FUNCTIONAL CHEMISTRY EDUCATION: A TOOL FOR NATIONAL BUILDING

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Abstract

With an appreciation that everything except a total vacuum, is made up of chemicals, the benefit of chemistry education in National Building is highlighted in this paper. The role of chemistry in national building, the treatment of diseases, production of fertilizer, community development etc are some of the benefits of chemistry education. Functional chemistry education and ways of teaching chemistry for National Building are also reviewed. A knowledgeable chemistry teacher and availability of laboratory equipments are essential for functional chemistry education. In a bid to realize this assertion, some vital proposals are recommended in this paper to foster functional chemistry for national building.

Introduction

Chemistry as defined by Bajah (1987), is the study of the properties, compositions and reaction of the materials around us. These materials are samples of matter, which include the natural resources of a nation such as gold, uranium, tin, petroleum and other minerals. There is a two fold reason in the study of chemistry. The first is to attract many young people to a career in which chemistry plays an important role. The second is the role which chemistry plays in the totality of experience essential to educating citizens (Aliyu, 1982).

The *National Policy on Education* (NPE) (2004), highlights the following among others, as the goals of chemistry education.

(l) To cultivate inquiring, knowing and rational mind for conduct of good life;
(ii) Produce professionals (chemists) for national development;
(iii) Service studies in technology and cause of technological development;
(iv) Provide knowledge and understanding of the complexity of the physical world, the forms and the conduct of life. Achieving the above goals is a precursor to National building.

The Role of Chemistry in National Building

All aspects of man's existence involve a wide range of chemistry.

Chemistry in Food

In food preparation, chemical bonds are broken and formed as substances are mixed and heated. The expansion of gases when heated brings about the changes during baking of bread and cakes. The changes in state to solid as they cool down, and the melting and boiling of substances when heated, also play an integral part in the preparation and cooking of the food need to meet the day-to-day energy requirement of our bodies.

Chemistry in Industries

Chemistry can be actively seen in oil refineries and in chemical industries where cosmetics soap, perfumes, plastics, nylon, glass, drug, pesticides and dyes are made. Nigeria is a country, which is over dependent on oil. Statistics shows that about 94% of our foreign exchange is now derives from oil which is being tapped at almost two million barrels a day. The exploration and processing of the oil and other related products depend a lot on the science of chemistry. Thus, chemistry produce not only materials needed in the developed and undeveloped world but also produce most of the wealth that maintains our economics.

Chemistry in Community Development

The impact of chemistry is also being felt in several communities. For instance, the production of salt at Okposi and Uburu in Lido State is an example of an industry producing salt based on chemical principles. The Jcbba paper mill in Kwara State, which manufactures paper from wood, are based on certain principles of chemistry (Aliyu, 1982). Chemistry is therefore developing rural communities, empowering the people and building the nation through self reliance and community development.

Chemistry in Agriculture

Chemical products such as fertilizers are needed to expand our agriculture. Fertilizers are chemical substances containing mineral salts and other plants food. They contain the essential elements in the required proportions. The knowledge of fertilizer has tremendously helped in maintaining the fertility of our soils and thus improve the yield of our crops, this has also reduced the rate of food importation thus conserving the Nations hard-earn foreign exchange.

Chemistry in Medicine

As the saying goes "a healthy man is the wealth of his nation", chemical elements are found in the cells and bodies of man which, if absent can cause general breakdown of man's systems. For example, iron, a transition element occurs as part of heam group in the oxygen carrying molecules haemoglobin of the red blood cell. Some other important elements with their functions an deficiencies are listed in the table below

Element	Functions	Deficiency
Cobalt Zinc	Development of the red blood cell i. Breakdown of alcohol in the liver 11.Transportation of carbon(iv)oxide in the blood	Pernicious anemia Poor alcohol metabolism
Manganese ('opper Iodine	Bone development melanin production Thyroxin production	Poor bone development Albinism Swelling in the neck - goiter

Culled from Fullick (1994:135)

Modern medicine depends on this chemical knowledge to produce drugs which are made to the same formula. A known dose of a drug can be delivered appropriately to the size of the patient and the severity of the deficiency or disease.

Considering the above facts, the importance of chemistry education in national building cannot be overemphasized. However, a solid functional chemistry education has to be put in place to achieve the goal of producing chemists for national development as stated in NPE (2004).

Functional Chemistry Education

Education, according to the *Longman Dictionary of Contemporary English* (1995), is the process by which one's mind develops through learning in a school, college or university. Fafunwa (1974) defined education as the aggregate of all the processes by which a child or young adult develops the abilities, attitudes and other forms of behaviour which are of positive value to the society in which he lives.

Chemistry education is a discipline concerned with the study of the materials around us and the transformation of such materials. It inculcates in the student a scientific approach to problem solving in everyday experiences and develop in the student those manipulative and experimental skills necessary to make him competent and confident in the investigations of the materials around him. For chemistry education to maintain its quality, achieve its aims and objectives and the expectation of various government, functionality of the concepts in chemistry should be emphasized.

A functional chemistry education is one that strikes a balance between theory, practical and application or usefulness of a chemical concept (Akubudike, 2003). Functional chemistry education emphasizes on applicability or transferability of the knowledge to the immediate environment. Tahasyan (1986), opines that application of science principles and concepts to farming, fishing and

daily life problems will enable students see the relationship between science and human needs. This will facilitate their understanding of these concepts and principles thereby enabling them utilize the knowledge to the outside world.

Teaching Chemistry for National Building.

In a developing nation like Nigeria, the teaching of Chemistry and Science in general at the secondary school level has tended to be too rigid.

Chemistry instruction has tended to concentrate on presenting the "Pure" substance of the field. Chemistry is crucial for the economic development of a nation and for the future of its' scientific enterprises (Ozobokems, 2002). Therefore, functional education chemistry should be directed along two lines. One concerned with basic chemical theory and the other with the importance and relevance of chemistry in everyday life. To achieve this, the following proposals are recommended.

Recommendation

1. The quality of any form of education should rest more on the quality of its teachers (Akubudike, 2003). What students learn is greatly influenced by how they are taught. The decisions about content and activities that teachers make, their interactions with students and the attitudes conveyed wittingly and unwittingly all affect the knowledge, understanding, ability and attitudes that students develop. Chemistry teachers must have theoretical and practical knowledge and abilities about chemistry, learning and chemistry teaching.
2. Effective chemistry teaching should depend on availability of chemical materials/reagents, equipment, media and technology.An effective chemistry teaching-learning environment requires a broad range of basic scientific materials, as well as specific tools for particular topics and learning experiences. Teachers must be given the resources and authority to select the most appropriate materials and to make decisions about when, where and how to make them accessible. —
3. The classroom is a limited environment for learning. Chemistry teaching and learning should extend beyond the walls of the school to the resources of the community. The physical environment in and around the school can be used as a living laboratory for the study of natural phenomena.
4. Chemistry teachers should be encouraged to attend seminar, workshop and conferences so as to acquaint them with modern techniques/innovations in the teaching of chemistry.
5. The learning attitude of the chemistry students can be stirred up by granting incentive to student learning chemistry.

Conclusion

Chemistry as a science subject is still being perceived as difficult by students due to the methods employ in teaching. There is therefore, the need for chemistry teachers to shift from chemistry teaching that is examination oriented to chemistry teaching that is vocation oriented, helping students to appreciate various scientific concepts and their relevance to national development.

References

Akubudike, J. A. (2003). Providing Functional Science Education in Secondary Schools and Teachers Education Programmes for a Sustainable UBE. Science and Technology Education. Federal College of Education (Technical) Umunze.

Aliyu, A. (1982). *Science Teaching in Nigeria.* Atolo Press Limited, llorin.

Bajah (1987). Chemistry for Senior Secondary Schools (STAN). Ileinemann Educational Books (Nig) Limited. Ibadan: Nigeria.

Fafunwa, A. B. (1974). *History of Education in Nigeria.* London: George Allen and Urwin.

Fullick, Ann Patrick (1194). *Chemistry.* Heinemann Educational Publishers Oxford. 135.

Longman Dictionary of Contemporary English (1995). (Third Edition). Clays Ltd: Great Britain.

National Policy on Education (2004). Lagos: NERDC Press.

Ozobokeme, J. K. (2002). Mathematics Education for Sustainable Development. A Paper Presented at the School of Science College of Education, Warri.

Tahasyan, V. M. (1986). Method of Promoting Student's Motivation to Study Physics. In K. Shumode and Ryut. Trends in Physics Education proceeding. The Physics Education on Society.