FACTORS MILITATING AGAINST THE INTEGRATION OF INFORMATION AND COMMUNICATION TECHNOLOGIES FOR EFFECTIVENESS OF TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING

Abstract

This paper grew from the relevance and importance of technical and vocational education and training (TVET) programmes. The paper examined factors militating against the integration of information and communication technologies in effective teaching and learning TVET. The fact is that TVET programmes involve practical skills acquisition and hands on experience, this paper therefore presents information and communication technology as a positive tool to promote teaching and learning TVET. As a result, it highlighted and explained factors militating against the integration of ICTs and emphasized that if such factors are overcome it could proffer better means of transferring practical skills. Strategic issues were raised on how to achieve the purpose. Conclusions were also drawn from the factors listed.

Introduction

The role of the teacher in the future is being predicted as that of a learning facilitator, as an expert in knowledge management and learning strategies. This requires variety of skills and competencies which most teachers rarely possess. The emergence of new technologies (Information and Communication Technologies, ICTs) and methods in teaching and learning processes is gradually changing the role of the teacher. That is to say, with the emergence of information and communication technology (ICT), there has been a paradigm shift from mere classroom instruction to how ICT can be effectively used in teaching and learning to promote students' academic achievement.

According to Anjlee (n.d), no technology can transform on its own. For technology to be impactful in education, teachers must integrate technology in the curriculum in such a way that it aligns with students' learning goals. In the global society today, Information and Communication Technology (ICT) marks a second "Big Bang" in electronics. The emergence of new tools to handle repetitive work, but also supply for acquisition of certain high level human skills is part of humans everyday environment at work, home and in productive

activities and at leisure. The use of Information and Communication Technology is highly needed in humans' domestic and professional lives. According to Depover, Karsenti, and. Komis (2009), the present era is marked by rapid changes in technology even that schools cannot remain indifferent. In education, ICT involves the introduction of new tools that gives opportunity to improve current practices and develop new solutions to meet present challenges. ICT if integrated in the teaching process could be an opportunity for all nations to seize a way out of a deadlock situation characterizing their educational system, and yet for other countries, to ease access and lower cost expertise of nations.

Similarly, Information and Communication Technologies (ICTs) often spoken of in a particular context such as ICT in education, health care, sports, commerce and others provide the opportunity for educational institutions and other organizations to harness and use technology to complement and support the teaching and learning processes. Furthermore, ICTs are useful in numerous instances as they facilitate the development of various aspects of the current society in such areas as knowledge management, acquisition of knowledge, business, communication, entertainment, commerce among others. The past decade has witnessed a fundamental change in the way people communicate, teach and as well learn. The new technologies have the potential of changing the face of education: where people learn; how learning takes place; the role of the teacher in the teaching process and the responsibilities of the learner in the learning process. This has nonetheless placed educational systems under increasing pressure to use ICTs to teach students the knowledge and skills they need to function in the 21st century.

Nevertheless, glaring challenges confronting the educational system today is on how to transform the existing curriculum so as to integrate ICT and provide students with skills needed to fit into and function effectively in a dynamic, information rich, and continuously changing environment. To buttress

this, Omwenga (2006); Wilson, Ayebi-Arthur, and Tenkorang (2011) were of the belief that ICTs provide a motley of tools that may help in transforming the present isolated teacher-centered and text-based classroom activities into a rich, student-focused multimedia and interactive knowledge environment. Therefore, in order to resolve the challenges faced, the gap created has to be filled through institutions of learning accepting and integrating the new technologies and appropriate ICT tools for learning.

In furtherance, Attwell and Hughes (2010) posited that for institutions of learning to actually make impact in the teaching and learning processes, they must move towards the objective of transforming the traditional paradigm of teaching and learning process into the use of ICT tools for teaching. As a matter of fact, technology is said to be the driver of the new economy and human capital is its fuel. Therefore the significance of human capital in the new economy, is conceptualized as workers' knowledge that results in effective and efficient performance (Moe & Boldget, 2000).In this wise, integrating ICT into teaching and learning creates concern between pedagogy (teaching tactics) and technology (ICT), and acquiring ICT skills is not the only concern, but using the acquired skills to improve teaching and learning is of major concern (Wilson & Boateng, 2014). The infusion of ICT in pedagogy if done successfully should be such that tends to enhance learning through a new learner-centered culture/atmosphere. ICT also fosters enquiry and exploration, promotes collaboration, motivates, and engages learners. The use of ICTs does not only allow the move from reproductive model of teaching and learning but also allows an independent, autonomous learning model that promotes initiation, creativity and critical thinking with independent research.

The development and integration of ICTs into technical and vocational education and training (TVET) has been a major area emphasized by UNESCO. This is due to the fact that ICT tools are becoming less-expensive, reachable and highly interactive, in which case their application into all spheres of education is

expected to be imperative in making educational results labour-market oriented, and in the transformation of contents, methodology, as well as promote information literacy.

Information literacy is predicted as basis for human survival in an increasingly digitalized world as it authorizes individuals in all walks of life to seek, evaluate, use and create information effectively to achieve their personal, social, occupational and educational goals. That is to say, information literacy which can be described in a lay mans term as the ability of knowing how to use ICT tools is the sustaining force of a knowledgeable society. Therefore, to improve the quality of learning using technology, there is need for teachers of technology to equip themselves with the required ICT skills, and make professional development for teachers a key issue in education.

Although, studies reiterating the advantages of ICTs in education cannot be exhausted in a dynamic knowledge and research based society, the literature on the integration of ICTs in teaching and learning of TVET is often not comparable to that of general education and has attracted only few scholars advocacy. This paper arises out of increased concern of more literature on the integration of ICTs in effective teaching and learning of TVET. Therefore this study examined factors militating against the integration of ICTs in teaching and learning of TVET.

Literature

– *'ICT' Integration*

The term 'ICT integration' according to Laferrière in Lloyd, (2005) connotes a range of learning environments from a stand-alone computer in a classroom to a situation where the teaching is done by the computer through pre-packaged 'teacher-proof courseware'. There is evidence to suggest that the term 'integration' is often used interchangeably with the more similar word 'use'. According to Lloyd (2005), ICT integration is generally taken as a term to

reflect a change in pedagogical approach to make ICT less peripheral to schooling and more central to student learning.

In some instances, and on a lighter note, ICT integration is seen as a set of typologies referring to how ICT is used in schools particularly when used to describe the introduction of ICTs as an integral component of broader curricular reforms that are changing not only how learning occurs but what is learned. In this wise not only can technology help children learn things better, but it can also help them learn better things, and that better learning will not come from finding better ways for teachers to instruct, but from giving the learner better opportunities to construct. To integrate is to seamlessly combine components, parts or elements into a complex but harmonious whole. Furthermore, the word seamlessness is implicit in the definition that ICT integration is the degree to which ICT vanishes into the background of the classroom.

Information and communication technology integration is a term and also a conglomeration of three domains, namely, *Information Literacy, Information Policy, and Knowledge Management*. The point of interest here is that integration speaks of processes rather than of hardware infrastructure and is exclusive of operational ICT skills. It is interesting in its partial encompassing of the acceptable sequence of data-information knowledge.

Similarly, integration is seen as a key outcome in any situation where a new activity or process is being introduced to foster activity. The presumption that teachers would know how to integrate, points to the assumptions that one main area of support that is oftentimes overlooked is that concerning the actual integration for instructional purpose. Contextually, therefore, in the researchers view ICT integration as a process of introducing the use of information and communication technology gadgets into the teaching and learning process for classroom effectiveness.

– ***The Need for Effective Integration of ICTs in TVET***

Technical and Vocational Education and Training (TVET) is one of the recognized and effective training processes by which quality up-to-date information, literate and knowledgeable workers are prepared, trained or retrained worldwide. United Nations Educational, Scientific and Cultural Organization (UNESCO) and the International Labour Organization (ILO) (2002) defined TVET as a comprehensive term referring to those aspects of educational process involving, in addition to general education, the study of technologies and related sciences, the acquisition of practical skills, attitudes, understanding and knowledge relating to occupations in various sectors of economic and social life. In the same vein, Saud, Shu'aibu, Yahaya and Yasin (2011) posited that TVET prepares human resources for the ever changing world of work, so as to promote effective human participation in the labour market and in the study of technologies and related sciences. As reflected in the definition, it is therefore of paramount significance that TVET goals can be realized with adequate ICT arrangement in TVET institutions. With this in place, practical skills can now be delivered virtually via organized ICT set up. Gone are the days where practical skills are taught using traditional/conventional teaching method with its attendance passiveness and poor participation on the part of learners; the traditional method of instruction also encourage route learning, does not permit concretization of phenomena and tends to restrict the learning process of students in larger proportion. Consequently, students memorize facts and thus unable to retain their knowledge gained. However, some programmed instructions and other complex tasks inform of software and interactive video made it easy for practical skills to be taught using ICTs. Also, jobs and skills that require only hands-on experiences are now possible via computer assisted instructional programmes. As such, the need for ICTs integration in TVET remains vital, bearing in mind the impact ICTs make in the world of work that requires knowledgeable workers skilled in information technologies (Rojewski, 2009). By implication,

according to Leach (2005), the use of ICTs 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 21st century, providing new and transformative models of development. The aim of TVET is to prepare individuals for self-reliance, self-employed and to become a medium of evolution for the world of work; by grooming in them the prevailing skills needed for effectiveness in the current day knowledge economy.

Consequently, TVET as described by Hollander and Mar (2009), is an instrument for reducing extreme poverty. This distinctive feature of TVET makes ICT application mandatory component which can aid in achieving sustainable and globally recognized workforce. The implication therefore is for TVET institutions to deploy and strengthen their commitment towards training and producing ICT-competent graduates that will meet up with the challenges of real life workplaces. In other words, making knowledge in the exploitation of ICTs is critical to the present day workers. One of the possible means to achieve that is to explore the enabling measures of acclimatizing TVET to develop human resources for the ever dynamic world of work and to focus its investment in the integration of ICTs in the curriculum implementation process (teaching and learning).

In the current economy situation, information and communication technology are becoming ubiquitous. By the year 2020, virtually all people living in industrialized countries will have access to multimedia services based on mobile or other terminals. As a result, application of ICTs into TVET changes the entire focus of manpower needs in the world; from skilled-based to ICT-competent-based work force. Therefore, the demand for the integration of an effective ICT-based learning environment for TVET becomes imperative. TVET is seen as one of the most distinguished fields of education right from Stone Age to the present era of industrial development; still maintain its tempo toward the infrastructural, industrial, human and material resources

development. Effective integration of ICTs eases the expansion and reinforcement of TVET by enhancing networking and knowledge sharing opportunities and would extremely curtail the supply of mechanically operated training hardware, thereby offering students individualize learning even after school hours. Furthermore, ICTs in TVET will propagate the ability to make available practical learning experiences that are needed to the instantaneous work situations, which in the interim would encourage students to reflect and articulate vital elements that are common across tasks. In that manner, students could increasingly vary the context in which their abilities would carry them in aptitude and skills acquisition.

Factors Militating Against the Integration of 'ICT' in Teaching and Learning

The act of integrating ICT into teaching and learning of technical and vocational education programmes is a complex process and one that may encounter a number of difficulties in the present day economy. Empirical investigations conducted over time highlighted amongst others glaring factors militating against the integration of ICT for teaching TVET as follows;

– ***Teacher Training in ICT***

Naturally the use of ICT in teaching, learning and managing educational institutions, just like any other innovations compels development of new set of skills, attitudes and pedagogical approach. This approach requires continuous training programs to build sufficient capacity among teachers, developers, educators and administrators. This implies that, while most schools (especially in developed countries, and relatively in urban areas of developing countries) are now equipped with computers, internet access, and occasionally more sophisticated equipment such as interactive whiteboards and effective e-learning materials, they require far more than the mere introduction of hardware in the classroom (Van Rij & Warrington, 2010). In this wise, for these ICT equipment

to mean anything, teachers must be conversant in utilizing them to implement an integrated approach in ICT use and new approaches.

Teacher training in ICT is a major factor militating against ICT integration. This is so because teachers are the main personnel when it comes to knowledge transfer. Therefore it becomes imperative to train teachers in line with ICTs introduced in schools. The issue of training is certainly complex because it is important to consider several components to ensure training effectiveness. These are, time for training, pedagogical training, skills training, and an ICT use in initial teachers training. Therefore the lack of training in digital literacy, lack of pedagogic and didactic training in how to use ICT in the classroom, and lack of training concerning the use of technologies in science specific areas are obstacles to using new technologies in classroom practice.

For effective practice of ICT integration, school administrators ought to organize training sessions and teachers must devout their time to become familiar and acquainted with ICT possibilities and new innovation. A major challenge for the use of ICT at university and other levels of education is the initial training of teachers. Due to lack of initial training, many teachers are afraid to integrate ICT in their teaching practice. The initial training of teachers in ICT plays an important role in the use of ICT in teaching and learning processes. However, the acquisition of intermediate computer skills by teachers is also necessary to enable them benefit fully from ICT usage. Such skills which include evaluation of material found on websites; how to make educationally appropriate use of resource for learning, including how to develop visual literacy skills, adapt material, design differentiated activities using the same resources and develop material are compelling factors for mastery. Finally, due to constant changes in the educational and technological sector, teachers need to be lifelong learners to keep themselves updated with the changes in ICTs.

- ***Teachers' Attitude Toward ICT***

Teachers' attitudes play an important role in the teaching-learning process that utilizes computers and internet connections. Unfortunately, whilst some have passionately integrated technology (such as computers), others have guardedly welcomed it whilst others have out rightly rejected it. The resistance in the acceptance of ICT in the classroom is oftentimes said to be primarily based on the risk of teachers losing influence over the values and directions of classroom activity. However, it is very important; to note that resistance to change is not necessarily a barrier in itself but could also be an indication of the presence of a much deeper problem. This deeper problem could be the lack of the necessary knowledge, skills and attitude to adapt to the changes which will necessarily be brought in education by technology. Thus, the motivation and confidence to integrate ICT in teaching and learning could only come from having access and the right attitude to ICT equipment and possessing the required ICT skills for effective utilization. Therefore, the leadership role of individual schools will play an equally important part in shaping the attitude and responses of teachers to ICT innovation. This will in turn make school owner's, appropriate authorities maintain cordial relationship with teachers for academic growth.

– ***Poor Infrastructure***

Apart from teachers' lack of capacity and attitude toward the use of ICT, poor and weak infrastructure remains a major obstacle in many developing countries. For instance, a survey in the United States of America by the National Centre for Education Statistics (NCES) in 2000 using the Fast Response Survey System (FRSS) revealed that 99% of full-time regular public school teachers had access to computers or the internet somewhere in their schools. Driving this home, this is still a dream in many developing countries such as Nigeria. Nonetheless, many countries (Nigeria inclusive) have increased the number of computers in their schools in recent years or have plan in place to enable teachers acquire ICT education during their training programmes. This is

all efforts to increase teachers' and learners' skills and access to computers during teaching and learning.

In Nigeria, a formidable obstacle to the use of information and communication technology is infrastructure deficiencies with electricity as the major factor. Computer equipment are designed to function with other infrastructure such as electricity under controlled conditions. However, for the past fifteen years Nigeria has been having difficulty providing stable and reliable electricity supply to every nook and cranny of the country. Currently, there is no part of the country, which can boast of electricity supply for 24 hours a day except probably areas where government officials reside and this has reduced the pace at which most activities are been carried out. Electricity as an infrastructure is a major need for the run of ICTs. Most individuals need this infrastructure to drive/run certain businesses. The epileptic nature of power in Nigeria has led to damage of electronic equipment such as radio, television, video recorder and even ICT equipment such as computers. When electricity supply is not constant, it becomes difficult to keep high-tech equipment such as computers functioning, especially under extreme weather conditions as obtained in Nigeria. The high level of dust during the dry season in Nigeria also damages obsolete ICT equipment.

In rural areas in Nigeria, most inhabitants do not have access to electricity, thereby depriving them and causing a great problem in trying to integrate ICTs in such locality. The few Internet access available in Nigeria is found in urban centers. These environmental realities are difficult to manage because ceiling fans, sealed rooms and stable electricity are lacking in many urban homes and rural areas.

Another obstacle to ICT development and integration in teaching and learning in Nigeria is inadequate telecommunication facilities which also are an ICT tool. The inception of Information and Communication Technology and the use of Global System of Mobile Communication (GSM) in most developing

countries has achieved even far better than many African countries. The crux of the matter is that integrating ICTs in teaching and learning processes requires adequate and up to date telecommunications facilities which are in short supply. Therefore, this calls for the need for the Federal Government of Nigeria through the Federal Ministry of Education to observe this situation and seeks for new ways of building necessary infrastructure to support ICT integration in teaching and learning.

Conclusion

Information and communication technology integration in schools in order to provide tangible teaching solutions for TVET ought to be adopted. The establishment of disciplinary and educational principles and procedures, as well as the division of labor among teachers, teaching assistants, workshop attendants and students are crucial elements to establishing a well-managed ICT-integrated class.

By emphasizing these elements, a learning process that is more likely to engage students in higher-order thinking and acquisition of hands-on-experience can be facilitated. Although some elements still prevail against enabling pre-service and in-service teachers to integrate ICT as a meaningful pedagogical tool. The Federal Government through its Ministry of Education should help pre-service teachers overcome difficulties they face during the use of ICT in their classrooms, and present effective strategies and solutions for addressing such difficulties. In technical and vocational education and training, the TVET governing bodies should ensure that technical educators understand that the ultimate objective of technology integration is to promote and advance the teaching and learning process and foster acquisition of practical skills rather that replace it. Therefore, proper planning for technology integration requires a special understanding of specific hardware and software related to the curriculum. Staff development and teacher training and re-training are also very

paramount to supporting the curriculum with technology integration. With these in place TVET will be given a face lift and foster National development.

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