Revitalizing Technology Education: A Catalyst for Sustainable National Development in Nigeria

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Abstract
Technology education is the study of purposeful application of knowledge, skill and experience to create and add value to products and systems to meet human needs. This paper acknowledges technology education as education recognized globally as the bedrock of civilization and development. It is an education for individual well-being and socio-economic survival of the society and a sure bet for sustainable national development if well implemented. The paper examines the technology education as it affect national development. It went further to ex-ray the challenges facing technology education in Nigeria. The paper also highlighted ways to revitalize technology education to enhance sustainable national development. Consequently amidst other recommendations made, the paper affirms that the government should create environmentally friendly public-private partnership in technology education to promote functional and affordable technology education capable of harnessing the resources of the nation for societal wellbeing.

Keywords: Catalyst, National development, Revitalizing, sustainable, Technology education.

Introduction

The increasing demand of skilled middle level manpower in Nigeria's emerging market economy highlights the development roles of technology education. These cadres of human capital are mostly trained at technical institutions, namely, Polytechnic, Monotechnics, colleges of technology and colleges of education (technical) (Ohabiyi, 2014). One of the most significant reasons students enroll into a formal school system is for them to be able to apply the learning acquired in school to the solution of problems they would encounter in the society. Thus, the ability to solve problems of various sorts is a vital educational objective in technical institutions.

The technological advancement of any nation depends on it ability to transform its resources into practical realities, which guarantees its self-sustenance and viability (Ogbuanya & Okoye, 2015). It is evident that most of the advanced or developed countries like China, USA, France, inter alia practiced a unique but home tailored technology education capable of utilizing their resources to meet its socio-economic needs with a view of industrializing the nation. This enhances the income or revenue disposition of the citizens by making them self-reliant and responsible.

Effective technology education programme is the type that prepares the beneficiaries for the world of work. Those who go through such programme should be able to contribute to the advancement of their society. According to Oluwatoyin (2011), the development of any nation is hinged on the availability and effective participation of its skilled manpower in a productive economy for the purpose of improving the quality of life of the citizens. Oluwatoyin maintained that the economic manpower wielded by any nation is a direct measure of its technological development. Technological development and its derivative

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economic development is strongly hinged on the type of educational experiences the youth of each nation are exposed to.

The national policy on Education (2008) as it concerns technology education states as follows:

a. Provide course of instruction and training in engineering, other technologies, applied science, business and management, leading to the production of trained manpower.

b. Provide the technical knowledge and skills necessary for agricultural, industrial, commercial and economic development of Nigeria

c. Give training that impact the necessary skills for production of technicians, technologists and other skilled personnel who shall be enterprising and self-reliant

d. Train people who can apply scientific knowledge to solve environmental problems for the convenience of man

e. Give exposure on professional studies in the technologies

In a comparative analysis of some developed countries, Olaitan (1996) in Ogbai & Obi (2014) proved that nations with well developed technology programmes ranked higher in terms of industrial, economic and social development. Olaitan identifies lapses in the Nigeria educational system and stressed that the only remedy was to revert to properly articulated technology education programme that actually prepares one for productive work.

Technology education and skill acquisition are two most important agents of development in any society or nation Ogwa (2016) opine "technology education provide relevant education for skill acquisition, while the industry is the theatre for practice in order to bring about the desired development of skills". The foundation of technology education is at the technical colleges where artisans as low level craftsmen are produced Ogwa (2016) asserted that with emphasis on full implementation of technology education, skill acquisition would be enhanced among the youths and this will undoubtedly lead to reduction of unemployment as many benefiting youths would become self-employed that will make them self-reliant. Technology education is very crucial for self-reliance and empowerment of youth in Nigeria. The African Union (2007) in support of the above assertion stated that technology and vocational skills are crucial in enhancing competitiveness and contributing to social inclusion, decent employment and poverty reduction as strong incentives to youths.

Technology education is to engage and create value contribution to the socio-economic advancement of the nation .The common wealth (2006) enumerated the following conditions that must be present include:

i. An economic and social base

ii. Political will and adequate resources allocation and supported by legal and administrative framework.

iii. A stable environment of equality, peace and democracy

iv. Access to knowledge, information and skills and positive value system in the society spearheaded by good governance.

The evolution and success of many nations of the world today are products of technology education (Edabor & Maliri, 2018). A close and careful examination of the wonders and achievement of technology would make one to believe and generalize that technology education has the solution to world and human problems. By the nature of science and technology man has been able to expand and exploit his environment for his benefits (Edobor & Maliki, 2018). Science and technology has proven beyond all reasonable doubt that earthly resources are inexhaustible and can be regenerated through continuous scientific and technological means via technology education. Education which is the process of acquiring basic skills and knowledge is fundamental for

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technology education to strive. It is viewed as platform for technology education to blossom.

Education by its nature is seen as the foremost instrument or agent of change in any society. This is sequel to the fail that education alone has remain the basic tool for rapid, social, economic, political, moral, scientific and technological development of any society-Nigeria inclusive. It is obvious that technology education is also agent of rapid and progressive socio-economic development of the Nigeria nation. Effective and qualitative education is needed for sustainable national development. Hence no nation can develop more than it development in education (Edobor & Maliri 2018). This paper seeks to agitate revitalizing of technology education for sustainable national development in Nigeria. Hence technology education must be relied upon as a bedrock for national development.

Concept of Technology Education

Technology is derived from the Greek word "Techne" and the Latin word "Techicus". These two terms mean "art" or "craft". The Greek word "Techne" was generally used to designate "a bag of tools" and was later responsible for the general definition by many people that technology is the study or mastery of the use of tools in the manufacturing and industrial sector (Grace, 2010).

Grace (2010) defined technology as a systematic and scientific application of practical skills and theoretical knowledge to solve problems. Edobor & Maliki (2014) added that a good technology must have the following qualities:
i.   It must be relevant and aspirations of the society or nation
ii.   It must be relevant to the peculiar culture, i.e. the local content
iii.   It must be practicable
iv.   Technology must be scientific, and
v.   It must be efficient.

In the other hand "Education" has been conceptualized in various ways by different scholars. Etymologically, the word education is derived from two Latin words " Educare and educere". The first means to train, to form or to mould. In other words, it means that the society trains, forms or moulds the individual to achieve the social needs and aspiration. Educere on the other hand means to build, to lead, or to develop (Egaga, 2018). From the foregoing education is the process of acquiring knowledge, skill, values and attitude necessary for individual and that of the nation (Mose, 2018). Education is the gateway to progress and a bedrock of societal development and no nation can rise above the quality of its citizens educational level as the type of education given to the people of a nation determines the type of growth that might exist in that country. Education is not only an end in itself. It is a key instrument for bringing about changes in knowledge, values and life styles required to achieve sustainable national development within and among countries (Egaga, 2018). With the concepts of technology and education clearly spelt out we can now marry the two words.

Technology education is the study of the purposeful application of knowledge, (such as ICT, material and structures, operations and manufacturing, strategies and management, system and control and technology and living) skills and experience in using resources to create and add value to product and systems to meet human needs (Technology Education, 2000)

Technology education is recognized globally as the bedrock of civilization and development. It is the application of scientific and technological knowledge in creating or using tools,

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techniques, resources and processes to harness human and natural environment for the purpose of individual well-being and societal development.

Technology Education and National Development

For any nation such as Nigeria to attain sustainable national development there is obvious need to recognize technology education as a priority area of education for her citizens. Edobor and Malki (2018) maintained that the quest for national development vis-à-vis scientific technology, growth and self-reliance should be matched with corresponding progress in technology education.

The Brunt-land commission (1987) in Egaga (2018) defines national development as the development that meets the needs of the present without compromising the ability of the future generation to meet their own needs. Egaga (2018) stress that a developed society is the one that has succeeded in providing a source of living for the majority of its inhabitants and that in such society, premium is attached to elimination of poverty, proven of food, shelter and clothing to its members. The modernization paradigm sees development as a multidimensional process which involves the sustained elevation of the entire society and social system towards better humane life. Any development model that does not reflect these tenets needs a paradigm shift.

The relationship between technology education and national development bothers on the questions of what to teach and when to teach (Mose, 2018). In order words, it has to do with purpose driven and system based learning process that achieve its target. Mose added that if a society or nation does not develop or is not developing/developed, it boils down to its educational system.

For a nation to be regarded as developed the level of technology education must be very high and sophisticated and that no nation can be above the level of its technology attained.

According to Agboghoroma and Umudhe (2007), the utilization of technology education in national life marks the difference between development and underdevelopment. This is why some nations of the world are classified as either developed or underdeveloped as a reflection of their state of scientific and technological development. While the developed nations are characterized by their attainment of sophistication in technology education, the underdeveloped countries lack such characteristic.

Technology has change the way education industry works in Nigeria. Earlier, blackboard and books were used to teach but now it's completely changed to digital boards and smart-books which can be access anytime and anywhere. Learning are much faster and students can gain more knowledge through internet. You will fine every information on the web which is not even in the book.

Nowadays, many top colleges and universities are offering online programmes for all national and international students. This provides flexibility to the individuals who want a higher education with their full-time or part-time jobs. The potentials of technology for sustainable national development cannot be overemphasized. Technology used to improve and facilitate learning can be found everywhere. (Ekpenyong,2010).

Challenges of Technology Education

Although technology is finally being integrated into education, its use for teaching and learning still remains a challenge. Despite the fact that many schools have access to technology, trained teachers and a favorable policy environment, the use of technology in

the classroom is still very low (Technology Educaton,2000). Today technologies used to improve and facilitate learning can be found everywhere, there is still unequal access to technological innovations and connected technologies across schools and districts. We can only say that we have embraced technology education when it is used for both teaching and learning.

The effective implementation of technology education in Nigeria towards sustainable national development is not without some hitches. The nation present approach to education has failed and efforts through research and development of ideas into concrete problem solving devices for which technology education are known. Some critical areas of technology education challenges as outlined by Edobor & Mahki (2018):

i.   Funding: The success of any educational policy and programme depends largely on funding. Inadequate funding hinders the provision of sound and qualitative education while adequate funding facilitates quality education, provision of infrastructure, recruitment of qualified manpower, mitigates strike actions and enhances good working environment

ii.   Lack of instructional materials: The instructional materials such as equipped workshops, libraries and laboratories needed by the teachers to explain the lessons for easy   understanding by the teachers to explain the lessons for easy understanding by the students are grossly inadequate. The availability and use of instructional materials have a significant effect on the performance of the learner.

iii.   The attitude of students towards Technology Education: Many of our students have negative attitude towards science and technology subjects and they believed that these subjects (Mathematics, Physics, Chemistry, Engineering Drawing, etc.) are very difficult. The wrong attitude has negative effect on technology education in Nigeria.

iv.   Teachers' attitude: Some teachers of technology tend to be so conservative in their approach to teaching. They find it difficult to adopt to new approaches in teaching their subject matter. Some are not committed and thereby discourage their students.

v.   Inadequate technology teachers: Technology education teacher are generally in short supply in Nigerian educational system

vi.   Large class size: The ratio of teacher to pupil is a big challenge to technology education in Nigeria. According to the FRN (2004) the teacher-pupil ratio should be 1:35 but this is contrary to what is observed in Nigerian school today.

vii.   Poor remuneration: Technology teachers are not adequately remunerated compared to their inputs in education.

viii. Politics of education: Most Nigerian politicians play prank with education. They pay lip service to education especially technology education.
       Inspite of the enormous challenges confronting technology education in Nigeria, there are great prospects for technology education in advancing the nation as stated by Edobor & Mahki (2018). Some of these prospects put in place for the enhancement of technology education for sustainable national development include;

1.   The award of scholarships to deserving students studying technology courses

2.   The organization and sponsoring of technology conferences, workshops and seminars to encourage technology education

3.   The technology of junior Engineers and Technicians scientists (JETS) Competitions in school.

Revitalizing Technology Education for Sustainable National Development

Technology education which is a systematic and scientific application of practical skills and theoretical knowledge in solving problem are no doubt the instrumentality needed for sustainable national development (Edobor & Mahki 2018). A sound and affordable education in science and technology for Nigeria child can also means better things for the society by helping the child to develop the skills and knowledge that would make him/her a responsible citizen who will help build a strong economy, promote healthier environment and sustain national development.

Technology education is fast replacing natural endowment as means of wealth creation as demonstrated by countries like Japan, South Korea, Taiwan, etc. These countries have become economic giants of the world today through the industrial technology they embraced. It is therefore important for Nigeria to improve her technology education in order to meet with modern development trend and rank among economic giant of the world.

A functional technology education is not only the backbone of the economy but also the secret of sustainable economy and makes a country technologically advanced. Ogbuanya & Okoye (2015), opined that enhancement of technology education and training is a strategic choice for sustainable development and economic growth and also posit that no education reform will work in an environment constrained by corruption, lack of infrastructure, electricity and incentives and polices that can promote private sector development. Okoye, (2014) decried overdependence on foreign products and expatriates as the bane of our economic sustainability and national transformation. Okoye further argued that Nigeria economy blossom when it lived on cash crops and other national resources such as coal, until the emergence of petrochemical product as the mainstay of Nigeria economy which Inspite of its great revenue potentials has encouraged corruption and other forms of antisocial practices. This is because the nation failed to inculcate technology and vocational education.

Technology and vocational education has been identified as a very imperative education in the present century. Obviously government has made numerous attempts to revitalizing the economy through educational reform programmes, with revised vision statement leading to a 10-year education sector plan as well as the over-celebrated vision 2020 document with its ambitions projection all aimed at making Nigeria emerging economy a model. delivering sound education policy and management for national development. The various reports in education reform policies have failed to properly address the manpower needs of industries and individual empowerment for self-reliance. With this in mind, it appears crystalline clear that the missing link truncating the success of technology and vocational education programmes is lack of attention that could better liverage to improve technology education and the way out is to revitalize it through the following methods.

i. Funding: Funding of technology and vocational education stands absolutely essential for the survival of the programme. No doubt technology education is capital intensive, sufficient fund is required to purchase the tools, equipment, machines and other facilities that would be employed to prosecute effective technology education.

ii. Public-Private Synergy: Training of students in the private sector by private institution can be the most effective and efficient way to develop the skills of the work force. This arrangement is supported by Ogbuanya and Okoye (2015) that it will not only provide direct links between institutions and the industries but also

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enables the students acquire requisite skills as well as have the confidence of the employers reposed in them.

iii. In-Service Training: In-service training is sine qua non needed for teachers to acquire better pedagogical and practical skills that will enable them effectively teach the youths. Teachers need further training on modern techniques of instruction and practical work as technology system is dynamic. They would become obsolete and not being able to deliver on modern techniques to contemporary students unless they receive further training.

iv. Innovation: Innovation is the driving force behind economic growth and the key to solve technology education challenges. Hence the need to repackage technology education curriculum and programme in line with global trend in technological breakthroughs that characterize information era. Such attempt will stream- line and integrate ICT. With wide spread availability of student databases that are able to track individual progress, teachers are encouraged to identify learning objectives and differentiate instruction based on the needs of their students

v. Incentives: The government that owns most of the technology institutions could award scholarships to deserving students while teachers remuneration increased above that of their counterparts in general education that are generally less rigorous to pursue.

vi. Availability and Adequacy of Tools and Equipment: Statistic available revealed that most school workshops and laboratories suffer inadequacy of facilities and fraught with obsolete and dysfunctional equipment. Believing too that even when fund is given for purchase of these facilities, substandard and moribund equipment are purchased with the aim of enriching individual pockets at the expense of the future of entire Nigeria. Provision and training of students with modern equipment would enrich the quality of technology education programme as well as transform the educational sector technologically.

vii. Non-Governmental Organization Participation: Since technology education is capital intensive venture, private rich individuals and groups could help in sponsoring technology education. This synergy is necessary since the efforts of the government will be complemented by these private organization and individuals.

Conclusion

The development of technology education in Nigeria portends a great value for the nation because technology education is the major tool needed for sustainable national development. Technology education if properly implemented will accelerate the social, economic, political and cultural development needed as a nation. Technology education is said to be the bedrock for sustainable national development in Nigeria. The above statement would be affirmed when technology institutions are well equipped and proper, effective and efficient teachers of technology are raised to train the youths to acquire practical and saleable skill that would make them self-reliance. The paper posits that revitalizing technology education would ensure creativity and promote employment creation.

Recommendations

1. The Federal Government should create environmentally friendly public-private partnership in technology education to promote functional and affordable education capable of harnessing the resources of the nation for societal wellbeing

2. Technology education workshops and laboratories should be well equipped with tools, machines and ICT systems that will make for easy training of the students.
3. The government should make technology education attractive by organizing in-service training, seminars and workshops for workers to update their skills to match with the modern techniques in technology education
4. Government to give incentives to students by awarding scholarship to deserving students as a means of encouraging the students to perform better.
5. Government should separate technology institutions from general studies to enhance proper management, monitoring and effective implementation of technology education programmes.

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