

CHEMISTRY EDUCATION AS A TOOL FOR SELF RELIANCE AND ECONOMIC DEVELOPMENT IN NIGERIA

BY

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Abstract

This paper highlights the contribution of Chemistry Education to the economic development of Nigeria. The topic is chosen due to the current economic status the country faces which affects both graduates and non-graduates as it is obvious that government could no longer employ our teeming youth. So we must think of other means for self-employment and self-fulfillment of our goals. Through an empirical survey of literature in the field, the research established that Chemistry Education could be used to serve as a means through which the Nigerian economy would be improved through the production of Chemistry based products such as shampoo, black polish, air-freshener, soap, and detergents, among others.

Keywords: Chemistry, Education, Self Reliance, Economic Development. Shampoo, Black polish, Air-freshener, Soap, and Detergent.

Introduction

Chemistry education could be used as a panacea for the self-reliance and economic development of any nation. Panacea is something that provides an answer to a question or cures all diseases or troubles. The anticipation of government-providing white-collar jobs for the youths at graduation has become a figment of the youths' imagination. This condition has become frightening in the serious menace of unemployment thereby making it imperative and serious that a modification is required for school personnel graduates to plan for a life-long survival (Dike & Worlu1, 2020). This rethinking is embedded in the National Policy on Education (FGN, 2014), wherein policy framework no (iv), states that an individual is to acquire appropriate skills, abilities, and competencies, both mental and physical as equipment for the individual to live and contribute to the development of society. Given this, the youth should be concerned about what is ahead of them. At this venture, the need to seek a timely avenue for self-employment and self-fulfillment becomes necessary. Looking at this, it could be said that, education for self-reliance becomes the only hope in the sense that educational (teaching) industries could as it has been

doing before now serve as an effective instrument for combating economic challenges in Nigeria.

Chemistry Entrepreneurship Skills and Self-reliance

The acquisition of Chemistry entrepreneurship skills is regarded as a solution to the disturbing unemployment growth. The skills when acquired can lead to the realization of self-reliance. Chemistry has cut across almost all fields in human endeavors and could as such, be utilized to meet the needs and aspirations of the teeming unemployed youths in the area of job creation since there are numerous opportunities which include the following among others;

- Enhancement of increasing food production through sourcing composts manure, and production of fertilizer from local raw materials.
- Insecticides and pesticides production from local raw materials like neem tree seeds, sweet pepper, and other plant materials used in grain storage, etc.

Chemistry entrepreneurship skills education is a carefully planned process leading to the acquisition of entrepreneurial skills for effective living. Entrepreneurship

skills education is an instrument that empowers the youths to be in control of their future, have more opportunities to exercise creative freedom, have higher self-esteem, and have an overall greater sense of control over their own lives. This implies that entrepreneurship is a major source of job creation and innovation and it is largely for this reason that it has been equated with new venture creation and small business development (Babale A. et al 2020).

The Role of Chemistry Education in Entrepreneurship Programmeme in Nigeria

Chemistry education will play a crucial role in meeting Nigeria's aspiration of becoming a developed country if given proper consideration in the entrepreneurship programme in our institutions. Chemistry education is a very important area as its knowledge will play a major role in the development of entrepreneurship programmemes. It is thus, important that students or youths engaging in entrepreneurship programmemes should understand chemistry subject so that they can apply their knowledge to creativity and technological development. The present system of education is unable to create employment opportunities and there is a need to instill a specific entrepreneurial culture among the students for the production of graduates that possess relevant skills for self-employment and self-reliance. It is, therefore, advisable that chemistry education be included in the school curriculum of all disciplines to enable the student to acquire the relevant entrepreneurial skills to become wealthy through vocational occupations and as well become self-reliant and self-sustaining in the society. Chemistry is a discipline which comprises knowledge, skills and is practical oriented. The integration of these three elements is very important in ensuring a quality entrepreneurship programmeme. Chemistry education will ensure the acquisition of relevant knowledge and practical oriented skills which is an essential pre-requisite for human

development and economic development of Nigerian society as a whole through entrepreneurship programmeme. According to Nleonu and Ezeibe (2020), relevant entrepreneurial skills acquired by students will make them wealthy through vocational occupations and as well make them to become self-employed. It will develop in students, a positive attitude to citizenship and the desire to make them useful to the nation by contributing to the creation of a United Nigeria by being self-reliant and self-employed. Chemistry education is aimed at producing students with skills that will be useful to themselves after leaving school in order to contribute to the economic developments of the nation.

Chemistry education deals with the study of materials around us and the transformation of such materials (Akanbi, 2012). It inculcates in the student a scientific approach to problem-solving in everyday experiences and develops in the student those manipulative and experimental skills necessary to make him competent and confident in the investigations of the materials around him (Asiriwa, 2006). Chemistry has been identified as a major subject and its applications in the scientific and technological developments of any nation have been widely reported (Avi, & Eilks, I 2015). It was as a result of the recognition given to chemistry in the development of the individual and the nation that it was made a core subject among the natural sciences and other science-related courses in the Nigerian education system such as medicine, biochemistry, pharmacy, pharmacology, agricultural science, laboratory technology, geology, toxicology, to mention but a few (David, 2019). It is on this premise that the Federal Republic of Nigeria (FGN, 2014), in its policy strategy for education, directs teachers to make curriculum a worthwhile avenue for learner-centered, activity-based, and practical work-oriented. The focus relies on the acquisition of entrepreneurial skills instruction in every part of concepts that are industrially based for the benefit of combating economic

challenges in the Nation. Ababio (2007) provides these under-listed sectors of the economy as the various avenues for which chemistry skills can be exploited for self-reliance and national development. They include Agricultural products, Soap, Detergents, Metallurgy, Petroleum, Candles, Polish, Pomade, Ceramics, Plastics, Glass, Pharmaceuticals, Cement, Food and Drinks, Fertilizers, Educational (teaching) industries, etc. Achieving the goals of self-reliance and national development is a precursor to combating economic challenges in the nation. The *National Policy on Education* (FGN, 2014) highlights the following among others, as the goals of chemistry education:

- (i) To cultivate inquiring, knowing, and rational mind for the conduct of good life;
- (ii) To produce professionals (chemists) for national development;
- (iii) To provide service studies in technology and the cause of technological development;
- (iv) To provide knowledge and understanding of the complexity of the physical world, the forms, and the conduct of life.

Attaining the above goals is a precursor to economic challenges in any nation and therefore could be best in Nigeria if attained.

The Nigerian economy is best described as a mono-product economy. Onuoha (2015) stresses that the economy was formally built as an agricultural economy in early Nigerian society. Nigerians were known to be agriculturists from the onset until the discovery of crude oil in Oloibiri, the present-day Bayelsa State, Nigeria, in 1956. In the early 50s, before the discovery of crude oil, Nigeria was self-sufficient in food production. Itua (2011), and Abah (2018) point out that, Nigeria ranked top as a net exporter of cash crops such as groundnut and cotton in Northern Nigeria, rubber in Southern Nigeria, Palm oil and kernels in Eastern Nigeria, and cocoa and coffee are grown in Western Nigeria. The human and natural resources endowment is not sufficient for wealth creation and economic development of any nation, nonetheless, the knowledge of the utilization of human and natural resources can be transformed into

valuable goods and services intended for economic development and improved quality of life (Matthew, 2013). The question is whether this could be done through the knowledge of chemistry education. Kola (2013) points out that many chemistry graduates can involve in the production of Soap, detergent, polish, shampoo, chalk, and metallurgy among others, thereby leading to boosting their economic status which in turn reduces the economic challenges in Nigeria.

Chemical Products for Self Reliance

The processes of some of the chemical products that could be useful to chemistry graduates to earn a living are as follows:

1. Soap

Soap is the product of the reaction between oil or fatty acid and alkali. The fatty acids include palmitic acid ($C_{15}H_{31}COOH$), Stearic acid ($C_{17}H_{35}COOH$), and Oleic acid ($C_{17}H_{33}COOH$). The common alkalis are sodium hydroxide (NaOH) and potassium hydroxide (KOH). Soap can be prepared using either the hot or cold method. In both methods, the soap separates from the glycerol while in the cold method, it combines with it to give a better quality soap (Zauro, & Abdullah, 2018).

2. Black Polish

Polishing is the process of creating a smooth and shiny surface by rubbing it or using a chemical action, leaving a surface with a significant specular reflection (Salador 2016). The reagent used in its production is Carbon black, Castor wax 2.5g, and solvents (Benzene, Ethanol 3g each by volume). The measured weight of carbon black is properly ground using mortar sieved. It is then dissolved in the required volume of solvent while applying a minimal amount of heat ($40-45^{\circ}C$) using the hot plate. The solution (solventdye) is continually stirred as the castor wax is added. (Lyu, 2020)

3. Shampoo

A shampoo is the most common form of hair treatment (Mainkar & Jolly, 2019). The shampoo is a preparation of a surfactant (i.e. surface active material) in a suitable form

liquid, solid, or powder which when used under the specified conditions will remove surface grease, dirt, and skin debris from the hair shaft and scalp without adversely affecting the user (Balsam, 2008). The main ingredients for the preparation of shampoo are distilled water, essential oil, alcohol, fragrance, and colorant. powder shampoo (Hanna powder 5%, soap powder 50%, sodium carbonate 22.5%, potassium carbonate 7.5%, Borax 15% perfume), Lotion Shampoo (TLS 35%, Glyceryl Monostearate 2%, Magnesium Stearate 1%, water up to 100%, color, and perfume q s) Liquid Shampoo (SLS 40% NaCl 2-4%, Water up to 100% Color and perfume q s) (Rajkumar 2018).

4. Air-Freshener

An air freshener is a product designed to mask and remove unpleasant room odors. These products typically deliver fragrance and other odors (Umbarch, 2019). The main ingredients for its preparation are sodium hydroxide, emulsifier (sodium laurel sulfate 0.5%) Extender (Glycerine 10%) boric acid 1%, and Water (deionized) (Steinemann, 2017).

5. Agricultural Products

Chemical products such as herbicides, insecticides, and 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 using herbicide, insecticide, and fertilizer has tremendously helped in maintaining the fertility of our soils and thus improves the yield of our crops; this has also reduced the rate of food importation thus combating our economy and the nation (Ibrahim, Tairo, Aminu, Isah, Muhammad, 2017).

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Involving in all these activities can therefore lead to actualizing and boosting the financial standards of youth in our country which in turn serves as an effective instrument for improving Nigeria's current economic challenges.

Conclusion

The contribution of Chemistry Education to improving economic development of any nation cannot be overemphasized. For Nigeria to progress economically, must willfully agree to advance in science education. The oil sector has done a lot for the Nigerian economy but there is a need to diversify into other areas, particularly those related to Chemistry such as the production of shampoo, black polish, air freshener, soap, and detergent among others.

Recommendations

- Teachers should be motivated and encouraged by prompt payment of salaries and on-the-job training to equip them with current principles and skills in Chemistry.
- Students should be made to study sciences by giving them scholarships and creating awareness of the importance of chemistry in combating economic problems in the nation
- Research institutes need special funding to establish a sound scientific base for technological know-how that gives meaningful economic development to the nation.
- Practical Entrepreneurial courses should be introduced at secondary and tertiary levels of education to encourage graduates to be self-reliant and productive. This will promote economic growth and enhance economic development in the nation.

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