**Review**

**Professional development of chemistry teachers for the industrial development for the industrial development of Nigeria.**

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Any nation that seeks to achieve industrialization must be able to provide a pool of scientific and technically-oriented manpower equipped with basic skills to appreciate, understand and manipulate the complexities of modern industrial process. A nation where this type of manpower is lacking also lacks industrial products. Based on that fact, this paper looks at the training of chemistry teachers as the bedrock of industrial development, and recommends the ideal chemical education training for industrial development.

**Keyword:** Chemistry teachers, Industrial development

**INTRODUCTION**

The idea that teachers are the most influential factor in any educational agenda is not controversial. When we talk of reforms, we are in essence calling for radical changes in the teacher’s knowledge and beliefs about the subject matter, teaching, children and learning. Ogunleye (2002) believes that implementation of any reform in education is seen as a matter of teacher and learner. He further suggests that understanding the complex process of teaching depends on the understanding of the knowledge of the teacher. This is to say that development of teachers is the most important factor in industrial development.

The extent to which industrial development can be achieved depends on the qualification and training of the science teachers. Nsofor (2002) asserts that the success of science, technology and mathematics education and achievement of development in Africa depends critically on the availability of technically and scientifically trained manpower. Akale (1990) contributed that the development of science and technology culture in any nation begins in the classroom and the teacher is the key factor. This therefore means that the implementation of the Science, technology and the mathematics based teachers. The Science of chemistry is presumed to be the fulcrum upon which all other Science and technology are attached. The chemical science permeates all the branches of science, and almost everywhere, chemical principles are used to offer explanation to the why, what and how of problems of mankind and his environment. Due to the importance of chemical education to the industrial and economic development of any nation, the science of chemistry has to be accorded. Its priority position among the other sciences. In this paper, the author seeks to address the teacher factor in the chemical science as the bedrock of industrial development.

**Training of chemistry teachers**

Training according to Nwoye (2002), is an act of teaching an individual how to perform a certain function or job, behave in an acceptable manner through regular instruction and practice. For Nigeria to develop industrially in Nigeria, we must accord the training of chemistry teachers must be given priority attention of nation. All the nations of the world clamoring for industrialization, scientific and technological development are re-organizing their chemistry curricular to relate to real life. Chemistry is concerned with the study of change and it is fair that practicing chemist (in the industry, classroom, laboratories and etc) have a professionally derived commitment to change. Ikoku (1973) called on trainers of chemists (chemistry department in the colleges of educations and universities to broaden their curricular to include efforts to make chemistry students aware of the chemist’s role in the society and to sensitize
them to society needs. This is in consonance with the fact that the chemistry laws which make up Gas laws, what the laws entails, their mathematical and graphical representation and combination of the two laws to give the general gas laws.

The use of concept maps will help to make learning meaningful. Learning can only be meaningful when the learner can recall what is taught and can apply them at any time. Concept mapping is time consuming, highly imaginative and requires brainstorming. However, if this strategy is continuously used by the chemistry teacher, it will soon become part of the teacher and students, making the teaching more purposeful, exciting and participatory. This it is hoped will help produce the much desired result in chemistry.

The author therefore recommended that chemistry teachers be exposed to in service training on concept mapping, to enable them acquire the skills needed in constructing concepts maps and also be abreast of the importance of concept maps. In addition, public examination syllabus needs to be reviewed to accommodate this innovation in the teaching of science.

Implication of industrial development of Nigeria

Chemical education as envisaged at the secondary schools, colleges of education and universities is supposed to equip the products with the basic technical knowledge and skills required for the industrial production and provide the nation with cream of scientific and technically oriented manpower equipped with basic skills to appreciate, understand and manipulate the complexities of modern industrial processes. A nation where this type of manpower is lacking also lacks industrial culture and therefore, must depend much on applied science and technology which in turn depends on the nation’s capacity to undertake Research and Development (R&D). A nation that seeks to achieve self-reliant industrialization must be able to develop its industrial, scientific and technologically based manpower without which its dream of industrial development remains an illusion.

There are certain industries which are considered the engine of growth for national economies and such industries require a population with a good base of scientific knowledge, particularly, chemistry. These industries include; metallurgical, pharmaceuticals, petrochemicals and polymers, fertilizers, paints, heavy chemicals, fine chemicals and etc. These industries cannot function if the nation does not have a reservoir of chemistry teachers at all levels of education to train the professional as well as the semi-skilled manpower.

Ideal chemistry education for industrial development

For appropriate industrial development, the author agrees with Ezekannagha and Ifeakor (2002), that the following are the idea chemical education environment required for any nation to develop industrially: Financing of chemical education and research should not be left to the government alone. Funds should be sought from corporate bodies and all multinationals cooperation and firms employing up to 50 chemists should be required by law to contribute 5% of their pre-tax profit to endowment funds for chemical education.

The chemistry curricular content and teaching methods should be oriented towards the application of chemical of chemical principles, rather than the acquisition of paper certificates. The skill and training given in chemistry education should link with what the society will need for industrial development. There should be public enlighten campaign on the crucial role of chemistry in the national economy for industrial development.

CONCLUSION AND RECOMMENDATIONS

The industrial development of a country hinges on the availability of chemical industries. Chemical industries also known as the industrial growth must therefore be readily available with appropriate manpower. If we in Nigeria must develop industrially, the training of chemistry teachers at all levels of education must be revised and accorded priority attention. The following suggestion is proffered for the professional training of chemistry teachers; Chemistry teachers (holders of B.sc, B.sc Ed, M.Sc Ed, or NCE) should take a course in industrial chemistry and have some experience of industry. This is to say that for the B.Sc. Ed chemistry students (pre-service teachers), they should go for their industrial attachment in the 100 and 200 levels while their teaching practice should be for 300 and 400 levels.

Some schools are cited in areas where industries are far away from them implying that transportation to any industry is a major problem, government should assist the schools in transportation and other logistics. The curriculum of the senior Secondary School also is fashioned in such a way to reflect the local activity. For example, iron smelting should be fashioned to reflect the blacksmith, local dyeing and training, salt distillation, etc.

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