

EMPHASISING TEACHING OF PHYSICAL SCIENCES IN SECONDARY SCHOOLS IN NIGERIA FOR FUNCTIONALITY AND SELF-RELIANCE

Iorparegh Aer; Sylvanus Ikwem Ador and Patrick Oraduen Anikpa

Abstract

One of the major dimensions of human growth and development is knowledge. This knowledge is principally gained using education as a vehicle. The acquisition of relevant knowledge and the development of appropriate skills and attitudes makes an individual a functional being, hence he lives successfully in the society and contributes to its development. Scientific knowledge is considered a vital tool for attaining functionality and self-reliance. This has been the basis for policies and reforms in science and science education in Nigeria since Independence. However, not much has been achieved as many problems, both social, economic and political still lingers. This is suggestive of an ineffective science education system. This paper therefore, considers emphasis on the teaching of physical sciences – chemistry and physics in secondary schools as attempts towards achieving functionality and self-reliance.

Introduction

Science embraces all human behaviour. It originates from human urges and tasks which drive people to seek rational answers to their questions; the questions which mostly deals with why and how things happen. This is the study of nature and has long been divided into two main branches – the physical sciences and the biological sciences (Aboh, 1997). He further described physical science as having two main aspects – Chemistry and Physics.

Chemistry as a discipline, is concerned with the making of different substances, finding out their properties, how they react with one another etc (Kneen, Rogers and Simpson, 1972). The knowledge of chemistry seeks to understand

happenings in terms of atoms, molecules electronic configurations, reactions and compounds formed and their uses.

Physics on the other hand, involves measurement of certain properties of matter which aim to examine if there are some important mathematical relationship between them (Abbott, 1997). Physics has developed important and useful equations as convenient ways of expressing the laws governing the behaviour of matter. The development of electric motors, dynamos, radios, television, artificial satellites, space crafts, nuclear power generators were made possible as a result of evaluation and utilization of these laws governing the behaviour of matter. These inventions have contributed in making and developing the socio-economic status of individuals, societies and nations.

Nigerian students have been recording mass failure in science and technological subject, which are an indication of the weakness of these study areas at the secondary schools. In Chemistry and Physics, the percentage of students who offer them is very low. It is also practical to observe that most secondary schools especially in the rural settlements do not offer them for students. The fact that these subjects contribute to understanding the non-living components of the environment in which we live, providing the basis for technological advancement, justifies the need to ensure that all secondary schools offer them as well as win student for enrolment in studying them.

Secondary School Science Education

The National Policy on Education (FRN,2004) defines secondary education as the education children receive after primary education and before tertiary stage. The policy states the following as the broad goals of this level of education in Nigeria:

- useful living within the society;
- preparation for higher education

Three of the stated specific goals, 'a', 'e', and 'h' have basis from scientific knowledge and skills, namely;

- Provision of manpower in the applied science, technology and commerce at sub-professional grades.
- Inspiring students with a desire for self-employment and achievement of excellence;
- Providing technical knowledge and vocational skills necessary for agricultural, industrial, commercial and economic development.

Secondary education in the country is dispensed in two stages – the junior secondary school (JSS) and the senior secondary school (SSS), each lasting for three years. At the JSS, Integrated Science is taught as a core science subject while at the SSS, Biology, Chemistry and Physics are core science subjects. The policy statement however, requires a student to offer one of Biology, Chemistry, Physics or Integrated Science. The implication of this statement is that a candidate is expected to offer and pass at least one of these subjects. It does not make all the three compulsory. A student who intends to offer Integrated Science at the SSS cannot offer any of Chemistry, Biology or Physics. The question is how many states in Nigeria offer Integrated Science at the SSS level? Integrated Science is erroneously restricted to the JSS. Writers, publishers have always produced textual materials for junior Integrated Science and none for Senior Secondary Integrated Science.

As stated earlier, an observable trend in science education in Nigeria is that most of the secondary schools do not offer Chemistry and Physics nor senior Integrated Science. Biology has therefore been made compulsory for every candidate. The over-emphasis placed on Biology coupled with the abstract nature of the physical sciences have affected their choice among secondary school students. Majority of people found as science teachers are Biology teachers. The question is why can't we have policies that will emphasize student enrolment in the physical sciences?

Physical Sciences for Functionality and Self-Reliance

In the caption above, the concepts of functionality and self-reliance needs clarification. The Webster Handy College Dictionary (1981) defines function as the proper action by which a person, organ, office, structure fulfills its purpose of duty. In this context, the function of education is to prepare recipients of education for useful living in the society and higher education by providing relevant knowledge, skills and attitude which help them adjust to the ever-changing social, economic and political environment.

The Oxford Advanced Learners Dictionary (2001) defines functionality as the quality in something of being very suitable for the purpose for which it was designed. This means that the science taught must be suitable in achieving the purpose for which it is designed. Remember that each society has peculiar problems which its educational system should seek to or designed to solve. Where such problem cannot be solved, the functionality of such a system is questioned. Is our science education solving our problems which relate to energy supply, clean water, good health, food production, effective

Emphasising Teaching Of Physical Sciences In Secondary Schools In Nigeria For Functionality And Self-Reliance

transport etc? If not what is the essence of the reforms which the system has been undergoing since independence? The singular position of this paper is that physical sciences which are central to manipulating matter are not emphasized early enough in youths.

It is worth remembering that the industrial Revolution of the past was possible in the West due to studies in the physical sciences that resulted to inventions of machines to replace human and animal power. The development of steam engine, combustion engines, electric generators and motors as energy converters were consequent upon industrial Revolution. Thus, efforts were made to improve productivity and quality of life (Encyclopedia Britannica, 2005). The knowledge and skills utilized for achieving these is obtained from laws of nature governing or expressing the physical world.

The concept of self-reliance refers to confidence in one's own self, judgement and abilities (Webster's New World Dictionary, 1951). Emerson (1941) cited in Encarta Encyclopedia (2001) defined self-reliance as expression of optimistic faith in the powers of individual achievement and originality. A talk about self-reliant education will imply that recipients are prepared and equipped to be on their own. They should be capable of using their knowledge and skills to create wealth and employment opportunities. Science education in the area of physical sciences, stand very tall for a variety of information abilities and operations about nature. This makes it capable of ensuring proper development of individuals and nations if correctly and effectively dispensed in schools.

The effective dispensation of physical sciences in schools is echoed because the slow rate of development or technological progress in the least developed countries is said to be the product of poor science and technology base in such countries, which results to the absence of a meaningful link between science and technology and production. (Herrera, 1973, Crane, 1977). The

paper posits that without emphasis on the physical sciences the talk about Nigeria achieving Vision 20-2020, will be a myth.

The Status of Physical Sciences in Nigeria

From a survey carried out by the National Institutes for Chemical Technology (NARICT) as cited by Okonkwo, Agbaji, Ihuoma, Adesida, Bello, Yahaya, Kashim, Atere, Roberts, Otegbeye and Dakere (2002) with special emphasis to Chemistry reveals that;

- Only about 2.236% of student offered Chemistry;
- Some schools offer Chemistry without chemistry teachers;
- Most laboratories in schools are in state of disrepair.
- The frequency of practical is found to be very low.
- In some schools, practicals are held once only a few weeks to SSCE.
- Incentives for motivation of teachers are absent.
- There is low performance by students.

This status of Chemistry education in the country is not different from that of Physics. The number of students offering Physics in schools is even lower. Akpan (1999) and WAEC Report (2000) cited by Owolabi (2002) indicated students abysmal failure in Physics. This suggests problems associated with methodology, availability and quality of teachers, laboratories and laboratory technologist, obsolete equipment and materials etc.

Conclusion

In this paper, efforts has been made to portray the physical sciences as crucial aspect of science for achieving functionality and self-reliance. A call is made for governments and policy makers to place more

emphasis on the teaching of Chemistry and Physics or Integrated Science at the senior secondary schools in all the secondary schools in Nigeria.

Recommendation

In line with the discussion above, the following recommendations are hereby made as strategies for emphasizing the teaching of Chemistry, Physics or Integrated Science at the Senior Secondary Schools so that youths should be prepared early enough to seek for skills that could uplift our technological base, make individuals and the nation in general functional and self-reliant:

1. Government in Nigeria should re-define science education policy to make the teaching of Chemistry and Physics or Integrated Science in the senior secondary compulsorily in all schools.
2. Government should intensify efforts to provide schools with meaningful laboratories and materials needed for the study of science.
3. Steps should be taken to train and retrain more Chemistry and Physics teachers. An allowance should be generously paid to such teachers on regular basis as incentive.
4. Individuals and organization should complement the efforts of the government in procuring and supplying laboratory equipment to schools.
5. Student should form science clubs, organizes quiz competitions to share ideas, encourage one another and pursue relevant studies in the area of science.

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Emphasising Teaching Of Physical Sciences In Secondary Schools In Nigeria For Functionality And Self-Reliance

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- Iorparegh Aer***
School of Sciences,
Federal College of Education, Obudu
Cross River State
- Sylvanus Ikwen Ador***
Integrated Science Department
Federal College of Education, Obudu
Cross River State
- Patrick Oraduen Anikpa***
Physics Department,
Federal College of Education, Obudu
Cross River State