, have less experience, and exhibit lower confidence in using ICTs than male teachers (Markauskaite,2006).

**Research Question 3:** Does the teachers' ability to use ICT in the teaching and learning process vary based on age?

After knowing the level of the teacher's ability to use ICTs generally and their ICT ability based on gender, the researcher went further to find out about the differences in the teachers' ability in ICTs based on age. The results can be seen in tables 5

**Table 5:** Teachers' ability in ICT based on age.

| Range of age | (%) Value |
|---|---|
| 21-25 years | 76.67 |
| 26-35 years | 74.62 |
| 36-45 years | 72.84 |
| 46-55 years | 64.53 |
| 56-60 years | 57.26 |

Table 5 shows the value of the teachers' ICT ability grouped by age. The teachers under review ranged in age from 21 - 60 years. They were divided into five age groups, with the highest percentage value of ICT ability in the age range of 21-25 years, then 26-35 years and 36-45 years. The study found out that, there was a significant decrease in the teachers' ICT ability from the age group 46-55 years and 56-60 years. This shows that, the level of the teacher's ability in ICT was inversely proportional to his age. The older a teacher, the lower his ability in ICT, and the younger the teacher, the higher his ability in ICT. Younger teachers explore more while older teachers are less open to technology and tend to prefer the old ways (Cirus, 2014; Park, Mal & Kim, 2007).

**Discussion of Findings**

The study has established the fact that secondary school teachers in Nasarawa state are far behind as far as ICT ability and its integration into the teaching and learning process is concerned. The teachers are within the average ICT ability value of 27.8% which is in level 1 of the PCMM. Level 1 means that, some of the teachers have had one or two experiences where information is an important component for achieving their desires and solving problems, and have involved information technology to look for it.

The study found that male teachers (29.4%) demonstrated greater ICT proficiency compared to their female counterparts (26.2%). This difference is likely because male teachers tend to be more eager to learn about new media and generally have a positive attitude towards it. In contrast, female teachers require more time to become familiar with new media. This observation aligns with Broos (2005), who noted that female teachers take longer to develop a positive outlook on computers and the internet. It also

supports Markauskaite's (2006) view that female teachers often experience more anxiety, have less experience, and feel less confident in using ICTs than male teachers.
Based on age, the teachers were group into five age range. The study found out that, the level of the teacher's ability in ICT was inversely proportional to their age. The older a teacher in age, the lower his ability in ICT, and the younger the teacher in age, the higher his ability in ICT. This is in conformity with Cirus (2014), Park, Mal and Kim (2007) who opined that, younger teachers explore more while older teachers are less open to technology and tend to prefer the old ways. Furthermore, infrastructure limitations, inadequate teacher training, and weak policy implementation could be strengthened to meet the standard ICT requirement, for efficient performance.

**Conclusion**

Based on results of findings, the ICT ability of secondary school teachers in Nasarawa State is very low. The teachers are far behind as far as ICT skills or ability is concerned. This can be stated quantitatively at 27.8% which falls between Levels 0 and 1 of the Personal Capability Maturity Model (P-CMM). Level 0 means that, majority of the teachers does not know at all and do not care about the importance of ICT. And Level 1 means that, some of the teachers have had one or more experiences where information is an important component for achieving a desire and solving problems, and might have possibly involved information technology to look for it.
Moreover, based on gender, there is significant difference in ICT ability of the teachers in favor of the male folk. Then, viewed by age, there is also a significant difference in ICT ability of the teachers in favor of the teachers who are younger in age.

**Recommendations**

Based on the discussion of the study's findings, the following recommendations are proposed:

i. The Nasarawa State Government should regularly organise in-service ICT training programmes for all secondary school teachers to enhance their competence and confidence in using technology for teaching and learning.
ii. The Government and all relevant agencies responsible for teacher recruitment should henceforth make ICT literacy a mandatory requirement for employment into the teaching service.
iii. Both Government and private school proprietors should ensure the adequate provision of ICT equipment, facilities, and infrastructure in secondary schools to promote effective integration of technology in education.

iv. Older teachers who struggle to adapt to the dynamics of 21st-century education should be provided with tailored and user-friendly ICT training programmes designed to meet their specific learning needs.
v. Secondary school teachers should strive to become globally competitive by collaborating, engaging in continuous professional development, and adopting innovative educational technologies aligned with global education standards.
vi. There should be proper sensitisation on the importance of emerging technologies in education, particularly for female teachers, who should be encouraged to recognise that technology transcends gender and to adopt an open and positive attitude towards new media tools.

## References

Abiodun, O & Omotayo, K. (2012)."ICT adoption and effective School Administration in Ekiti- State" European Journal of Educational Studies 4(I), pp 59-64.

Abolade, A.O &Yusuf, M O. (2005). Information and communication technologies (ICTs) and the Nigerian teacher education program. *African Journal of Educational Studies,* 3(1), 1- 19.

Adebayo, E L & Adesope, O M. (2007). Awareness, access and usage of information and communication technologies between female researchers and extensionists. *Int. J. Educ. Dev. Using Inf. Commun. Technol.,* **3 (**85-93)

Adomi, E. E. & Kpangban, E. (2010). Application of ICTs in Nigerian Secondary Schools. Library Philosophy and Practice (e-journal). Paper 345

Akarowhe, K. (2017). Information Communication Technology (ICT) in the educational system of the third world countries as a pivotal to meet global best practice in teaching and development. *American Journal of Computer Science and Information Technology* 5:2. doi: 10.21767/2349-3917.100010

Broos, A. (2005). Gender and Information and Communication Technologies (ICT) Anxiety: Male Self-Assurance and Female Hesitation, *CYBER Psychol. Behav.* **8** 21–31

Cirus, L. (2014). Survey of primary computer and information literacy among pupils attending elementary school, *DT 2014 - 10th Int. Conf. Digit. Technol. 214 IEEE* 36–42

Flavin, M. (2012). Disruptive technologies in higher education. Research in Learning Technology.20. 10.3402/rlt.v20i0.19184.

Islami, A R. (2019). Level of ICT literacy: the ability of elementary school teachers to use ICT investigation. J. Phys.: Conf. Ser. 1375 012096

Khan, B. H. (2015). *Managing E-learning: Design, Delivery, Implementation and Evaluation,*

Hershey, PA: Information Science Publishing.

Lau, B & Sim, C. (2008). Exploring the extent of ICT adoption among secondary school teachers, *Malaysia. Int. j of Comp and ICT research, 2(2),19-36*

Markauskaite, L (2006). Gender issues in pre-service teachers' training: ICT literacy and online learning, *Australas. J. Educ. Technol.* **22** 1–20

Ogunsola, L.A. (2005). Information communication technologies and the effects of globalization: Twenty-first century "digital slavery" for developing countries- Myth or Reality? Electronic Journal of Academic and Special Librarianship 6 (1- 2) 1-10.

Oni, C. S. & Adebisi, T. A. (2011). Vocational education in Nigerian junior secondary vocational schools: an antidote to youths unemployment. The African Symposium: An online journal of the African Educational Research Network, 11(2), 113 – 118.

Onyije, L. E. & Opara, J. A. (2013). Information and communication technologies (ICT): a panacea to achieving effective goals in institutional administration. Mediterranean Journal of Social Sciences, 4(13), 227 –230.

Palmer, K. (2015, June 4). *15-characteristics-21st-century-teacher*. https://www.edutopia.org/.

Park, S., Mal, D., Kim, C. & Kim, J. (2007). Survey and Analysis about the Level of Teachers Ability of using Information and Communication Technology, *Proc. 2007 11th Int. Conf.*

*Comput.Support.Coop. Work Des.*990–4

Serdyukov, P. (2017), "Innovation in education: what works, what doesn't, and what to do about it?", *Journal of Research in Innovative Teaching & Learning*, Vol. 10 No. 1, pp. 4-33.

Tella, A., Toyobo, O.M., Adika, L.O. & Adeyinka, A. A. (2007). An Assessment of Secondary School Teachers Uses of ICTs: Implications for Further Development of ICT Use in Nigerian Secondary Schools. The Turkish Online Journal of Educational Technology, 6 (3).

Tinio, V.L. (2002). ICT in Education: UN Development Programme. Accessed November 12, 2020 from https://www.eprmers.org

UNESCO (2014). ICT in Primary Education, Vol 2

Williams, B. K. & Sawyer, S. C. (2005). *Using information technology: a practical introduction to computer communications*. Boston: McGrawHill

Yong, Z., Pugh, K., Sheldon, S & Byers, J L. 2002 Conditions for Classroom Technology Innovations **104** 482–515

Zhang, Y. (2007). Development and validation of an internet use attitude scale. *Computers & Education*, *49*(2), 243-253.