PROMOTING INDIGENOUS TECHNOLOGY EDUCATION IN NIGERIA: A PANACEA FOR NATIONAL DEVELOPMENT

Ukpebor Jonathan Ehiabhi
Government Science and Technical College, Benin City

Abstract:
This paper is centred on the relevance of indigenous technology education in Nigeria as panacea for unemployment and national development. It focuses on the need for top quality hands-on practical skills training for middle level man power in the areas of primary and intermediate technology. This will facilitate national technology process, socio-economic welfare and create job opportunities. It recognized the improvements of technology education training with a view to provide a clear, coherent and comprehensive system of education and training that will be directly relevant to the needs of employment and the individual to advance rapidly in their careers. Therefore, the paper recommended among others that government at both Federal and State levels should provide adequate funding, provision of infrastructural facilities, instructional materials, awarding of scholarship to deserving students, employment of competent and qualified technical teachers as well as providing in-service training to technical teachers.

Introduction

Employment today is mostly based on relevant skills. No nation can attain its technological development without embracing indigenous technology. Nigeria has, in recent years has been yearning for the establishment of functional education system which would meet the man power, technological and industrial needs of its citizen. On the basis of this, the Federal Republic of Nigeria in its published indigenous National Policy on Education (NPE 1977 Revised Edition in 1981) gave significant recognition to technical education in the school's curriculum.

Technical (technology) education is being emphasized at all levels of education in Nigeria. Its goal includes among other things; the preparation for professionals, in the world of work (NPE 1981). A "Professional" thus is someone who is learned or skilled in a particular job in which he tends to practice throughout his working career; (Ozigi and Peter, 1977). In other words, it is a "calling" (Aghenta, 1985).

Recently, there had been some criticisms of the 6 - 3 - 3 – 4 new system of education for a number of reasons. One criticism is that the new system of education is being implemented without elements of production of goods and services which are native to Nigeria (indigenous technology) built into the programmes and courses (Ifedi, 1988). He added that no country can develop by ignoring its indigenous technology. Agu(1984) has found that the engineering programmes of the ten universities and eleven polytechnics he investigated did not include courses in indigenous technology. A similar finding was made by Alabi (1987) who lamented that the introductory technology courses at the Junior Secondary School level in Nigeria does not have elements of indigenous technology systems built into it. Also, the recent efforts by some state governments to popularize, develop and sustain so-called "Skill acquisition centres" have been severely criticized as an attempt to approach a serious issue through trivial and ignorant way (Ali and Akubue, 1988).

It is an obvious awareness of the role of creativity in the curriculum that National Education Policy (Federal Republic of Nigeria, 1981) had to include in the policy document, objectives such as building "a united, strong and self-reliant nation" and of including "faith in man's ability to make rational decision". Again in section 9 of Decree No. 16 (Federal Republic of Nigeria, 1985) setting out minimum academic standards for the nation, the Federal Government spelt out the purpose of technical education to include those of providing technical knowledge and vocational skills necessary for agriculture, industrial, commercial and economic development and provision of training to impart the necessary skills leading to the production of craftsmen, technicians, technologists and engineers and other skilled personnel who will be enterprising and self-reliant. Also, the need to include the concept of creativity in technical- vocational teacher education curriculum should be regarded as vital if we must get away from the erroneous assumption that it is impossible to train for creativity (Crutchfield, 1972).

Concept of Indigenous Technology

Indigenous technology is as old as man's creation. It forms an integral part of our everyday life. It involves man-machines relationship for the production of goods and services for human needs. The Universal Dictionary of Arts and Sciences defines technology as the art and science of applying man's knowledge in all sorts of human endeaviours such as engineering, machine, culture, music so as to satisfy man's needs. The dictionary of science and technology defines technology as the practice, descriptions and technology of any or all of the applied sciences which have practical values and or industrial use. The word indigenous is also defined in the Oxford Advanced Learner's Dictionary as native, not improved. Looking at the concepts of technology and indigenous, we can conclude that man as God's creation has been involved in technology for ages including Nigeria as a country endowned with natural resources needed for technological growth.

Concept of Technical (Technology) Education

The introduction of technical education into Nigeria educational system is quite laudable in the world of work. Hence, it is considered as an aspect of education that leads to the acquisition of practical and applied skills as well as basic scientific knowledge (NPE, 1981). This is because it aims at developing practical skills as well as the creative and innovative abilities and facilitates decision making skills and problem solving abilities.

Its aim is to train students in the application of scientific knowledge to the solution of practical problems facing society. It is often seen as an aspect of education for national development (Urevbu, 1984). It is the education which provides the persons that has received it with self-employment thereby contributing to the society in which he/she lives. However, Edigin (2000), Ekpenyong (1995), Fafunwa (1991) and Sofolahan (1989) attributed under-development to low-level of technology which marks the socio-economic difference between developed and developing worlds. In a similar view, Miller (2011) attributed low level technological growth to inadequate funding and infrastructures in technical colleges.

For this purpose, Nigerian Educational Research and Development Council, NERDC (1988) came up with the following goals, which shall include to:

a. Provide the trained man power in the applied sciences and business particularly at craft, advanced and technical levels;
b. Provide the technical knowledge and vocational skills necessary for agricultural, commercial and economic development;
c. Give the necessary training and impart skills to individuals who shall be self-reliant.

In pursuance of the above goals, the main features of the curricular activities for technical colleges shall be structured in foundation and trade modules. The curricular for each trade shall consist of four components namely: General education, trades and related courses, workshop practice, industrial training and small business management and entrepreneurial training. For this reason, technical college teachers must be versatile in their areas and in the general and science education courses (Ekpenyoung, 1995).

In addition, Technical and Vocational Education and Training (TVET) as emphasized in the National Policy on Education (FRN 2013) 6TH edition shall cover the following:

i. Technical colleges
ii. Vocational Enterprise Institutions (VEIs)
iii. National Vocational Qualifications Framework (NVQF)

The goals of TVET shall be to:

a. Provide trained manpower in the applied sciences, technology and business particularly at craft, advanced craft and technical levels;
b. Provide the technical knowledge and vocational skills necessary for agricultural, commercial and economic development; and
c. give training and impart the necessary skills to individual for self-reliance economically.

Looking at the significance of NVQF (FRN 2013) as a system for the development, classification and recognition of skills, knowledge and competencies acquired by individuals, irrespective of where and how the training or skills was acquired. The system gives a clear statement of what the leaner must know or be

able to do, whether the learning took place in a classroom, on -the -job or non-formal. The framework indicates the comparability of different qualifications and how one can progress from one level to another.

The main objectives of NVQF are to provide standards in order to enhance quality, accountability, transparency, access, profession and comparability of qualifications in relation to the labour market needs. NVQF shall consist of six levels;

NVQF level
1. Entry level or unskilled employees
2. Foundation or basic skilled employees
3. Operators or semi-skilled employees
4. Technicians, skilled and supervisory employees
5. Technical and Junior management positions
6. Professional engineers.

The researcher is of the opinion that if the framework is well articulated and implemented, it will provide a platform for the training of different levels of professionals for national development, youth restiveness, creativity and employability.

Employment–based Technical-Vocational Education

The Nigerian governments have taken steps to stimulate, assist and harmonize employment-based vocational education, in which effective use is being made of on-the– job training. This gives rise to the introduction of National Directorate of Employment (NDE), designed to provide youths with the skills to become self-employed. It is projected that reasonable number of youths will be trained on various trades as mechanics, carpenters, welders, bricklayers, electricians, woodwork, leather work, blacksmithing, goldsmithing, weaving and pottery making.

In addition, there are a few isolated cases of on-the-job training programmes. The Delta steel company at Ovwian-Aladja, for example trains young school leavers on-the-job in automobile repairs work and the skills needed in the steel company. The Petroleum Training Institute at Warri, trains young men and women on-the-job (in-service training) with a view of employing them at the end of the training. The course offered include welding and fabrication, instrumentation and design, electrical and petroleum technology. There are also farm institutes in various parts of the country where young school leavers can be trained on modern techniques of farming.

The Technical and Vocational Education and Training (TVET) organized summer holiday boot camp (SkillUp), which covers technical colleges, vocational enterprise institutions (VEIs) and National Vocational Qualifications framework (NVQF). SkillUp is an Industry-Backed Technical Skills Competency Development Initiative focused on developing practical skills to cover skills gaps and identified by the industry for immediate employment by the industry. It is an initiative in partnership with Lagos State Government under the auspices of the Lagos State Technical and Vocational Education Board (LASTVEB), renowned global technical and vocational qualifications awarding body City and Guilds of London and the industry (LASTVEB 2014). Also, the World Bank Intervention through the State Employment and Expenditure for Results (SEEFOR), a programme which is currently appreciated by many states in Nigeria for renovation and supply of the needed equipment in technical colleges workshops to enhance teaching and learning process as well as to improve the performance of students hands-on practical skills so that they will be better equipped for the industries that requires their services.

Technology Training Centres in Nigeria

The following table gives a concise view of the training centres in Nigeria

Table I: Federal Government Accredited Training Centres in Nigeria

Name of Institutions		Location
1.	Institute for Industrial Technology (IIT)	Obafemi Awolowo Way Lagos, Isheri-North KM2 Lagos-Ibadan Express Way.
2.	Industrial Training Fund (ITF)	Lagos, Jos, Kano
3.	National Power Training Institute of Nigeria Plc (NAPTIN)	Jos
4.	Nestle Nigeria Plc Technical Training Programme	Agbara – Lagos

5.	Applied Engineering Technology Institute Ltd	Lagos, Port-Harcourt Calabar, Accra-Ghana

Source: Federal Ministry of Science & Technology, (FMST 2014)

To actualize the dream of employability in Nigeria, governmental, non-governmental, institutions and organizations have taken steps in providing the following services:

a. Electromechanic, a multiskilling course combining mechanical, electrical, electronics and industrial automation subjects, is targeted at young secondary school leavers.
b. Mechatronics, a high – end automation course targeting fresh graduates of tertiary institutions and experienced technicians and engineering for industry. This is a practical hands – on course which instills confidence in the participants;
c. Electrotechnics – a multiskilling course heavy in electrical, electronics and automation trades designed to develop technical professionals for the power sector;
d. consultancy services which preparing feasibilities study/business plan for new colleges, train the trainer courses, fabrication of items, recruitment of technical/engineering personnel, capability assessment for technicians and engineers (FMST 2014).

Evaluation of Technical Education

Evaluation is a process that determines the extent to which goals and objectives has been achieved (Toby, 1997). Despite the usefulness of technical (Technology) education in national development, vocational and technical education in Nigeria is faced with numerous constraints (Miller, 2011). Regretably, vocational and vocational education is yet to be given the recognition it deserves from Nigeria society (NBTE 1987). The board has of course diagnosed what it considers to be the greatest problem facing vocational and technical education in Nigeria to be the ambivalence attitude of the society.

Inspite of these constraints militating against rapid growth of Vocational and Technical Education programme in Nigeria, it has recorded some tremendous progress. These include:

a. Entrepreneurship. Employment today is mostly based on self-employed (Urevbu, 1985).
b. Employability: This is the capability to be employed in the labour market (Fugate, 2004). This implies the total population of persons who are capable of being included in the labour force, including the handicapped and the socially disadvantaged.

Trends in Technical-Vocational Education: A seminar was organized by National Board for Technical Education (NBTE. 2012), where school administrators, education policy making employers, students and technical teachers dialogued on the need of embedding employability skill into technical college curriculum in Nigeria. A relationship was drawn between industrial training and production unit. This is sequel to employers of labour seeking for a number of deeper qualities and task-centred skills that make up employability. These include effective learning skills, self-awareness, inter-personal skills, team working skills, analytical and research skills. It was observed that there was a need for synergy between industry, institutions and community. For effective participation, teacher to student's ratio in workshop practice, is recommended to be 1:20. It was discovered however that adequate attention has not been given to those issues. Among others are workshop practice, small business management and entrepreneurial training (NBTE, 2012).

Conclusion

There is obviously a close relationship between development and education, because the key to all development is quality and functional education. However, education in itself does not necessarily lead to development and progress. A society may have a large percentage/number of educated people and yet experience little progress in its development. A lot depends on other factors such as quality and type of education its citizens are receiving and the nature of its political and economic status. Thus, it is essential that vocational and technical institutions place greater emphasis on indigenous technology that will be directly relevant to the need of employment and national development.

In a developing country, like Nigeria, education is not only important as a social service but is also a key factor in the overall national development. The role of technical education in the development and transformation of Nigeria into a modern society is a collective responsibility for all.

Above all, specific Professional Skills and personal values are the most important tools that employees need to succeed in the organization. They are to be learned, cultivated and developed and to be maintained over one's life. Employers are also of the opinion that these skills should be put to full utilization for success in the search for job.

Recommendation

On the basis of this study, the following recommendations were made:

i. Science and Technology should continue to be taught in an integrated manner in the schools to promote the appreciation of the practical application of basic ideas;
ii. The Federal and State Governments should make frantic efforts to provide functional technical/vocational workshops in the various vocational trades.
iii. Technical Education is an integrated part of technological development, a greater proportion of education expenditure should be devoted to technical education at Federal and State level;
iv. Every technical college should establish and operate a production unit to promote creativity as well as production of goods and services.
v. Technical colleges should be adequately funded to enable students and staff embark on designing and constructing proto-types that could be developed to finished products by the private sectors.
vi. Provision of adequate classroom facilities by government for effective teaching/learning of technical education courses.
vii. Federal and State Government should add more values in Artisan training/Vocational Centres/Skills acquisition centres to enhance creativity.
viii: Federal and State Government should provide a synergy between industries and institutions to enhance creativity and employability.
ix: Management of technical colleges and the government should release funds for the procurement and distribution of training materials in technical colleges.
x: Technical teachers should be given adequate training in collaboration with industries and institutions.
xi: Employment of competent and qualified technical teachers for training of students.
xii. Federal and State Government should offer scholarship opportunities to deserving technical colleges' students.

References

Aghenta, J.A (1985) Analysis of Education and Employment of Vocational and Technical Schools Graduates Human Resources Development. *Benin Education Research.*

Agu,S. (1984) Relevance of Engineering Programmes in Nigeria to her needs, School and Society; *Nigeria Journal of Technical Education, 9, (1&2), 1992*

Alabi, N. (1987) Another look at the National Policy on Education; *Education Review*

Ali, A and Akubue, A. (1988) The role of technical education in improving indigenous technology in Nigeria, Polytechnic education and implementation of the 6-3-3-4 Education System; *Nigeria Journal of Technical Education, 9, (1&2), 1992*

Crutchfield, S. (1977) Nurturing the Cognitive Skills and productive thinking, the Psychology of open Teaching and learning; Boston, Little, Brown & Co.

Edigin, J.E.O (2000) Vocational and Technical Education in Nigeria: Issues, Problems & Prospects. A paper presented to the vocational & Technical Education Post Graduate Seminar Trainee Workshop in Benin, Faculty of Education, University of Benin, Benin City.

Ekponyong, L.E. (1995) Foundations of Technical and Vocation Education Evolution and Practice. Benin. Ambik Press Ltd.

Fafunwa, A.B. (1991) History of Education of Nigeria. London: George Allen and Unwin Publishing Co.

Federal Republic of Nigeria (1981) National Policy on Education (revised), Yaba Lagos, NERDC Press.

Federal Republic of Nigeria (2004) National Policy on Education 4th Edition, Abuja; NERDC Press.

Federal Republic of Nigeria (2014) Federal Ministry of Science and Technology Training Centres/Workshop Press.

Federal Republic of Nigeria (1988) Nigerian Educational Research and Development Council (NERDC) Lagos, NERDC press.

Federal Ministry of Sciences and Technology (2014) Institute for Industrial Technology Training, Ikeja, Lagos.

Fugate, M. (2004) Employability a Psychological construct, its dimension and applications', *journal of vocational behavior 65 (PP. 14-38).*

Ifedi, A. (1988) In – Service Needs of Technical Teachers, *Journal of Teacher Education, 4 (1) (PP. 45 – 53)*

Lagos State Technical and Vocational Education Board (2014) SkillUp Technical and Vocational Education and Training, City and Guilds of London Training Centre, Government Technical College, Ikorodu, Lagos.

Lagos State Technical and Vocational Education Board (2014) SkillUp Youth Holiday Booth Camp, Government Technical College, Ikeja, Lagos.

Miller A. (2011) Technical College Teachers in Nigeria; Issues, Problems and Challenges. *Mediterranean Journal of Social Sciences 2 (7), (PP. 57 - 61)*

National Board for Technical Education (1987) Nigerian Certificate in Education; Curriculum and Module (Business Education) Specification, NBTE.

National Board for Technical Education (2012) Embedding employability skill into Technical Colleges Curriculum in Nigeria. A seminar organized for Technical College Teachers by National Business and Technical Education Board, Benin City.

Ozigi, A. and Peter, C. (1977) An Introduction to the foundation of Education, London: Macmillan.

Sofotohan, E. (1989) The implementation and Constraints of Technical Components of the National Policy of Education. A paper presented at the National Seminar of Technical & Vocational Education Training in Nigeria, Kaduna.

Toby, T.U. (1997) Essentials of management and leadership in vocational and Technical Education. Jos, Nigerian Association of Teachers of Technology. (NATT) National Secretariat.

Urevbu, A.O. (1984) Vocational Education in Nigeria: A Preliminary Appraisal, *International Journal of Educational Development, No 3, (PP. 233 – 229)*

Urevbu, A.O. (1985) Curriculum Studies, London: Longman Group Ltd