Journal of Educational Research in Developing Areas (JEREDA)
Vol. 5. Issue 3, Pp. 275 –285, 2024
http://www.jeredajournal.com
E-mail: info@jeredajournal.com

Research Article **DOI**:https://doi.org/10.47434/JEREDA.5.3.2024.275 **eISSN**:2735-9107

ANALYSIS OF SUPPLY AND UTILIZATION OF TECHNOLOGY EQUIPMENT ON TECHNOLOGY KNOWLEDGE AMONG SECONDARY SCHOOL TEACHERS IN KANO STATE

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Received: 29th May, 2024; **Revised**: 29th July, 2024; **Accepted:** 24th September, 2024

ABSTRACT

Introduction: Shortage and low utilization of technological devices in our education system motivate this study in secondary schools in Kano Municipal Education zone.
Purpose: This paper focus to examine effect of supply and utilization of technology equipment as predictors of technology knowledge among secondary school teachers in Kano state.
Methodology: Descriptive correlation research design was employed to discover the effect of supply and utilization of technology on teachers' technology skills. The population of this study comprised all secondary school teachers of Kano Municipal education zone in Kano state. The sample of this study comprised of ten teachers each from a randomly selected 31 government secondary schools. A self-developed questionnaire was used to measure the supply and utilization of ICT on literacy level among teachers. Pearson Product Moment Correlation (PPMC) and multiple regression statistics analysis were used to analyse the data collected.
Results: The findings of the study showed there were significant correlations among the independent variables "ICT Supply and Utilization. The independent variables made a significant contribution to the prediction of teachers ICT level. Also the independent variable 'ICT Supply and Utilization' when pulled together have significant effect on teachers literacy level.
Recommendation: It's recommended that Government and non-governmental organization should provide supportive environment for teachers as well as students so as to improve their technology knowledge and productivity.

Keywords: Analysis, Supply, Utilization, Technology Equipment, Technology Knowledge, Secondary School Teachers

Cite paper as:
Isma'il, H. A., & Hashim, B. A. (2024). Analysis of supply and utilization of technology equipment on technology knowledge among secondary school teachers in Kano state, Nigeria. *Journal of Educational Research in Developing Areas, 5*(3), 275 - 285. https://doi.org/10.47434/JEREDA.5.3.2024.275.

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PUBLIC INTEREST STATEMENT

Secondary school teachers stand to benefit from the findings of this study so as to improve proper utilization of technological devices during lesson presentation which in turn will save teachers' time and energy and at the same time will ease learners understanding and performance.

INTRODUCTION

In the information age we live in, technology has become a crucial factor of life and is used widely in various daily life actions such as, business, transportation, shopping, and communication. In addition, technology has converted the societies and shaped the way people think, live, work and act. Developments in the information and communication technologies (ICT) have vividly affected many fields including education, and necessitated the advent of new teaching methods. Within this context, schools have the sole responsibility for preparing the students for the growing demands of the technology. As a result, technology has become a permanent part of education and schools are expected to adjust the education systems and curriculum in accordance with the increasing digital demands.

The capability of any state or system to acquire information either for strategic use or for educational application gives the nation the real advantage in the comity of nations. Through the spread of information and communication technology, people across national boundaries can instantly access information mainly through the internet, computer devices, and other technologies (Ubaru, in Nwachukwu, 2014). In schools as in the health sector, governance, military and business, the exploitation of technology for maximum information acquisition is in fashion and gives an organisation, system or country the best opportunity to emerge as a leader on the global scene. For this reason, the quest for the integration of technology in teaching and learning has become a pervasive issue and many authorities propagate its usefulness. Abanikannda (2011) asserts that technologies have tremendously transformed modern society producing a global economy and system of things. According to him, this transformation affected education as it did to other activities across the world. Therefore, technologies have transformed the nature of education, how and where education takes place; the role of the teachers and learners; and standards of literacy.

In effect, students and teachers must be enabled to deal with large volume of information, make quicker decisions and work more as a team. In the same vain, technology facilities are faced with three major challenges in educational industry. In their discussion of challenges to changing educational practice, Babatunde, and Olanrewaju, (2017), articulated that 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.

Vasquez and Findikoglu (2011) in their work on "ICTs in education and the influence of modernization in developing countries" confirm that most authorities in education and ICT agree that technology is a "*sine qua non* condition for economic growth and local improvement in developing regions" (p. 101). The positive influence of technology is felt not only in agriculture and economy but also education.

Technology is more than just another way of presenting information; it

is the system through which information is presented. The authors referred to the work of Oliver, which analysed the role of students, teachers and institutions and showed that the integration of ICT in education facilitated student-centred learning and promoted competency and performance based curricula. It gives students "access to various information sources, forms and types, creating learning environments focused on problem-centred and inquiry-based activities" (Oliver, and Stephenson, cited in Vasquez and Findikoglu, 2011, p 104). Other great benefits of ICT deployment in teaching and learning as recounted by Vasquez and Findikoglu (2011, p. 104) are:

i. Changes the paradigms of what, when, how learn;
ii. How much students learn;
iii. The cost of learning;
iv. Students take responsibility of their learning and get deeply involved in the reconstruction of knowledge;
v. The constraints experienced by learners with special needs are temporarily removed by the use of ICT by "offering asynchronous support for learning so real-time participation is not necessary.

Numerous scholars have described the changing stages in education as a matter of necessity and that the changes should involve the use of technology for instance, 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. They 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 bonding and networking.

In spite of the changes going on globally, there are transformations going on locally on educational sector here in Nigeria and these are propelled by policies. For example, Federal Republic of Nigeria (FRN, 2000) on Information Technology policy specifies among others that; by the year 2000, all civil servants and teachers in Nigeria should be computer literate. Despite this policy description it's clear that not all civil servants and classroom teachers are computer literate. The case of teachers is annoying because they are custodian of social values.

FRN (2013) explained that no nation can be greater than the level of its teachers. Several emerging terminologies in educational dictionary today include; e-learning, virtual learning, e-mail, computer base test (CBT) etc. this shows that learning, studying, assessment, banking, trading, banking etc. have gone electronic. It becomes unhappy to remain at the same level of manual operations in national system of education while the world rushed on. Scott and Rarieya (2011) clarified that there is need for professional development of school leaders especially as it relates to the preparation of school teachers and leaders. They stressed that learning must be link to real school context, substantial involvement of trained and experienced teachers, flexibility to meet the diverse needs, multiple opportunities for reflection coherent bonding and networking. In line with the above, there is need to develop and reposition of Nigerian teachers to the world of technology and ICT. A major limitation to the development of technology and ICT in Nigeria is the non-availability of hardware and software (Babalola, 2010).

Oyadeyi and Muraina (2017) described that the changing school environment which was hitherto manual has become automated. For example must private schools in urban area have computer laboratories VSTA communication gadgets, operation of the computerized Management Information System (MIS), electronic school registers and teacher registers, biometric identification system, with are all fall outs of the new ICT environment. With the identified changes, government cannot allow teachers to remain at the same level. Theoretical frameworks of Rogers (1995) theory provide the information on facilitating factors within computer based technologies in education. He suggests that technological innovation and its diffusion is the outcome of stakeholders'

efforts (leaders), but execution and acceptance of the technological innovation is dependent on teachers (workers) who eventually are the users or executors of the innovation. These users always need assistance in form of training and support. Roger's Diffusion of innovation (DOI) framework explains a complete scenario of technology adoption and lays focus on the circumstances, environment, and attributes of innovation and conditions. It's been proposed that Rogers' DOI model as one of the most important model for technology adoption and integration because of its practicability (Zanaboni & Wootton, in Afridi, and Chaudhry 2019; Ben & Hakkinen, 2014; Levin & Jacobson, 2017).

Diffusion of Innovations (DOI) theory provides a conceptual framework to this study as this theory assess technology or innovation in three ways: (1) accessibility of technology or innovation, (2) skills of adopters in that technology, and (3) integration of that technology in teaching by the executors of technology. Therefore, current research study was conducted by using this model. DOI is based on stakeholder's expectations and perception which could be comprised of three dimensions as follows:

1. Accessibility of computer based technologies (CBTs);
2. Skills in computers based technologies;
3. Integration of computer based technologies in teaching.

Studies have shown that teachers at different levels supposed ICT as very important as making instruction joyful, easier and memorable. In the study of Tella, et-al (2007) found that Nigerian 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 teachers and students to play an active role in teaching activities. Idoko and Ademu (2010) investigated the challenges of ICT for teaching and learning as perceived by Agricultural science teachers of Kogi state. They found that ICT facilities were not available in secondary schools. Similarly, Fakaye (2010) also examined English language teachers' knowledge and use of ICT in southwest LGA of Oyo state and found that availability of computers and their connectivity to the internet was non-existent in virtually all the secondary school studies and utilization, which is dependent on availability, and because availability is poor, thus, usability was also found to be poor. Kearney, et-al (2017) investigates Australian teachers' adoption and use of a popular technology that has been extensively supported by governments and school systems: the interactive whiteboard (IWB).

The study found that teachers experienced increasing external pressures from a range of stakeholders to use IWBs, but also perceived a range of pedagogical and organisational benefits, especially in primary education. The study suggests that a number of the barriers identified in the early days of adoption and use of this technology, such as professional support and access, still remain for many teachers, thereby impeding effective practices. The research also found that primary school teachers were using the technology in diverse ways, in contrast to secondary teachers who were using the IWB mainly for instructionist, presentational purposes. We conclude by considering various ways of reducing the effect of the identified barriers to support implementation of educational technologies in the classroom, especially the next generation of technologies promoted by governments and systems.

In the same vein, Oyadeyi and Muraina (2017) found that ICT literacy correlate with supply of ICT and utilization of ICT. Kotrlik & Redmann (2009) investigated technology adoption in teaching and learning process. They found, that teachers have increased their technology adoption for use in instruction over the past 5 years, although they still do not have access to the technology they need to use technology fully in their instruction. They continue to perceive that moderate barriers exist that prevent them from integrating technology into their teaching, with no change over the

past 5 years. Agricultural science teachers were experiencing some technology. Teachers continue to use traditional sources for their technology training. The availability of technology and gender are strong predictors of the extent to which agricultural science teachers had adopted technology in their teaching. Ubogu and Ogbedo (2023) investigated the availability and utilization of Information and Communication Technology (ICT) Equipment on the teaching and learning of students in Public Secondary Schools in Delta Central Senatorial District. The finding revealed that, there are inadequate ICT facilities to be used by teachers and students in teaching and learning process.

It has been found in some previous studies that teachers' knowledge and skills in technology have great impact on their use of technology in teaching and learning process (Aydın, 2013). Lawrence and Tar (2018) stated that teachers' competence and their attitudes are determinant in the use of technology in the classes. Similarly, Buabeng-Andoh (2019) emphasized that teachers' competence in using computers and technological devices increase their technology integration level in the classes. Babatunde, and Olanrewaju, (2017) investigated supply and utilization of ICT as predictors of ICT literacy among secondary school teachers in Oyo State, Nigeria. The study found that teachers' ICT literacy is significantly correlated with Supply of ICT and Utilization of ICT. They also found that independent variables (ICT supply and utilization) when pulled together have significant effects on teacher literacy level 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 to the prediction follow by utilization of ICT. Sipila (2014) found that teachers' competence level in technology use influences their technology integration. Arslan and Zhu (2017) indicated that teachers' competence determine their integration of technology into teaching process.

Therefore teachers need to be train and re-train to use technological tools when interacting with theirs students. 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. In view of this this study explores analysis of supply and utilization of technology equipment on technology knowledge among secondary school teachers in Kano state, Nigeria.

STATEMENT OF THE PROBLEM

It can be challenging for any educational system to develop and achieve its aims without proper application of technology. Information and communication technology has been employed practically all aspect and forms of teaching, learning and assessment be it traditional system or distance education. FRN (2000) on information technology (IT) policy species that; by year 2000 all civil servants and teachers in Nigeria should be computer literate. FRN (2000) document further explained that Nigeria should be among Global IT nations by the year 2005. Today, ICT is a useful tool for students, teachers and other personnel in education system. Communication has been enhanced and education has gone technological. Though these are very common in advanced countries, for developing countries like Nigeria there are some challenges that basically include: absence of ICT equipment, poor capacity development, underutilization of available ICT resources, and cost of ICT resources, poor electricity supply and cost of network. This study is set to investigate the level of demand in schools for technology equipment.

PURPOSE OF THE STUDY

The objectives of this paper are to find out:

1. The relationship among supply and utilization of technology and secondary school teachers' literacy level.
2. The joint effect of supply and utilization of technology and secondary school teachers' literacy level.
3. The relative effect of supply and utilization of technology and secondary school teachers' literacy level

RESEARCH QUESTIONS

1. What is the relationship among supply and utilization of technology and secondary school teachers' literacy level?
2. What is the joint effect of supply and utilization of technology and secondary school teachers' literacy level?
3. What is the relative effect of supply and utilization of technology and secondary school teachers' literacy level?

METHODOLOGY

Design

This study employed descriptive correlation research design to discover the effect of supply and utilization of technology on teachers' technology skills. This designed was appropriate to use because it is used to gather information to describe the present condition, status or trend and deals with what is prevailing.

Population and Sample

The population of this study comprised all secondary school teachers of Kano Municipal local education authority in Kano state. There are sixty two (62) government owned secondary school in this zone out of which twenty schools (31) were randomly selected using hart and draw method. There four hundred and sixty nine (679) teachers in the selected schools from where two hundred and seventeen (260) were selected to serve as sample of the study as advised by research advisors (2006) table for determining sample size. The total two hundred and fifty (250) questionnaires were completely filled and returned, others were either with the respondents or incomplete.

Instrument for Data Collection

A self-developed questionnaire was used to measure the supply and utilization of ICT on literacy level. The instrument consisted 32 items attached based on four point Likert Scale, which range from strongly agree (4), agree (3), disagree (2) and strongly disagree (1). Section one measures demographical variable of the respondents. Section two measures ICT supply for the schools Section three measures utilization of ICT by the teachers. Section four measures the ICT literacy level by teachers. The instrument is face and content validated by experts in the field of curriculum and instructions, educational research and statistics. Their inputs are effected in the final version of the instruments. The instrument is then tried tested to 30 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 reliability index stood at .83.

Procedure for Data Collection

In order to collect first-hand information for the study, the researchers personally went to the field and the instrument was administered to the respondents on the day approved by the school authorities for the exercise. The researchers were helped by vice principals and or senior master in the administration and collection of the questionnaire.

Method of Data Analysis

Pearson Product Moment Correlation (PPMC) was employed to find out the relationship and relative effect among supply and utilization of technology equipment among school teachers' literacy level and also multiple regression statistical analysis was used to analyse the two independent variables; supply and utilization of ICT on teachers ICT literacy level.

Research Question 1: What is the relationship among supply and utilization of technology and secondary school teachers' literacy level?

Table 1: Relationship among Supply and Utilization of Technology and Secondary school teachers' literacy level.

Variables	N	Mean	SD	ICT Literacy level	Supply of ICT	Utilization of ICT
ICT Literacy	250	25.56	4.61	1.00		
Supply of ICT	250	25.96	4.30	.464	1.00	
Utilization of ICT	250	21.28	3.54	.444	.608	1.00

Table 1 comprises descriptive statistics and inter-correlations among the study variables. Teachers' ICT literacy is significantly correlated with 1 supply of ICT (r= .464; < 0.05) and utilization of ICT (r= .444; P<.05). That showed, there were also significant correlations among the independent variables "ICT Supply and Utilization''.

Research Question 2: What is the joint effect of supply and utilization of technology and secondary school teachers' literacy level?

Table 2: Multiple Regression Analysis on Effect of Supply and Utilization of ICT on teachers ICT literacy level.

Multiple R(adjusted)=.251
Multiple R^2(adjusted)=.257
Standard Error Estimate=3.99

ANOVA

	Sum of square (SS)	Df	Mean Square	F
Regression	1360.26	2	680.13	42.64
Residual	3939.08	247	15.94	
Total	5299.34	249		

Table two (2) above shows that the independent variable 'ICT Supply and Utilization' when pulled to gather have significant effect on teachers literacy level. The value of R(adjusted)=.251 and R^2 (adjusted)=.257. The analysis of variance performed on multiple regression yielded an F-ratio value of 42.64 was found to be significant at 0.05 levels.

Research Question 3: What is the relative effect of supply and utilization of technology and secondary school teachers' literacy level?

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Table 3: Effect of supply and utilization of ICT on Secondary School Teachers ICT literacy level

Model	Unstandardized coefficient	standardized coefficient		T	P
	B	Standard Error	Beta		
Constant	9.878	1.719		5.747	.000
Demand of ICT	.330	.074	.308	4.456	.000
Utilization of ICT	.334	.090	.256	3.708	.000

Table 3 above shows that each of the independent variables made a significant contribution to the prediction of teachers ICT level. In terms of magnitude of contribution, demand of ICT made the most significant contribution (Beta=.308; t=4.45; P<0.05) to the prediction follow by utilization of ICT (Beta= .256; t=3.71; P<0.05).

DISCUSSION

Finding there were also significant correlations among the independent variables "ICT Supply and Utilization". This is in line with this study of Babatunde, and Olanrewaju, (2017) investigated supply and utilization of ICT as predictors of ICT literacy among secondary school teachers in Oyo State, Nigeria. The study found that teachers' ICT literacy is significantly correlated with Supply of ICT and Utilization of ICT. They continue to perceive that moderate barriers exist that prevent them from integrating technology into their teaching, with no change over the past 5 years. Teachers need to be supported to get the most from the using ICT in classroom. Also, the findings is in line with the study of Buabeng-Andoh (2019) who concluded that teachers' competence in using computers and technological devices increase their technology integration level in the classes.

Result also indicated that 'ICT Supply and Utilization' when pulled to gather have significant effect on teachers literacy level. this is in line with findings of Babatunde, and Olanrewaju, (2017) who found that independent variables (ICT supply and utilization) when pulled together have significant effects on teacher literacy level 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 to the prediction follow by utilization of ICT.

In line with this finding Sipila (2014) found that teachers' competence level in technology use influences their technology integration. Arslan and Zhu (2017) indicated that teachers' competence determine their integration of technology into teaching process. Also the result agrees with the result of Buabeng-Andoh (2019) that established that teachers' competence in using computers and technological devices increase their technology integration level in the classes.

CONCLUSION

This study examined supply and utilization of technology equipment as predictors of technology knowledge among secondary school teachers in Kano state. Three objectives and three research questions guided the study to find out relationship among supply and utilization of technology and secondary school teachers' literacy level. Based on the findings of the study, persistence low ICT knowledge among teachers needs not to continue forever.

There is anticipation that with the improvement of some factors such as supply and proper utilization of technology equipment in teaching and

learning sector the teachers' skills can be changed for the better. This study discovered some of these factors influence the teachers' knowledge in the school. It was also concluded that teachers knowledge level on can be improved through adequate supply and efficient utilization of technology equipment in the school system.

RECOMMENDATIONS

1. Government and non-governmental organization should provide supportive environment for teachers as well as students so as to improve their technology knowledge and productivity.
2. Teachers are to be trained on how to improve their technology knowledge this is because it has influence on overall literacy level in the school.
3. Community organization should endeavour to ensure that the equipment provided is properly maintained and utilize as expected.
4. School examination officers should intensify their effort to save all examination record (especially internal) in the computer and if possible online. This will ease retrieval of the needy examination result.
5. School managers should organize in-house seminars on the implications of supply and utilization of technology equipment on teachers' effectiveness and technology knowledge.

CONFLICT OF INTEREST

The authors declared no conflict of interest.

ACKNOWLEDGEMENTS

The authors acknowledged the principals of the schools used for the study for their corporation and accommodation. The class teachers who assisted throughout the study are highly appreciated.

DISCLAIMER STATEMENT

We certify that this work is not an extraction of any work.

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