

## An Historical Survey of the Development of Science and Technology Education in Nigeria

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### Abstract

*This paper examines the development of Science and Technology Education in Nigeria. Science and Technology Education in Nigeria and its development can be phased into two periods as Science and Technology Education before Independence, 1842-1960 and after Independence. Today, Nigeria like other developing countries, is facing the greatest challenges of humanizing Science and Technology that is to make them relevant to human needs and aspirations to bring about a sense of satisfaction and content. A paper like this would be an impetus to the understanding of the challenges inherent in the present day development of Science and Technology Education in Nigeria. As a result of these challenges, suggestions for improvements were recommended.*

**Keywords:** Science, Technology, Education, Development.

### 1. Introduction

This text is intended to present an historical analysis of the development of Science and technology education in Nigeria and the relative roles of the conferences, government and the various voluntary Agencies in this development during the period 1842 to 2012. It was hoped that these contributions would be designed to provide the frame work for an understanding of the current Science and Technology Educational situation in Nigeria. In spite of the tremendous development made by Nigeria as a whole in the field of Science and Technology Education, it is doubtful if the content of Nigerian Science and Technology Education meets the national demand in the matter of efficiency. Maduemezia (1997) remarked that in terms of the quantum of scientific and technological knowledge that exists in the world today and is available for tapping by all and sundry, Nigeria is backward.

On the whole, it might be said that Science and Technology Education has come to stay or, at the very least, it would continue to serve Nigeria Schools until a more viable system could be devised. We are living in a world where Science and Technology have become an integral part of the world's culture and any country that over looks this significant truism does so at its own peril. In our onward march to vision 2020, nationhood and national greatness, our science and technology educational system has yet to forge a proper link between the educational system and the agricultural and industrial programmes of the country. It is universally acknowledged that advancement in science and technology dictates whether a nation is industrialized or not, since development in agriculture and industry is based on a technology, which is rooted in science (Guobadia, 1976).

In like manner for Nigeria to be a producing country, that is, to have industrial development, challenges facing science and technology education in primary, secondary and tertiary institutions should be identified and dealt with in a manner akin to pursuit of war. Eshiet (1991) pointed out that in the block area of health, food, agricultures, transport, communication and exploration of material resources, science and technology have combined to transform our world while at the same time are opening up new frontiers in an unending search for new ideas in the solution to human problems. Science and technology education has introduced a lot of changes in our world today and it will continue to do so in the future.

## 2. Definition of Science and Technology Education

For the purpose of clarity and clearly understanding, there are certain terms that deserve definitional clarification, such include science and technology education and science and technology education development, so as to present their distinctions.

The definition of science and technology given in the National Policy on Education by Federal Republic of Nigeria (2004:23) appeared to be more comprehensive. It defines it as: "The teaching and learning of science and technology process and principles that will lead to fundamental and applied research in the sciences and technologies at all levels of education". In other words, science and technology education can as well be described as training or retraining which is given in schools or institutions, and is conducted as part of a programme designed to produce scientists and technologists for national development.

However, the term science and technology education has been variously defined as All the learning experiences, activities, planned, designed, and organized for the disciplines- Biology, Microbiology, Bio-chemistry, Chemistry, Physics, computer science, Health science, Agricultural science, Basic science, Integrated science, Basic technology, Introductory technology and so on by the school or an institution to achieve not only the aims and philosophy of science and technology but also the over-all goals of the national development.

## 3. Then, What is Science and Technology Educational Development?

Development is central to all educational sectors, their evolutions, techniques and technologies that tend to their establishment. Therefore science and technology educational development connotes improvement from a certain point of initial growth to a higher level of growth which is a demonstration of improvement from a primary education level to secondary education level and higher education level along approved continuum. The Encyclopedia of Education (1971) sees science and technology educational development as programmes of Science and technology which begin in the elementary school and extend through the secondary school to tertiary institution. Development in science and technology education tends to encourage further development in other facets of life.

It connotes not only on the establishment of institutions for science and technology, but it is the pivot on which advancement of science and technology subjects or courses rest. Developments in Science and Technology according to Akpan (1992) start with education of the people in science and technology.

Science and technology education development as a way of life in which the main human activities-biology, chemistry, physics, agricultural science, integrated science, basic technology and introductory technology are divided and sub-divided, for the convenience of learners and teachers, into subjects of the curriculum. Development in science and technology education can be defined as all the novel introductions (new teaching methods, new science teaching materials and new curriculum content) that enhance efficient and effective teaching and learning of science and technology.

## 4. Background Factors for the Development of Science and Technology Education in Nigeria. (1856-1946)

As in other parts of African formal education was introduced into Nigeria by the Christian Missions which arrived in the country in 1842. As soon as they came, the missionaries opened a number of primary schools, the general education of the converts. Fafunwa (1974) affirmed that the missionaries devoted attention, initially to the development of elementary (primary) education in the country. He stressed that the reason for this initiation was inadequate resources the missions depended upon from their overseas headquarter.

It was only later that the few educated Nigerians in Lagos began to clamour for a kind of post primary academic education that would enable their children to become doctors, engineers, scientists, technologists and the like. Consequently, the realization that, "changing times, demand a change in any kind of education (Hurd 1960). With the introduction of the Western system of education by the European Christian missionaries in 1842, science and technology education had been treated as a relatively insignificant appendage of the country's education system. This was firstly due to the motives of the missionaries which were mainly for evangelization and production of clerks that could assist them in their commercial enterprise. The motive of the missionaries was not to develop Nigerian citizens scientifically and technologically

Secondly, the British rulers did not want to educate Nigerians for positions which provided jobs for themselves. Many of them knew that if they intensified the education of Nigerians they would hasten the end of occupation. So they

rationed education cautiously, hoping that it would be many centuries before the Nigerians would be able to govern themselves. They feared that educated Nigerians would agitate over many things.

Thirdly, the British Colonialists applied measures, albeit surreptitiously, that stultified science and technology development. This was done deliberately to strengthen the hold of Britain on the socio-economic life of the nation, thereby perpetuating the Nigerian peoples' dependence on British products and services (Rodney 1972). As a result they gave Nigerians more of literary education.

Fourthly, according to Abdullahi (1982), some colonial administrators had misgivings about rapid development of interest in science and technology education in Nigerian schools. He quoted Lord Lugard as saying that "African versed in science and technology was a suspect to; and some colonial masters believed that given the specialised vocabulary of science and its mode of inquiry, that Africans, who are biologically inferior to the whites are incapable of understanding science and technology".

It is a fallacy to believe that the early pioneers in Western education of Nigeria moved into a complete science and technology educational vacuum. This does not mean that the association of the Nigerians with the British was a total evil. Later, despite all these hurly-burliest, which were made to block the development of science and technology education, the British government relinquished to the development. Broadly, the western education in Nigeria serves as landmark for the origin and development of modern science and technology education. The expanding colonial government and the economy in Nigeria created the high demand for both tradesmen and higher level of technological manpower. The subsequent required the services of technologists by the colonial administration, whose importation from Europe will increase their financial cost of running the colony and the issue of recruiting junior technical workers from Britain who will obviously come from the lower socio-economic class would have negative effect on their assumed superior image of the white men whose instrument of governance was hinged on prestige. So, the colonial administration encouraged poorly financial and morally the missionary schools as it concerned technology education, even when it was used as a condition for financial assistance, particularly as in secondary and higher institutions so that Nigerians would do the mean practical jobs. Therefore, formal technological programme in school setting had to be developed and this marked the inception of trade centre college system.

This development, in the opinion of Nigerian educational historians, was motivated by the socio-economic situation of the era which was firmly under the control of the missionaries and colonialists and whose dire need the institutional training served (Ajayi 1965; Odunmi 2006). In 1856, the church missionary society (C.M.S) established an industrial school at Abeokuta. Since there was emphasis on practical education hence its introduction in primary schools and later extended to secondary education

In line with the policy from 1856 upwards, some Christian missions like the CMS began to establish institutions which offered some kinds of vocational training in town like Abeokuta, Lokoja and Onitsha in the country (Fafunwa 1974, Odunmi 2006). Before the independence, Nigerian Railways started technical training in 1901; Survey school was established in 1906, for the training of survey assistants Marina Department, the Public Works Department (PWD), the Department of Agriculture, the Department of Health, and the Department of Posts and Telegraphs (P&T). In the sameness, three years after the development of technology education, science teaching was introduced in Nigeria secondary schools. The establishment of church missionary secondary school, at Lagos in 1859 was the significant step which resulted in marked the introduction of rudiments of science in the school curriculum. Likewise, at the introduction of Primary Science in Nigeria in 1859 during the colonial era, there seems to have been no defined method since what was taught depended on out-door activities (Bajah, and Yoloye, 1982).

Shortly afterwards, the following secondary schools were established, Science and Technology were taught there: C.M.S. girls school, Lagos, founded in 1869; St. Gregory's College, Lagos opened by Roman Catholic Mission in 1876; Methodist Boys High School, Lagos (opened by the Methodist Mission in 1878); Baptist Boy's High School, Lagos (established in 1885 by the Baptist Mission); St. Andrews College, Oyo (founded by the C.M.S in 1876); Hope Waddel Institute, Calabar opened in 1861; the Baptist Training College, Ogbomoso (opened in 1899) and the Wesleyan Training Institute founded in 1905 (Ogunleye, 1999).

Similarly, according to Ekpo (1993) the history of science teaching in Nigeria begins with the teaching of Nature study in the school in 1859. Emphasis on Nature study was in the areas of personal Hygiene and environmental sanitation. In particular the United State of America, Bairley and associates at Cornell University and later Comstock, were prime movers of Nature study. They on their part were motivated by the need to improve agriculture and "to half the increasing migration of young people from farms to cities" (Bajah 1988).

Science and technology developed by them were not given desired support. Thus, science and technology education did not enjoy as much attention as the religious education. However, not much was done to implement the

policy to the letter. As a result they gave Nigerians more of literary education than practical and scientific education. Moreover practical education was part of their curriculum but it did not have a pride of place in their education system.

It was not until 1882 that the colonial government started to co-ordinate the curriculum. The government thought the schools would stop functioning but they did not and so the government began to grant aid to them on science and technology programmes. In addition, the education ordinance of 1887 recognized the importance of science and technology education; hence its provision became a condition for the government financial assistance. The colonial masters planned for science and technology education in Nigeria, but its implementation suffered.

With the passing of the Education Ordinance of 1908, some of missionary schools were able to acquire science equipment for laboratory instruction. King's College Lagos was the first to offer science and technology education to the standard of Cambridge University Senior Local Examination (Taiwo, 1980). But with the establishment of more schools in Lagos and the Southern part of the country, the teaching of science spread to the Northern part. In 1920 Phelps-Stokes Commission was set up to examine the process of education in Africa and then made recommendations. In 1922 the report was out. It recommended the inclusion of agricultural science and some other subjects on the curriculum. With the commission's report in 1925, a memorandum was set up. The memorandum was very important in the sense that, it made provision for studying science and technology education in higher institutions. This led to the establishment of Yaba College Lagos in 1934 with courses in medicine, engineering, agriculture science, and teacher education which led to the award of the college diploma which lasted at least four years (Oyededeji, 2001; Reform Agenda, 2007). It shows that, science and technology were not taught in the higher institution in Nigeria up to the 1930s. From 1931 to 1945 private individuals, participated in the contributions to the development of science and technology education in Nigeria.

The period indicated above witnessed a lot of local community efforts at spreading science and technology education in the country as individuals, groups, communities or tribal unions set out to establish more secondary schools in the country. For example, Ozoro (1982) reported that many Nigerians such as Professor Eyo Ita, professor Oyerinde N.D, Chief Daniel Henshaw, Rev. O. Offiong and Professor Alvan Ikoku opened secondary and technical schools in different zones in the country. This made the science and technology teaching at the primary and secondary school level possible.

The introduction of science teaching in Nigerian high school curriculum was put at late 1940s (Abudullahi, 1982). Between the 1940s and 1950s, there have been a number of governmental sponsored or institutionalized innovations in our educational system.

Science and technology education and activities were handled mainly by foreigners before Nigeria got independence. Even in educational institutions sciences and technology were taught mainly by expatriates. Engineers, doctors and other high-level manpower were expatriates. The scientific/technology equipment that were used at that time were usually imported from abroad. This turned out to be the cradle of higher level production of practitioners of science and technology, leading to the production of the first generation of scientists and technologists in the mid-forties.

## **5. Provisions for Science and Technology Education during Representative Government in Nigeria (1947-1959)**

Nigerian government prior independence according to Bellstone (1975) operated on regions. The 1948 Education Ordinance, was the first comprehensive publication of an educational policy and practice in Nigeria. The primary purpose of this ordinance was designed to put into effect the educational provisions of the 1947 constitution of Nigeria which put the country into three regional administrative units. It further decentralized educational administration by classifying education as a regional service. The ordinance re-echoed the provisions of the Phelps-Stokes recommendations. During the ordinance science and technology curriculum content became more expanded and the training of indigenous teachers was vigorously pursued. The University College, Ibadan was established in 1948 as an outpost of the University of London

In 1949 Nigerian government set up a commission to conduct a feasibility survey of the polytechnic idea in terms of Nigeria needs. Thus, the commission recommended the establishment of a Nigerian college of Arts, Science and Technology with branches in each of the three regions into which the country was then divided. A Bill for the founding of the college was introduced into the Nigerian legislature in April, 1952. The first branch of the college opened in Zaria in January 1952. The Ibadan branch opened in February, 1954 and was to offer courses in agriculture and forestry, book-keeping and accountancy, education, science, arts, and engineering. The Enugu branch opened in 1955 and was to offer courses in mining, surveying, science and Arts. In 1959, the government appointed another commission headed by Eric Ashby to conduct an investigation into the Nigeria's need in the field of post secondary school certificate and higher

education over the next twenty years, 1960 to 1980 (Fafunwa 1974). The recommendations of the commission paved way for the offering of courses in Engineering, Medicine, and Agriculture and teacher education in sciences and technology in higher institutions.

The three branches of the Nigerian college of Arts, science and technology were closed in 1962 and absorbed into the three new universities: the Enugu branch became part of the University of Nigeria, Nsukka, the University of Ife absorbed the Ibadan branch. While Ahmadu Bello University absorbed the Zaria Branch. The picture of the closing years of colonial education in Nigeria was characterized with situations where elites, politicians and so on began an intensified quest for a redefinition of the goals of Science and technology education in Nigeria. On the eve of independence, the science and technology education in the land was in embryonic state. According to Lewin (2008) educational planning in Africa in the 1950s and 1960s had been preoccupied with the urge for decolonization.

## **6. Contributions of Professional Organizations to the Development of Science and Technology Education in Nigeria**

To help the country to achieve its lofty Science and Technology objectives, the following professional organizations contributed to the development. The Science Teachers' Association of Nigeria (STAN), the Science Association of Nigeria (SAN), the Joint Admissions and Matriculation Board (JAMB) and the WAEC. The current senior secondary school science and technology curriculums grew out of draft developed by the Comparative Education Study and Adaptation Centre (CESAC) and was presented to a national critique workshop (which included STAN members). The Science Teachers' Association of Nigeria (STAN) was formed on November 30, 1957. Some of the aims of the association include helping science teachers to keep in touch with development in science and its application in industry and commerce and to popularize science in the community (STAN, 1989).

In terms of systematic change, the science Teachers Association of Nigeria was perhaps the most consistent agent of change. Early in 1968 a request was received by STAN from the West African Examinations Council (WAEC) to the effect that STAN should make recommendations to WAEC for revision and improvement of the current West African School Certificate (WASC) science syllabuses. A revision of the syllabuses was felt to be necessary in the light of modern developments in science education. Furthermore it was felt that with the updating of the Higher School Certificate (HSC) Science Syllabuses, the gap between the WASC and HSC was widened and so an updating of the WASC syllabus would help to bridge the gap. In response to the request, the National Executive Committee of STAN constituted four Curriculum Development Committees in 1968.

While the WAEC as an examination body is responsible for determination and approval of examinable syllabuses, STAN as a professional body was considered a fitting ally. As a result, the members of STAN spent several months critically examining the existing syllabuses in physics, chemistry, biology and mathematics. In this exercise, STAN transformed the usual WAEC "Exam syllabus" to a "Teaching syllabus" to facilitate the use by the generality of science teachers in Nigeria. Over the years, STAN concerned itself with reviewing the WAEC syllabuses but has also through its duly elected WAEC subjects panels contributed a lot to the other facets of WAEC- serving on ad-hoc committees and contributing to the quality of the questions set at various council examinations in science (Bajah, 1988).

The Science Association of Nigeria (SAN) was founded in 1958 and its main objective is to encourage the pursuit and understanding of science in Nigeria. It promotes science teaching by organizing on a regular basis, symposia, workshops on variety of topics of national interest and organizing annual conferences. Also SAN has been able to organize school science prizes, science fairs and constant supply of scientific manpower through its numerous members who are engaged in science teaching in the secondary and tertiary institutions. Ikeobi (1990) stated that STAN and SAN through their members have contributed immensely to the development of science education in Nigeria for the past decades.

The Joint Admissions and Matriculation Board (JAMB), the body established by decree to provide a single central admission process for all Nigerian Universities, polytechnics and college of education also helps to ensure that the admission policy ratio of 60:40 science: arts and of technology to other courses at the polytechnics at 70:30 are maintained. The policy is intended to solve the problem of inadequate numbers of graduates in the sciences and technology.

The Nigeria Educational Research Council (NERC) and the Comparative Education Study and Adaptation Centre (CESAC) are equally active in science curriculum development in Nigeria. Some international agencies such as the United Nations Children's Fund (UNICEF), the United Nations Educational, Scientific and Cultural Organization (UNESCO) and the Education Development Centre (EDC) of Newton, USA working through the USAID have also

contributed towards science curriculum improvement in Nigeria. Also, the below projects were initiated in Nigeria, the mid-west primary science project (MPSP), later known as the Bendel Primary Science Project (BPSP). Primary Science Project for Northern States of Nigeria, another primary science project known as the Primary Education Improvement Project was initiated at the Ahmadu Bello University (ABU), Zaria, Nigeria in 1970. However, a Unique Primary Science Project known as "sayensi", Ife Six Years Primary Science Project which emphasized the teaching and learning of science in the mother tongue (Yoruba) was developed at the university of Ife, now Obafemi Awolowo university, Ile-Ife in 1970. This became the first and the only indigenous experimental science programme ever produced in Nigeria. The National primary school science project of the 1971, the Macmillan Primary School Project of 1975 and the science for Universal Primary Education, Lagos State of Nigeria in 1976 thereafter followed.

## **7. Conferences and the Development of Post-Independence Science and Technology Education in Nigeria (1960-2012)**

The revolution in science teaching which began in the West had begun to influence science programme in Africa including Nigeria. Series of conferences were held, including the famous international conference on science in the advancement of new states held at Rehovolt, Israel in 1960. The major focus of this conference was the application of modern curriculum techniques to the educational needs of Africa. This was followed by another conference a year later (1961), held at the Massachusetts institute of technology (M.I.T.), Endicott House, U.S.A. This conference laid the foundation of curriculum development in science and technology all over Africa including Nigeria.

Ogunniyi (1986) reported that several regional and inter-regional conferences were held to prepare the ground for a truly revolutionary science teaching in Africa. Such include the 1961 Addis Ababa (Ethiopia) conference of the African ministers of education, the Rome conference of 1964, and the February, 1965 conference held in Kano, Nigeria under the auspices of Educational Services incorporated (later known as Educational Development Centre (EDC) Newton, Massachusetts). Many African scientists, science educators, curriculum planners and psychologists were brought together during the 1965 conference in Kano to discuss the future direction of science and technology education in Africa. The African Primary Science Programme (APSP), later called Science Education Programme for Africa (SEPA) evolved from the conference. When independence came in 1960, three years after the launching of the Russian Sputnik into space (Sund & Trowbridge, 1973), Nigeria joined the rat race of curricular reforms.

The attainment of independence was expected to be followed by nation-building. Moreover, the level of development of science and technology education can itself determine the level of development of an economy. Science and technology education as degree programmes did not begin until 1961 when University of Nigeria, Nsukka introduced such degrees programmes. Other universities such as Ahmad Bello University, Zaria 1962, Universities of Ibadan (1965), Lagos (1962), and Obafemi Awolowo university, Ile-Ife (1962) followed suit. These are called first generation universities. There are second generation universities and third generation universities with state universities and private universities. These universities have faculties of education science and technology which offers courses leading to bachelor of science education degrees in physics, chemistry, biology or mathematics (that is B.Sc. (Ed.) or B.Ed.).

Subsequently the technical institutes were expanded and upgraded. Thus, Yaba Technical Institute (established 1948) became Yaba College of Technology in 1963; technical Institute Kaduna (established 1956) became Kaduna Polytechnic in 1968. The Technical Institute, Enugu (Established 1958) became College of Technology (and later Institute of management and Technology) in 1965; the Technical College, Ibadan became the Polytechnic, Ibadan in 1970 and Mid-West Technical College, (established 1964) became Auchi Polytechnic in 1972 (Reform Agenda, 2007).

It should also be noted that science and technology education gained more support in the mid- 1970s when it became clear that there was need to have a nationally accepted standard and uniformity in technology education. In 1972, the then National Science and Technology Developed Agency; now, Federal Ministry of Science and Technology set up a working committee on scientific and Technological manpower and science education, which produced a report on middle- level technical manpower and their training. The committee further recommended that a national board for technical education be created which should be responsible for the implementation of its recommendations. Therefore, the Federal Military Government under degree No. 9 of January 1977 established National Board for Technical Education (N B T E). The body is charged with the responsibility of advising the federal government on all aspects of technical education falling outside the universities, including the general development of Polytechnics, Colleges of Technology, Trade Centers and other Technical Institutions. Hence the Federal Government of Nigeria and all those concerned with education have focused attention on how to improve the teaching and learning of science and technology subjects. For instance new goals, new methodology and new curriculum were introduced. These new correctional emphases have

precipitated development in universities of science and technology.

The 1969 curriculum conference in Nigeria and the Federal government realization of the crucial role of science in national development helped in projecting science and technology education in Nigeria. The National Curriculum Conference in 1969 provided the impetus for curriculum designs in Nigeria to pursue a pragmatic goal oriented approach in various levels of education in the country, (Bajah, 1982). The new structure of 6-3-3-4 systems of Education necessitated the Federal Ministry of Education about developing the core curricula. In the late 1970s the Federal Ministry of Education assemble group of Nigerian Science and Technology educators to design a modern science and Technology curriculum in line with the new policy education. From this emerged the core curriculum for Primary Science, Integrated Science and introductory technology for Junior Secondary, Biology, Chemistry, Physics, Technical and Vocational for Senior Secondary Schools. The white paper on Nigeria's educational policy which was first published in 1977 and revised in 1981, 1998, 2004 and 2006, gave prominence to giving science and technology education to children. The document classified such sector into three levels, namely: the primary, secondary and tertiary levels. The Federal Government of Nigeria embarked on the implementation of this policy starting with the primary science and technology programmes nation wide (F R N, 2004).

In 1958, the senior secondary school science and technology subjects have increased from there in 1958 physics, chemistry and biology to eleven in 1997. The subjects are Agricultural science, biology, chemistry, physics, mathematics, technology, science-technology-society (STS), teacher education technical and vocational. As part of government effort in 1986, promoting science and technology education and teacher vacation courses (TVC) were organized for teachers at state levels and Abuja in integrated science, Biology, Chemistry and Physics on the new curricula (Ikeobi, 1987). Core curricula were also developed in Agricultural science, introductory technology, metal work, wood work and technical drawing. These have been in use since 1980. In spite of this trend, Ajakaye (1988) said that insufficient qualified teachers of science and technology are problem in implementing science and technology education in Nigeria. Courses available in Higher Institutions are computer science, telecommunication and information technology, biology, integrated science, physics, industrial chemistry, chemistry, microbiology, biology, biochemistry, human kinetics, health sciences, and agricultural science, petroleum and petrochemical.

With the introduction of the 9-3-4 educational system, massive and revolutionary revision of syllabuses has been undertaken. Today we have separate syllabuses in science and technology at both the Junior Secondary School (JSS) and Senior Secondary School (SSS) levels, up to tertiary institutions. The establishment of Federal Colleges of Education (technical), with Federal and State Universities of Science and Technology have improved the image of science and technology education in Nigeria. The University of Technology, university of science and technology, university of Agriculture and special science schools have been opened within the past two decades or so. Of the 108 Universities in the country in 2012, there were 13 Universities of science and technology and 3 Universities of Agriculture.

1. Federal University of Technology, Akure, Ondo State-1981
2. University of Agriculture, Abeokuta, Ogun State 1988
3. Ladoke Akintola University of Technology, Ogbomosho, Osun State 1990
4. Ondo State University of Science and Technology Okitipupa 2010
5. Bells University of Technology Ota, Ogun State. 2005
6. Wesley University of Science and Technology, Ondo State 2007
7. Federal University of Agriculture, Makurdi,
8. Michael Okpara University of Agriculture, Abia
9. Abubakar Tafawa Balewa University of Technology, Bauchi
10. Federal University of Petroleum, Delta
11. Federal University of Technology Owerri
12. Federal University of Technology Minna
13. Federal University of Technology Yola
14. Enugu State University of Science and Technology, Enugu.
15. Kebbi State University of Science and Technology, Aliero
16. Rivers state University of Science and Technology, Port-Harcourt

## 8. Challenges of Science and Technology Education for National Development in Nigeria

Despite the long time of science and technology education development in Nigeria, the country has not gotten something big to show for the development. There are lots of challenges facing science and technology education in Nigeria. This

making it difficult for good quality education that will eradicate poverty and create employment, in the country. Every one knows how to fix the blame on sources, the government blames the teachers, teachers are blaming the government, policy makers blame it on the practitioners (i.e teachers), the society is blaming the school, the school blames the society. Nonetheless, the country is still with a cap in hand begging for bread from technologically advanced nations of the world because our practices have not the capacity to bail us out of economic and technological doldrums. No wonder that Oluwasanmi (1970) noted, "There are a lot of challenges facing Nigerian education and making it difficult for good quality science and technology education that is empowering and capable of bringing about desired and sustainable development. Such challenges include inability of the graduates to solve our societal problems.

Therefore, the present situation of unemployment graduates should once again take us back to the drawing board where we need more strategies of achieving quality science and technology education because of the perceived failure of the sector to meet the social, economic and environmental needs of the citizens. The prevalence of poverty among graduates of the science and technology education challenges the admissions procedures and measurement of the field achievements. There is need to do something to rescue the system in Nigeria. From the non- functionality of the system, which also created unemployment after leaving school.

In Nigeria today, the federal and states governments place emphasis on the invitation of foreigners for doing what our scientists and technologists could do in the country. The emphasis has become stronger with increasing poverty and unemployment rates in the land. In short the country is just a consumer of all the products manufactured by the scientists and technologists from other advanced countries of the world.

The stage of scientific and technological development has been used to classify the world into two main groups. The developed world has attained technological sophistication by exploiting science and technology for the benefit of man and the developing countries that lack the required adequate scientific and technological knowledge to utilize them for their comfort. A developing country such as Nigeria with a population of over 160million has an economy which is dependent on the industrialized world because it has not on its own been able to adequately use science and technology education to exploit, process and add values to its natural resources.

The pertinent questions at this junction are: "To what have the objectives of the science and technology education been achieved?" "Can Nigeria be said to be on the right track to technological growth in spite of the numerous polytechnics and universities in existences?" The answers to these questions are definitely in the negative.

Although, there is development in the area of policies for science and technology education but the implementation does not justify the efforts that have been made by the Federal and state governments as well as the organizations mentioned above. Consequently, science and technology teachers began to prepare their pupils/students for examinations instead of educating them in accordance with the needs of their environment, a problem that still persists to this day. This is mainly due to the fact that the implementation/ administration of the science and technology education had been fraught with many problems. It is as a result of this that the following conclusion and recommendations are made.

## Conclusion and Recommendations

In conclusion, the scientists and technologists that Nigeria needs are those who excel in their areas of specialization and at the same time have the breadth and vision needed in a developing country and who will consider service to their community as an integral part of their responsibility. Knowledge must be for contribution and not for earning. The great end of life is not knowledge but action.

Nigeria's greatest potentials are its human and natural resources, and unless these are fully developed and harnessed for her services, the land will continue for a long time to be a land in travail

The man power that will translate this into action will have to evolve from science and technology education, since development starts with people and education.

Some readings and records have shown that many breakthroughs in science and technology have come from mistakes. Let Nigerian educators and policy makers make the mistake in trying these innovations, and let us observe whether these will be a breakthrough in scientific and technological education and development in this 21<sup>st</sup> century.

From the discussion, the following recommendations are made:

- ❖ The government should show strong political will in addressing the issues affecting the implementation of policies on science and technology education
- ❖ Science and technology education was not so much characterized by a collection of facts but, instead, by the actual problem- solving activities through which information is derived. Attention should be paid to both the



manpower and natural resources which will be needed for the development of the country.

- ❖ Science and technology education should not be regarded to earn but it has to be used to contribute to the development of the land. The concentration of the science and technology education should not be on the programme of studies for earning only, the programme of activities, contribution and guidance must be considered.
- ❖ The science and technology education programmes of colleges of education, polytechnics and universities should be grounded on practical works. In addition, the programmes should be technique- dominated, innovation conscious and industry- oriented.
- ❖ The time has come to look for ways in which past and on-going implementation policy on science and technology education can be improved upon to meet the needs of changing times. Taking such a critical look certainly entails raising questions on the implementation basis of what has been done, examining alternatives, and stimulating an exchange of ideas on how to go on.
- ❖ Science and technology education should not be reduced to mere schooling. The school should see mainly as a production line which should squeeze raw materials till they become useable products. The returns to quality science and technology education are seen simply in terms of skills, job opportunities and enhanced contributions in the country.
- ❖ It must never be forgotten that science and technology education is not a process of packing articles in a trunk. It is, of course, a process completely of its own peculiar genius. The purpose of science and technology education is to stimulate and guide children for self-development. It is only by the well-guided self-development of children that schools can effectively realized any worthy aim of science and technology education in Nigeria.

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