



UTILIZATION OF INFORMATION AND COMMUNICATION TECHNOLOGY COMPETENCIES BY MECHANICAL TRADES TEACHERS OF TECHNICAL COLLEGES IN PLATEAU STATE

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Abstract

The rapid proliferation of Information and Communication Technology (ICT) has placed new demands on competencies needed to fully, effectively participate and progress in the new information technology society. This challenge posed by ICT is of great concern to technical education. Technical education trains and develops manpower in quantity and quality to meet societal needs and contributes to National development. The technical teacher is a major player in achieving this goal. This study was designed to investigate the utilization of ICT competencies, for quality teaching and learning of mechanical trades in technical colleges of Plateau State. Specifically, the study determined the extent of ICT competencies needed by mechanical trade teachers for computer operation. A research question and hypothesis were formulated to guide the study. A descriptive survey design was employed for the study. The study was carried out in the two technical colleges of Plateau State namely, GTCBukururu and John Bosco Technical College Kuru. The population of the study comprised 16 mechanical trades teachers and 3 Administrators. A structured questionnaire containing 19 items was used for data the collection. Reliability test of the instrument was carried out using Cronbach alpha. The findings of the study revealed that the teachers do not have the needed competencies for the effective utilization of ICT facilities in the technical college of Plateau State. Based on these findings it was recommended that teachers should be trained to acquire the needed competencies so as to ensure effective utilization of ICT facilities in the teaching and learning of mechanical trades in the technical colleges of Plateau State.

Keywords: *Information and communication Technology (ICT), Technical teachers, Mechanical trades, Technical colleges*

Introduction

The modern world we now live in is dominated by Information and Communication Technology (ICT). The application of ICT has affected virtually every aspect of life, be it in agriculture, commerce, transportation, manufacturing etc. ICT is a term that covers any



product that will store, retrieve, manipulate, transmit, or receive information electronically in a digital form, e.g. personal computers, digital television, email, robots. (Wikipedia, 2018). One of the areas that ICT have had tremendous impact is in education. Kalu and Eweme (2003) described education as a process through which one generation transfers or import the ideals and values of the society to the next generation in an unending process. Indeed, ICT has not only changed the way people live, work, play and study but has also changed the teaching and learning processes.

The chalk and talk method had been applied in the teaching and learning processes for centuries; today the emergence of ICT can be used not only to supplement teaching, but to take over as medium of passing information and the entire pedagogical issues, at least in a phase by phase process. No wonder, Begho in Garba, Guga and Yusuf (2016) noted that electronic media is accepted globally as a major factor in pedagogical issues, where many western countries have made it compulsory for all teachers to undergo ICTs certification, regardless of their subject area. Furthermore, the usage of ICTs is geared towards ensuring the attainment of qualitative education for the enhancement of sustainable socio-economic development, global competitiveness and the individual's ability to survive in the contemporary environment. This can lead to the production of graduates of the educational system that can survive in the contemporary society, sustain national development and can compete globally (FRN, 2016). ICT can enable a global outreach for sharing of knowledge, materials and data bases, quickly and cheaply over long geographically distances using online resource.

Paradoxically though, one of the areas that ICTs has had little impact is in education, especially Technical Vocational Education and Training (Oluwatumbi, 2015). The National Policy on Education described Technical Vocational Education and Training (TVET) as that aspect of education involving in addition to general education, the studies of technologies and related sciences and the acquisition of practical skills attitudes, understanding and knowledge relating to the occupations in various sectors of economic and social life (FRN, 2016). The policy specifies that Technical Colleges should produce craftsmen at senior secondary level (FRN, 2016:40). The courses offered at the technical colleges lead to the award of the National Technical Certificate (NTC).

The curriculum of technical colleges includes mechanical trades. Mechanical trades is a general name used in describing trades that have direct bearing with metals, welding/forming and or servicing/repairs of machines or machine related equipment and appliances (FRN, 2016). In mechanical trade skill learning, students must relate directly with tools, equipment, instruments, special relationships etc. The common mechanical trade skills include general metalwork, welding and fabrication, automobile repairs, metal machining etc.

Broadly, competency in teaching mechanical trades is eventually anchored on subject matter mastery and instructional technique. However, beyond these basic skills is the



for mechanical trade teacher to be able to apply ICT skills in the preparation, presentation and evaluation learning. For instance, there is the need for the teacher to be able to access learning resources, and ability to deploy the most effective method of presenting practical exercises. The competency in handling ICT tools in teaching mechanical trades therefore becomes necessary. Unfortunately, in Nigeria today, the traditional method of teaching and learning remain unchanged (Amunche & Iyekekpolor, 2014). The absence of ICT skills among the technical teachers could spell doom as learners may fail to access quality education as ICT has been identified as the best way of improving learning.

The importance of ICT in learning is well captured in the National Policy document for Information and Communication Technology which clearly spells out the ICT vision and mission for Nigeria (FRN, 2010). Access to computers and other ICT materials are important aspect of teaching and learning which mechanical trades' teachers must acquaint to function effectively to meet the learning challenges of the 21st century. There are strong suggestions that success in ensuring that teachers acquire the competencies and knowledge needed in using ICT effectively open doors to all kinds of new educational opportunities for changing their classrooms practice (Amunche and Kpoler, 2014). In the same manner, Akudolu (2006) points out that the benefit of ICT can only be realized when teachers develop necessary pedagogical competencies for instruction using ICT. Teacher competencies in handling instruction for mechanical trades are therefore fundamental for effective learning.

In spite the importance of ICT in learning, the situation of the use of ICT in the technical college in Plateau State appears to be poor, as most mechanical trades teachers don't seem to utilize ICT facilities for their instruction. The consequence is that teachers still rely on the traditional method of instruction. This practice confirms the study by Abdulkadir (2011) who lamented the lack of utilization of ICT in teaching and learning in most technical colleges in Nigeria. Buttressing this assertion, Olayanji (2007) cautioned on the danger of neglecting the application of ICT in TVET.

Whether the teacher is involved in higher education, secondary education, elementary or special education, it is necessary for all to catch up, keep up, and put up with fast moving ICT. Not since the introduction of blackboard has there been a piece of equipment to make such a difference in how teaching and learning take place. Thus, it is no longer acceptable for technical teachers to be ICT illiterate. As ICT combines to change and evolve, technical teachers must continue to strive to excellence in their work. This demands that technical teachers acquire the new set of skills to efficiently participate in the technology-driven economy.

Basic operational knowledge and skill of computer is a core ICT competency needed of every ICT user. Williams, Wilson, Richardson, Turkson and Coles (1998) found that even where teachers have firm ideas of how they would like to apply ICT in the classrooms, they can be held back by lack of technical skills and knowledge in their operation. The ultimate goal may be the effective use of ICT in teaching and learning but there is a feeling amongst teachers that they first need to build up their basic skills and



confidence. A fair knowledge of ICT competency in operating computer is pre-requisite for acquiring other ICT competencies.

Statement of the Problem

Advances in technology have brought instructional materials especially the Information and Communication Technologies (ICTs) to the forefront as the most radical tools of globalization and social development which have affected the classroom teaching/learning situation positively. With them both teaching and learning become very pleasant experiences and less stressful. While acknowledging that the issue of instructional materials may not be easily resolved, it is important to remark that teachers should not use lack of instructional materials as an excuse not to teach well. However, Current reality is that, most teachers depend mostly on textbooks and chalkboards as instructional materials while other relevant ICTs such as overhead projectors, digital televisions, and computers were sparingly used in aiding teaching.

Okabia (2011) noted other problems associated with the utilization of ICTs in most parts of Nigeria, including cost, power supply, poor network, non-availability, poor utilization and maintenance skill. But, Information and Communication Technology (ICT) affect virtually all aspects of life in the modern world and in recent times the integration of ICTs in teacher training programmes have been the topic of much debate because educational systems around the world are under increased pressure to use the ICTs to teach knowledge and skills that students need in the 21st century. The dominant role of ICT means that there must be adequate presence and utilization of ICT in teaching and learning at all levels. The utilization of ICT in Technical and Vocational Education and Training (TVET) is even more important for both the teachers and students because of the need for applied learning at this level. For mechanical trades studies, ICT plays an even more significant role in learning, hence the need for teachers in mechanical trades in Plateau State to be competent in handling ICT for effective teaching and learning.

According to Abdulkadir (2011), literature available points that most teachers are deficient in the aspect of utilization of ICT in teaching and learning in technical colleges. The competency of mechanical trade teachers could make them be aware of the best application of ICT in teaching as well as encourage teachers for more skills and competencies necessary for sourcing for relevant issues that affect the mechanical trades in general. The problem of the study therefore is the low utilization of ICT in teachers of mechanical trades in technical colleges in Plateau state.

Successful integration of ICT into TVET classrooms will depend not only on the ability of mechanical trade teachers of technical colleges structure the learning environment into non-traditional ways, but to also merge new technology with new pedagogy and to develop socially active classrooms in order to encourage cooperation, interrelation, collaborative learning and group work. Therefore, the problem of this study therefore is the lack for empirical data on ICT competencies by teachers of mechanical trades in technical colleges of Plateau State.



Purpose of the Study

The purpose of the study specifically is to determine the utilization of ICT competencies by teachers of mechanical trades in technical colleges of Plateau State.

Research Question

One research question was formulated for the study:

What is the level of utilization of ICT competencies by teachers for in mechanical trades in technical colleges of Plateau State?

Hypothesis

A hypothesis was postulated and tested at 0.05 significant level:

Ho: There is no significant difference between the mean response of mechanical teachers from technical colleges of Plateau State and administrators in the ministry of education on the extent of utilization of ICT competencies by mechanical trade teachers of technical colleges in Plateau state.

Method

The population of the study consisted of all the 23 mechanical trade teachers in the two technical colleges in Plateau State and 3 administrators from the department of Science and Technology, Ministry of Education, Jos. There were 16 teachers at Government Technical College Bukuru, 7 teachers at St. John Bosco Technical College, Kuru and 3 administrators of the Ministry of Education. There was no sampling as the population was manageable. A structured questionnaire was developed to obtain information from the subjects of the study (Mechanical trades teachers and administrators). The instrument was validated by two experts in TVET from the University of Jos. The internal consistency of the instrument was ascertained using Cronbach alpha and a reliability coefficient of 0.87 was obtained. Data collected in the study were analyzed by using the mean and standard deviation. The mean of an item was interpreted in relation to the real limits of the nominal value of the scale used for data collection. A cut-off point of 2.50 was used to determine which item was accepted or rejected. Based on this cut-off, any item with mean score equal to or greater than 2.50 was accepted and any item with less than 2.50 was rejected. T-test statistics (for independent samples) was used to test the null hypothesis at 0.05 of significance using the Statistical Package for Social Science (SPSS) from computer software.

Results

Research Question

What is the level of utilization of ICT competencies by teachers in mechanical trades in technical colleges of Plateau State?

Data collected in respect of this research question are presented in table 1.



Table 1: Mean rating of the respondents on the level of the utilization of ICT competencies. (N =19) (U = Utilized, NU = Not Utilized)

| S/N | Level of utilization of ICT Competencies | Mean (\bar{x}) | SD | Decision |
|---------------------|---|-----------------------|------------|-----------|
| 1. | Setup system Computer | 1.2 | 0.8 | NU |
| 2. | Connect and install peripheral devices (printer, scanner, etc. | 1.1 | 0.97 | NU |
| 3. | Start up and shut down computer | 1.47 | 0.5 | NU |
| 4. | Make backup copies of key applications and documents | 1.05 | 0.23 | NU |
| 5. | Install and upgrade an application | 1.0 | 1.02 | NU |
| 6. | Identify and use icons, windows and menu | 1.2 | 0.2 | NU |
| 7. | Start an application, create and save document using save and save as command | 1.3 | 0.48 | NU |
| 8. | Insert and eject external storage devices (floppy, flash, CD) | 1.47 | 0.5 | NU |
| 9. | Initialized, name/rename storage devices and folders | 1.47 | 0.5 | NU |
| 10. | Copy from hard disk to external storage drives and vice versa | 1.37 | 0.49 | NU |
| 11. | Recognize different file types and adjust file format for easy exchange | 1.3 | 0.97 | NU |
| 12. | Effectively use Word Processor e.g. MS Word, Word Perfect | 1.0 | 1.02 | NU |
| 13. | Effectively use Presentation Software e.g. MS Power Point | 1.2 | 0.8 | NU |
| 14. | Effectively use of Spreadsheets e.g. MS Excel, Multiplan, Super Calc | 1.05 | 0.23 | NU |
| 15. | Effectively use of Desktop Publisher e.g. MS Publisher, Ventura publisher, Adobe Page/maker | 1.1 | 0.97 | NU |
| 16. | Effectively use Computer Aided Design e.g. AutoCAD. Anita Cad. | 1.0 | 1.02 | NU |
| 17. | Effectively use Computer Aided Manufacturing (CAM) | 1.0 | 0.02 | NU |
| 18. | Effectively use of computer design e.g. Corel Draw, Adobe Illustrator | 1.0 | 1.02 | NU |
| 19. | Effectively use of control technology/robotics | 1.0 | 1.02 | NU |
| Overall mean | | 1.2 | 1.5 | NU |

Data in table 1 show that nineteen items had their mean values ranging from 1.0 to 1.47. These values are below the criterion value point of 2.50, indicating that the level of utilization of ICT competencies needed for computer operation by the mechanical trade's teachers in technical colleges of Plateau State was low. This indicates that all the respondents in the study have little or no ICT competencies fir computer operation. The standard



deviation of all the nineteen items ranged from 0.32 to 1.20 indicating that respondents were not far from mean and from one another in their responses. The overall mean (1.2) of all the items on the level of utilization of ICT competencies for computer operation was low. This indicates that teachers of mechanical trades in Plateau State have little or no competencies for computer operation.

Hypothesis

There is no significant difference between the mean responses of mechanical trades teachers from technical colleges of plateau state and their administrators on the extent of utilization of ICT competencies in technical colleges in Plateau State.

Data collected in respect to this null hypothesis are shown in Table 2.

Table 2: T-test comparison between mechanical trades teachers and their administrators on the extent of utilization of ICT competencies in technical colleges in Plateau State.

| | n | \bar{x} | S^2 | df | t-cal | t-tab | Decision |
|----------------|----|-----------|-------|----|---------|-------|--------------|
| Teachers | 16 | 16.23 | 4.02 | 17 | -5.4606 | 2.110 | Accept H_0 |
| Administrators | 3 | 19.33 | 0.213 | | | | |

Data in Table 2 above show that the calculated t-value is -5.406 and is less than t-value of 2.110 at 17 degree of freedom at 0.05 level of significance. Consequently, the null hypothesis was accepted and based on this result; teachers of mechanical trades in Plateau State do not differ significantly from their administrators on the extent of utilization of ICT competencies neededfor computer operation.

Discussion of Results

The research question sought to find out the level of utilization of ICT competencies in computer operation. From the findings presented in table 2, the respondents indicated that they lacked ICT competencies for computer operations. The study revealed that the present ICT competencies of teachers in computer is too low and needs to be improved upon and sustained in order to enhance teaching and learning in the technical colleges of Plateau State. This is in line with the views of Ayeni&Ogunbaru (2013) who stressed that in spite of the benefit of ICTs in education, most teachers have not taken the advantages in their classroom teaching and professional development. Ayeni&Ogunbaru (2013) further stressed that the adduced for non-utilization of ICT in teaching and learning process were inadequacy of ICT facilities for the teaming population of teachers who needed them. The use of ICTshas not been institutionalized in our schools and colleges (Aleburu&Olusanya, 2007; Kundishrra, 2018). The new innovation of ICTs in teaching and learning process is still a dream yet to be realized in most technical colleges, thus traditional world of paper is still the order of the day (Abdulkadir, 2011).



Since computer operation skills are pre-requisite to acquiring other ICT competencies, there is the need for technical teachers to be trained on computer operation. Almas and Nilson (2006) observed that technical skills were the first step to acquire knowledge about ICT. Gulbahar and Guven 2008 found out that the main barrier to technology implementation is insufficiency of teachers' technical knowledge to prepare materials based on technology. As it was observed in the study of Williams, Wilson, Richardson, Turson and Coles (1998), that even where teachers have firm ideas of how technology can be applied in the classroom, they were held back by lack of technical skills and knowledge.

The hypothesis, which was formulated for the research question was accepted on the findings presented in table 2. This was because t-value of all the items of the instrument falls below the critical t-value of 2.50. Therefore, it implies that there was no significant mean difference in the mean responses of teachers and administrators with regards to the utilization of ICT competencies needed for computer operation in technical colleges of Plateau State.

This finding agrees with Abdulkadir and Ma'aji (2014) who noted that in spite of the benefits of ICTs in education, most teachers are not utilizing them for the teaching and learning.

Conclusion

The study thereby concluded that competence in the operation of ICT tools such as computer can be used for effective instructional planning, delivery in the technical colleges in Plateau State. This finding when properly utilized by the government and other stakeholders in Plateau State could possibly help to enhance the rate and adoption of ICT tools for instructions in the technical colleges in the state for effective instructional delivery in line with the current struggle for e-learning and technological advancement.

Recommendations

Based on the findings of the study, the following recommendations were made:

1. TVET teacher's preparatory program/curriculum should be reviewed so that relevant ICT competencies that will meet the needs of the technical teachers as well as the demands of the knowledge economy will be incorporated.
2. ICT should be helped and encouraged through in-service educational activities to become competent in and the receptive to ICT.
3. Technical teachers in the technical colleges in Plateau State should be sent by their employers on in-service training to upgrade their skills in ICT, particularly in the area of integrating ICT into the courses they teach.
4. Technical colleges should make ICT facilities sufficient enough to expose their teachers to current and emerging ICT facilities meant for teaching purposes.



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