



Bridging Skill Gap to Meet Technical, Vocational Education and Training School-Workplace Collaboration in the 21st Century

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Abstract: Technical vocational education and training (TVET) refers to a deliberate intervention to bring about learning which would make people more relevant and productive in designated areas of economic and technological activities. In order to meet the demand of the 21st century workplace for skilled manpower and also to produce individuals that will be equipped with saleable skills for employment and self-reliant. If this must be achieved, TVET educational institutions must collaborate with the industry towards bridging the skill gap. This paper therefore examines best practices in TVET school-workplace collaboration: bridging the skill gap to meet manpower needs of the 21st century workplace. This paper discusses concept of workplace training in TVET, concept of workplace-school collaboration, need for workplace-school collaboration in TVET, best practices to workplace-school collaboration: bridging the gap to meet the manpower needs of the 21st century workplace.

Keywords: Best Practices, 21st Century, TVET, Workplace Training, School-Industry Collaboration

1. Introduction

The acquisition of workplace skills is seen universally as a key driver of economic and technological development. The essential role of Technical Vocational Education and Training (TVET) in facilitating skills development for the socio-economic and technological development of countries globally account for the increasing importance that is being attached to TVET. TVET is the type of education which provides individuals with skills, knowledge and attitudes for effective employment in specific occupation. According to UNESCO (2001), TVET is a comprehensive term referring to those aspects of the educational process in addition to general education, the study of technologies and related sciences, and the acquisition of practical skills, attitudes, understanding and knowledge relating to occupation in various sectors of the economic and social life. TVET can be seen as: (i) an integral part of general education; (ii) a means of preparing for occupational fields and effective

participation in the world of work; (iii) an aspect of lifelong learning and a preparation for responsible citizenship; (iv) an instrument for promoting environmentally sound sustainable development; (v) a method of facilitating poverty alleviation (UNESCO, 2001). Similarly, UNESCO (2009) defined TVET as all forms and aspects of education that are technical and vocational in nature, provided either in educational institutions or under their authority, by public authorities, the private sector or through other forms of organized education, formal or non-formal, aiming to ensure that all members of the community have access to the pathways of lifelong learning. According to Federal Republic of Nigeria (FRN) (2013), the objectives of TVET are to:

- i. Provide trained manpower in applied science, technology and commerce particularly at sub-professional level;
- ii. Provide the technical knowledge and vocational skills necessary for agricultural, industrial, commercial and economic development;

- iii. Provide people who can apply scientific knowledge to the improvement and solution of environmental problems for the use and convenience of man;
- iv. Give an introduction to professional studies in engineering and other technologies;
- v. Give training and impart the necessary skills leading to the production of craftsmen, technicians and other skilled personnel who will be enterprising and self-reliant; and
- vi. Enable our young men and women to have an intelligent understanding of the increasing complexity of technology.

This implies that TVET is a type of education given to individuals to develop their creative and manipulative potentials for the benefit of humanity. The goal of education and TVET is therefore to fight ignorance and illiteracy so as to produce competent human resources for economic and social development. According to Uzoagulu (1999), TVET demand that: (i) individuals be exposed to their environment for positive interaction; (ii) individuals be oriented to various practical skills and scientific knowledge; (iii) innate abilities of individuals be identified and recognized; (iv) individuals be enabled to develop and harness abilities identified; (v) challenging tasks be provided for individuals; and (vi) practice and guided discoveries be applied on the individuals to attain perfection. TVET can also be seen as a planned programme of courses and learning experiences that begin with exploration of career options, support basic academic and life skills, and enable achievement of high academic standards, leadership and preparation for industry-defined work (Kukoyi, 2009). This author emphasized that TVET prepares learners for careers that are based on manual or practical activities, traditionally non-academic and totally related to a specific trade, occupation or vocation. Kombe (2010) posited that in contrast to general education, learning in TVET is centred on 'applied' as opposed to 'academic'; practical as opposed to theory, and skill as opposed to knowledge.

Obviously, TVET today face huge demands globally due to the high level of youth unemployment.

Nigeria as one of the developing nations of the world is saddled with the fundamental issues of graduate unemployment and this has become a serious cause of concern. It is universally accepted that no nation can develop above the level of quality manpower resources it possesses. Consequently, in order to meet the manpower needs of the 21st century workplace, the manpower work force has to possess the right skills, up-to-date knowledge, the right attitude and abilities to do the work in line with the demands of the occupation. All these can be achieved through a functional and effective TVET-industry collaboration.

In spite of several efforts by government through her different policies to make Nigerian educational system more functional, there are still growing concerns among education stakeholders and industrialist that graduates from our educational institutions lack adequate practical background and relevant job related skills for employment in industries

(Ideh, 2013; Idris & Rajuddin, 2012). Employers of labour have continued to express their worry over the quality of the current graduates of TVET institutions in Nigeria who are experiencing set-backs due to lack of relevant job skills for employment in the 21st century.

The 21st century workplace is unique and only people with adequate skills can serve. The unique characteristics of the 21st century according to Aguba (2010) in Iroriteraye-Adjekpovu (2013) include: (i) a scientific and computer world; (ii) a technological or jet age demanding efficient use of computer in all spheres of life; (iii) an age requiring sound scientific and technological skills for children to cope with its complexity; (iv) a world where emphasis will be more on accuracy, competence, efficiency and effectiveness which are derived from educational foundation; and (v) an era of highly skilled practitioners and generalists. These unique characteristics have made employers of labour to find graduates unusable in the world of work.

The skill gap in most TVET graduates in Nigeria being subjected to series of retraining programmes because most of them are considered to be ill equipped and adjudged unemployable based on the quality of training acquired (Rufai, Abdulkadir & Kagara, 2013; Ideh, 2013). In situations when industries cannot employ and re-train our indigenous TVET graduates, they technically bring in the 'expatriates' to do the same job. The TVET institutions and industries work place collaboration training programmes has failed Nigerians over time to address the skill gaps which exist and diminish the usefulness of TVET graduates from the Nigerian educational institutions. Agreeably, for TVET in Nigeria to achieve its envisaged objectives, it must be properly strengthened through school-workplace training collaboration.

2. Concept of Workplace Training in Technical Vocational Education and Training

Workplace training has been widely recognized as the most efficient method for skills development. According to the Australian National Training Authority (2003), workplace training and learning is the training or learning undertaken in the workplace, usually on the job, under normal operational conditions. Similarly, the European Centre for Development of Vocational Training (CEDEFOP) (2011) defined workplace training as a form of training that takes place in a workplace based on the principle of learning by doing and includes demonstrations by a more experienced employee, performance under supervision, and coaching, job rotation and participation in specific projects. CEDEFOP further asserted that workplace training can be associated with formal training programmes as well as informal or incidental learning that may or may not result in some form of credential. The works of Lave & Wenger (1991), Brown & Duguid (1991) & Lave (1995) in Uwameiye (2010) emphasized the need for learning and practice to be in

context, for learning to be effective and meaningful. To these authors, knowledge is situated of which is a product of the activity, context and culture in which it is developed and utilized. This implies that enabling learners to work and learn in stimulating environment can enhance learning. Workplace training can take various forms such as formal apprenticeships which typically involve a contract, lasting for a period of two to four years and leading to a formal qualification or other shorter and often less formal training and work experience programmes for youths as well as training for employees. CEDEFOP stated that workplace training generally involve the use of experts (trainers) who play a leading role in transferring the needed knowledge and skills to the learners or workers. Through workplace training, people are motivated to learn (Uwameiye, 2010). Uwameiye added that the workplace is the primary location in which the pedagogic values can be appreciated by relating 'what is learnt' to the application and development of identities. Here, learning becomes a natural process that occurs as people participate in the work situation. A key advantage of workplace training is that it provides opportunity for immediate application of the acquired knowledge and skills to the workplace (CEDEFOP, 2011).

3. Concept of Workplace-School Collaboration

The laudable objectives of TVET cannot be achieved without an effective connecting workplace-school collaboration relationship. Emphasizing the need for TVET workplace-school collaboration, Lave & Wenger (1991), Brown & Duguid (1991) & Lave (1995) in Uwameiye (2010) provided the following theoretical supports: the rejection of formal and informal learning dualism; the rejection of the transmissions, teaching and learning model which portrays the learner as a passive recipient of knowledge; among others. According to Lave (1995) in Uwameiye (2010), the recognition that the knowledge can be produced in practical as well as academic setting; and knowing is never context free; learning should be recognized as a social, collective phenomenon, rather than the individual psychological phenomenon. To this end, Engestron (1994) asserted that knowledge and understanding can be further advanced through structural teaching and learning. The purpose of instruction is to enhance the quality of learning and to make it purposeful and methodical (Uwameiye, 2010). According to Engestron (1994), the ingredients for effective learning include: (i) ensuring that individuals have access to theoretical and experimental knowledge; (ii) the opportunity to engage in authentic task and interaction with others; (iii) the chance to develop critical and intellectual capacities through the application of concept and theory in practice; and (iv) the opportunity to have their thinking and understanding enhanced through the guidance and teaching of others.

Workplace-School collaboration is a mutual work experience learning relationship between educational

institutions and the workplace where the students for training acquires workplace experiences for a period of time. Workplace-School collaboration has in recent times gained increasing popularity due to the enormous benefits that such arrangement always brings in delivering skill acquisition. Workplace collaboration, according to the Involvement and Participation Association (IPA) (2009), is a relationship based on the satisfaction of mutual as well as separate interests given by both parties to those interests. It is the relationship or agreements between the TVET institutions and the world of work to device, finance, build, manage, preserve and equip the students with the required work skills needed for purposeful employment upon graduation. Workplace collaboration offers potential work benefits to the industrial training students through the Student Industrial Work Experience Scheme (SIWES) programme, and a good relationship with the local and international community (Scott, 2014; IPA, 2009). Contextually, Workplace-School collaboration refers to a wide variety of agreements between TVET institutions and the world of work by which workplace delivers infrastructures and services that should have been provided in the school without compromising the profit objectives of the workplace, the sole aim of which is to provide opportunities for practical training of students for skills development. Through this relationship between school and workplaces, TVET students are exposed to industry operations and use of industrial work tools and machines, management structure of industrial organizations and good work habit in their specialized areas through industrial attachment in order to improve the quality of TVET programme as well as gain valuable practical experiences for participants in the training (Ideh, 2013).

The environment habit theory of work experience postulates that work experience will be efficient in as much proportion as the environment in which the learner is trained is a replica of the environment in which the learner must subsequently work (Prosser & Quigley, 1949). This theory reveals the conditions, circumstances and influences surrounding and affecting the development of skills that will be relevant to get work done. The job-in-learning must not be for ordinary exercise, but exact jobs or part of exact jobs or projects with actual tools and machines. This implies that TVET students should be trained in the environment with machines, tools and equipment similar to that the graduates will use when in employment. However, irrespective of how good a classroom environment is, classroom environment does not provide and compensate real life working environment.

4. State of Technical Vocational Education and Training in Nigeria

Several Nigerian governments have made different policies in favour of TVET. These policies have merits and are capable of transforming Nigeria TVET system to an enviable height. The confounding issue however lies on their

effective implementation. According to Obebe (1993) in Ekong (2013) posited that TVET policies are written by knowledgeable proposal writers who have foresight and believes strongly in what they write for future but the problem comes when it comes to translating theory to practice.

The non-successful implementation of TVET policies and programmes by successive Nigerian Governments has led to low enrolment in TVET. According to Kazaure (2009), less than one percent of secondary school education was oriented towards technical vocational skills. Similarly, African Economic Outlook (2008) posited that the overall TVET enrolment constitutes only about one percent of total education enrolment with female participation in TVET averaging about a third. Ogumyemi (2003) posited that the ratio of secondary schools to that of technical colleges stand at 37:1. This ratio has been attributed to the lopsided nature of manpower production in the nation. A situation which has led to low production of skilled manpower (OECD Report cited in Dabesaki, 2012). This in turn has culminated in numerous inadequacies in the development and sustenance of the country's economy and production industries. Such inadequacies include uneven distribution of technical vocational manpower in the industries and other sectors. In this connection, analysis of Gross Domestic Product (GDP) of Nigeria in 2008 revealed that the content of labour force in technical vocational areas tilted heavily towards agriculture with 42.07 percent while manufacturing was 4.13 percent, oil and gas 17.54 percent, telecommunication 2.9 percent, construction 1.83 percent and others 31.53 percent (Business Day, 2009). Agriculture is practiced at subsistence level, and the 42.07 percent is made up of mainly unskilled people, so the percentage of skilled personnel in TVET is relatively low.

In Nigeria, there are five TVET institutions outside the University (African Economic Outlook, 2008). These include pre-vocational, Vocational school and technical colleges at post-primary level and at the post secondary polytechnics and technical teacher educational colleges. At the tertiary level, TVET programmes are examined and certified by different bodies. Recently, the Nigerian Government approved the establishment of two types of TVET institutions at non-formal level, namely: (i) Vocational Enterprise Institutions (VEIs); and (ii) Innovative Enterprise Institutions (IEIs). These institutions are to provide a veritable alternative route to higher education. They are private institutions designed to offer vocational, technical, technology or professional education and training at post-basic and tertiary levels to equip secondary school graduates and working adults with relevant skills and knowledge to meet the increasing demands for the various sectors of the Nation's economy (National Board for technical Education (NBTE), 2012).

VEIs and IEIs serve as a link between training and the world of work; guarantee a life-long continuous training for updating of workers knowledge and skills, as well as to ensure sustainable living. VEIs admits those with basic minimum certificates and on completion award National Vocational Certificate (NVC) while IEIs admit those with

five credits at Senior School Certificate level, and upon completion, award National Innovation Diploma (NID).

The issue of developing and sustaining skilled workforce for Nigeria's industrial sector through TVET is great because of the variety of occupations and areas of technical manpower needs of the 21st century workplace; and the fact that individuals need to be skilled for self-employment. The quality and image of TVET in Nigeria is of great concern at this given time when it is evident that the key indicator of any country's advancement in development cannot be divulged from her success in TVET. The perception of the society about TVET is nothing but an educational programme for the 'never do well' or students that are academically deficient. Collaborating this view, Aworanti (2011) asserted that TVET is seen by the public and even parents as education tract as fit for only the academically less endowed. This poor perception of TVET according to Ogumyemi (2003) in Ekong (2013) has resulted to low recognition of craftsmen graduated from TVET institutions.

In addition, the issue of quality assurance in TVET presents a serious challenge to development of technical manpower for Nigeria industries. Netherlands Organization for International Cooperation in High Education (NICHE) (2010) posited that in most developing countries including Nigeria, TVET is limited in scale, scope, quality and relevance. Similarly, Oviawe & Uwameiye (2010) reported that most TVET institutions lack the tools and equipment necessary for practical education. The little equipment in workshops and laboratories are often obsolete, bearing little or no resemblance to the technologies currently used by the 21st century workplace. In most cases, insufficient training resources lead to trainees overcrowding during classes, with most of them only observing the teacher demonstrate and not having opportunity to get hand on practice. The effects of these are more evident on graduates who are not considered more skilled than their academic counterparts by the workplace. This has also added to the poor image of TVET and also hampered the production of adequate workforce for the industries and other sectors.

5. Need for Workplace-School Collaboration in Technical Vocational Education and Training

TVET is no longer seen as being solely in the realm of educational institutions but is increasingly involving workplaces, private individuals and a variety of other non-governmental and community organizations (Australian National Training Authority (ANTA), 2003). ANTA further posited that the increasingly competitive changes in the nature of the economy as well as occupational and workplace changes have had a significant impact on the nature of the workplace. These changes imply that the skill level of present and prospective employees must be continuously developed. As such, workplace learning is taking on an increasingly essential role in the education and training of the workforce.

Although workplace-school collaboration has been in existence, it has failed to connect the cognitive, affective and the psychomotor dynamics of TVET curricula to meet the current trends of the industry and as such, TVET students find it difficult to have a smooth transition from school to the world of work. In spite of the exposure of TVET students to SIWES, there still exist skill gaps between the demand for employment (manpower needs) and the level of educational preparation of graduates which may be linked to some inadequacies of workplace-school industry collaboration which continue to widen the gap between theory and practice. Some of the issues in SIWES according to Okoro (1997) in Ideh (2013) are: (i) duration of industrial training being inadequate for the acquisition of meaningful and relevant experience; (ii) students were sometimes placed on jobs other than the ones in which they were enrolled in school; (iii) conflict often arise between what was taught in school and what is actually done on the job; (iv) students oftentimes did not receive training throughout the period of industrial training. Thus, there is need for collaboration.

The need for workplace-school collaboration is further justified by the fact that available literature evidences indicate that TVET institutions and their programmes are ineffective and of low quality. Okeshola (2012) asserted that there are several issues facing TVET in Nigeria, the greatest of which is inadequate funding by the Federal, State and Local governments; poor school to work transition curriculum; inadequate facilities in our training institutions (Obioma, 2015); lack of comprehensive career guidance of students; lack of commitment of industries towards undergraduate training; poor working relationship between schools and the workplaces (Offiong, Akpan & Usoro, 2013); lack of awareness of new technological innovations in the industries; over emphasis on theory (certifications) at the expense of work experience training (practice)' poor planning and inaccurate research data; teacher incompetence (poor material and resources); inconsistent monitoring and evaluation; and inability of TVET institutions to develop other forms of workplace collaboration that will incorporate theory and practice (Olorufemi & Ashaolu, 2008). Yusuf & Soyemi (2012) added that most formal TVET institutions in Nigeria are currently operating in an environment that is characterized by low quality training and mismatch between training and labour market skill demand. Similarly, Akhuemonkhan & Raimi (2013) posited that the quality of TVET facilities like workshop rooms, books, learning environment, machines, computer rooms, TV/Audio visual, instructors and content of curriculum are inadequate in most tertiary institutions in Nigeria. Further, Ayonmike, Okwelle & Okeke (2013) identified inadequate classroom blocks, lack of conducive staff offices, inadequate electricity supply, lack of water supply, inadequate workshop spaces, lack of TVET machines and tools, lack of TVET textbooks, lack of consumable materials and inadequate instructional materials as other issues militating against attaining quality TVET programmes in tertiary institutions in Nigeria. The obvious effect of all these issues is that the quality of training given to

the TVET students is very low and they may end up not acquiring adequate skills required for getting and sustaining employment in the 21st century world of work. In view of these issues, workplace-school industry collaboration has become inevitable for several reasons. These include the growing economic and financial difficulties which have made it impossible for many governments to pay for the rather high cost of TVET (Okoye & Chijioke, 2013); widening infrastructure gap, growing students' population and increased demand for TVET.

6. Best Practices to Workplace-School Collaboration: Bridging the Gap to Meet the Manpower Needs of the 21st Century Workplace

Collaboration are diverse and address concerns unique to different TVET institutions and industries, but best global practices that are geared towards developing alternative education programmes for TVET students to gain valuable work experience with industries found within and around the educational institutions is a key for meeting manpower need in industries (Soares, 2010). The key elements of smooth transition of school classroom theories to work practice in an occupation of work to be according to Scott (2014) are: (i) collaborative partnership; (ii) integrated curriculum; (iii) technological advances; (iv) adaptable friendly workers (industry based supervisor); (v) comprehensive career guidance; (vi) work-based learning; and (vii) a step-by-step approach. These practices and key elements to school-to-work transition use collaborative resources, relationships, and activities to build alternatives to classroom theoretical instruction that would develop a student towards manpower needs of the 21st century workplaces. These best practices amongst others may include:

6.1. Funding and Shared Resources for Sustainability

School-workplace collaboration can contribute to sustaining newly developed educational innovation and reformation in vocationalization (Ikeoji & Agwubike, 2006) over time as well as create avenues for financing TVET on specific research into job task as required by funding industries to meet a given need or modernization of the workplace. In so doing, industries can develop school-workplace collaboration relationship of the industry that would enhance a sustainable workforce that would meet the industries manpower needs. To this end, Offiong, Akpan & Usoro (2013) opined funding of TVET institutions through endowment, partnership with companies and non-governmental organizations, establishment of internally generated revenue projects, parent Teacher Associations, and Alumni Associations.

6.2. Curriculum and Instructional Transformation

School-Workplace collaboration can result in meaningful

changes to traditional TVET curriculum and instructional practices. Employers of labour play key role in ensuring this transformation of students from school-to-workplace upon graduation (Obioma, 2015; Scott, 2014). Contextualization of Vocationalization (Scott, 2014), competency-based curriculum, workplace learning, occupation-to-job-task analysis orientation education are some forms of transformation that can be adapted into TVET curriculum in Nigeria.

6.3. Adequate Infrastructural Facilities for Vocationalization

A major issue of under-funding education in Nigeria is the existence of inadequate and decaying infrastructures in our TVET institutions (Obioma, 2015). For TVET institutions to meet manpower needs of the 21st century workplace, adequate provisions of the right technological work base learning facilities to train the TVET students on the current practices involved in the 21st century world of work must be made available for effective and functional learning to take place.

6.4. Academic and Social Support

School-workplace collaboration can create sustained academic and career navigation supports for TVET institutions and employers. The transfer of knowledge from schools to the workplaces and workplaces to the schools is imperative to enhance a better school-to-work transition of students upon graduation. In the same way, employers of labour providing social support to TVET institutions and students is vital also in building highly priced quality relationship in school-workplace collaboration.

6.5. Entrepreneurship and Skill Development

Entrepreneurship education is a lifelong learning process and a tool through which socio-economic and political development could be attained if properly planned, funded and implemented (Alabi, Alana & Bahal, 2014) this education would promote job creation, reduce unemployment and alleviate poverty in Nigeria.

6.6. Assembling Political Will for Vocationalization

Employers of labour, curriculum planners, policy makers, education stakeholders and law makers can identify what tools and information that are required to make school-workplace collaboration evidence based best practices in the development of TVET students to secure employment or be self-employed upon graduation from school and thereby improving TVET in Nigeria. The political will of the government of the day is paramount in fostering the goals and philosophy of vocationalization and this can be achieved through: (i) developing a typology of collaboration between TVET institutions and the workplaces that promote systematic research and innovations; (ii) developing adequate and up-to-date data base to track the outcomes of industry collaboration participants and the students demographic characteristics; and (iii) evaluating the return on investment

from school-workplace collaboration from students, TVET institutions, and industries (Soares, 2010).

7. Conclusion and Recommendations

Nigeria is a country with the unique distinction of having enormous resources juxtaposed with abject poverty and the solution to this situation is an effective and functional TVET school-workplace collaboration. This collaboration will provide the key to the production of manpower that would be able to utilize the abundant human and material resources through the platform of school-workplace collaboration that offers TVET students the unique opportunity of developing the required manpower to meet the ever dynamic world of work. Having explored the issues in the 21st world of work school-workplace collaboration in Nigeria, the following recommendations are made to fill the identified skill gaps among TVET products:

1. The Nigerian government at all levels and TVET policy makers should make a mandatory provision for TVET institutions to establish effective and sustainable linkages with the 21st century workplace. This collaboration could be very useful for practical training of students and therefore facilitating effective skill acquisition.
2. TVET institutions curriculum should emphasize more on work environment habit inculcation into students in order to make them abreast with the emerging trends in the occupation of work.
3. Adequate monitoring and supervision of SIWES programme should be intensified as well as developing a synergy of information between the TVET institutions and the 21st century workplaces.
4. All stakeholders in the TVET sub-sector should employ the school-workplace collaboration for enhancing workplace training. This will improve the quality of TVET programmes in Nigeria.
5. TVET institutions should encourage and give credit points to students who do long semester holiday placement training in relevant industries in their field of endeavour in order to improve and boost the student working experience for a smooth transition from school-to-work.

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