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TABLE OF CONTENTS

INVESTIGATION INTO VOCATIONAL TECHNOLOGY TEACHERS COMPETENCY AND UTILIZATION OF INFORMATION AND COMMUNICATION TECHNOLOGY FOR INSTRUCTIONAL DELIVERY IN LAGOS STATE

OLABIYI, O STEPHEN (Ph.D.)[1], JIMOH, J. A. (Ph.D.)[2] & OWODUNNI, A. SAMUEL (Ph.D)[3]

[1&2]Department of Science and Technology Education,
Faculty of Education, University of Lagos, Akoka
[3]Department of Industrial and Technology Education,
Federal University of Technology Minna, Niger State
E-mail: Solabiyi@unilag.edu.ng **Phone No:** +234-706-220-9015

Abstract

The paper examines effective utilization of ICT tools by technology teachers for efficient instructional delivery. It sought to determine the competency level of ICT required of technology teachers and extent at which technology teachers use ICT to improve students' learning outcomes. The study was conducted in Lagos State Technical Colleges, Nigeria. A descriptive survey research design was used. Structured questionnaire was used for data collection. 210 technology teachers participated in filling the questionnaires. Analysis through the use of Statically Packages for Social Science computer program was carried out on the responses of198 respondents who returned the questionnaires. The findings among other things showed that teachers are to demonstrate competent in: using power point presentation for lesson delivery; incorporate use of media and technology for teaching where appropriate and the extent at which teacher use ICT tools is very low. It was recommended that TVET institutions should spend a considerable amount of time and efforts developing teachers' competency in ICT pedagogy to improve students' learning outcomes.

Key words: Information Communication Technology Tools; Technical and Vocational Education Training (TVET); Learning Outcomes; Competency level and Instructional delivery.

Introduction

A good number of researchers have shown that the quality of learning and teaching can be significantly enhanced when Information communication Technology (ICT) tools is utilized as an intellectual multi-tool. Utilization of ICT tools in various fields of education and training has been a topic of discussion by educational researchers Wang, (2009); Howie and Blignaut, (2009); Bryderup, Larson and Quisgaard (2009); Rogers, (2002); Gulbahar, (2007); Louw, Brown, Muller and Soudien, (2009), Jimoyiannis, (2010), United Nation Education Scientific Culture Organisation (UNESCO), (2008); Asian Development Bank (ADB), (2009), and stakeholders in other sectors of the economy. This might be unconnected to the fact that ICT tools gained its application in almost all areas of educational specialization; in architecture Wang, (2009), mathematics and science Howie and Blignaut, (2009), social sciences Louw et-al, (2009), geographical information system Muniandy & Lateh, (2010), vocational education Jantrakool, (2010) and in other human development programs too numerous to mention.

Educational, financial, social, and professional development sectors have been benefiting from ICT tools for years (Minuandy & Lateh, 2010; Wang, 2009). Utilization of ICT tools in technology education have been one of the major area emphasized by UNESCO, due to the fact that ICT tools are becoming inexpensive, reachable and interactive, in which their application into all levels of education is expected to be imperative in making educational

results labor-market oriented. ICT tools have been recognized to be very powerful tool in education reform. It has radically influenced the way knowledge and information are generated, developed and transmitted. ICT has also reduced the entire world into a global village and replaced the use of physical strength in performing task with automation. Teachers, teacher trainer and educationist who are not familiar with ICT will find themselves threatened by professional obsolescence (Adewoyin, 2009).

Since education is perceived generally as an instrument par excellence for effecting social changes. The Federal Government of Nigeria fully appreciates the role of ICT in national development, consequently, has put in place (in the year 2001), a policy document entitled the national policy for information communication technology. The policy clearly spelt out the ICT vision, mission and policies for Nigeria. Also, Federal Government of Nigeria (FGN), (2004) acknowledge the importance of using ICT in improving knowledge and thus states in the national policy that government shall provide necessary infrastructure and training for the integration of ICT in advancing knowledge and skill in the modern world (FGN, 2004). It is assumed that government policy has been implemented; teacher in our school system must have acquired ICT skills which will help them for effective instructional delivery as well as facilitating teaching and learning. No wonder that Iwiyi (2007) pointed out that computer acquisition and use is an important aspect of the teaching and learning process. If a teacher is to function effectively, and meet with the challenges of the 21st century, the teacher education process must make adequate provision of individualized computer training for would be technology teachers, for a better output.

Information Communication Technology according to Adewoyin (2009) is the new communication and computing technology use for creating, storing, selecting, changing, developing, receiving and displaying many kinds of information. According to Adewoyin ICT is classified into three groups namely: (i) those that process information e.g. computer (ii) those that disseminate information e.g. communication, i.e. electromagnetic devices and system and (iii) those for presentation of information e.g. multimedia. Obi (2002) describe ICT as a technological tools and resources used to communicate, create, organize, disseminate, store, retrieve and manage information. In this study ICT does not only mean computers, it has to do with technological tools. These technological tools according to Chika (2008) include computers, the internet, broadcasting technologies (radio and television) and telephone.

Studies have shown that quality learning and teaching can be significantly improved when ICT is utilized as an academic multi-tool. Teaching is an attempt to assist someone to acquire skills, attitudes, ideas, appreciation and change behavior. The teacher's job therefore is to influence desirable changes in the behaviour in learners through the use of hardware and software such as video, computer, internet, radio. Learning on the other hand is a process of gaining knowledge or acquiring skills or having understanding a new thing and has a better way of carrying it out. Considering the role of technology education in the national development. Technology teachers should possess relevant ICT skills that will aid effective instructional delivery. In view of the importance attached to ICT, relevant authorities in Nigeria have made the acquisition of basic ICT skills and capabilities part of national minimum standards for certification and practice at both Nigerian certificate in education and degree in education. The relevant authorities include National Commission for College of Education (NCCE). National University Commission (NUC) and Teacher Registration Council (TRC). In the word of Njoku (2006) these developments are the strongest indication ever that the era of teachers without ICT skills are gone. To show that you are a teacher today, you must prove your e-capabilities.

For technology education teacher to meet up with the demands of global world, they must be dynamic to innovations in educational system. This will enable Technical and Vocational Education Training (TVET) to achieve the objectives for which it was established. The modern technology must be able to source for information locally and globally as the entire world has become a global village. Materials acquired in one environment can be used to solve problems in another environment. Technical and Vocational Education Training (TVET) is viewed as that form of education involving, in addition to general education, the study of technologies and related sciences, and the acquisition of practical skill, attitudes, understanding and knowledge relating to occupations in various sectors of economic and social life (UNESCO & ILO, 2002; FGN, 2004). According to UNESCO and ILO, and FGN, TVET is further understood to be an integral part of general education, a means of preparing for occupational fields and for effective participation in the world of work, an aspect of lifelong learning, a preparation for responsible citizenship and a method of facilitating poverty alleviation. TVET is one of a recognized and effective process by which quality, up-to-date, information literate and knowledgeable workers are prepared, trained or retrained worldwide.

In a nutshell, TVET prepares human resources for the ever changing world of work. In that, for effective participation in the world of work the study of technologies and related sciences' as reflected in the definition, is of paramount significance that can be realized with adequate ICT arrangement in TVET institutions. Practical skills can now be delivered virtually via a well-organized ICT set up; gone are the days where practical skills are taught using hands-on learning only. Programmed instruction in form of software and interactive video made it easy for practical skills to be taught using ICT. So also, job that requires only hands-on experiences are now possible via computer controlled programs. As such, the need for ICT tools utilization in TVET remains a great challenge, considering the impact ICT tools make in the world of work that needs knowledgeable workers skilled in information technologies. By implication, the use of ICT tools in the training, up-grading and re-training of workers is of paramount significance and an essential aspect of teaching's cultural toolkit in the twenty first century, affording new and transformative models of development.

In Nigeria, TVET courses were taught in secondary schools, Technical colleges, Colleges of education (Technical), Polytechnics and Universities to produce skilled, semi-skilled manpower, craftsmen/master craftsmen, and technical teachers at Nigerian Certificate in Education (NCE) and bachelor level and technicians/technologists, in various sectors of the economy for industrial and technological development (Federal Government of Nigeria (FGN), 2000).

In technology education students have to relate directly with tools, equipment, materials and situation which can be visualized through ICT. ICT plays vital role in sourcing, assessing, retrieving and managing information that can facilitate teaching and learning. If technology teachers are ICT compliance, they can browse on the internet to get useful information which could be of help in technology education instruction. They can use computer to store and retrieve information, television and radio which form part of technological tools can also be used as instructional strategy to facilitate teaching and learning which enhance their competencies. Competency is a standardized skill or set of skills for an individual to perform a specific job. Competency is ability to do something well, measured against a standard especially acquired through experience or training. Technology education materials can be store in disk, CD-ROM, Memory card, Flash drives, and can be used during instruction. Any teacher who is knowledgeable in the use of ICT tools is at liberty to judiciously use any of these technologies to enrich teaching and learning. In agreement with the above facts Chika (2008) succinctly puts that ICT tools can provide easy

access to information source, enable communication, create interacting learning environment and promote change in methods of instruction. Quality and access to up-to-date materials can be improved while offsetting some cost of textbooks.

Statement of the Problem

Despite the importance of ICT tools for teachers in improving knowledge, and how it affects technology education subjects and use it in their teaching. Literature reveals that technology education teachers lack knowledge and skills for presentation of ICT teaching materials, lack of teacher competency (Albirini, 2006), and teachers slowness to adopt ICT (Hayes, 2007). Majority of technology teachers in our secondary schools and technical colleges do not have fundamental knowledge of ICT tools. This invariably jeopardizing the fundamental objectives of vocational technical education and vision, mission and policy of ICT as stated in the National Policy of ICT (2001) to produce ICT- skilled graduates. A nation with high turnover rate of TVET graduates and graduates not being employed or under employed is certainly in a problem socially, economically and politically. This situation may ultimately lead to frustration, lawlessness and brain drain of its citizen. To prevent such situation, TVET institutions, whose part of responsibility is to prepare individual for (self-) employment and to be a medium of evolution for people to the world of work; by making individual to have a sense of belonging in their communities.

Purpose of the Study

The main purpose of the study is to investigate vocational teacher's competency and utilization of ITC for instructional delivery in Lagos State. Specifically, the study sought to determine:

(i) The ICT competencies required of technology education teachers to enhance effective instructional delivery.

(ii) The extent to which technology education teachers use ICT tools to improve students' learning outcome.

Research Questions

Base on the purpose of the study, the following research questions are raised;

(i) What is the competencies level of ICT required of technology education teachers to enhance effective instructional delivery?

(ii) To what extent do technology education teachers use ICT tools to improve students' learning outcomes?

Hypotheses

The following non hypothesis were formulated to guide the study and tested at 0.05 level of significance

H_{O1}: Is there any significant difference in the mean responses of NCE (Technical) and Bachelor degree Technology teachers regarding the competencies level of ICT required to enhance effective instructional delivery.

H_{O2}: Is there any significant difference in the mean responses of NCE (Technical) and B.Ed Technology teachers regarding the extent at which they make use ICT tools to improve students' learning outcomes.

Methodology

The research employed descriptive survey research design. Two hundred and ten (210) technology/vocational teachers in the five state own Lagos technical colleges participated in the study which comprise of 52 NCE (Technical) and 158 B. Ed (Technology) teachers. Structure questionnaire and observation were used as instrument to collect data from respondents. The instrument has three sections. Section A, B' and C'. Section 'A' sought

information on personal data of the respondents such as gender years of experience and age. Section 'B' contains information on the competencies level of ICT required of technology teachers to enhance teaching and students learning outcomes. Section 'C' contains items on extent at which technology teachers use ICT tools to improve learning outcomes. The questionnaire items were structured on a likert scale type. The questionnaire was subjected to face and content validation by three experts from Department of Science and Technology Education, University of Lagos. The internal consistency of the instrument was determined using Cronbach Alpha. The instrument was administered on twenty technical teachers in Federal college of science and Technical. Yaba, Lagos. The reliability coefficient established were as follows: Section B-ά =.80; Section C – ά = .82; and overall – ά =. 88. The instrument was administered by the researcher through personal contact. Out of 210 questionnaires administered, 198 were duly filled and returned by the respondents. These represented 94.2% rate of return. Data generated from the questionnaire were analyzed using mean, standard deviation, t-test statistics at .05 level of significance. SPSS was used in the data computation.

Results

Research Question 1. What are the *ICT Competencies required of technology teacher to enhance effective instructional delivery*

In order to answer Research Question 1, mean and standard deviation of respondents was carried out and presented in Table 1.

Table 1: ICT competencies required of technology teachers to enhance effective instructional delivery N= 198

S/N	ICT Competencies required of technology teacher to enhance effective instructional delivery	Mean	SD
1	Starting and shutting down computer system/peripherals successful	4.08	.63
2	Ability to identify and use of icons, menu and window clearly	3.60	.86
3	Competent to make backup copies of documents and files	4.52	.50
4	Protect and care for storage media	4.44	.50
5	Skilled in cutting, copy and paste document/text	4.00	.50
6	Using words processing for typing and other applications correctly	4.71	.45
7	Skill to prepare and use power point presentation for lesson delivery	4.47	.50
8	Design and management of learning environment and resources	4.69	.45
9	Use media and tools to address differences in learning and performance	4.70	.51
10	Incorporate use of media and technology for teaching where appropriate	3.55	.52
11	Use technology tools to support learning of student with learning disability	4.32	.76
12	Select and create learning experiences relevant to learners and based principle of effective teaching	3.97	.93
13	Develop performance tasks that require students to locate and analyze information as well as draw conclusion.	4.28	.55
14	Ability to add and delete documents on computer	4.08	.54
15	Ability to use computer and video source for large screen presentation	4.21	.83
16	Use varieties of media to communicate and present information clearly	3.95	.71
	Overall mean	**4.15**	**.88**

Table 1 above presents technology teachers' average total scores and standard deviations on ICT competencies required to enhance effective instructional delivery. The overall score of (4.15) shows that technology teachers required these skills to effectively carry out instructional delivery. Among ICT competencies required are: ability to identify and use of

icons, menu and window clearly; use words processing for typing and other applications correctly; skill to prepare and use power point presentation for lesson delivery; incorporate use of media and technology for teaching where appropriate; use media and technology to support learning of student with learning disability and use varieties of media to communicate and present information clearly. With means values ranges from 3.60 to 4.71above the cut-off point of 3.50.

Research Question 2. To what Extent do technology education teachers use ICT tools to improve students' learning outcomes

In order to answer Research Question 2 mean score and standard deviation of respondents was completed.

Table 2: Extent at which technology education teachers use ICT tools to improve students' learning outcomes N=198

S/NC	Extent at which technology teachers use ICT tools to improve students' learning outcomes	Mean	SD
1	Practical skills are easy to be taught using programmed instruction in form of software	2.67	.53
2	Regular use core-draw to develop, design and drawing as well as print materials improve student skills	2.98	.46
3	Micro-soft excel to is very effective in preparing students records and results	3.01	.50
4	Use of power point presentation for lesson delivery to students regularly enhance students performance	2,68	.45
5	I usually connect video and devices with computer to present information for large screen display for students	3.00	.55
6	Regular browsing on internet enhance source for relevant materials in instructional delivery	3.56	.65
7	I make use of white board in instruction delivery	2.06	.40
8	C-drom and other storage tools are effective to store relevant materials obtain from internet and computers	3.67	.65
9	Interactive video made it easy for practical skills to be taught using ICT tools.	2.56	.51
10	Television and radio part of technological tools are used as instructional strategy to facilitate teaching and learning	2.89	.52
11	Application of smart board to develop cognitive and affective skill in students	2.43	.76
	Overall mean	**3.01**	**.93**

Results presented in Table 2, shows the responses of respondents on the extent at which technology education teachers use ICT tools to improve students' learning outcomes was low as they disagree with most items among which include: practical skills are easy to be taught using programmed instruction in form of software; regular use core-draw to develop, design and drawing as well as print materials improve student skills; micro-soft excel to is very effective in preparing students records and results and use of power point presentation for lesson delivery to students regularly enhance students' performance. With means values ranges from 2.43 to 3.01below the cut-off point of 3.50.

Testing of the Hypotheses

Hypothesis 1: Is there any significant difference in the mean responses of NCE (Technical) and Bachelor Degree Technology teachers regarding the competencies level of ICT required to enhance effective instructional delivery.

In order to test the hypothesis on the competencies level of ICT required in enhancing effective instructional delivery; an independence sample t-test was conducted to compare the mean scores of NCE and Degree teachers. The independent sample t-test scores were presented in Table 3.

Table 3: t-test results of respondents on the competencies level of ICT required in enhancing effective instructional delivery N=210

Variables	N	df	$\bar{X}$	*SD*	F	ρ
NCE (Technical) teachers	52	208	3.64	.50	.258	.797
Bachelor degree teachers	158		3.57	.61		

As shown in Table 3, there were no statistically significant differences between the NCE (Technical) and Degree technology teachers in Lagos state technical colleges' means scores on ICT competencies required in enhancing effective instructional delivery. ($t=.258, \rho>.05$) In order words technology teachers in technical colleges are required to possess certain level of competencies to enhance effective instructional delivery.

Hypothesis 2: H_{02}: Is there any significant difference in the mean responses of NCE (Technical) and B. Ed Technology teachers regarding the extent at which they make use ICT tools to improve students' learning outcomes.

In order to investigate the extent at which NCE (Technical) and Bachelor degree technology teachers use ICT tools to improve students' learning outcomes; an independence sample t-test was conducted to compare the mean scores of NCE (Technical) and Bachelor degree teachers. The independent sample t-test scores were presented in Table 4.

Table 4: t test results of respondents on the extent at which NCE (Technical) and Bachelor degree technology teachers use ICT tools to improve students' learning outcomes (N=210)

Variables	N	df	$\bar{X}$	*SD*	F	ρ
NCE (Technology)Teachers	62	208	4.20	.38	.659	.512
Bachelor degree Teachers	35		4.63	.48		

As seen in Table 4, Bachelor degree teachers in Lagos technical college had relatively higher mean scores than NCE (Technical) teachers. However, there were no statistically significant differences between the NCE (Technical) and Bachelor degree teachers mean scores on the extent at which they make use of ICT tools to improve students' learning outcomes ($t=.659, \rho>.05$). The results show that degree teacher use ICT tools more often than NCE teachers and thereby influence students learning outcomes.

Discussion

ICT competencies are measured in terms of ability of technology teachers to effectively use ICT tools to carry out their assignment properly, measured against a standard especially acquired through experience or training i.e. from skilled-based to ICT-Capable work force. The competencies required of technology teachers identified from the study are: Skill to

prepare and use power point presentation for lesson delivery; design and management of learning environment and resources; incorporate use of media and technology for teaching where appropriate; use media and technology to support learning of student with learning disability; select and create learning experiences relevant to learners and based principle of effective teaching and ability to use computer and video source for large screen presentation. The findings support previous research work on utilization of ICT in teaching and learning process. Njoku (2006) found out that technology teachers should possess necessary skills that will help them use ICT for effective instructional delivery, Adewoyin (2009) emphasized that if technology teachers is to function effectively, and meet the challenges of 21st century, teachers must be competent to use ICT tools. Albirini (2006) in his study found lack of teacher competency in schools as a main obstacle to their utilization. As such, serious work needs to be done to curtail the worseness of the situation, considering the fact that the fast changing world of work never awaits anybody. Also, Hayes (2007) stated that teachers' slowness to utilize ICT reflects their effort to discern how best to incorporate new technologies into old teaching practices. In order to ensure that ICT tools meet learners' educational needs, teachers should be competent to facilitate ICT-mediated learning.

Determine the extent at which technology education teachers use ICT tools to improve students' learning outcome, as shown in table 2 revealed that majority of respondents disagree that practical skills are easy to be taught using programmed instruction in form of software; micro-soft excel is very effective in preparing students records and results; use of power point presentation for lesson delivery to students regularly enhance students' performance; use of white board in instruction delivery; usually connect video and devices with computer to present information for large screen display for students and application of smart board to develop cognitive and affective skill in students. The findings supported the view of Chika (2008) who found out that majority of secondary and technical college teachers do not possess the necessary competent and therefore cannot use ICT tools to obtain information and materials for improving learning outcome. Adewoyin (2009) lament that TVET institutions do not use ICT resources to cope with the challenges and at the same time our education and training system are not adequately and effectively equipped to provide opportunity for teachers to use ICT tools and retraining of teachers. Allan (2003) Observed that when ICT tools are appropriately used, it offers an excellent and powerful tool to facilitate the improved delivery of many courses and modules. So familiarization with the ICT tools provides a whole range of pedagogical options Forsyth, Jolliffe & Stevens (1995): Maier, Barnett, Warren & Brunner, (1998) ICT tools can be utilized in the curriculum to facilitate learning by those with different learning styles. It should, if integrated and used properly, encourage and support more professional delivery of teaching and learning materials and thus facilitate student learning outcome.

Implication of the Findings

The study has shown that utilization of ICT tools eases the expansion and reinforcement of TVET by enhancing networking and knowledge sharing opportunities, also has the capability to make available practical learning experiences that are needed to the direct work situations. The study sensitizes TVET institutions to establish the necessary measures that need to take to ensure that TVET teachers possess the necessary ICT competencies. These may include conducting needs assessments to determine the ICT comfort level of teachers, establishing minimum training standards, developing training plans and establishing appropriate mechanisms to monitor training results. The study further sensitizes technology teachers need to develop themselves on the use of ICT by vigorously pursue ICT training with seriousness for teaching and learning process. As such, serious work needs to be done to curtail the worseness of the situation, considering the fact that the fast changing world of

work never awaits anybody. This situation also poses a great challenge to stakeholders, policy makers and curriculum implementers.

Conclusion

The study has revealed that ICT tools are globally recognized tools that needs to be fully utilized in all educational fields especially TVET, considering the nature and the importance of TVET to the economic, industrial and human resources development, in public or private sector. However, the finding of study shows that technology teachers required skill to prepare and use power point presentation for lesson delivery; design and management of learning environment and resources; incorporate use of media and technology for teaching where appropriate; select and create learning experiences relevant to learners and based principle of effective teaching and ability to use computer and video source for large screen presentation.

The findings of this study further show that technology teachers use of ICT tools is very low as respondents disagree that micro-soft excel is very effective in preparing students records and results; use of power point presentation for lesson delivery to students regularly enhance students' performance; use of white board in instruction delivery; usually connect video and devices with computer to present information for large screen display for students and application of smart board to develop cognitive and affective skill in students. It was recommended that Federal and state government should ensure that her policy statement regarding the provision of necessary infrastructure and training for the utilization of ICT tools in the school system is effectively implemented. Teachers and TVET institutions should spend a considerable amount of time and efforts developing teachers' competency in ICT pedagogy to improve students' learning outcomes.

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