

African Research Review

An International Multi-Disciplinary Journal, Ethiopia

Vol. 4 (1) January, 2010

ISSN 1994-9057 (Print)

ISSN 2070-0083 (Online)

Capacity Building Imperatives for Developing Science, Technical and Vocational Education for a Future World of Work (Pp 506-518)

Odu, Kennedy Oji -Technical and Business Education Department, Delta State University, P.M.B. 1, Abraka, Delta State – Nigeria.

E-mail: drodu2008@yahoo.com

Abstract

The Nigeria's educational system during the colonial era was literal in nature and defective. Notable among the defects was lack of practical skills which the government failed to introduce in the various school subjects of the curriculum. The wilful or unwilful exclusion of practical skills from the curriculum by the colonial administrators gave rise to youth unemployment, rural/urban migration by youths in search of white-collar jobs, and lack of productive skills for self-employment among graduates. The educational system at that time could not solve the mounting national problem. This was the major purpose why the National Policy on Education was launched in 1977 with great emphasis on Vocational and Technical education and self-reliance. The new curriculum arising from the National Policy on Education, though focused on vocationalization, has not succeeded mainly because of implementation problems. The author of this paper therefore, advocates that for developing science, technical and vocational education for a future world of work, teaching and learning in our various levels of education should include: appropriate teaching strategies entrepreneurship education,

employment and training of qualified teachers, provision of adequate facilities among others.

Keywords: Vocationalization, Entrepreneurship, Instructional media, Job related skills, Manual dexterity, Concept formation.

Introduction

The curriculum of schools, during the colonial period of the Nigerian history has influenced the contemporary educational curriculum. During those early days, two vital characteristics of the curriculum could be identified: the heavy orientation to religion and the literary nature of the curriculum. It was not surprising then that the curriculum had very religious orientation. It was Christian missionaries that brought formal education and their major purpose was conversion. So education in form of reading and writing was encouraged not as end but a means to an end which is the propagation of the Christian religious faith. The curriculum was devoid of much science and technology. The reason was that the missionaries felt that one could get to heaven without even knowing much of science and technology. Their process and actions according to Ajibade (1987) were systematically designed to stifle or stunt science and technological development in the school system.

The government on her part needed no scientific manpower but administrators to assist in the administration of the colonies. This explains why the curriculum of the school at that time was heavily religious and literary. The curriculum existed until recently when its shortcoming became apparent. As Ohikheno (1974), put it, the nation was still faced with how to shed the garb of the grammar school education which has come to be branded as being too academic and of little relevance to the needs of the individuals and society. The government soon discovered that the national educational system, as it then was, could not solve the mounting national problems and appeared obvious then that the entire system needed a reform and a reorientation (Ajayi and Awoyele, 1985). The federal government responded to the problem of literary education in Nigeria by launching the new National Policy on Education in 1977 (revised in 1981, 1998 and 2004) with emphasis on science and technology and one of its objectives as self-reliance.

The curriculum of education during the colonial era was faced with a lot of challenges, which are:

1. Unemployment, especially to youths giving rise to various vices like armed robbery, prostitution, child kidnapping thuggery etc.
2. Poor attitudes of youths toward rural society.
3. Rural/Urban migration
4. Lack of productive skills useful for employment
(Lillis and Hogan, 1983; Urevbu, 1988; Ishumi, 1988).

The New Curriculum

As a result of the dyfunctionalities of the Nigerian curriculum during the colonial era, the Nigerian Education Research Council (NERC) sponsored a national curriculum conference between 8th and 12th of September, 1969. As a follow-up, a national seminar was summoned by the Federal Government under the chairmanship of Chief Simon O. Adebo in 1973 to deliberate on all aspects of a National Policy on education. The conference and the seminar culminated in what is today known as the National Policy on Education formulated in 1977 revised in 1981, 1998 and 2004. It touched on all aspect of the Nigerian Educational system but the aspect directly relevant here, which of course, constitute the major innovation of the policy (Wali, 1991; Okafor, 1988) is the total vocationalization of the secondary school curriculum beginning with the Junior Secondary School.

Inherent Challenges of New Curriculum

The challenges are categorized as follows:

1. Administrators' Misconception of the Nature of Science, Technical and Vocational Education.
2. Inadequate Practical Skills acquired by Learner.
3. Lack of Entrepreneurship Initiatives
4. Inadequate Facilities
5. Dearth in Qualified Science, Technical and Vocational Teachers.
6. Poor Teaching Strategies

Administrators' Misconception of the Nature of Science, Technical and Vocational Education

One of the greatest problems facing science, technical and vocational education is that many administrators of the programmes, at the policy making level are not trained in the various areas of specialization. They do not seem to understand the needs of the programme when it comes to distribution of funds. Hence science, technical and vocational education is grossly under funded. The under funding affects the supply of up to date

facilities and equipment needed to train workers of the 21st century. Furthermore, there are few trained science, technical and vocational teachers dedicated to the programme. Oranu (2004) observed that:

Despite the best intentions of successive Nigerian governments, Vocational and Technical Education programmes are still fraught with problems, including administrators' misconception of the nature of the programmes, inadequate political will by the government, deficient educational monitoring and evaluation procedures, poor funding, poor incentive for teachers and a rapid rate of technological changes.

Inadequate Practical Skills Acquired by the Learners.

Skill acquisition is one of the surest ways through which young people (youths) can find ways to the labour market either in the public or private sector. Skill, has been defined by Hull (1982) as manual dexterity through repetitive performance of an operation. This implies mastery. Ezeji (1988) stated that the acquisition of requisite skills is a means of increasing the productive power of a nation, hence the Nigerian society should recognize the fact that every citizen should be well equipped to contribute effectively to the welfare of the country.

Skill acquisition varies in nature and complexity according to the trade involved. Individuals who opt for science, technical and vocational skills should among other things, possess qualities such as interest, ability, aptitude, patience, personality characteristics and other physical qualities that would enable them succeed in it. Therefore, the acquisition of appropriate skill is necessary to every youth for sustainable empowerment. Unfortunately, Nigeria's secondary school leavers/graduates do not have such skills because of the poor implementation of science, technical and vocational programmes in the school. So they cannot be self-reliant neither could they be self-employed. Anyaduba and Osu (1990) argue that despite the introduction of science, technical and vocational education programmes in the secondary school curriculum, secondary education could be said to be certificate oriented with little or no attempt at the preparation of students for the world of work.

Lack of Entrepreneurship Initiatives

Teachers in Nigerian schools and colleges do not possess entrepreneurship skills and as such cannot impart same to the learners “Entrepreneurship” or small business management is very imperative to our science, technical and vocational programmes. A successful programme, according to Nwaokolo (2003), will enable a student either get a job or create a job and employ others thus reducing unemployment and enhancing the pre-capital income of Nigeria. The reverse is the case in Nigerian Educational programmes. However, it is important that the introduction of entrepreneurship education does not disadvantage the manipulative skills loading of science, technical and vocational education syllabus. The skills component must be sufficiently stressed and jealously guided. Uwa (1989) identified three elements that are necessary for entrepreneurship education, namely having some skills related to the job, having the right attitude towards work and finance.

Dearth in Qualified Science, Technical and Vocational Teachers

There is inadequacy of qualified science, technical and vocational teachers in the national education system. In 1997, a survey report by the Nigerian Educational Research and Development Council (NERDC) revealed the state of demand and supply of science, technical and vocational teachers nationwide. For instance, seventy four percent of the TVE teachers (about 270,000) were not available in 23 different subjects (Yakubu, 2001). Gang (1989) asserts that technical and vocational education in the secondary school programmes has not been implemented because of dearth in TVE teachers’.

Poor Teaching Strategies by Teachers

Teaching of science, technical and vocational subjects have been too theoretical which have not placed much emphasis on the learners’ practical skill acquisition. Teachers in most cases use lecture method only in a programme they supposed to apply lecture method and demonstration or demonstration and explanation.

Inadequate Facilities

Facilities like classrooms, workshops, laboratories, studios, equipment and materials are grossly inadequate in our schools and colleges. The problem in the procurement of facilities does not augur well for the practical acquisition of skills by learners. The reason why the facilities are not there is partly due to high cost of science, technical and vocational education and recently to economic recession coupled with high inflation rate in Nigeria (Imarhiagbe, 1992). The impact of inadequacy in educational facilities is that training of

the students becomes impeded and they end up not acquiring skills to go into the labour market.

The Way Forward

The following strategies will help to improve science, technical and vocational education programmes for sustainable graduate performance in the world of work.

1. Improvement on Teaching Strategies:

Arubayi, Nworgu, Akpochafor and Odu (2008) suggest the following teaching strategies in technical and vocational education that will enhance skill acquisition among teachers and learners in Nigerian Secondary Schools.

- a. Concept formation
- b. Real Life application
- c. Job-related skills acquired by learners
- d. Demonstration
- e. Equipment, care and maintenance
- f. Diagrams/Illustrations/Drawings.
- g. Sub-scales are further defined below.

- **Concept Formation:** This deals with all the ideas coming from the teacher and learners culminating in the formation of what the topic/object of discussion are.
- **Real Life Application:** This evaluates the ability of the teacher to make the learner relate what is learnt to-day-day activities in his environment and beyond. Real life application makes reference to the implication of the concept to real life/possible future careers.
- **Job Related Skills Acquired by the Learners:** The topic of subject matter should offer various skills to learners which they can use in the world of work.
- **Demonstration:** This sub-scale explains all the teacher does in the class/laboratory/workshop or studio to engage the attention of the learners to him/her in order to replicate the procedure and process involved in an experiment/workshop practice etc
- **Diagrams/Illustrations/Drawings;** These sub-scales emphasize teacher's use of drawing/diagrams as it relates to the topic and

stressing the importance of accuracy in spelling, labeling and neatness of diagrams.

Entrepreneurship Education in Science Technical and Vocational Education Curriculum

In every programme of science, technical and vocational education, especially at the post-primary and post-secondary levels, a three-credit subject, which may be titled “Entrepreneurship” or small business management should be introduced and made compulsory for all science, technical and vocational students.

If one is determined to set up one’s business, an objective or honest self-study will be of great help. The following are the competences that may help you determine whether to start up small business or not. Ojukwu (2000) quoting Akeredolu, (1975); Baumbach and Lawyer (1979); Oshagbemi (1985); Amaechina and Nnadozie (1995) stated the following competencies.

- Experience in the intended business
- Viable idea, which can be translated into a product of service to meet customer’s demand
- Handwork, self-confidence and luck
- Availability of business opportunity and ability to identify it
- Having a clear business goal
- Level of education i.e. General literacy especially in business education

Other competencies according to Okenwa (1999) include:

- Having the right skills and ability, both technical and management to run the business
- Obtaining the resources necessary to produce the product/provide the service
- A business which satisfies you in terms of allowing you to make your own decisions or make a lot of money or provide you with a job you really like doing.

Adequate Supply of Technical and Vocational Teachers by the Government

Science, technical and vocational teachers in secondary schools and tertiary institutions need to be trained and retrained in large numbers preferably through scholarship by government. To make them to be retained in the

education industry, they should highly be remunerated by the government. Teaching allowances of between 35 percent and 40 percent of teachers' monthly salary should be paid to them in order to stem their exodus to the industries.

This little encouragement will make many more technical teachers to stay on the job (Farrugia, 1985).

Acquisition of Requisite Skills by Both Teachers and Students for Economic Production

For technical and vocational education curriculum to be useful, the right caliber of teachers should be used to implement the programmes. The benefits of a quality education programme are based on inculcating skills to the students for self-employment and self-reliance. Agbai (1989) stated that the alarming rate of unemployment has forced the government to stress on self-employment and self-reliance as alternative to paid employment.

Skill acquisition in youth development is so important that National economic empowerment Development strategies (NEEDS) (2004) makes it one of intervention strategies targeted at youth development and to reduce urban poverty reduction and to reduce urban poverty reduction. NEEDS also believes that poverty can be reduced, wealth can be created and quality of life improved when people are trained to acquire skill relevant for the word of works.

The rate at which skill is acquired is a function of knowledge of result i.e. feedback (Holding 1965). The feedback can be intrinsic or artificial with the artificial being either concurrent or terminal. The concurrent and the terminal feedback can be immediate or delayed with each being either verbal-or-non-verbal. It then follows that a skill teacher must be aware of how skills are acquired to be in a position to design his teaching for a success.

Attitudinal Change towards Technical and Vocational Education

Enlightenment campaign should be mounted in the mass media: radio, television, internets etc on the importance of technical and vocational education. This campaign will improve Nigeria technological culture and national development. Technical and vocational education should have separate planning, separate administrative and operating arrangement from general education. There should be a changed attitude towards technical and vocational education by all stakeholders.

The Use of Workshop Practical Project

In the early experiences of children they learn both to do and to know better by doing things. Through practice learners movements in the case of psychomotor activities becomes more skilled. At the same time their knowledge grows and they also develop certain attitudes. Odu and Biose (2003) stressed that project is used to identify a wide variety of students' learning experiences which emphasizes the application of skills and knowledge that result in some type of product.

A project may be ceramic moulding e.g. flower vase, simple construction of wood joints etc. With the above statement the major purpose of using project is to provide an opportunity for practical application in a context that is meaningful to students. Ezeji (1988) defined project as a whole hearted, purposeful activity planned and carried to completion by the students in a natural setting. Stiles Dovsey in his book "Democratic Teaching in Secondary Schools" identified four steps in developing a project viz purposing, planning, executing and evaluating. According to him project encourages a wide exploration of knowledge related to the project being developed and attempts to help the learner see the relationship of isolated facts and specific generalization to a whole body of experience. Project method in learning helps to motivate the study of technical facts and related knowledge in all spheres of learning.

Provision of Different Instructional Media

Instructional media such as charts, models, cut-away, mock-ups, real objects, slides, overhead transparent films, audio-visual and video tapes facilitate learning of science, technical and vocational education. Heinich et al (1982) pointed out that the various instructional media should be put to best use for effective education. Models cut-away; real objects are partially useful in many science and technical subjects. Such subjects as physics, chemistry, biology, auto-mechanic, building, and introductory technology require such instructional media to concretize the subject to the learner. Intricate machine parts can be exposed to the learner by the use of well prepared transparencies and charts. Similarly, a resourceful teacher can make use of those media to arouse and sustain students' interest in the technical area.

The Use of Field Trips

Fieldtrip could be a visit to dealers or manufacturers of technical equipments and materials, industries etc so that students would be provided with information about processes of materials, their properties, uses and costs. Ezeji (1987) emphasized that vocational skills acquired through classroom

instruction must have industrial application. This means that school training programme must be geared towards understanding of industrial practice and production method.

From this statement, it indicates that people can learn skills by carefully watching others do something they want to do, since watching others perform helps to eliminate some of the trials and errors that would have been made. The methods used in classroom and workshop instruction supplement outside study and on the job training. Hence environmental approach is the answer so that science. Technical and Vocational Education teachers can organize his teaching towards methods that will facilitate teaching and learning processes. This, then means that for a teacher to be able to identify relevant activities in the environment to be used by students in practical experience, he must select skills, methods, procedures and processes that are similar to those used in real life situation but difference in size and co complexity.

Teacher's Role in Implementing Science, Technical and Vocational Programmes

If children are to develop the skills, interests and understandings about the world of work, the teachers need to help them. To develop creativity and self-expression, teachers cannot let children do just as they please; some guidance must be given along with the opportunity to gain experiences. Teachers have some choice in the activities provided for children and those selected are usually influenced by such factors as the teacher's own abilities, the interest and background of the children, the kind of daily programme the teacher follows and the amount of time that can be spent on the subjects. Infact, the teacher must know what he is doing, he must know how to organize, he must know how to make use of available materials and he must be enthusiastic (Cacace, 1976).

Teachers at the primary school level should use the activity approach to provide for the varied interests of all members of the group and to allow each child the opportunity to exercise his special talents. By so doing, the natural aptitudes of children are brought into play and utilized as a means of learning. Those who have aptitudes for weaving, painting cooking or drawing can make their contribution and can express themselves through these media.

Evidence has shown that in the past, specialist teachers were available in the primary schools as handiwork masters, rural science teachers for the teaching of agriculture and domestic science subjects. As more and more emphasis is placed on functional education in Nigeria, there is need to revitalize the

teaching of vocational subjects in the primary schools. One way of doing this is by employing qualified teachers. Those who are presently teaching may be encouraged to undertake some in-service training programmes.

Conclusion

The dyfunctionalities in the present education curriculum have resulted to many ills in the society such as graduate unemployment, poverty, child kidnapping, armed robbery, prostitution, 419 syndrome, to mentioned but a few due to lack of skilled acquisition of school leavers. It was therefore, suggested that using appropriate teaching strategies proper technical skill acquisition, technical and vocational education among others will create viable options for preparing graduates/school for skill acquisition in our secondary schools and colleges.

References

- Agbai, J.O. (1989). A Survey of the Attitude of Technical College Final Year Students Towards Self-employment after graduation. *Unpublished B.Sc Thesis*. Department of Vocational Education, University of Nigeria, Nsukka.
- Ajayi, T. and Awoyele, T. (1985). Planning for Effective Implementation of Introductory Technology in Nigerian Secondary Schools: A Case Study of Ogun State. IN E.T. Ehiamentator and S. Ogunsaju (eds) *Trends in Vocational Education in Nigeria*. Benin City: Nigerian Educational Research Association (NERA).
- Ajibade, A.J. (1987). Self-employment. Solution to Unemployment. *Vocational Educator* I, (1); 43-44.
- Anyaduba, M.O. and Osu, C.O. (1990). Job Identification for Senior Secondary Students in Office Occupations in Anambra and Imo States of Nigeria. *Business Education Journal*, ii (2)
- Arubayi, E. Nworgu B.G; Akpochafo, W. and Odu, K.O. (2008). Manual for Monitoring Curriculum Contents of Subject Inspection in Senior Secondary Schools.
- Cacace P. (1976). *The Teaching of Art and Crafts in Primary Schools*. London: Macmillan Education Limited.
- Ezeji, S.C.O.A. (1987). Teacher Behaviour that affects Students' Learning. *Journal of technical Teacher Education* 1 (1) 1-8.

- Ezeji, S.C.O.A. (1988). *Elements of Guidance, Vocational and Career Education*. Summer Educational Publishers.
- Farrugia, C.J. (1985). *The Status of School Teachers in Malta*. Ph.D Thesis (Unpublished), University of London.
- Gang, K.P. (1988) *Vocationalising the School Curriculum: A Case Study of School Responses to the Implementation of the National Policy on Education in Nigerian secondary Schools*. Unpublished Ph.D. Thesis, Lancaster University, England.
- Heinich, Modenda & Russal (1988). *Instructional Media and the New Technologies of Instruction*, New York: John Wiley and Sons.
- Holding, D. (1965). *Principle of Training*. London Regaman Inc.
- Hull, H.S. (1982). *Method and Problems in apprenticeship system*. New York. The Century Publishing Co.
- Imarhiagbe, K.O. (1992). Vocational Education Programmes in Nigeria; Issues and Challenges. *Journal of Technical Teacher Education* (1), P.45.
- Lillis, K. and Hogan, D. (1983). Dilemma of Diversification: Problem Associated with Vocational Education in developing Countries. *Comparative Education* 19 (1).
- Nwaokolo, P.O. (2003). Recent Experiences in Educational Alternatives in Africa: The Post-Primary Technology Education Case. *Related Thoughts in Vocational Education: The Developing World Experience*, Pp. 116-128.
- Odu, K.O. and Biose, C.A. (2003). Technical College Education and the Challenges in the New Millennium. *Nigerian Journal of Research and Production* 2 (1).
- Ohikheno, T.O. (1974). Integrating Elementary Technology into Secondary Education in Nigeria. *West Africa Journal of Education*, xviii.
- Ojukwu, K. (2000). Entrepreneurship Development in Business Education: Critical Success Factors in Starting Small Business Enterprise. *Business Education Journal* III (3) 102-108.

- Okafor, F.C. (1988). *Nigerian Teacher Education. A Search for New Direction*, Enugu: Forth Dimension Publishing Co. Limited.
- Okenwa, C.O. (1999). *Entrepreneurship Development in Nigeria. A Practical Approach*. A Onitsha, Adson Educational Publishers.
- Oranu, R.N. (2004). *Vocational and Technical Education in Nigeria*. <http://nigeraeduc/eduving/23/htm>.
- Shumi, A.G.M. (1988). Vocational Training as an Educational and Development Strategy; Conceptual and Practical Framework. *Education Development* 8 (3).
- Urebvu, A.O. (1988). Vocationalising the Secondary School Curriculum: The African Experience, *International Review of Education*. 34 (2).
- Uwa, E.I. (1989). The Success Story of Okon Udo. *The Democrat*, P. 11.
- Wali, H.S. (1991). "Support Paper". The Junior Secondary School System, in O. Ohuehe (ed) *Moving Education in Nigeria Toward the Year 2000*, Enugu: Optimal Computer Solutions Limited in Association with Nigerian Academy of Education.
- Yakubu, N.A. (2001). Refocusing Technical Education in Nigeria. Paper Presented at the National Conference on Refocusing Education in Nigeria. Federal College of Education (Technical), Asaba.