

COLLABORATION BETWEEN CHEMISTRY EDUCATION STAKE HOLDERS AND CHEMICAL INDUSTRIES AS INSTRUMENT FOR ACHIEVING PRESIDENT YAR-ADUA'S SEVEN POINT AGENDA

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Abstract

The evidence of the contribution of chemistry in industrial production of goods abounds. This shows how relevant chemistry education is in the provision of our needs and generation of revenue; hence the nation's standard of living and her economy depend on the quality of chemistry education. The quality of chemistry education in Nigeria has been assessed based on students' achievement in examinations which is said to be low. One major factor responsible for the low achievement is lack and shortage of laboratory facilities. This paper therefore, highlights on improving students achievement in chemistry through the use of laboratory method by teachers and donated facilities by the chemical industries. This paper also seeks to call for the support of the chemical industries to complement the Federal Government's efforts towards achieving the needed laboratory skills among chemistry students.

Introduction

Chemical industry is a work place that is involved with manufacturing a broad variety of products such as drugs, paints, soaps, detergents and paper. Others include plastics, petroleum, fertilizers, pesticides, etc. Chemical industry offers employment opportunities as well as generates income.

The benefits of processed materials from chemical industries include shelter, comfort, medicament, aesthetic value, improvement in crop yield, pests control etc. The direct application of the chemical industry's products in education include the use of chalks, biros, pencils, corrective fluids, erasers, inks, gums, cello tapes, inks and laboratory equipment/reagents used in conducting experiments in schools and outside the school environment for example in research institutions. Laboratory equipment/reagents serve as instructional materials. These equipment/reagents are employed by teachers during the laboratory lesson to make the teaching of chemistry (and any other science subject) more effective. The impediment encountered in this direction is lack of adequate laboratory materials in our schools. This paper takes a stand, that employment of laboratory teaching method in collaboration with the chemical industry's infrastructural facilities and donations will make teaching and learning of chemistry concepts effective. This can be a viable instrument for achieving the needed skills among our students towards the realization of two of the goals (reforms) of President Yar Adua's seven point Agenda. The two reforms include:

- (i) Wealth creation through diversified production especially in agricultural and solid mineral sector.
- (ii) A strategic educational plan that will ensure excellence in both the tutoring and learning of skills in science and technology by students who will be seen as the future innovators and industrialists of Nigeria (Presidency press release, 2007.)

The Level of Achievement of Students in Chemistry

The state of science education, physics and chemistry in particular, has not been encouraging. Many sources have reported of poor performance of students in SSCE chemistry, for instance, Taiwo (1980) in Akpur (2002) declared that between 1900 and 1963, students in most existing schools in Nigeria then performed very poorly in chemistry subject. This condition has not improved till date and that is why Nigeria is yet to develop industrially. This trend must be averted and this is the basis of President Yar-Adua's reform which is aimed at achieving excellence in science and technology education.

Factors Responsible for Low Level of Science Education with a Focus on Chemistry

Science has been defined by many authorities at different times. Aminu (1989: 59) defined science as “Knowledge within the limits of human perception. It is a product of human thought which is nurtured by experimentation and application”. In other words, science is developed through human activities for the benefit and comfort of man. Science is an idea which is abstract and its abstractness is removed through the process of conducting tests and arriving at inferences. For science to thrive well, facilities and infrastructure must be available.

Chemistry is one of the branches of science that is concerned with the chemical behaviour of substances. Through experimentation, the chemical behaviour of substances is studied using laid down techniques. The results of these experimentations are not far-fetched as these are evident in the production of many valuables in the chemical industry. Nigeria is endowed with abundant raw materials for industrial manufacturing, but because of paucity of facilities, infrastructure and well trained personnel in science and technology education, most of the raw materials, example, solid minerals are not discovered or put into finished manufactured products. Also, our abundant agricultural produce is left unprocessed and they perish during harvest seasons as a result of lack of storage facilities. Factors responsible for the under-development of science and technology education are numerous. Mbuk (2006) identified poor/inadequate science infrastructure as the major factor. Most secondary schools in rural areas are approved centres for writing the WAEC/SSCE examinations. Such schools even though have been presenting chemistry students for SSCE over the years, still do not have standard chemistry laboratories. These laboratories cannot even distil water due to lack of distilling apparatus. On the other hand, graduates from such schools pass out without developing the basic laboratory skills. This trend is not different from what is obtainable in township public secondary schools across the country even in our tertiary institutions.

The dearth of chemistry laboratory support staff is another common feature in our school system especially the secondary schools. This attenuates the efforts of the chemistry teachers. Mbuk, (2009) found that some secondary schools in two Local Government Areas of Benue State and two Local Government Areas of Cross River State had no single chemistry laboratory staff. The available chemistry teaching staff single headedly struggle to cover the overloaded WAEC syllabus. Thus all the practical aspects of the subject are pushed to the first term of senior secondary school year three (3). The presence of laboratory staff is highly necessary in order to enhance the effectiveness of laboratory work and the academic achievement of students in general.

Chemical Industry as a Complementary Instrument

Developed countries such as United States are industrialized and wealthy because of their advancement in science and technology. Nigeria is one among the developing nations of the world. If we are to join the rest of the developed nations, the status of science and technology education must be upgraded. The starting point should be at the secondary level to the tertiary and to the university. One of the strategies in this direction is to checkmate the gross shortage or lack of chemistry laboratory infrastructure and apparatus in our educational set up. This can be done through the collaboration between the chemical industries and the stakeholders in science education.

Conclusion

Building and equipping of chemistry laboratory is capital intensive. Servicing of equipment and replacing consumable items from time to time is another additional cost. It is from this backdrop that President Yar-Adua’s reforms are geared towards providing huge amount of money for the provision of science/technology facilities and infrastructure. Partnership between the chemical industry, chemistry education stake holders and the Federal Government is mandatory. Joint contribution is needed for adequate provision of fully equipped chemistry laboratories. It has been difficult for private/public schools’ proprietors and sometimes Parents Teacher Association to provide standard chemistry laboratories in schools. Considering fully well the significance of laboratory facilities as instructional materials, there is a clarion call on the chemical industry management for assistance. The complementary sponsorship, acceptance of students for industrial training and

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employment of students during long vacation by the chemical industries are steps which if taken will make a great difference positively.

Recommendations

Over the years, chemistry teachers have adopted so many teaching strategies including the laboratory approach so as to make chemistry education more effective. The advantage of the laboratory approach over other approaches includes concretizing the knowledge of theoretical concepts, motivation of students' interest, developing of students' manipulative skills as well as scientific attitude. According to Ogunniyi (1986) in Eriba (2007: 50) "Laboratory method is an instructional method that is prominent among priority methods of current emphasis. It helps in developing first hand familiarity with learning materials, equipment and processes of science" Availability of laboratory materials and equipment is a pre requisite for developing practical skills in our young scientists that cannot be compromised if Nigeria must become industrialized.

The writer proffers the following recommendations that will go a long way to surmount the impediments encountered by teachers in the field as they use the laboratory techniques of teaching:

1. The chemical industry should rise up to the challenge of improving quality in chemistry education by donating needed materials and equipment. These can be a medium of promoting public relations between the industry, education stakeholders and the communities where such industries are located.
2. The needs in the chemistry laboratory should be identified by the teachers and should be jointly sponsored by the government, proprietors and the chemical industry nearest to the school.
3. Ekpo (1987) opined that the Ministry of Education should solicit the cooperation of chemical industry in employing chemistry students on long vacations. This might not necessarily attract any pay since the essence is for students to have direct experience with the instruments and processes of manufacturing.
4. In the universities, Industrial Training (I.T) programme is mounted for undergraduate students of B.Sc Chemistry Hons. Students of Computer Department in the Colleges of Education also proceed on I.T after their first level in school. After their second level, they proceed for teaching practice. The writer recommends that students of Chemistry Department in the Colleges of Education also be given the same opportunity to go for I.T.

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