

THE PLACE OF TECHNOLOGY EDUCATION IN MANPOWER DEVELOPMENT IN NIGERIA

Adakole Una

Abstract

For any nation to be able to cope with the demands of modern civilization, it must strive to acquire a strong scientific and technological skills base. Nigeria, several decades after independence, is still in a turbulent socio-economic state due to her low level of technological development. All efforts so far made to bring the nation to a position of self-sustenance in terms of economic and social stability have proved to be an illusion vigorously pursued, but never attained. Factors responsible for the slow pace of science and technological advancement include:-transfer of technology and its impact on the people with particular reference to manpower development, attitudes of the people and African culture as they affect the teaching and learning of science, indiscipline and corruption, and lack of working tools and materials. This paper attempts to highlight how these factors have negatively or positively affected our march towards technological breakthrough.

Introduction

It is common knowledge that the state of science and technology of a nation determines its development. Modern civilization is thus heavily dependent on advanced science and technology. Any nation that wishes to remain stable and self-perpetuating must strive to raise the standard of living of the people through the employment of certain scientific and technological advances that tend to maximize the exploitation of all available resources. This calls for skilled manpower that can only be developed through science and technology education. Illustrated World Encyclopedia of Science Volume 18/SU-Ve, page 122) defines technology as applied science and industrial act. By this definition, one can conclude that technology cannot be developed in the laboratory and that science is only useful when it can be applied to develop technology.

Technology takes the discoveries and inventions of scientists and makes them available in practical form for man. Thus, it will not be wrong to say that the level of development of any country depends almost entirely on its state of science and technology. It is on the basis of this that countries are categorized into:

- A. Developed referring to countries with advanced technology and
- B. Under developed or developing referring to countries with little or no modern technology.

Modern technology in this case is the yard stick for measuring a country's level of development and entire civilization.

Technology as viewed by U.N.E.S.C.O (1985) is the knowhow of and creative process that may utilized tools, resources and systems to solve problems, to enhance control over the natural and manmade environment in an endeavour to improve the human condition. One can therefore say categorically that skill or know how of doing things is an integral part of technology. Thus we cannot say that we are technologically advanced simply because every household has a television set or video cassette player or because we have more than enough imported cars on our streets. The question is, can we make them?. For any nation to excel technologically, the area of utilization of advanced scientific knowledge and methods must not be neglected. In science, our awareness of a phenomenon is determined by the use of such processes as observation, measurement, experimentation, and other operations included in the scientific method to get a scientific information. Technology on the other hand is concerned with the skills and techniques required to harness and apply scientific knowledge for the benefit of man.

According to Iyande (2001), manpower development is a complex concept which involves human capital through the process of education, training and skills acquisition. Ogundele (1987) noted that learning is really the core of educational and manpower development efforts.

Technological skills and techniques are acquired through technological education. It is no wonder then that Onyeukwu (1997) quoted himself to have observed in 1990 that technology education is the acquisition of basic skills capable of transferring scientific knowledge to the solution of practical societal problems; adding that technology education rests on its ability to satisfy the basic

human needs which are identified as food, water, energy and shelter on one hand, and health, security, recreation, transportation and communication on the other hand.

The recognition of the need for science and technology teachers in Nigeria only began in 1960, under the influence of the Ashby Commission report (1960). The Federal Government of Nigeria set up the Ashby Commission in April 1959, on the eve of independence, to conduct an investigation into the needs in the field of post school certificate and higher education over the next twenty years. The report was published in 1960 and titled "Investment in Education". The report stressed the need to improve higher education in Nigeria. It states that science and technology, a service upon which Nigeria's economy depends, should be given urgent attention.

In spite of the fact that technology education acts as a catalyst for accelerated growth in all aspects of human endeavour, it was not until 1979 when the Federal Ministry of Science and Technology was created that it could be said that there was a policy on technology education, which was however, further articulated in the National Policy on Education Decree 16 of 1981.

Technology Education in Nigeria the Journey So Far

Animalu (2003), opined that in Nigeria, there is a chasm between science and technology and the realization of economic growth resulting from science and technology. He said that what any society that must develop into a vibrant economic middle income or major income society must do is to first bridge this chasm. And the bridge according to him is to place science as the bedrock of its society and its goal to be creation of industries, which power economic growth. This bridge in science and economic growth is technology. It was in realization of the importance of science and technology education, that the Federal organs for science and technology administration in Nigeria were set up at the end of the civil war by Decree No. 6 of 1970 which established the Nigerian Council for Science and Technology (NCST).

NCST in 1977 gave way to the National Science and Technology Development Agency (NSTDA), with General Shehu Musa Yar Adua, then Chief of Staff Supreme Headquarters as its chairman. Since then series of other agencies and policies have come and gone. These were headed by different people with different visions under different governments thereby leading to disjointed or incoherent policy decisions. All these were futile attempts made by the government to formulate a relevant and reward oriented National Policy on Science and Technology (S&T) for the nation. The new Universal Library (Encyclopedia) volume thirteen (page 286) defines Technological Education as Education of University standard but with definite bias towards industrial application. Technological courses are at the present time offered both in the universities and the major technical colleges.

As earlier mentioned, technology education is imperative in the technological and overall development of a country. It is an indispensable vehicle by which a country's economic self reliance can be attained.

According to Ekpo-Ufot (1990), a self reliant nation is the one whose citizens have realized their creative potentials and they use this to develop indigenous technologies for producing the goods and services for the consumption of their fellow citizens. That is to say that self reliance depends to a large extent on indigenous technology.

Objectives of Technology Education

The objectives of technology education as contained in the National Policy on Science and Technology should be:

- i. Establishing programmes to facilitate the diffusion of information technology nationwide through:
 - a. Promoting computerization in the public and private sectors.
 - b. Promoting the application of information technology in small and medium scale enterprises.
 - c. A national project on information technology education system and involving the establishment of information as a university engineering discipline.
- ii. Development and exploiting hard ware and software skills of information technology expertise with special attention to contemporary front line technologies such as micro electronics, communications, artifact, intelligence, robotics space science and plasma physics.
- iii. Establishing programmes and appropriate institutions for the development and enhancement of national capability in information technology involving;
 - a. Application oriented research and development activities.

- b. The development of local manufacturing capacity in spares and rural/urban digital telephone exchanges.
- c. The development and application of tested technologies such as radio, radar and satellite communications infrastructure.
- d. Facilitating the establishment of an export oriented local information.

The 6-3-3-4 system of education made adequate provision for the realization of the above stated objectives. Heavy machines and tools have been installed in almost all secondary schools in the federation to enhance skill development. Unfortunately however, most of the schools that have such facilities have no qualified teachers, in some other cases the machines are installed but no electricity supply making the tools to be a source of temptation for both the teachers and the students. What they have learnt from such machines and tools is pilfering. Obanikoro (2004) opined that the kind of educational programme that has thrived in our country in the last four decades had been counter productive. It is bedevilled by the following features.

It places much emphasis on the acquisition of certificates.

It encourages teachers to teach their subjects, but not the creative application of knowledge acquired from the subject.

It reduces the confidence of students and fails to inspire their creative and inventive capacities. - It is largely devoid of practical applications etc.

In his conclusion he said the consequence of the forgoing scenario is the dilemma of a nation in complete darkness: Thus rather than being technologically driven, we are technologically backward.

Aboyi (2003) in his own opinion said that Nigeria is one of the few countries blessed with abundant natural resources, yet we are ranked among the poorest countries in the world today. He attributed this to our inability to fully utilize these resources for sustainable national development, the main reason being the failure of our technical education programme. He went further to say that the present state of technical education in Nigeria has not facilitated the realization of the aims and objectives and hence the attainment of real national development.

Reasons advanced by some schools of thought as being responsible for the poor position of technology education system in Nigeria include: - inadequate physical facilities, proliferation of technological institutions without a corresponding increase in the number of qualified and experienced teaching staff, and inadequate funding. These are some of the many factors militating against students' enrolment in technology oriented disciplines and poor performance.

Transfer of Technology and Its Impact

In African traditional society before the colonial era, the people had the technology that met their needs and this was cherished. What was left was how to continue to improve on it. Furnaces were used to produce steel that was needed for agricultural implements, domestic utensils and weapons of warfare. There were also highly recognized carvers, textile industries which supplied the clothes the people needed, etc. However these have been neglected with the coming of the Europeans and their superior western technological products. Foreign technology relies on foreign machinery e.g. Electric generators, heavy equipment for road and building construction etc. It should be noted however that when foreign machinery is imported, technologists will also have to be imported to operate them. It seems that greater emphasis is being laid on the importation of foreign technology. Adeniyi (1996) Opined that the most pertinent problems, which need be addressed in the Nigerian situation is that the nation is not able to stimulate its local resourcefulness, the psychological awareness and initiatives of the citizens to solve its problems through adaptive inventions.

According to Denga (1981) there is the need for us to have a change of attitude and mobilize our human material and intellectual resources for our needs. It is important to promote our indigenous technology. Technology importation rather than helping us develop our modern technology makes us to be more dependent and uncreative. Nigeria and indeed Africa should be able to develop advanced technology through a gradual process of skill development and creativity.

According to J.S Oke (1998) creativity can simply be regarded as the ability and power to develop new ideas by perceiving new relationships between previously unrelated things. It can also be explained as the application of a person's mental ability and curiosity to a situation resulting in the

making, production, design or discovery of something new. Thus a new theory, a new product, a new production process or a solution to a problem which had defied solution are all results of creative process. We must reject the present method of importing technology if we must attain technological and hence political and economic independence.

Awokoya (1981) drew attention to the conflict of science and superstition in Nigeria when he concluded that there is a big difference between the positions of science in Africa and the Western world.

In Africa, according to him, it is the products of science that are presented to the people while they (the Africans), need the search light of science to illuminate the dark corridors in their knowledge. This is to say that the teaching aids, projector and television etc, are products of science and technology.

Importation of foreign machinery is often accompanied by importation of the technologist to operate them as earlier mentioned but over the years a few Nigerians are trained to take over. This is not to say however that the trained Nigerians can carry out major repairs on such machinery. When there is a major break down, the manufacturers of the equipment will have to be invited to rectify the situation. Further more, most of the raw materials for foreign technology also have to be imported.

Technological development according to Enyi (1998), is environmentally determined. Therefore, teachers should pay much attention to helping the child cope with understanding and interpreting his own environment. Adaralegbe (1979: 208) opined that science and technology education requires more than just teaching and imparting information. According to him, it is a process of changing people's attitudes. He lamented that the kind of science and technology in our schools does not provide a healthy scientific attitude.

Attitude/Culture of the People

That Nigeria is laying greater emphasis on the importation of foreign technology is a hard fact. That could be as a result of people's attitudes towards local products. Most Africans are in a haste to meet up with the demands of modern technology and cannot afford to wait and develop their own technology from the scratch. It is the belief of many also that indigenous technology is primitive technology and the products cannot be of the same quality as those produced in developed countries. This is a matter of attitude. In Africa, there is also a conflict that exists between culture and the study of science which has stood against our journey towards technological advancement.

Bajah (1981) threw more light on culture and the study of science by Africans when he emphasized that the importation of Western Education in Africa to some extent stimulated Africans to develop a strong awareness of the conflict of western religion and African culture, and the conflict of African culture and science. There is a wide belief that science as an academic discipline is facing an uphill task because most African students and teachers still hold firmly to superstitions that conflict with any modern approach to science.

Recommendations

Nigeria continues to produce technicians and engineers from her numerous universities, polytechnics and colleges of technology and professional institutions to mention but a few. The question however is, have these been able to effect any change in our state of technological development? The answer is no. Most of our graduates in the science disciplines are half baked (theoretical engineers and technicians) due to inadequate or a total lack of necessary teaching materials and qualified personnel. It is therefore not surprising to hear that a graduate of mechanical engineering has not during the course of his or her study, been subjected to any form of serious practical demonstration. In like manner, a quantity surveyor might not have handled or even seen the theodolite. How then can we provide the level of manpower that is desired to turn around our present situation in terms of technological development?

Following are some of the recommendations that could help push Nigeria a little higher from the position she now occupies in the technological development scale.

1. Government should lay more emphasis on technology education knowing that it forms the basis of our technological development.
2. Government must ensure that conducive learning environments are provided especially at the primary and secondary school levels. By conducive environment, it is meant satisfactory physical structures and facilities that could enhance good reading habits e.g. libraries stuffed with relevant and up to date books.
3. The content of the science curriculum under the 6-3-3-4 system of education should be geared

- towards achieving the set objectives.
4. Government should pay greater attention to the areas of teacher training and provision of working tools.
 5. Science teachers/students should be encouraged with incentives in the form of scholarship awards and science teachers allowance for the student and teacher respectively.
 6. Instituting an annual award at the college level for the best performing science and or introductory technology teacher. This will help to encourage competition among teachers. The best performing teacher in this context is the teacher whose students have recorded the highest percentage pass in the final examination.
 7. The existing polytechnics, colleges of technology and universities of technology should be adequately founded and closely supervised or monitored in order to avoid any form of financial misappropriation.

Conclusion

It has become clear that Nigeria like any other country striving to attain social and economic self-reliance must try to remove such factors that constitute stumbling blocks to science and technology development. Due attention must be given to indigenous technology by way of encouraging and funding it alongside modern technology.

Our training programmes have to be geared towards teacher and technology education since only industrial skills acquired from imported technology cannot be adequate to elevate or promote the country from her present status of developing or retrogressing nation if I may be allowed to use the word (retrogressing).

Our level of indiscipline and corruption should be checked. The present situation whereby government money or property is looked upon as no body's money or property is not healthy for any meaningful development.

There should also be a form of incentive for anybody, teacher, pupil or any Nigerian that distinguishes him or herself in science or technology based activities.

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