Determining Information and Communication Technology Competencies for the Teaching and Learning of Technology and Vocational Education in Technical Colleges of Enugu State Nigeria

Edwin Chizoba Isani[1], Sarah Salihu[2]

Department of Vocational Education, Modibbo Adama University of Technology, Yola, Adamawa State, NIGERIA.

[1]dr.edwinisani@gmail.com

ABSTRACT

This study was designed by the researcher to determine the ICT competencies required for the teaching and learning of technology and vocational education in Enugu state. To accomplish this, one research question and one researcher hypothesis were formulated based on the objectives of the study. Descriptive survey research design was used. The study convened the entire technical colleges in Enugu state. Data were collected using questionnaires administrated to 454 vocational technical teachers in the state. Data were analyzed using mean, standard deviation and t- test statistics was used to test the hypothesis. It was discovered that technical teachers require ICT competencies for teaching and learning of TVE. There were no significant different in the mean ratings of Urban and rural technical teachers in the study area. It was therefore recommended that; the national board for technical education should include the findings in the curriculum. Workshops should be organized for technical teachers to acquaint them with the ICT teaching competencies.

Keywords: Information and communication competencies, teaching and learning, vocational education

INTRODUCTION

Globalization has created a new world order for doing business. New information and communication technologies have drastically changed the way we live, learn, work and even think about work. The synergy of combining globalization with new technology has had dramatic economic and social impacts; it has created new opportunities as well as new challenges and uncertainty. Many workers have been dislocated, while a significant number of young people are

structurally unemployed or underemployed (shepherd 2001) skills polarization between so-called mind or knowledge workers and unskilled-low-knowledge worker has widened the gap in income inequalities. Youth, women and old workers are group most affected.

While these changes have brought about considerable challenges to technology and vocational education (TVE), they have created new opportunities for change and innovation. In the past the status and condition of vocational education did not match the importance of its potential contribution to society.

However, in this new environment where human capital has become the most critical element in achieving a competitive advantage, TVE can now aim to reach its full potential.

According to Norton,(2009), information and communication technologies drives the new economy and human capital as its fuel. The ICT revolution makes knowledge competitive resources in this economic era, Economic prosperity depends on brain rather than brawn and value is created by employing knowledgeable workers and continues learning. The need for

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recurrent education and the changing labour market conditions, call for flexible access to TVE. Continuing education models that will meet workers lifelong learning needs have to be relevant and flexible to provide just –in time learning without distance. ITC can play a crucial role in removing distance from education and in developing a lifelong learning culture in TVE. In spite of these potentials little is known regarding the usage of ITC in TVE in the study area. This study is therefore intended to bridge the knowledge gap through the development of ICT competencies for teaching and learning of vocational education subjects in technical collages.

The Area of the study is Enugu state of Nigeria. Enugu state is located in the Southeast geo-political zone of Nigeria. It is then the capital of eastern region of Nigeria. The state is bounded in the East by, Ebonyi state, North by Kogi state, South by Abia state and west by Anambra state. It is a state remarkably known for coal deposit. The state has 27 technical colleges located in the three senatorial zones thus Enugueast 7 Enugunorth10 and Enuguwest 10 respectively.

Information and Communication Technologies for Teaching and Learning

ICTS are revolutionizing education by removing distance from education and making knowledge accessible to all (Canda, 2007) .Technology enhanced learning will play a crucial role in the development of a lifelong learning culture and has the capacity to empower learning by providing them with multiple pathway that offer choices and channels to meet their education and training needs. Human Resources Development, (1998). It is not surprising therefore to see a growing interest in technology based learning (TBL) across the world. TBL may be defined as the array of hardware and software used in teaching and learning system that include computer- based training system multimedia system, electronic performance support system telecommunications systems, as well as the internet

with World Wide Web systems. The rate at which the internet is being accessed keeps increasing at light speed (Bowe,2011). TBL can enhance teaching and learning; it has the potential to become cost–effective as it offers greater flexibility regarding time and location of training delivery. Additionally, TBL may facilitate institutional policy regarding access and equity. Technologies also provide greater flexibility to adapt teaching and learning to meet learners cognitive and learning styles.

Attwell, (1999) noted that although ITCs are by the most significant element undergirding the foundation of TVE, there is a paucity of literature and research regarding its implementation and use in this field of education and training. Whilst there is a wealth of studies and debate on the use of information and communication technologies in university and higher education, there has been only limited work on the potential impact of vocational education and training in technical colleges.

Imel,(2007) identified four different application of ICT in technology education, namely , technology as a curriculum, technology as a delivery mechanism, technology as a complement to instruction, and technology as an Instructional tool. When using technology as curriculum the focus is on developing ITC literacy skills. There are two types of ICT literacy skill sets. The first is generic ICT literacy skills such as keyboarding, word –processing using data bases, using spreadsheets, desktop publishing and using the internet for research and communication (kasworn and Londoner,2000). In this network economy every graduate from TVE programme needs to possess these essential and generic ICT literacy skills. The second ICT skill sets are the occupationally specific ICT literacy skills.

When technology is used as a delivery mechanism the focus is on packaging course content for digital delivery. Common approaches in current use include: computer –assisted

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instruction (CAI), computer-based instruction (CBI), and web –based or online instruction. Open and distance learning programmes makes extensive use of technology as their delivery mechanism.

According to kasworn, (2004) when technology is used to complement instruction the emphasis is on providing opportunities to practice skills taught and extending learning by working with specific software applications . Simulators are often used in TVE to address safety concerns during the initial phase of training and to offset cost in renting equipment for training tractor operators and truck drivers. In this simplest form, technology can be used for drill and practice to complement instruction.

Human learning is a very complex process. In spite of years of research in education, our understanding of how human learn is skill limited. For this reason educations strive to use the little that is known about human learning whenever

they engage in the act of teaching and learning of technology and vocational education in the study area. The learning process can be divided into two broad categories.

The first relates to learning conditions that are internal to the learners. While this is the area where the potential to improve learning outcomes is the highest, it is undoubtedly the area that is most difficult to affect. The second condition of learning is external to the learners, people learn through their senses and the contribution of each to the amount that we learn varies. The followings are the estimated amount of learning from the five senses (Kupsh and Mason, 2012): a) Taste 1%, Touch 1.5%, Smell 3.5%, Hearing 11%, & Seeing 83%.

Imel,(2007) proposed the following additional guideline for using ICT in TVE.

1. Let learning outcome drive the process of technology choice. Technology is only a tool therefore teachers must use technology as part of a total instructional plan.
2. Strive to infuse or integrate technology into instruction and curriculum.
3. Use the technology to shift the emphasis from teaching to learning.
4. Be prepared to modify the role of the instructor –the teacher is not the only sources of information.

Use technology to move the focus away from low-level cognitive task to higher order thinking skills.

Imel concluded by listing the following application as software used by TVE teachers. Productivity, software, word processing, integrated software, spreadsheet, database, graphics applications graphics software, presentation software desktop publishing, discipline –specific programmes, simulations and authoring software. The evolution and development of ICT has resulted in a paradigm shift in the educational system.

ICT are changing the way people learn, offering new alternatives to the traditional classroom. In this new economy, it is essential for learners to have access to education anytime and anywhere Haddad and Draxler,(2002), stated that “lifelong learning and training for TVE cannot be confined to traditional classroom. It is unrealistic and unaffordable to continue to ask learners to come to designated place every time they have to engage in learning. ICT allow the delivery of education to adapt to an individual needs as opposed to having the individual adapt to have the education delivered.

Education will not be confined to the four walls of a classroom but wherever and whenever the learner deems appropriate, “Education will not be a location anymore, but an activity, a teaching learning activity “ (Haddad and Draxler) (2002). ITC have the capability of providing personalized, just in time, up to date, and user- centered education activity in TVE.

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Besides their potential to providing education to anyone, anytime and anywhere ICT have encouraged new research and development in teaching and learning techniques. According to Haddad and Draxler,(2002), Shank, the founder of cognitive arts, believes that educational institutions must adapt a new way of teaching . They claimed that students learn better through experiential and emotional learning rather than through memorizing names and dates and thus, educators must simulate real world environments. Technology can be caused to facilitate these types of learning environment. Courses would be customized to each user and provide a wide array of options like a computer game. From the foraging discussion, it become imperative to determine the ICT competencies required for the teaching and learning of TVE in technical colleges in Enugu state.

STATEMENT OF THE PROBLEM

The synergy of combining globalization with new technology has created new opportunities as well as new challenges and uncertainty. Many workers have been dislocated, while a significant member of young people are structurally unemployed or underemployed.

Skills polarization between skilled workers and unskilled workers has widened the gap in income inequalities. Youths are the group most affected. While these changes have brought about considerable challenges to TVE, they have created new opportunities for changes and invocation.

The status and condition of vocational education doest not match the importance of its potential contribution to society. However, in this environment where human capital has become the most critical element in achieving a competitive advantage, TVE can now aim to reach its full potential.

It is based on these conditions of dislocations and unemployment of the youth that the researcher intended to determine the ICT competencies for teaching and learning of VTE in technical colleges in Enugu state.

SIGNIFICANCE OF THE STUDY

This study will be of benefit to the graduates of vocational education, ministry of education and the employers of labour. The findings of the study if published will benefit the graduates of technical education in the sense that they will acquire ICT competencies that will enable them secure job on graduation. The ministry of education will from this study be able to plan and organize or integrate these competencies in the curriculum. The society will benefit because the graduates of this programme will have requisite competencies for gainful employment or to be self –employed.

OBJECTIVES OF THE STUDY

The objective of this study is to determine the ICT competencies required for teaching and learning of technology and vocational education in technical colleges in Enugu state. It was intended also to test whether location (Urban or rural) has significance influence in ICT competencies required for teaching and learning of TVE in the study area.

RESEARCH QUESTION

What are the ICT competencies required for the teaching and learning of TVE in the study area?

RESEARCH HYPOTHESIS

There would be no significant difference between urban technical teachers and rural technical teachers in the competencies required for teaching and learning of TVE.

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METHODOLOGY

Based on the objectives of the study, one research question and a hypothesis were raised to guide the study. Descriptive survey research design was used for the study. A 15 item structured questionnaires was developed and utilized. The target population comprises all they 545 technology, and vocational education teachers in the 27 technical colleges in Enugu state.

The instrument used for data collection was questionnaire developed by the researcher. Copies of the questionnaires which contain section A and B were distributed to the respondents with assistant of four research assistance. Out of the 545 distributed questionnaires 540 were completed and retuned.

Data collected were analyzed by the use of mean and standard deviation. t-test statistics was used to test the hypothesis at 0.05 level of significance.

RESULT AND DISCUSSION

Research question

What are the ICT competencies required for teaching and learning of technology and vocational education in the study area?

To answer the research question above items showing ICT competencies in technology and vocational education were presented to the respondents to indicate their opions based on their disposition. The mean scores of the respondents for each of the item was presented in table 1.

Table 1. ICT competencies required for teaching and learning of T.

Item No	*ICT competencies*	$\bar{X}$	*SD*	*Remarks*
1	Teaching attitude and practical skill	3.01	1.01	required
2	Developing informal skills	3.42	.80	required
3	Internal web-based learning	4.04	.86	required
4	The use of ICT for administration purposes	3.95	.100	required
5	Programme design and development	3.62	.92	required
6	Learning assessment	3.45	1.07	required
7	Control of the technical system	3.54	1.01	required
8	Information search and retrieval	3.12	1.24	required
9	Career education and guidance	3.76	1.01	required
10	Computer assistance instruction	3.77	.96	required
11	Identify and select computer hardware	4.01	.84	required
12	Identify keys and keyboard	3.84	.79	required
13	Write a computer programme	4.06	1.73	required
14	Use interactive e-learning tools	3.99	.85	required
15	Protect and maintain computer hardware	4.02	.75	required

$\bar{X}$ = mean, SD= standard deviation. N=540, Source: field survey 2014

Table1 above indicate the mean scores of respondents on ICT competencies required for teaching and learning of TVE. All the competency items presented to them has mean score

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range of 3.5-4.49 which based on the decision point implied that the teachers require all these ICT competencies.

Table 2. Calculated t – value on ICT competencies required by urban and rural technical teachers for teaching and learning of TVE. N_1= 102, N_2 =438

Items No	*ICT competencies*	$\bar{X}$	*SD*	$\bar{X}$	*SD*	*t-cal*	*Sign level 0.05*
1	Teaching altitude and practical skills	3.72	.95	3.73	.61	.84	NS
2	Developing informal skills	3.61	1.9	2.44	1.08	.18	NS
3	Internet web-based learning	2.46	1.00	2.49	1.10	.83	NS
4	The use if ICTs for administrative purposes	3.78	.89	3.90	.60	.05	NS
5	Programme design and development	2.32	1.02	2.41	1.07	.52	NS
6	Learning assessment	2.82	.75	4.04	170	.46	NS
7	Control of the technical system	3.21	14	3.31	1.05.56	.56	NS
8	Information search and retrieval	3.29	179	4.11	.90.54	.54	NS
9	Career education and guidance	4.02	90	3.19.85	.93	.93	NS
10	Computer assisted instruction	3.78	.96	3.92	102.87	.87	NS
11	Identify and select computer hardware	3.81	91	3.75	1.21.	.42	NS
12	Identify keys and keyboard	3.52	97	3.52.94	133	.33	NS
13	Write a computer programme	3.62	99	3.55	98.60	.60	NS
14	Use interactive learning tools	3.88	92	4.00.96	96S	1.20	NS
15	Protect and maintain computer hardware	4.06	1.923.79	.83	58	.58	NS

$\bar{X}$ =Mean SD=standard deviation t-cal=t calculated 0.05= level of significant.

Table 2 above shows the mean and calculated t- value for comparing the urban and rural technical teachers' ratings of level of ICT competencies required for the teaching and learning of TVE. The analysis show that the calculated t-value for the entire items are not significant (p=>0.05) as perceived by technical teachers in urban and rural areas. The null hypothesis of no significant difference of these items was therefore accepted. This means that location has no significant influence on ICT competencies required for teaching and learning of TVE in the study area.

DISCUSSION OF THE FINDINGS

The findings of the study were discussed according to the one research question and one research hypothesis. Technology and vocational education teachers in Enugu state required all the ICT competencies for teaching and learning. This finding is in line with the report of Hobart, (2011) who stated that students of technical colleges need competencies in ICT to enable them match with industrial jobs on graduation.

Gray, (2002) in his study also agreed with the finding by positing that there is surplus of individuals with degrees but there is also shortage of university graduates with ICT competencies.

Location as perceived by the technical teachers on ICT competencies required in the study area has no significant difference in all the ICT competencies presented to them for the study. This is in consisted with the position of Reubens. (2013) who in his opinion posited that ICT competencies requirement cut across all segment of educational pursuit, i.e. what is required in urban is also required in the rural area.

CONCLUSION

The following conclusions were drawn based on the findings of the study. Technical teachers in the study area require ICT competencies in the teaching and learning of TVE. This includes Teaching attitude and practical skills .Developing, programme design and development among others.

Location (urban and rural) has no significant influence on ICT competencies required by technical teachers in the area of study. This means that there is no significance difference in the opinion of technical teachers on ICT competencies for teaching and learning of TVE.

RECOMMENDATIONS

The researchers recommended that the National Board for technical Education should include these findings in the curriculum.

2 workshops should be organized for technical teachers to acquaint them with the teaching of these ICT competencies.

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