

PLANNING AND POLICY IMPLICATIONS FOR RENEWAL AND PARADIGM SHIFT IN THE CURRICULUM CONTENTS OF VOCATIONAL AND TECHNOLOGY EDUCATION PROGRAMMES IN NIGERIA

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Abstract. Vocational and technology education (VTE) is widely recognized as agent of technological development, industrial revolution, economic growth and vocational independence all over the world. In Nigeria, attempts have been made by various governments to restructure the system so as to keep pace with what operates in developed countries and to meet global competitions and best practices. However, in this paper, the need for the renewal and paradigm shift in the curriculum contents of vocational and technological education is emphasized. The paper e-rays the historical development of vocational and technology education in Nigeria from the colonial era. The paper further examines issues associated with implementation of a reviewed curriculum and the participation of VTE in industrial revolution and vocational independence. A curvilinear model and two equations are developed in the paper to explain the assumed linear correlation between curriculum renewal and technological breakthrough (technological development, industrial revolution, economic growth and vocational independence). The challenges facing VTE in

Nigeria and the implications of the proposed curriculum renewal for stakeholders are highlighted in the paper.

Keywords: vocation, technology, curriculum renewal, paradigm shift, technological development, vocational independence

Introduction

Education is said to be a potent tool in effecting change, social transformation and sustainable development. Each level of education is designed to serve specific purpose. This is to say specifically that, there are different forms of education particularly at the tertiary level with different modes of operation. For instance, while vocational and technological institutions are established to produce manpower in vocational and technological related disciplines (vocational experts and technicians), colleges of education and universities are expected to produce teachers and administrators respectively for the manpower need of the country. But the similarity in them is the way they pursue their universal mission through teaching, research, and community service.

There is no doubt that vocational and technological education plays significant role in the socio-economic growth and development of a country. Research findings (FME, 2003; UNESCO, 2005) have shown that countries that have breakthrough in the technological world today are those that have placed more emphasis and invested substantially on vocational and technological education. These countries have also re-defined their vocational and technological education through strategic planning, effective policy and appropriate decision making strategies (Adepoju & Famade, 2010).

Vocational and technological education all over the world is recognized because of its significant roles which it can play in curbing unemployment and in providing the needed skilled labour for industrialization. The important position with which advanced countries placed this type of education

cannot be overestimated because the rapid advancement in science and technology being experienced today by these countries can be linked to the proper organization, effective strategic planning and policy statements supported by political will.

The National Policy on Education (FRN, 2004) refers to vocational education as:

[t]hat form of education, which is obtainable at the technical colleges. This is equivalent of the senior secondary education but designed to prepare individuals to acquire practical skills, basic and scientific knowledge and attitude required as craftsmen and technicians at sub-professional level.

Similarly, technical education is defined as: “that aspect of education which leads to the acquisition of practical and applied skills as well as basic scientific knowledge” (FRN, 2004).

In Nigeria, observations have shown in recent times that there is a mismatch in the production of vocational and technological education graduates and labour market. In other words, the employability of the graduates of vocational and technological-based institutions is at low ebb compared with graduates of other educational sectors (universities and colleges of education). This development has therefore informed this paper to advocate for curriculum renewal and paradigm shift. It is being assumed that with the renewal and paradigm shift, the observed mismatch and gaps would be filled while vocational and technological education in Nigeria would respond to global competitiveness and best practices.

Definition of concepts

Curriculum

Curriculum is the broad programme of activities designed by the government or institution in order to help achieve the general goals or objectives of education. It must embrace all activities that will lead to effective teaching and learning outcomes in the school system. According to Snyder & Anderson (1986), the curriculum serves as the standard for guiding teachers, planning for learning and for measuring teacher effectiveness in fostering expected outcomes. Curriculum can also be referred to as planned actions for instruction. The content and context of the curriculum designed for certain level or type of education must reflect the expectations of the government and society from that level of education. The need for periodic review of school curriculum by the government is highly desirable in view of the fact that, modern technology and innovations can make school curriculum outdated and out-fashioned hence the need for a change. This is why Adepoju (1999) contends that good curriculum should be made to be dynamic and flexible.

A systematic approach should therefore be taken in order to effect a change in both the content and context of the school curriculum. This calls for the involvement of the curriculum experts who should inject into the new curriculum, the needs and aspirations of the country as well as the demands of technology and innovations (Fadipe & Adepoju, 2006).

Adepoju (1999) and Babalola & Jaiyeoba (2008) remind us that curriculum is “a package of planned actions for arousing learning: It consists of defining the goals of education, content, methods (including assessment), materials (textbooks) and the conditions relating to the appropriate training of teachers”. The curriculum must also take account of a number of different factors: education policy, education philosophy, the economy, science, the school reality and the socio-cultural environment while not forgetting the psychological aspect.

The curriculum reform has to pass through an operational process, which confers it with its social value. An operational curriculum no longer comprises merely content curricula. It should specify not only the results expected from the learner but also the outcomes expected by society or the group concerned.

What types of teachers are needed to respond to the curriculum?

It is important to stress that the design of a multi-dimensional curriculum must take into account the appropriate training for teachers. A minister of education said that “the quality of public education is first of all made of the quality of its teachers”. This statement underlines the importance of teacher training – both initial training and continuous training.

Also, a committed academic staff is expected to employ the following list of creativity techniques: (i) establishment purpose and intention; (ii) building basic skills; (iii) encouraging acquisitions of domain – specific knowledge; (iv) stimulating and rewarding curiosity and exploration; (v) building motivation, especially internal motivation; (vi) encouraging confidence and a willingness to take risks; (vii) focusing on mastery and self-competition; (viii) promoting supportable beliefs about creativity; (ix) providing opportunities for choice and discovery; (x) developing self – management (Mental Cognitive Skills); (xi) teaching techniques and strategic for facilitating creative performance; (xii) providing balance.

Course and curriculum: the links

The course should be designed to fulfill a clear role in the institution's curriculum and the learner's overall programme with clear statements of its objectives in terms of knowledge acquisition and skills development. If the course fulfills a role in more than one programme, the dependencies that may affect student's knowledge and skills in all these programmes should be clear-

ly identified. An institutional curriculum map may provide information on the role of each course offered by the institution.

Issues associated with the implementation of a reviewed curriculum

Introducing a reviewed curriculum involves implementing written prescriptions, which should then be transformed into teaching practices and finally, translated into learning. It also modifying certain old practices in order to more effectively achieve learning goals and a better student's output. Additionally, it may include retaining and more clearly defining other practices. Finally, it can be a question of changing perspective on some practices and adapting others.

Academic staff should note that the review curriculum implies adoption of new teaching strategies, plan learning activities and assessment of student's acquisition.

Historical development of vocational and technology education in Nigeria

The development of vocational and technology education in Nigeria could be traced back to the missionary days. The aim of the missionaries then was to produce church workers and spread the gospel. They were equally concerned with food production, shelter construction, water conservation, wood work, metal work, health and technical requirements of living. The Hope Waddell Training Institute at Calabar was opened in 1894 with 18 apprentices, 7 carpenters, 5 engineers, 5 printers and 1 cook-in-training. All the European instructors came from Scotland (Adepoju & Famade, 2010).

In 1908, a government survey school was established in Lagos where Africans could be trained 'for responsible professional posts' (Fafunwa, 1977). The school was attached to the government's survey department in Lagos. Prospective trainees were required to have Senior School Certificate, and admission was predicated on projected vacancies in the survey department of the

government. Similar departmental training arrangements include a junior technical staff training school to train Nigerian technical assistants, established in 1931. It mounted a 3-year course for senior school certificate holders and it taught English, Mathematics, and professional subjects, including surveying, electricity and magnetism and building construction. Other efforts are as follows: (A) A departmental training course introduced in 1901 by the Nigerian Railway to ‘train selected staff who must have had at least five years railway experience’ and possessed initially a junior school certificate, and later (from 1942) a senior school certificate. The Railway department also mounted a five-year ‘Apprentice Course in Mechanical Engineering’ in 1942. Applicants were admitted on the possession of a senior certificate course and successful performance at an interview. The Railway department also mounted training for African engine-drivers in 1936-1937 financial year ‘in view of the reductions made in the number of European drivers during the past few years’ (Fafunwa, 1977); (B) The Post and Telegraph department mounted a 6-year training course for Senior Cambridge Certificate holders or senior school certificate holders to produce sub-inspectors of lines. The trainees eventually sat for a United Kingdom external City and Guilds examination. Graduates of the programme were employed into ‘semi-responsible positions’ in the department; (C) The department of Agriculture offered various courses for school certificate holders. They include: (a) Forestry School at Samaru Agricultural Station, close to Zaria, in 1938; (b) Veterinary School in Vom in 1935, and (c) Department of Agriculture started in 1930, with centers in Sagamu, Zaria and Ibadan; (D) The Marine department also mounted a six-year course for school certificate holders to produce ‘those who would ultimately occupy senior posts on Nigerian Marine Vessels’. The trainees were presented for external United Kingdom’s Board of Trade Certificate Examination.

A number of the afore-mentioned departmental training schools eventually got transformed to well establish government schools or Institutes of universities. Examples are the Government Survey School established in La-

gos in 1908 which got transferred to Ibadan in 1926, and finally to Oyo as a full-fledged institution, and remains so today. Ditto for school of Agriculture Samaru, Zaria, Veterinary School Vom, and School of Agriculture, Moor Plantation, Ibadan, each of which is now an Institute of one University or the other.

Yaba Higher College was the first higher technical institution that was not founded by a mere government department. It is also the pioneer government-established higher institution in Nigeria. It was established in 1930. Earlier, the then colonial government's Director of Education, Mr. E.R.J. Hussey, had proposed a 3-staged education for Nigeria, viz: elementary, secondary and a final stage of vocational training. The establishment of Yaba Higher College was a way of actualizing the third stage. The first intakes of the college were enrolled in Medicine, Agriculture, Engineering and teacher training.

Government made attempts to establish vocational and technical education centres in the 20th Century. For instance, at the government schools, Bonny and Benin City, instruction was given in carpentry and other crafts. Bonny government school was residential and under the supervision of European principal. Technical and vocational courses were also started in various government departments like Nigerian Railways, Nigerian Maritime, public work, etc. This was followed by the engineering and workshop courses at the old Yaba Higher College in 1932. There were series of development up till April 1959 when Ashby Commission was set up to investigate into the manpower needs in Nigeria for the period of 20 years (1960 – 1980).

Much of the interest in VTE and its rising status in Nigerian education system arise from the belief that a skilled workforce is a necessary ingredient for technological development. At the level of individual, it is believed that a more satisfying work life than an unskilled person. The Ashby Commission report which was submitted in September, 1960 pointed out the urgent need to improve the situation of dearth of technical manpower in Nigeria. As a result, the Federal Government showed some concerted efforts in improving the

technical manpower situation in Nigeria by recognizing the importance and including VTE as an important component of the educational system (FRN, 2004). The government also embarked on the establishment of an appreciable number of various types of vocational and technical institutions in the country (Adepoju & Famade, 2010).

Goals of vocational and technology education in Nigeria

The goals of science education shall be to: (I) cultivate inquiring, knowing and rational mind for the conduct of a good life and democracy; (II) produce scientists for national development; (III) service studies in technology and the cause of technological development, and (IV) provide knowledge and understanding of the complexity of the physical world, the forms and the conduct of life.

The goals of technical and vocational education shall be to: (V) provide trained manpower in the applied science, technology and business particularly at craft, advanced craft and technical levels; (VI) provide the technical knowledge and vocational skills necessary for agriculture, commercial and economic development, and (VII) give training and impart the necessary skills to individual who shall be self-reliant economically.

Vocational and technology education and curriculum renewal

Vocational and technological education is responsible for creating and expanding vocational, technological, infrastructures and the development of the right manpower. Todaro (1987) buttressed this fact when he stressed that a nation that is unable to develop the knowledge and skills of its citizens and utilize them effectively may find it difficult to develop other resources. The increase demands for skilled middle level manpower in Nigeria's emerging market economy highlights the developmental roles of vocational and technological education. This form of education is also desirable in the quest for technological development in Nigeria.

Vocational and technological institution refers to any non-university tertiary institution in Nigeria offering varieties of technician, technological and business diploma programmes at the National Diploma (ND), Higher National Diploma (HND) and post-HND levels that qualify holders for registration in their professional fields (NBTE, 2002). No doubt, vocational and technological education provides the technical knowledge and skills necessary for agricultural, industrial, commercial and economic development of Nigeria (FRN, 2004). In order to achieve the mandates of balanced development, the objectives and contents of technical and vocational institutions' curriculum are tailored towards skill acquisition and employment. However, besides, the general unemployment situation in the country, products of these institutions are found to possess less than satisfactory levels of employable skills.

This development necessitated the United Nations Educational, Scientific and Cultural Organization (UNESCO) and the National Board for Technical Education (NBTE) to jointly revise the programmes of Polytechnic (UNESCO & NBTE, 2003). The prominence feature of the review is the injection of entrepreneurial courses. Umoh (1989) posited that one of the significant courses which are vital and relevant in Nigeria today is entrepreneurship. As part of the on-going reform in various aspects of the economy, Ezeh⁽¹⁾ argued for the promotion of entrepreneurship education at various levels of our tertiary education so that the graduates of the system can set up their own businesses, create employment and alleviate poverty in the society. Trainees should be prepared to be *job creators* but not *job seekers*.

Participation of vocational and technology education in industrial revolution and vocational independence in Nigeria

According to Adepoju & Famade (2010), the participation of technical-based institutions (polytechnic) in the realization of technological and vocational advancement of the country is overwhelming in the recent years. However, there is the need to pursue the 70:30 prescribed ratio of production-based

and service-based programmes. For instance, the polytechnics are still unable to apply the prescribed admissions ratio of 70:30 in favour of production-based programmes (FME, 2003). In order to approximate the prescribed admission ratio in production and service-based programmes, the NBTE decided that effective from 2003/2004 academic session for the purpose of its accreditation, less than 30% enrolment in state and private polytechnics in production based programmes would be unacceptable. NBTE statistics on the state of disparity between production and service-based programmes in 2000 revealed 36:64 ratio. In 2001, the polytechnics enrolled a total of 186,080 out of which females were 74,612 (40%) in ND and HND programmes. In 2002, the enrolment in ND and HND programmes was 197,440 in the then 51 polytechnics (17 federal, 27 state and seven private) in the country while their output graduates were 32,451. NBTE statistics also showed in 2001, a total enrolment of 11,358 with an output of 2,964. In 2001, enrolment in Pre-ND courses was 37,500 in 45 polytechnics, which is about 37.5% of enrolment in ND programmes (FME, 2003).

The implication of this development is that since polytechnics has been participating in technical advancement of the country; more attention should be focused on them by the government.

Fig. 1 shows the potency of technological and vocational education in creating technological development, industrial revolution, economic growth and vocational independence. Of importance to note from the model also, are the two types of programmes (production-based and service-based) being offered in technical and vocational-based institutions herein referred to as polytechnic. Government has recommended that the ratio of admission into these programmes should be 70:30 in favour of production-based to ensure the realization of the goals of the institutions (FME, 2003). The model also identifies the observable problems that inhibit this type of education and the needed interventions meant to tackle the problems. With the needed interventions, the

end-results would therefore be re-invigorated through the feedback mechanism.

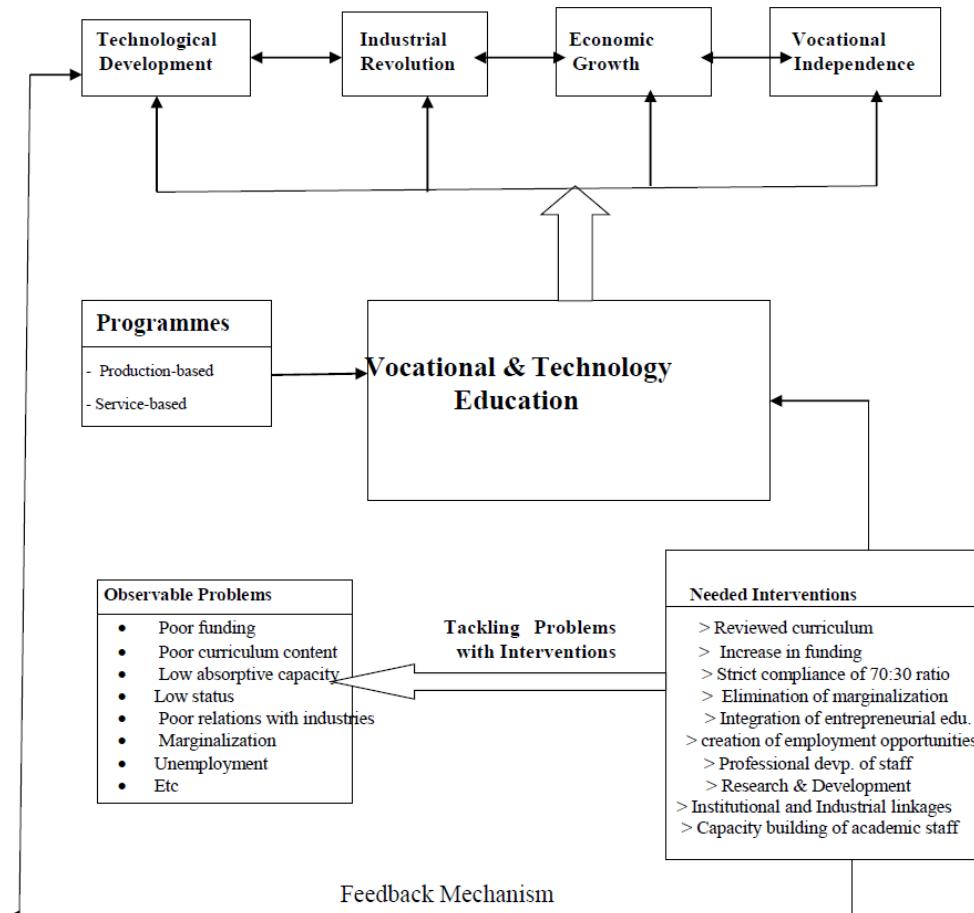


Fig. 1. Vocational and technological turnaround model for technological development, industrial revolution, economic growth and vocational independence

Innovations in vocational and technology education in Nigeria

Following the observations made at the Higher Education Summit in 2002 and the need to reshape the terrain of vocational and technological education for better performance, the government took a step to reposition the system for greater advantage in the national education scheme.

The reversal of federal technical college craft programmes to full secondary education duration of six years. Students from primary schools are admitted into the junior college component of technical colleges to enable the technical colleges stand a fair chance of having good quality entrants as well as provide an early orientation to students towards technology education and the world of work. In addition, the FME has converted its technical colleges to science and technical colleges offering senior school science and normal craft and advanced craft programmes at senior secondary level to attract entrants: (i) setting up an action plan to review the policy and mandates of polytechnics to enable them award degrees; (ii) consideration of adopting policy of separate development and independent operation of tertiary institutions; (iii) eliminating all forms of marginalization consequent upon old tradition; (iv) setting up of an action plan to review the ceiling in career progression of graduates and staff of polytechnics so that disparities between university and polytechnic graduates may be eliminated; (v) setting up plans to integrate entrepreneurial education into the scheme of technology and vocational education; (vi) introduction of post-HND programmes to enable holders of HND to qualify for professional registration and practice (FME, 2003).

Adepoju & Famade (2010) highlight other reform initiatives of the federal government in Nigeria with respect to technological and vocational education in the following areas: (a) government renamed the technical schools to become science and technical schools; (b) government included vocational training in technical centers and Applied Science and Technology in Polytechnics and Universities.

Meeting global competitions, best practices and breakthrough through renewal process

The proposed curriculum renewal and rate of technological development, industrial revolution, economic growth, vocational advancement and

breakthrough to be recorded through technological and vocational education programme could be expressed in this way (Fig. 2).

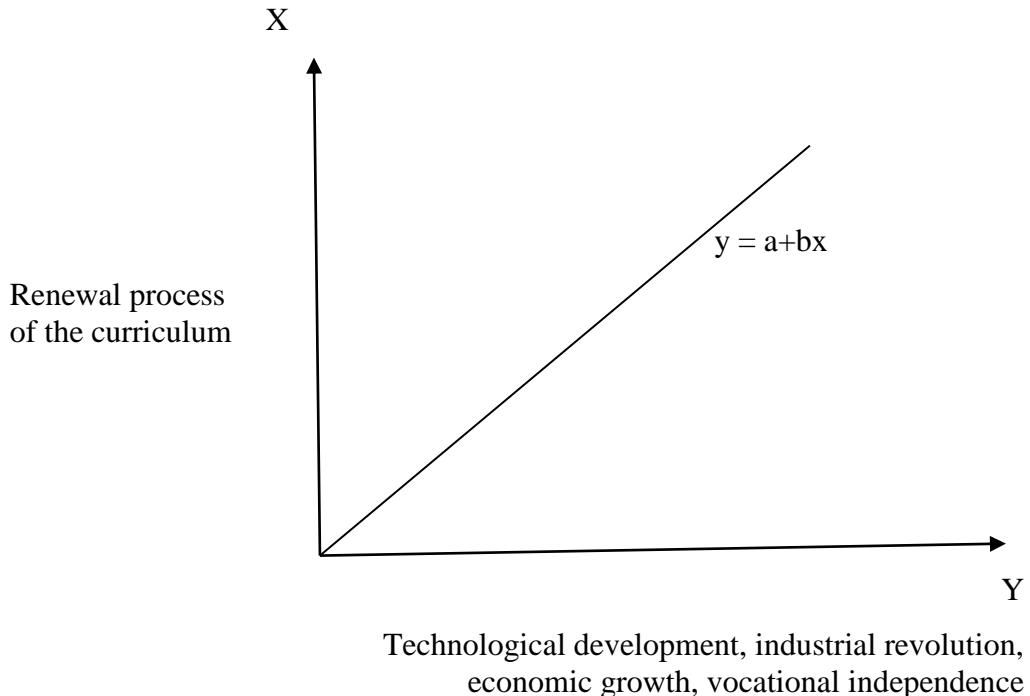


Fig. 2. Curriculum renewal, vocational and technology education breakthrough curve

Fig. 2 shows that a linear correlation exists between curriculum renewal and TVE. In other words, the simple linear equation ($y = a + bx$) and curvilinear regression have shown that the more the curriculum is renewed in response to the needs and aspirations of the society, global best practices and global competitions and challenges, the end-result would record breakthrough (unprecedented technological development, industrial revolution, economic growth, vocational independence) in all ramifications (see also Fig. 1).

Arising from the expression as shown in Fig. 2 are the notational expressions in Eqs. (1) and (2) thus,

$$VTEb = f (Rcc) \quad (1)$$

where: VTEb = Vocational and Technology Education Breakthrough; Rcc= Renewal of Curriculum Contents; f - Functional notation.

From Eq. (1), the “VTEb” is the dependent variable and expressed as a function of “Rcc” which is the independent variable. The import that could be derived from this equation is that, the more the curriculum contents of technological and vocational education programme are reviewed in line with the needs and aspirations of the society, global best practices, global competitions, the more the technological breakthrough that would be achieved. This breakthrough is summarized in Eq. (2).

$$Td, Ir, Eg, Vi = f (Cr) \quad (2)$$

where: Td = Technological development; Ir = Industrial revolution; Eg = Economic growth; Vi = Vocational independence; Cr= curriculum renewal; f - functional notation

The expression in Eq. (2) indicates that “Td”, “Ir”, “Eg” and “Vi” are all dependent variables and are expressed independently and compositely as function of “Cr” (independent variable). By implication, all the dependent variables could only be achieved only if there is sound renewal of the curriculum contents of Nigerian vocational and technological educational institutions. This has become very imperative so as to meet the global competition and best practices.

Challenges facing vocational and technology education in Nigeria

Several challenges are facing vocational and Technology education in Nigeria. These include: poor funding; unemployment of polytechnic graduates; low absorptive capacity of the economy; problem in the content and context of the curriculum; poor relations between polytechnics and industries; low status ascribed to polytechnic graduates/lack of social appreciation of techno-

logical; inability of polytechnics to produce graduates with qualifications that respond to labour market needs, etc.

Poor funding

Vocational and technology-based institutions are very expensive to maintain. In Nigeria, for instance, most engineering and vocational departments lack modern laboratories and workshop equipment for proper training of their students.

Unemployment of vocational and technology-based graduates

Several graduates of the institutions where vocational and technological courses are offered are facing the problem of employment. This poses a big challenge to the sincerity of government.

Low absorptive capacity of the economy

In Nigeria, there are several areas seeking government interventions and recognition. The economy in Nigeria is so sensitive that competitions have prevented graduates of vocational and technical educational institutions to be absorbed into the economy of the country.

Problem in the content and context of the curriculum

As earlier indicated, the problems so observed in the curriculum content and context of the vocational and technical educational institutions required the need for a change.

Poor relations between vocational and technology-based institutions and industrial sector

These unlike in developed countries where industries engage the services of the institutions in the areas of research and development, this is not so

in developing countries like Nigeria where there is poor or no institution and industrial linkage.

Low status accorded vocational and technical-oriented institutions

In Nigeria, there is a marked distinction between vocational and technical institutions as universities graduates. Graduates of vocational and technical institutions are not usually matched with those from universities. This, therefore, leads to low status accorded to them.

Vocational and technology education and labour mismatch

Inability of vocational and technological institutions to produce graduates with qualifications that respond to labour market needs is very obvious in Nigeria. This is as a result of the mismatched between vocational and technological education graduates and labour market. Evidences abound that, the extent to which vocational and technological educational institutions are producing graduates out-matched the level to which the labour market could absorb them.

Why the need for renewal and paradigm shift in the contents and context of the vocational and technology education in Nigeria?

The following factors have necessitated curriculum renewal in the vocational and technological institutions in Nigeria: (a) need to meet global competitiveness and best practices; (b) need to re-invigorate technological development and achieve scientific base; (c) need for entrepreneurship education; (d) need for graduates of the technological and vocational institutions to be self-reliant and independent; (e) need to re-engineering the system in response to the needs and aspirations of the society, and (f) need to achieve technological and scientific base.

Global competitiveness and best practices

For a country to meet the global competitiveness and best practices, it requires a complete turnaround of the existing curriculum contents and context being used now. New and modern technologies have pervaded the mode of instruction in institutions of higher learning all over the world. An examination of the curriculum contents of Nigerian polytechnics would reveal wide gaps between what is operating in advanced countries and the current practices in Nigeria. For these observed gaps to be filled there is therefore the need to review and renew the curriculum contents and context if the desired results must be realized. Succinctly put, it is very imperative to review the existing curriculum contents of Nigeria polytechnic to meet the global challenges and best practices.

Re-invigoration of technological development and achievement of scientific base

There is no doubt that one of the cardinal objectives of polytechnic education all over the world is to realize technological development and achieve scientific base, hence, these objectives should continue to be rigorously pursued. Polytechnic education is technical and productive based or inclined unlike what operates in the universities where the programmes are ultimately service based or inclined. For this to be achieved there is the need for a renewal and paradigm shift in the existing practice.

Entrepreneurial education

Of all the institutions being classified under higher institutions in any country, the polytechnics offered the opportunities and advantage of entrepreneurial in nature. Since most of the programmes offered there are technical and production-based therefore the rate of entrepreneurship is higher compared with the operation in universities and colleges of education. In other words,

polytechnics offered a wide range of employment opportunities for the graduates.

Self-reliance and independence

The essence of polytechnic education is to make the graduates self-reliant and independent. Polytechnic education because of its productive orientation, graduates are better equipped and established on their own instead of looking for white-collar jobs as is the case of universities. For this to be achieved, the need for have polytechnic education curriculum renewed in Nigeria is very imperative.

Refocusing polytechnic education

This has become imperative because of the observed gaps in the curriculum contents, context and practices in Nigeria. This is manifested where polytechnics are pushing for award of degree programmes just like the universities in the country.

Re-engineering of the system

Of important to know is that no institution is expected to operate in a vacuum. In other words, polytechnics are established to operate in response to the needs and aspirations of the society. If a polytechnic is established this implies that there is a need to do so in terms of science and technological development. There must be a gap to be filled in the society and by doing so, manpower need of the society must be ascertained through a survey (manpower need survey). This survey will ultimately reveal the required manpower need and manpower contribution from the sector. There is doubt if this is the current practice in Nigeria where polytechnics are established without consideration for the needs and aspirations of the society hence, the imperative for renewal and paradigm shift.

Implications of the strategic direction (renewal of vocational and technology education curriculum) for the stakeholders

- (A) Drafting recommendations and documents for the orientation of academic staff;
- (B) Promoting innovative and best practices in the review/renewal of curriculum, teaching methods, facilities and the school setting;
- (C) Publishing and disseminating case studies and monographs on the revised curriculum;
- (D) Building the capacity of academic staff for competence;
- (E) Building the capacity of decision makers to monitor progress made over time;
- (F) Building synergy between / among different stakeholders through working group;
- (G) Academic staff new role (teaching/ learning facilitators), their status, integrity and commitment are key to the smooth operation and transmission of the life;
- (H) Government should be ready to increase the funding for the polytechnics;
- (I) The facilities and equipment used in institution – based training must be the same or comparable to those used in the job market or world of work;
- (J) The conditions under which training is given should be similar to those desirable in the field;
- (K) Orientations of this nature should be given to teachers to cope with the changes in the curriculum;
- (L) Teachers in vocational and technological-based institutions should prepare themselves to meet the challenges posed by the reviewed curriculum;
- (M) Proper orientation programmes should be packaged for vocational and technological-based teachers;
- (N) Teachers should try as much as possible to seek for more knowledge to enable them cope with the challenges;

- (O) Support services should be provided for academic staff;
- (P) Academic staff should be committed and current in their field of studies;
- (Q) There is the need for strategic planning and sincere implementation;
- (R) Teachers should always use entrepreneurial modes;
- (S) Teacher should note that the reviewed curriculum will have implications on the methods of their teaching;
- (T) Teachers should take cognizance of changes in methodology and in the curriculum and see the need for exposing themselves academically and professionally to meet the challenges;
- (U) In the area of professional support through school-based in-service workshops, seminars and training programmes, should be mounted for the teachers by the institutional management; and
- (V) A partnership should be forged between government and private sectors

Summary and conclusion

The paper has e-rayed the historical development of vocational and technological education in Nigeria from the colonial era. The paper also examined issues associated with implementation of a reviewed curriculum and the participation of VTE in industrial revolution and vocational independence. A curvilinear model and two equations are developed in the paper to explain the assumed linear correlation between curriculum renewal and technological breakthrough (technological development, industrial revolution, economic growth and vocational independence). The challenges facing VTE in Nigeria and the implications of the proposed curriculum renewal for stakeholders are highlighted in the paper. The paper highlights the following as the needs for curriculum renewal in vocational and technological-based institutions (i) need to meet global competitiveness and best practices; (ii) need to re-invigorate technological development and achieve scientific base; (iii) need for entrepreneurship education; (iv) need for graduates of the technological and vocational

institutions to be self-reliant and independent: (v) need to re-engineering the system in response to the needs and aspirations of the society, and (vi) need to achieve technological and scientific base.

The paper finally highlights the implications of curriculum renewal for stakeholders in vocational and technology-based institutions.

NOTES

1. Ezeh, E. Scrapping of polytechnics is ill-advised. *Saturday Punch*, March 31, 2007.

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