Challenges of Effective Utilization of Information and Communication Technology (ICT) in Teaching and Learning of Vocational and Technical Education

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Abstract:

Information and communication technology (ICT) is an integral part of teaching and learning for this generation and the generations yet to come, ICT stimulates learning and increase motivation that enables teachers and students to interact productively with neighboring communities. Unfortunately, this may not be easily achievable, because teachers that are expected to initiate these changes are not well knowledgeable in ICT and its applications. This study examined the challenges encountered in effective utilization of ICT in teaching and learning of VTE. Staff and students numbered 650 of the selected schools were used for the study. Two research questions guided the study. The instrument used for data collection was questionnaire. The data were collected, presented, analyzed and interpreted using mean. The findings showed that although teachers often resist change, the extent to which their perception negatively influences ICT implementation is minimal. The findings also showed that the major challenges to effective utilization and implementation of ICT were those faced by teachers in the course of using ICT facilities in teaching and learning of technology based courses. This paper identifies other challenges to the effective integration of these technologies in schools and in teaching VTE in general. This includes: lack of competence, poor access to resources and inadequate training and re-training in ICT, poor technical support from government, erratic power supply, finances and security. The paper concluded that an enabling environment, finances and technical support should be provided for smooth transition to ICT. This paper recommended that teachers should be trained and re-trained in ICT; this would provide them with necessary skills required for new device and technology. Government should make provision for staff development by sponsoring seminars and conferences to train VTE educators in ICT skills. Government should make adequate provision for computers and internet facilities in school as well as steady electricity supply.

Keywords: VTE, ICT, Teaching, Learning, Training.

I. INTRODUCTION

Information and communication technology (ICT) is an important part of most organization and schools. Computers were observed in schools in the early 1980s, and several researchers suggest that ICT will form an integral part of teaching and learning for this generation and the generations yet to come [1]. ICT in education has potential to bring the positive changes in teaching and learning. However, this potential may not be easily achievable, because when teachers that are expected to implement these changes are not well knowledgeable in ICT and its applications.ICT is now an integral part of teaching and learning and so it is important to identify the obstacles for the effective integration of these technologies in schools.

Education has been viewed in many ways by different individuals, however, it is commonly agreed that education is a process of facilitating learning and equipping a person to function effectively in his environment. Therefore, it may not be an understatement to say that education is the basic instrument of human development. This is because no meaningful change in economic, social, and cultural life of an individual can be achieved without education. ICT in education has potential to bring the positive changes in teaching and learning. The use of ICT for teaching and learning will provide opportunities for students and teachers to operate in new technology age. Therefore, studying the challenges to the use of ICT in education may assist both students and teachers to overcome the challenges and become successful technology adopters in education.

II. TECHNICAL AND VOCATIONAL EDUCATION

Technical and vocational education is a program for the training of individual in a formal environment for the acquisition of occupational skills under the supervision of an expert or technical officer.[2] used the term Technical and Vocational Education to refer to those aspects of the educational process that deals with study of technologies and sciences and the acquisition of practical skills, attitudes, understanding and knowledge relating to occupations in various sectors of economic and social life. Technical and Vocational education 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 and a preparation for responsible citizenship; An instrument for promoting environmentally sound sustainable development;

A. Concept of Vocational and Technical Education (VTE)

Vocational and technical education is defined by different authors in different ways.
[3] defines Vocational Technical Education (VTE) as all those experiences whereby an individual learns to carry on successfully any useful occupation. These experiences may be organized and institutionalized or unorganized and haphazard. Simply put, Vocational Technical Education may be looked at as a series of controlled and organized experiences arranged to prepare a person for socially useful employment. In the views of [4], Vocational Technical Education (VTE) aims at the development of human abilities in terms of knowledge, skills, and understanding so efficiently in carrying on the activities in the vocational pursuits of his choice. [5] in his contribution opined that vocational education is designed to develop skills, abilities, understanding, attitude, work habits and appreciation encompassing knowledge and information needed by workers to enter and make progress in employment on a useful and productive basis. It is an integral part of the education programs and contributes towards the development of good citizens by developing his social, civic, physical, cultural and economics competencies. According to [6] practical's in vocational technical training are found in many subjects area such as: woodworks, metalwork, building construction, tailoring and dress making, dyeing, plumbing, electrical installation,

block laying and concreting, carpentry and joinery, furniture making, motor vehicle mechanic works, electronics, radio and television servicing and technical drawing. Studies have shown that the degree of the contribution made by educated people on the job is dependent upon the degree of the appropriateness of the vocational training received. Skills acquisition in technical and vocational education involves the mastery of practical skills and knowledge in any vocational and technical field of study. While skill acquisition in Nigeria education system could be through technical and vocational education, this is done through teaching, training, retraining, practical experience and on the job training. Technical and vocational education is the education that provides the skills, knowledge and attitude that lead to the production of industrialists who are resourceful and productive [7]. Technical and vocational education emphasizes skills, knowledge and attitudinal acquisition for productivity and self reliance. Individual that is self – reliant can also be classified under entrepreneurial cadre because he/she is self employed and a manager of his/her own organization. [8] Stated that the importance of technical and vocational education cannot be over emphasized as it enables acquisition of skills and development of attitude and knowledge which will enable young people to play their part in the business community and help them to be self – reliant.

Technical education empowers and prepares an individual to achieve its full potential for contribution to a better quality life. [9] Pointed out that through technical education an individual is empowered to develop capabilities and values for the benefits of the individual and that of the society

III. STATEMENT OF THE PROBLEM

The researcher observed that, the introduction of ICT centers in tertiary institutions in Nigeria supposed to be recording successes in teaching and learning. However, these efforts met with some critical challenges. It is based on this observation that this research was carried out to determine the challenges confronting the effective utilization of Information and Communication Technology (ICT) in schools especially in areas of Vocational Technical Education (VTE) and strategies which could be used to improve on the use of ICT in teaching and learning.

IV. ICT AND VOCATIONAL, TECHNICAL EDUCATION

Information and Communication Technology (ICT) has been generally adopted by all levels of education in Nigeria as an innovative system in teaching and learning. The new technology has reduced the world to a global village with significant impact in the field of education leading to electronic teaching and learning known as e-learning [10]. According to [11] E-learning has opened up opportunities for individuals to access information and learning programmes through the internet. This implies that ICT is revolutionalizing education by removing distance and making knowledge more accessible to all. All branches of education have accepted this emergent technology as a veritable tool for education services delivery. As a result of this, technology based courses have to align with this emergent in ICT. This is important because according to [12]. ICT provides teachers and students access to vast stores of knowledge beyond the school, as well as multi- media tools to add to this stored of knowledge. [13], observed that the huge growth of computer, internet and other electronic devices provide opportunities for the development of quality teaching and learning of the technology based courses. Technology based courses are those courses that are taught using basic theories of sciences and these include; metal work technology, automobile technology, applied electricity/electronics, building construction, technical drawing, home economics, food and nutrition among others [14]. The teaching of these technology based courses is confined to classrooms with few ill-equipped workshops and laboratories using the teacher centered method [15].

V. AIM AND OBJECTIVE OF THE STUDY

The aim of this study is to investigate the challenges in effective utilization of Information and Communication Technology (ICT) in teaching and learning of technology based courses in tertiary institutions in North-West part of Nigeria. The specific objectives of the study is to

- Find out the ICT devices available for teaching and learning of technology based courses in some of the selected schools in the zone.
- Investigate the problems encountered by technology teachers when using ICT in teaching and learning of technology based courses.
- Adopt strategies for improving the use of ICT devices in teaching and learning of technology based courses in the zone..

VI. RESEARCH QUESTIONS

The following research questions guided the study:

- What are the ICT facilities available for teaching technology courses in some of the selected schools in the zone?
- What are the problems encountered by technology teachers in the use of ICT devices?
- What strategies could be used to improve the use of ICT devices by technology teachers in the zone?

VII. METHODOLOGY

The study is a survey designed to determine the challenges encountered in effective utilization of ICT in some selected schools in North- West zone part of Nigeria. A survey research design was used because a group of people were studied by collecting and analyzing data from a few people who were representative of the entire population of the zone. The study was carried out in tertiary institutions in the zone. The population of this study comprised all the academic staff of eight schools and twenty five students in each of the selected schools. A set of questions titled challenges encountered in effective utilization of ICT facilities in tertiary institutions in North- West zone was the instrument used for data collection. The questionnaire was made up of items which were formulated based on the two research questions. These items were designed to gather information from the respondents. The questionnaire consisted of two parts: Part A is the respondent personal data and part B consisted of three sections designed to gather information from the respondents in the areas of the research questions. A five point rating scale consisting of Strongly Agree (SA), Agree (A), Disagree (D) and Strongly Disagree (SD) was used. Copies of questionnaire were given to experts in the Educational Research / Measurement and Evaluation at Federal college of Education (Tech) Bichi, Kano state for content validity. Their corrections and suggestions were effected which formed the final copy of the instrument used or data collection. Questionnaire was administered to the academic staff of the selected schools numbered 450 and 200 students giving a total population of 650 respondents.

A. **Method of data analysis**

The data collected were analyzed using mean. The two research questions were answered using mean. The cut- off point determine whether an item is accepted or rejected and was decided by finding the class boundaries of the responses as shown in Table 1. Using the interval of 0.5, the upper limit of cut- off point was 4.01 and above this point was accepted while any mean point lower than 4.01 was rejected.

B. Presentation of research results

The data collected were presented in tables and analyzed using mean. These analyzes were based on the research questions.

C. Research question one

What are the challenges faced in effective utilization of ICT facilities in teaching and learning of technology based courses in North – West zone.

Table 1:

Mean responses of respondents on their perception on challenges of effective utilization of ICT in some selected schools in North-West zone, Nigeria.

S/N	Perception	SA	A	D	SD	N	X	Decision
1	Inadequate of ICT facilities in schools hinder teaching and learning activities	20	13	350	150	650	2.98	Rejected
2	Use of ICT in schools will aid effective teaching and learning	90	35	255	200	650	4.23	Accepted
3	Students and teachers resist changes and have wrong perceptions about ICT in teaching and learning	102	85	195	105	650	4.34	Accepted
4	The use of ICT in teaching and learning is essential for bringing learning to the door steps of students	102	300	95	145	650	4.21	Accepted
5	The use of ICT will aid examination malpractice in schools	15	55	45	60	650	1.54	Rejected
6	Lack of teachers competence is challenge to implementation of ICT	95	105	290	205	650	4.05	Accepted

Table 1 showed that items 2, 3, 4 and 6 with mean score of 4.23, 4.34, 4.21 and 4.05 are all above cut off point and were accepted as perceptions of teachers that influence positively, inadequate of ICT facilities in schools and use of ICT will promote examination malpractice was rejected

D. Research question 2

What are the challenges teachers encountered in using ICT facilities in schools.

Table 2:

Mean responses of teachers on their perceptions on the challenges encountered in using ICT facilities in schools

Challenges	SA	A	D	SD	N	X	Decision
7) Teachers require more time to implement ICT in teaching technology courses.	100	145	115	140	650	4.32	Accepted
8) Inadequate access to ICT facilities hinders the implementation of ICT in schools	60	85	155	178	650	4.72	Accepted
9) Lack of sufficient training and competence hinder effective use of ICT in teaching technology based courses.	125	85	112	150	650	4.54	Accepted
10) Poor network and erratic power supply constitute a great challenge.	205	125	117	135	650	4.71	Accepted
11) Lack of financial support from government to fund computer laboratories	185	106	112	160	650	4.23	Accepted
12) Lack of time to use ICT devices due to work load.	154	134	216	134	650	4.44	Accepted

From Table 2 above, it can be seen that items 7, 8, 9, 10 and 11 have mean score of 4.32, 4.72, 4.54, 4.71 4.23 and 4.44 respectively, in each case, the mean score is above the cut -off point of 3.50, and therefore they were accepted otherwise rejected. Table 2 showed that all challenges confronting effective utilization of ICT in schools were accepted

VIII. DISCUSSION OF RESULTS

Some of the identified challenges hinder the effective utilization of ICT in technology based courses seem to be closely related to each other. Challenges such as poor network, erratic power supply, inadequate of ICT facilities and poor funding seem to be more significant than others. Lack of accessibility to resources as a challenge to ICT implementation in schools is closely related to several other key issues which can be considered as challenges to ICT utilization in schools, in most cases where these facilities are available in schools, excess workload on teachers does not allow timely access to these facilities. This claim was lamented by [16]. They noted that integration of technology into education may not be achievable without teacher access to timely ICT facilities and teachers should be re-trained on ICT to make them up to date technologically. It should be noted that access to ICT facilities should not be limited to classroom alone, but access at home will help with self- training. This is important to increase teacher's competence and improve ICT use. One of requirement for ICT competence is available time to practice and familiarization to the new technology, teachers whose schools give time to develop their skills can be more productive and efficient than teachers who do not have ample time to develop themselves. Teachers who use ICT in classroom have to demonstrate high level of competence and hard-working. For many teachers, computer implementation may require changes in attitudes and classroom practices. There are number of practical skills which need to be developed. There are computer operation skills and classroom management skills which presents an obstacle to number of teachers. Therefore, teachers need to continually update their knowledge and skills in the operation and use of ICT. They also need to be up-to-date with curriculum content and methodology. It is therefore important that these teachers should be supported in acquisition of ICT practical skills and be motivated by providing occasional training and incentives. [17], noted that personal access for teacher to a computer for the purpose of preparation and planning is one of the strongest influence on the success of ICT training and subsequent application into teaching and learning in classroom use.

Teachers are the key factors in any educational innovation. They need training in the use of the new technology (ICT) to enhance teaching and learning of technology based courses. Some technology teachers in schools lack the adequate knowledge and skill required for effective teaching and learning. [18] lamented the infrastructural deficiencies and shortage of ICT facilities such as computers, internet, multimedia, projector, video tapes, CD-ROM, flash drives, satellite, telephone, television etc are constituting serious threat to full implementation of ICT in schools. There are also problems associated with erratic power supply and poor funding. The existences of these problems challenge the full utilization of ICT applications in teaching and learning of technology courses [19]. In the nation's quest for technology development, technology education has an important role to play. One innovation that may boost the teaching and learning of technology courses is the use of modern technologies which will help bring knowledge to the door steps of every Nigerian. The degree of efficiency of technology teachers in carrying out their function is to large extent dependent on the availability and usage of necessary ICT facilities in classrooms.

X. CONCLUSIONS

Information and Communication Technology (ICT) is one of the most innovated powerful tools so far in teaching and learning and it is open up unlimited opportunities in education. It is fast growing rapidly and cut across all disciplines and all aspects of human endeavors and applications. Most developed countries have witnessed significant changes that can be linked to ICTs. Such changes are multidimensional changes in the areas of technical, financial, economic and political. ICTs have made access to education, communication and travel and information distribution at our door steps. ICT

implementation in teaching and learning could go a long way in removing the obstacles that are standing tall on the way to qualitative education in Nigeria.

RECOMMENDATIONS
In the light of the findings of this paper, the following recommendations have been offered.

- It is important for the school authority to cooperate with teachers by providing sufficient time to implement new technology in the classroom. This can be achieved by reducing excess workload or increase length of lecture time to accommodate ICT practical acquisition.
- ICT literacy should be part of minimum requirement for teaching appointment; this will enable teachers to be fully equipped before joining teaching profession.
- Seminars and workshops on ICT should be organized regularly by academic staff union in the tertiary institutions as part of in- service training to make academic staff develop positive attitude towards the new technology.

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