

INDIGENOUS TECHNOLOGIES AND TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING FOR EMPOWERMENT OF YOUTH IN NIGERIA

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Abstract

A society that focuses more on development of indigenous technologies creates more avenues for youth empowerment in form of paid employment and self employment. The frequencies at which indigenous technologies are deployed in solving national technology problems have immense impact on the quality of Technical and Vocational Education and Training (TVET) programme. An effective TVET programme is expected to empower youths with relevant vocational and technical skills needed to gain employment or to set up their own craft business and be self reliant. The high rate at which Nigerian governments depends on foreign professional craftsmen and technicians to solve national technological problems discourages the youths from focusing on indigenous technologies in Nigeria. The adoption of policies that discourages the development of indigenous technologies consequently hinders effective skills acquisition through TVET programme. This paper reviewed the situation of TVET and indigenous technologies in Nigeria with highlights on youth empowerment and TVET, skills acquisition in TVET through indigenous technologies, indigenous technologies and TVET for development of human resources, challenges to TVET and indigenous technologies development in Nigeria. Recommendations were made and it was concluded that TVET plays a vital role in enhancing youth empowerment through indigenous technologies.

Keywords: Indigenous Technologies, Youth, Empowerment, Skills, Technology.

Introduction

Youth are expected to contribute positively towards the development of the nation as they are assets and leaders of tomorrow and they are also seen as people who can move between a specific age of childhood to and adulthood and from dependent to independent. A large number of graduates are unemployed and in order to address the rate of youth unemployment, Technical and Vocational Education and Training (TVET) is seen as the only solution to unemployment in a particular country like Nigeria (Oweh, 2013). The form of education that place emphasis on pragmatic attitude as a priority on individual and community development is technical and vocational education and training (TVET). TVET is the form of education that advocates development of the head (brain), training of the hand (bronze) and enriching the heart (*conscientiousness*). According to Okoye (2013), Technical and Vocational Education and Training (TVET) is a total deviation from the previous emphasis on reading, writing and arithmetic, which was fundamental a form of entry into elite status with its graduates/products roaming about seeking for non-existing white-collar jobs. TVET is a means of acquiring the practical skills, talents, attitudes and understanding necessary for employment in a particular occupation, trade or group of occupations. Ajayi and Ayodele, (2014) stated that TVET cuts across educational levels, post-primary, secondary, and even tertiary institutions.

Educational institutions are in different forms, such as formal or school-based, non-formal or enterprise-based, and informal or tradition apprenticeship. In other words, TVET is concerned with the acquisition of knowledge ai skills for the world of work to increase opportunities for productive work, sustainable livelihoods, personal empowerment and socio-economic development in knowledge economies and rapidly changing environments (Okafor, 2011). Also Radwan and Akindeinde (2010) argued that in order to achieve the African Continent's development aspirations, young people need to have access to an education that enable them to enhance their standard of living, become aware of health issues, achieve their desired family sizes and gain *competitive skills* that will be in high demand in the labour market. De-Largentaye (2011) recalls that vocational training is only one of several instruments for employment generation. Vocational training can develop appropriate skills and thereby improve labour supply and the "employability" of the work force, the demand for labour

depends on incentives for investment, including prices, the exchange rate and generally the business climate in the country.

In essence, *TVET is the education for those who need it, those who want it, and those who want to progress by if a result-oriented form of education. It is not education for the dullards or educationally disadvantage people*". Educating the head is important in order to develop a cadre of intelligent workforce, training of hand is essential to raise army of highly skilled workforce in any work they may become engaged, educate the heart enhances the molding of the workforce into good and responsible citizens. According to Sifuna (2011), colonization, simply put, was a mechanism of exploitation when colonial was designed to serve the needs of the colonial country, by producing educated cadre of labour force with skills but trained to facilitate economic production in offices. In this wise, the colonial education placed no emphasis on promoting skills acquisition and capacity building on advanced professions, in engineering, technology and allied courses for Africans. In many countries of African extraction, it is currently apparent that non-professional system of education is no more suitable for the desired human capacity building and national development. Ma'aji and Hassan (2012) defined technology as all the modifications humans have made in the natural environment for their own purposes.

Technology can be most broadly defined as the entities created by the application of mental and physical effort in order to achieve some value (Lewis, 2010). In this usage, technology' refers to tools and machines that may be used to solve real-world problems. It is a far-reaching term that may include simple tools such as a crowbar or wooden spoon or more complex machines such as a space station or particle accelerator. According to Rowell (2012) technology can also be used to refer to a collection of techniques. In this context it is the current state of humanity's knowledge of how to combine resources to produce desired products to solve problems, fulfill needs or satisfy wants. It includes technical methods, indigenous methods, skills, processes, techniques, tools and raw materials. The word indigenous can be used to refer to a localized approach of doing things which usually involves the use of local materials. By this definition of the word technology and indigenous one can conclude that man as God creations has been involved in technology for ages. Similarly, Indigenous technologies can be referred to as technologies employed by the native inhabitants of a country and which constitute an important part of its cultural heritage and should therefore be protected against exploitation by industrialized countries (Lewis, 2010).

Indigenous Technologies is a set of tail processes, methods, techniques, skills and the characteristic products existing and developed around specific condition of populations. These form the basis for local level decision making in fabrication, manufacturing, in agriculture, health care, food preparation, education, natural resource management and a host of other activities in rural communities (Okafor, 2011). For instance, development is not simply an economic process, but a complex whole that has to arise endogenously from deep down inside each society. It springs from the culture in question, and cannot be reduced to imitation of developed countries or societies. That is to say, nation cannot be developed, when the people are not developed. The interdependence of people most especially the youth and the environment require that no single development or environment objective be pursued to the detriment of others (Okafor, 2011).

The environment cannot be protected in a way that leaves half of humanity in poverty. There can be no long-term development on a depleted planet. Appropriate sustainable strategies must be developed for both rich and poor nations, this makes sustainable development more a moral precept than a scientific concept, and links it as much with notions of peace, human rights and fairness as it does with theories of ecology or global warning (Morton & Montgomery, 2013). If Indeed, sustainable development involves the natural sciences, policy and economics, it is primarily a matter of culture: it is concerned with the values people cherish and with the ways in which we perceive our relationship with others and with the natural world.

Youth Empowerment through TVET

According to the World Bank's (2017) World Development Report, 1.3 billion 15 to 30-year-old young people now live in the developing world and the largest youth population in the history of the world, in both absolute and relative numbers. Young people make up nearly half of the world's unemployed

(Mogaji & Bankole, 2014). Research further revealed that surveys of young people in East Asia, Eastern Europe, and Central Asia indicate that have access to jobs, along with physical security is young people's biggest concern. The report goes on to say "developing countries have a very short time to get this right before the youth dividend turns into a generation of unemployed adults. Three central goals of TVET, UNESCO's (2011) recommendations on TVET took into account the notion of sustainable development, with UNESCO recommending that TVET should:

- Contribute to the achievement of the societal goals of greater democratization and social, cultural and economic development, while at the same time developing the potential of all individuals, both men and women, for active participation in the establishment and implementation of these goals regardless of religion, race and age;
- Lead to an understanding of the scientific and technological aspects of contemporary civilization such a way that people comprehend their environment and are capable of acting upon it while takes a critical view of the social, political and environmental implications of scientific and technological change;
- Empower people to contribute to environmentally sound sustainable development through their occupations and other areas of their lives.

TVET takes on a complex and distinctive character with regard to sustainable development. This is because both directly and indirectly-TVET produces and consumes resources, as well has affects attitudes towards sustainability of work for future of workers in all nations, TVET has always included elements of sustainability especially in the way scarce training materials were conserved and waste materials were disposed (Okonkwo, 2013). The historical commitment gives TVET a foundation upon which to build future commitments to sustain practices. Robert (2012) observed that the manner in which production and consumption is managed can either contribute to sustainable or to practices and conditions that are not sustainable. He observed further that during education and training, the greater the of trainees to sustainable concepts, practices and examples, the more likely the desired workplace culture change will take place in the future. Moreover, the delivery of sustainable practices must be universal; that is, encompassing not only pre-service TVET, but also on-the-job learning and worker upgrading and retraining (Monika, 2011). Continuing TVET will continue to predominate in the future, in order to accommodate both technological and job change.

In addition, the growing significance of sustainability is having major impacts upon business and industry Many companies are now not only reporting the results of their economic achievements to their shareholders and community stakeholders, but also the impacts of their social and environmental record through a system known as "triple-bottom-line" reporting (Akande, 2010). Many new industries and employment opportunities are also being developed, e.g. in ecotourism, environmental monitoring, sustainable community development, eco-design, recycling, alternative energy sources, land rehabilitation, pollution control, waste water treatment and reuse (Okorieocha & Duru, 2014).

All require skilled workers who have knowledge of and commitment to sustainability, as well as the requisite technical knowledge. This is creating new roles and courses in TVET. These many aspects of TVET from pre-workforce learning to leafing in the workplace and further training - all require deep immersion in the understanding and practice of sustainable development. The changing nature of the world of work, especially due to globalization and technological change, demands that TVET develop a skilled, committed and motivated workforce that understands how global changes impact upon local opportunities for business and industry - and hence employment - and how these changes also impact upon the quality of local social, economic and environmental conditions (Gbenedio,2012). To ensure a sustainable future, if is necessary that TVET also ensures that all workers are able to play appropriate roles, both in the workplace and the wider community, in contributing to social, economic and environmental sustainability, Employers have a responsibility to develop a skilled, committed and motivated workforce (Monika, 2011).

Unfortunately, TVET in many developing countries like Nigeria remains locked into the role of being a supplier of skilled labour to industry and is, thereby, unable to respond effectively to the needs of the emerging Information Age (Okonkwo, 2013). Anderson attributes this to the culture of "productivism" in TVET "which presupposes that economic growth is a permanent and necessary feature of human existence, regardless of its environmental impact and consequences. Giving precedence to economic interests, productivism can subordinate the needs of individual learners to those of industry and prioritizes work and "employability" over the non-economic outcomes of TVET (Monika, 2011). This has resulted in TVET being seen as "training-for-growth" and "skills-for-work", two goals for TVET that are antithetical to the needs of the Information Age and the that TVET also needs to serve.

Skills Acquisition in TVET through Indigenous Technologies

There is a mixed up in TVET skills and demand due to globalization, changes in technology, organization of work, new development of work like worldwide, recession, international financial crises. In the long run lead to no skills being acquired but merely acquisition of a certificate showing one reached a certain level and this will lead one not to get employed *some* resorting to diverse ways of acquiring wealth (Monika, 2011). In Nigeria, development must start with meeting the basic needs and a reduction in poverty, ignorant and disease and this can be achieved through science and technology as it will lead to *empowerment* at individual level. The use of technology is evident in agriculture, manufacturing, communication, energy, communication, transportation, construction and even bio-technology (Okorieocha & Duru, 2014). High economic *growth* is contributing to the reduction of global poverty rate. However, high economic growth also has high economic high environmental costs.

Education for Sustainable Development (ESD) can develop critical thinking skills for evaluating and assessing the relationship between the different competing variables in economic development. It will also lead to exploration of new development alternatives and also provide and supporting education and learning goals that help in the achievement of the national objectives. To enhance capacity building of the human resources to support development of indigenous technologies, emphasis should be on TVET programmes such as:

- Building and construction (including bricklaying and concreting);
- Carpentry and joinery;
- Welding and fabrication (including manufacturing of simple agricultural implements and tools);
- Agriculture (crop production and animal husbandry);
- Electrical installation and electronic equipment repair;
- Car repair and maintenance;
- Water supply and sanitation systems maintenance, including domestic plumbing works;
- Handicrafts and traditional skills;
- Basic ICT skills (word processing, data management and internet);
- Tourism-related skills (hotel management, tour guides., cooks, waiters;
- Business entrepreneurial skills and attitudes (including time management, marketing; basic accounting, micro-business management; joint ventures.

Given the scale of human resource development needs in countries emerging out of a pandemic battle like COVID-19, it will be necessary for Nigeria governments to foster collaboration and partnerships with private sector training provider including NGOs and CBOs. It is also important to put in place post-training support services for gradual and provide for the psychological support of trainees

Indigenous Technology and TVET for Development of Human Resources

Indigenous or Local technology in Nigeria needs a new focus and new direction to strongly respond to the industrial and manufacturing need. In fact a national harmonized policy for Indigenous technology is required for a national industrial development. One outstanding mandate of TVET is to provide individuals with learning experience and training that equip them with skills to manipulate hand or machine tools and equipments in their own environment and nurture development for their

immediate community and the nation at large. To manipulate and nurture development, hinges on research activities to improve on technological arts meant for both domestic and commercial utilization. As Gbenedio (2012) puts it, peoples' search on technology tools enhances their information search and directs them on how to make use of such tools. The kind of research undertaken by scholars in any community on country could increase human capacity for the nation's economy.

The major problems that inhibit meaningful research output in technology and vocational training is high unit cost. May be by error of unabated corrupt tendencies or error of commissioner collaboration involving management and those delegated to ensure implementation, what appears deliberate under-valuation of research on TVET projects and policies has been reoccurring in Nigeria. Consequently not much has been achieved in Nigeria in respect to TVET comparably. For instance, the core mandate to link industry and school activities on TVET programs in order to facilitate research and skill acquisition, the stakeholders in TVET programs have not shown adequate commitment to actualize that. The stakeholder in quote are; management of all institutions offering TVET programs, all levels of government in the countries and affiliate individuals of professional repute in TVET and other development agencies, local or international. Subsequently, graduates of the TVET program in that country become employed in the industry on graduation. Currently, most of this luxurious buses plying Nigerian roads are imported from Brazil as dividend from good TVET program of that country.

Challenges to effective TVET and Development of Indigenous Technologies in Nigeria

There are so many challenges to effective TVET and development of indigenous technologies in Nigeria which hinders efficient youth empowerment. Some of these challenges among others include;

1. Inadequate quantity of Information and Communication Technology (ICT) facilities and equipment in TVET Institution's workshop in Nigeria.
2. Gender imbalance and bias in the area of human capacity building and technical skills trends.
3. Over dependent on Foreign technologies and equipments,
4. Energy, Failure to use of Research products and TVET curriculum.
5. Poor teacher preparation and Teachers' welfare schemes.
6. Gross inadequate resource input and consequent low output.
7. Inadequate funding of research efforts in the TVET institutions.
8. Low public esteem of TVET trainees and graduate of technology and polytechnic.
9. Inadequate resource input and consequent low output
10. Underfunding of TVET institutions and other technical-related institution.

Recommendations

Based on the review, the following recommendations were made:

1. As a way of reducing unemployment among Nigerian youths, TVET should be integrated properly into the general education system with the provision of needed facilities and infrastructure for the success of the national transformational agenda at levels of education in Nigeria beginning from pre-school to university level.
2. Indigenous technologies exhibitions both in local and international centers.
3. Nigerian technological institutions competitions and research display updates. Technical Institutions collaboration for local technicians in both national and international Youth Summits and Technological companies' summits.
4. Guidance and counseling services should be provided and strengthened in all schools in the country so that students will be made to see the value of TVET as a catalyst for the transformation agenda.
5. There should be strong linkages and collaboration with employer and job opportunities should be provided in industries for TVET teachers to regularly update their workplace experiences.
6. There should be strong political will on the part of the leaders to judiciously implement all policies, programmes and projects concerning the development of technical and vocational education with sincerity.

7. Qualified technical teachers who are ICT complaint should be recruited all over the country to teach technology related courses.
8. There should be exchange of TVET teachers between states in the federation, that is, between "educationally disadvantaged and of technical knowledge and ideas.
9. Primary and secondary school teachers should be more involved in the orientation students towards the relevance of technical vocational education to their communities and they should be constantly informed of the nation's manpower needs.'
10. Giving training and imparting the necessary skills leading to the production of ar4tisans, craftsman, technicians, technologists and other skilled personnel who will be enterprising and self-reliant.
11. Providing the technical knowledge and vocational skills necessary for agricultural"; industrial, commerce and economic development.
12. Increasing attention should be giving to Local technology and indigenous manufacturing.
13. The campaign to become one among the 20: 2020 world class economy through her national transformation agenda, Nigerian governments should fund research activities adequately It is through research activities that new technologies are unveiled and the already existing ones adapted.
14. Technologies employed by the native inhabitants of a country and which constitute an important part of its cultural heritage and should therefore be protected against exploitation by industrialized countries

Conclusion

As the Federal Government of Nigeria initiates national transformation agenda in order to sanitize the society, it involves a change that restructures the innate nature of what has existed in life past, such as introduction of new techniques or methods, enact laws that will encourage indigenous technologies and manufacturing, change in the way people think and do things, change in ideas and leadership methods, among others. As such, people tend to resist some initiatives inherent in a true transformation objective because most people do not suddenly change at circumstances unless the need for change is understood, until individual sees the need for change, no true change can occur because of the struggle and commitment that is necessary. Conventional secondary schools should continue to offer TVET courses to churn out graduates who have acquired specific occupational skills to gain employment or create their own jobs and be self reliant. Lifelong learning options should be explored to take advantage of learning new work skills through lifetime. Lifelong learning is a self-motivated and voluntary pursuit of knowledge for personal reasons. It takes place throughout life and in many flexible varying situations.

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