

ISSUES RELATED TO THE USE OF ICTs IN TVET TEACHER EDUCATION IN THE 21st CENTURY IN NIGERIA

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Abstract

Teacher Education in Nigeria has in recent time's undergone a momentous transformation, notably is the application of Information and Communication Technologies (ICTs), which affect the nature of Technical, Vocational Education and Training (TVET) teachers' work and operation. However, despite the increasingly prevalent adoption of ICTs in almost all facets of education, some momentous issues are thwarting the widespread and successful implementation on teachers' education of the professional learning they need to meet the new demands of their professional tasks under the impact of ICT in the 21st century. Consequent upon this, the current paper identified and expounded on the issues relating to the use of ICTs in TVET Teacher education in the 21st century. More specifically, it focuses on the barriers to professional learning participation of TVET teacher in education. Some recommendations were proffered as bridges to the issues, these include among others, a framework for policy formulation and implementation on the working model for integrating ICT-mediated teacher education in TVET should be accessible. TVET Teacher education should move beyond the narrow aims of mainly responding to industry currency and compliance needs to address the broad, complex, and changing needs of teachers

Keywords: Education, ICT, Issues, Teacher and TVET

Introduction

Globalization has created a new world order for doing business; novel Information and Communication Technologies (ICTs) have systematically changed the way we live, learn, work, and even think about work. The synergy of combining globalization with these novel technologies has had remarkable impacts on the economic, social and educational sector and has created new opportunities, challenges as well as uncertainty (Mustapha, 2018). These changes have brought about momentous challenges and opportunities for change and innovation to Technical Vocational Educational and Training (TVET).

In the past, the status and condition of TVET did not match the importance of its potential contribution to society. In the present era of academic globalization, technicians, technologists and engineers of today and tomorrow are projected to be far more creative and innovative. Nowadays, with the tremendous developments in technology, possibilities are emerging to provide TVET in an innovative way to meet global demands with the help of Information and Communication Technology (ICT) (Mustapha, Idris, Abubakar & Musa, 2016).

The ICT revolution makes knowledge a competitive resource in this economic era which depends on brains rather than brawn and value is created by employing knowledge workers and continuous learning. According to Mustapha, Idris, Abubakar and Musa (2016), ICT is an umbrella term that covers two inseparable concepts, that is, information technology (IT) and communication technology (CT). These concepts wrap all the technical equipment to communicate, process and send out information. IT is used as a tool to process, manipulate and manage information while CT is everything linked with the utilization of tools to process and convey data from one gadget to another. The need for recurrent education and the changing labour market conditions, call for flexible access to TVET. Continuing education models that will meet workers' lifelong learning needs have to be relevant and flexible to provide just-in-time learning without distance. ICTs play a crucial role in removing distance barriers from education and in developing a lifelong learning culture in TVET (Usono *et al.*, 2016). Despite these potentials, little is known regarding the usage of ICTs in TVET within UNESCO's Member States. The purpose of this study is to determine the issues related to the use of ICTs in TVET teacher education in the 21st century in Nigeria. This paper focuses on the factors that enhance the effective use of ICTs in TVET Teacher Education and the barriers to professional learning participation of TVET Teacher Education (TE).

TE refers to the policies and procedures designed to equip prospective teachers with the knowledge, attitudes, behaviours and

skills. It is a process that involves the acquisition of knowledge, attitudes, behaviours and skills.

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1. Initial teacher training /education: This is a pre-service course before entering the classroom as a fully responsible teacher;
2. Induction: This is the process of providing training and support during the first few years of teaching or the first year in a particular school;
3. Teacher development or Continuing Professional Development (CPD): This is an in-service process for practising teachers. CPD is the process by which teachers (like other professionals) reflect upon their competencies, maintain them up to date and develop them further.

In Nigerian institutions, policies and practices in the curriculum of the National Policy of Education (2013) such as funding have been evolving over 3 decades to promote the objectives of TVET curriculum to improve the readiness of today's industries (FRN, 2013). The TVET Teacher Education curricula can be broken down into four major areas, these include:

1. Foundational knowledge in education-related aspects of the philosophy of education, history of education, educational psychology, and sociology of education.

2. Skills in assessing student learning using technology to improve teaching and learning, and supporting students with special needs.
3. Content-area, methods knowledge and skills often include ways of teaching and assessing a specific subject.
4. Practice at classroom teaching or at some other form of educational practice usually supervised and supported in some way, though not always. The practice can take the form of field observations, student teaching or internship

Despite the stated objectives, employers of labour have continued to express their worry over the quality of the current status quo of TVET institutions in Nigeria who are experiencing setbacks due to the deficiency in relevant job skills for employment in the 21st-century workplace. Therefore, adequate synergies of achieving the above goals of TVET in Nigeria are an indication of the gap between TVET TE policy and practice.

TVET Teacher Education Policy in Nigeria

The process by which teachers are educated in the subject of political discussion in many countries, reflecting both the value attached by societies and cultures to the preparation of lifelong skills and the fact that the TVET education systems use significant financial resources is termed TVET Teacher Education Policy. However, the degree of political control over TE varies from the hands of universities at Federal and State level, the state may have no direct control whatever over what or how new teachers are taught; this can lead to anomalies, such as teachers being taught using teaching methods that would be deemed inappropriate if they used the same methods in schools, or teachers being taught by persons with little or no hands-on experience of teaching in real classrooms.

Haughey (2002) identified the following five policy issues and concerns that need careful consideration in deciding whether or not to implement ICTs in TVET

1. Infrastructure: Appropriate infrastructure must be available to ensure equity of access and proper delivery of content.
2. Administration: The system must provide adequate resources and support for technology integration.
3. Learning: ICTs must be used to enhance teaching and learning.
4. Teaching: Teachers need to be adequately prepared for using ICTs to teach and facilitate student's learning.
5. Content Development: Content development can be costly and time-consuming, and the content itself can have a short shelf life. Developing and keeping high-quality instructional products up-to-date is a major challenge for TVET.

Barriers to Professional Learning Participation of TVET Teachers in Education

There are varied reasons why TVET teachers do not take part in formal professional learning activities. These reasons include among others, lack of teachers' interest, absence of pertinent, quality professional learning opportunities, fiscal and time restraint. Even though, these aspects have been well-known and conferred to different degrees in the general professional development text, this section provides a fundamental analysis into the barriers of professional learning participation of TVET teachers in education.

1. **Fiscal Constraints:** There are professional learning activities such as conferences, seminars, symposia that go with the teacher's to focus but as a result of deficient in fiscal support from their establishments. Despite the fact that it is clear in this time of tensed funding, it is much regret that these professional learning events that teachers

acknowledged as being germane to their trained workers are not within their means and in view of that, they have to take turns to partake in professional learning activities organized by external establishments, which are typically expensive and high-priced to the controlled budgets of institutes and teachers.

2. **Time Constraints:** Time is an imperative inhibitor to TVET teachers' commitment to professional learning activities. Even if teachers are given entrance to professional learning opportunities, in some occasion, they basically cannot take part because of their intense workload which might thwart teachers' commitment in professional learning since they have to get in touch with their full ability in performing their expected work responsibilities. Sometimes, TVET teachers are too busy to participate in professional learning activities or any other extra activity due to conflicting schedules of responsibilities in hectic periods like the end of a semester as they have reached their full power just performing their usual everyday tasks.
3. **Casualization of the Teaching Staff:** Casualization of staff has proved to be an inhibiting factor to TVET teachers' professional learning. More and more academics these days are employed on a casual basis. In the TVET sector, growing casualization of teaching staff in recent years has been seen to be associated with the marketization of TVET programs and recruitment of international students where a large number of teachers might be required to backfill the teaching of a growing but somewhat unstable number of international students in some programs on high demand at a certain period of time such as Hairdressing, Cookery or Accounting. Within private TVET institutes, in particular, most teachers involved in teaching students often work as casuals or on a

short-term contract. Their contracts depend mainly on the number of students in their program. Due to teachers' tight budgets, institutes cannot support casual staff to take part in professional learning activities crucial to improving their teaching skills and thus enhancing the teaching and learning quality. While there are staff who would not take the opportunities, there are likely staff who would commit to their professional learning by sacrificing their own time and effort to improve themselves as a teacher. Casual staff are generally marginalized and vulnerable, thus any support for them is valuable. Indeed, they play an important role in maintaining the teaching and learning activities at institutes thus should be treasured rather than being excluded. Only with that can they be assured so that they could commit even more to their teaching.

4. **Lack of Teachers' Interest:** There are grounds why teachers are not attracted to participating in professional learning activities. These include a lack of incentive in terms of monetary rewards. This shows that the TVET teachers' reluctance to engage in professional learning activities respites with their alternative. Even though, the teachers might have sound justifications for their choice. It is such sympathy to discover that the professional learning offerings are not attractive and rewarding enough for TVET teachers to spare their own time.
5. **Lack of Relevant and Quality Professional Learning Opportunities:** Other vital barriers to professional learning participation by the TVET teachers in this study are the unavailability of professional learning in the area they need or the mismatch between the professional developments offered and the one needed. Indeed, there is currently the lack

of professional learning activities focused on equipping TVET teachers with the required knowledge and skills in teaching students.

Barriers to the Integration of ICTs in TVET

Integrating ICTs in TVET Teacher Education holds great promise in teacher education; its ubiquitous implementation poses some pressing issues with reverence to capital expenditures in hardware and software, equal access to get rid of technological “haves” and “have-nots”, proper strategies for integrating technology across curricula, copyright issues, and availability of pedagogically sound materials. Stevens (2001) identified five barriers related to the integration of ICTs in TVET, namely:

1. **Content and Curriculum:** While much attention is being given to the development technologies that drive ICT-mediated learning, one of the most critical issues remains the curriculum content. As Stevens noted, “A current impediment to the further growth and diffusion of more advanced systems in all parts of the world is the unavailability of relevant, well-designed instructional content. This is particularly true in the technical/vocational training area”. The considerable up-front investment must be made in developing programme materials for electronic delivery. This is especially problematic in TVET because recovering investment costs could be difficult or even impossible due to the relatively small markets, particularly in developing countries.
2. **Appropriateness and Efficacy:** There is a perception that distance education is not an appropriate method for delivering vocational and technical skills. However, "... for many

occupations within the emerging 'knowledge economies,' the cognitive and affective learning domains are becoming more substantial relative to psychomotor skills". Providing distance education in these two domains is much less challenging than teaching manual skills at a distance. The efficacy for distance learning in vocational education will keep improving with the upgrading and improvement of learning technology, instructional design, adaptive learning models, simulation of a workplace environment, learners support systems, access to e-learning, and the development of intelligent tutoring. Greater emphasis on a self-directed style of learning and an increase in computer literacy among stakeholders will further enhance the efficacy of distance learning in TVET.

3. **Quality and Branding of Distance and E-learning:** The proliferation of e-learning courses in North America raises suspicion among learners as to the quality of course content and the credibility of the institution. These courses must be accredited by educational authorities for e-learning to become a legitimate method of course delivery and to gain learners' confidence.
4. **Stakeholder Resistance:** The shift to technology-based learning may represent a threat to job loss for some stakeholders, thus resulting in resistance to embrace innovation. Adopting ICTs for teaching and learning will not result in job losses, however, there will be a change in the instructor's role, moving from teaching to facilitating and guiding the learning experience. Brennan, McFadden and Law (2001) noted that "there is a potential loss of work if the scenario of teacherless classrooms comes anywhere near reality. Secondly, technology by its very existence and its degree of present and predicted

permeation of education and training throws all existing methods up to scrutiny. Practitioners are forced to examine and justify their existences". The case studies of online learning conducted by Curtin (2002) also confirmed this problem: "where the institutional constraints are not addressed, the case studies suggest that online delivery is likely to remain an island of innovation in a sea of resistance".

5. **Institutional Barriers:** Institutional barriers associated with ICT-mediated learning have been well documented in the literature. Zirkle, (2002) identified the following as some of the barriers: Difficulties in recruiting qualified instructors, maintaining reliable technical assistance and support and in scheduling, high cost of programme development, Instructional difficulties, lack of adequate resources, equipment and support
6. **Student Barriers:** There are many barriers experienced by distance education learners. Zirkle (2002) highlighted the following as some of the barriers affecting students: Motivation, alienation and isolation, cost of equipment and access to technology, lack of adequate support and services, ICT literacy skills, immediate feedback from instructors, skills in managing data and time.
7. **Lack of Appropriate of Software:** The development of ICT-mediated learning materials for TVET has been slow as compared to the rate for the general education sector. This trend can be explained by comparatively low enrolment in TVET and the need for a wide variety of occupational specific software in TVET. "Specifically, technology applications used in various occupational fields are not available to educators" (Allen, Walker, & Morehead 1999). TVET teachers do not benefit from manufacturers developed software and hardware dealing with specific products or services. On the other hand, many of the

products are not comprehensive enough to cover all aspects of a programme's curriculum. Herschbach (1984) notes: The market for vocational education is relatively small, compared to the potential market for general education subjects in the elementary and secondary levels. On the other hand, vocational education benefits from products of all kind developed for business and industrial applications in general, although there are few instructional areas where comprehensive coverage may be expected.

8. **The Digital Divide:** ICTs can be seen as driving the new network economy. Access to ICTs is essential to innovation, economic growth, and social development. Research attributed GDP growth, economic activity, productivity growth, research and innovation, and higher-paying jobs to the use of ICTs. Therefore, differences in access to ICTs create a "digital divide" between those who can benefit from the opportunities offered by ICTs and those who cannot (Montagnier, Muller & Vickery, 2002). This digital divide is widening inequalities between the haves and the have-nots not only between countries but also within them. The ILO (2001) identified three ways in which ICTs contribute to the widening of this digital gap, these include:

- i. Higher-level skilled workers are moving freely in the global economy. Therefore, leading to a global division of labour. Knowledge workers will cross borders freely, facilitating the circulation of technology, including the growth of technology-intense industries, and helping to create a truly global marketplace for skills.
- ii. More than 200 countries are currently using the Internet, only 5% of the world's population is Internet users and 88% of those users are from industrialized

countries. Furthermore, within each country, access to the Internet usually depends on income, education, age, racial or cultural background, urban or rural location, gender, geography, and firm size. Montagnier, Muller and Vickery (2002) noted that language is another dividing factor since the majority of web sites are still in English.

- iii. Speed separates companies and countries to the benefit of those in a better position to adapt and change rapidly. ILO (2001) indicates that "A distinct minority of the world the wealthiest, the best educated is best placed to gain the greatest advantage from these technologies".

The digital divide has accentuated the existing social and economic inequalities among nations. The world today is not only divided by ideology, but also by technology. To illustrate the magnitude of the divide, the ILO reports that the number of phone lines per capita in developed countries is approximately one line for every two citizens as compared to 1.4 phones per 100 people in low-income countries. This gap is further evidenced by the fact that of all the individuals in the world using the Internet today, only 1% live in Africa (Chris, 2005). Africa is responsible for only 0.4% of Internet content. It is therefore not surprising that most of the world's technology innovations originate from only 15% of the world's population, while a third of the world's population is technologically disconnected (ILO, 2001). The ILO (2001) also reported that: "The poorer developing countries face the formidable task of overcoming the handicaps that have so far prevented them from seizing the new opportunities. The priority is to raise the basic education and skills levels of their populations, for instance, establishing policies and systems for lifelong learning" (ILO,

2002). The involvement and active participation of developed countries are crucial to bridging the ever-widening ICT gap between developed and underdeveloped countries. Farrell (2001) cautions: "even within developed economies, the disparity of access (to ICTs) is so great that many policymakers fear that adopting these technologies will result in widening the gap between the "haves" and "have nots".

9. **Cognitive Divide:** Technology is said to be driving this new economy and human capital is its fuel (Moe & Boldget, 2000). Increasingly, human capital investment is seen as an essential ingredient in the growth recipe of advanced economies (Baran, *et al.*, 2000). In the new economy, human capital is defined as workers' knowledge that results in effective and efficient performance. Knowledge is not only beneficial to the well-being of the worker but also viewed as a major competitive advantage for the company and a key element to the country's national prosperity and social development. In a recent report on human resources development, the ILO noted: "People with low skill levels, obsolete skills or no employable skills are more likely to be excluded from the labour market. Disadvantaged groups are also excluded from opportunities that are central to participation in the social, political, and cultural life of society, as a result of their limited access to education, skills training, health care and employment. Their exclusion incurs high costs on social security systems and society in general. Also, the opportunity cost to national economies of having so many inactive people is substantial" (ILO, 2002). Access and equity in adult education and training is seen as an essential policy for combating exclusion and promoting inclusion, especially among disadvantaged groups. Considerable efforts and resources are being devoted to providing equal education and training opportunities to all. However, having equal educational opportunities now means

more than having access to education and training. It also means that a person has the repertoire of cognitive skills needed to learn and succeed in the learning environment. Many adults lack the essential cognitive literacy skills to succeed even if they were given access to education.

10. Copyright ICT-mediated Learning Materials: The Australian National Training Authority (ANTA) (2002) defines copyright as "a form of intellectual property that protects literary, dramatic, artistic and musical works, films, broadcasts, sounds recordings and published editions. The main goals of copyright systems are to ensure that the creators of work are credited and compensated for their effort and to encourage creation and innovation (Dusollier *et al.*, 2000). Copyright covers the expression of an idea, not the idea itself, which is public domain (Australian Copyright Council, 2002). Copyright protection comes into effect as soon as the creator's work is in a reproducible form. The creator should place a copyright notice and symbol on the work.

Conclusion

ICTs in education and skill development are undergoing a rapid change. As advances in computer graphics, artificial intelligence, and machine learning technologies rapidly evolve, the future of TVET will invariably be impacted by a more sophisticated integration of ICT. These tutoring systems will then modify content delivery strategies and pedagogical and testing approaches so that every student gets a customized learning experience suited to their needs.

Recommendations

Based on the conclusion, it was recommended that:

1. A framework for policy formulation and implementation on a working model for integrating ICT-mediated teacher education in TVET should be accessible.
2. TVET Teacher education should move beyond the narrow aims of mainly responding to industry currency and compliance needs to address the broad, complex, and changing needs of teachers

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