
EQUIPPING YOUTH WITH CHEMISTRY ENTERPRENEURIAL SKILLS FOR NATIONAL DEVELOPMENT

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ABSTRACT

This paper examines the role of chemistry education in equipping chemistry students with basic entrepreneurial skills needed for self - reliance and national development. It discusses the objectives of entrepreneurial education, and ways of acquiring the entrepreneurial skills which involve active learning of the process skills. It also discusses the role of chemistry teachers towards imparting entrepreneurial skills to the learners and how to achieve national development through chemistry entrepreneurial education. At the end it was recommended that our youths should be encouraged to acquire entrepreneurial skills and practice it.

INTRODUCTION

For any nation to grow and be able to address many challenges facing its economic development, its youth must be job providers rather than job seekers. The National Policy on Education (FGN, 2004) emphasizes that every individual should be self - reliant amongst other objectives. It is hoped that a graduate who has passed through all the levels of education should have acquired skills and competencies necessary for self - reliant. Unfortunately, the present Nigerian education equips students only with explicit knowledge which exposed students to rote learning without necessarily leading to the acquisition of skills needed for production processes. Mass unemployment, widespread of ignorance and poverty as well as create individual backwardness are the result of the graduates produced. This has made the nation to be consumer

nation instead of a producer nation; since learning is not channel towards what the society needs (Dulumlyes, 2014).

Developing entrepreneurial skills through chemistry education is highly essential most especially in this present time of youth unemployment. This requires teacher's proper preparation, dedication, knowledge of subject matter and ability to carefully organize and properly conduct practical activities as demanded by the curriculum. It is in line with this, that this paper tends to address this problem by suggesting ways of acquiring chemistry entrepreneurial skills, with the hope of minimizing problem of unemployment of chemistry graduates.

ENTREPRENEURIAL SKILLS

Entrepreneurial skills are those skills required to start or run a business especially when the business requires taking financial risks (Hornby, 2005). Entrepreneurship helps to create wealth, self-direction, satisfying career and also add value to society's well-being. Therefore, there is need for our youths to acquire basic entrepreneurial skills.

Chemistry is a branch of science that deals with nature of matter and transformations. Chemistry as a subject is the wealth of any nation because it deals with almost all areas of human endeavor (Bugaje, 2011). It is also concerned with the utilization of natural substances and the creation of artificial ones. It is an artistic enterprise which offers a lot of occupational opportunities in areas like manufacturing of goods and sales of goods (Nbina, Viko & Brabil 2011 and Kassim, 2013).

Nbina, *et al* (2011) went further to say that functional chemistry education emphasizes applicability of the acquired knowledge to the immediate environment. This is the purpose of chemistry education as stated in (FGN, 2004) which includes the "Acquisition of appropriate skills and development of mental, physical and social abilities and competencies to contribute to the development of his society".

OBJECTIVES OF ENTREPRENEURSHIP EDUCATION

According to Paul (2005), entrepreneurship education is designed to achieve the following objectives:

- i) To create self – employment opportunities to teaming graduates.
- ii) To reduces the high rate of poverty by identifying business enterprises for young graduates.
- iii) To create smooth transition from school to modern industrial economy.

- iv) To serve as a catalyst for economic growth that will raise Gross Domestic Productivity (GDP).
- v) To provide the young graduate with training and support to provide small and medium size enterprises.
- vi) To equip graduates with skills to incubate business ideas.
- vii) To provide knowledge that enable graduates take up business in any environment thereby reducing rural urban drift.
- viii) To offer young graduates turn theoretical concepts into functionality for self - employment and self- reliance.
- ix) To make youth to be creative, innovative, industrious and positive – minded in ability to identify noble business opportunities.
- x) To offer tertiary institution graduates with adequate training skills and abilities in risk management.

HOW TO ACHIEVE CHEMISTRY ENTREPRENEURIAL SKILLS

Chemistry like other entrepreneurship education aims to equip an individual to be self - reliant. It involves the process of converting innovations in chemistry into marketable products for commercial gain. This include manufacturing of goods such as pharmaceuticals, food stuff, packaging, detergents, soap, flavors, fragrances, pulp and paper, paints, candles, textiles, agricultural products, oxygen, chlorine ammonia, sulphuric acid, sales of goods, analytical and consultancy services, researching, laboratory services and consumer education (Nbina, *et al* 2011). Developing entrepreneurial skills through chemistry will best be achieved through an active learning of the process skills. What learners learn is greatly influenced by how they are taught. For the

learners to develop the entrepreneurial skills, the teacher must have a theoretical and practical knowledge and abilities about chemistry teaching and learning. Examples of chemistry entrepreneurial skills include the skills of making, processing, production, conversion, transfiguration, and rebirth. These skills are acquired through a science process skills which are; observation, classification, measurement, recording, communication, prediction, hypothesis, inference, experimentation, generalization etc. The development of these process skills should lead to the acquisition of the skills that successful entrepreneurs use to start their ventures, which includes; creative thinking, planning, and research, decision making, organization, communication, goal setting, recording to mention but a few (Dulumlyes, 2014).

These skills can be acquired through active learning. Active learning as a teaching - learning strategy emphasize that the planning, teaching and assessment are focused on the needs and abilities of the learner. The learners are actively engaged in doing most of the work by using their hands and brains in the teaching and learning process. In active learning, learners do manipulate, observe, report, measure, record, communicate and handle, they are involved in process and entrepreneurial skills.

There are many active learning strategies that can be used in chemistry classroom. They include discussion, games, excursion, role playing, demonstration, discovery, brainstorming, problem - solving methods, and process - based approach (Nbina, *et al*, 2011). Attitudes such as creativity, open-mindedness, intellectual honesty help students in developing their entrepreneurial skills.

THE ROLE OF CHEMISTRY TEACHER

Development of knowledge and skills among chemistry students depends on teacher's own

knowledge and skills and their ability to guide learners to acquire the knowledge and develop the necessary skills. This will depend on appropriate teaching strategy and the availability of resources. Chemistry teachers should be professionals who have the knowledge of chemistry and the pedagogical content and skills to guide learners. Kassim (2013) observed that both knowledge and skills are needed in planning of instructions.

According to Glasersfeld (2001) the purpose of education is to foster independent thinking. This independent thinking can be developed by constructivist teaching which according to Gray (2007) is based on the belief that learning occurs as learners are actively involved in a process of meaning and knowledge construction rather than passively receiving information. Learners are the makers of meaning and knowledge. Constructivist teaching fosters critical thinking and creates motivated and independent learners. A productive, constructivist classroom consist of learner centered active instruction. In such classroom, the teacher provides students with experiences that allow them to hypothesize, predict, manipulate objects, pose questions, research, investigate, imagine, and invent. The teacher's role is to facilitate this process.

Learning is not simply a process of adding knowledge to the learner, rather learning is an active process in which the learner gets information and constructs personal interpretations and meanings (Park, 2007). The classroom is a place where students are actively involved in building scientific meaningful learning. What is learned depends on prior knowledge, cognitive strategies, and the interest and purposes each student brings to the learning environment. Text books are replaced by hands - on materials and students are encouraged to think and explain their

reasoning instead of memorizing and reciting facts (Park, 2007).

Creating such a classroom environment requires commitment and a good knowledge of teacher's subject areas with the necessary pedagogical content. The teacher then serves as a mentor and a guide who facilitates students' deep understanding and acquisition of higher order thinking and creative problem solving skills. The question is do Nigerian teachers possess the knowledge and skills to create such a classroom environment?.

NATIONAL DEVELOPMENT THROUGH CHEMISTRY ENTREPRENEURIAL EDUCATION

Chemistry entrepreneurial education has the potential of changing the fortune of a nation and transforming it from under developed to a developing and subsequently developed country. A chemist is an entrepreneur and an entrepreneur is a person who evaluates business opportunities, gather necessary resources and initiate appropriate action to ensure success (Wushishi, 2013).

The success of Nigeria in the 21st century, its wealth and welfare will depend on the ideas and entrepreneurial skills of its population. These have always been the nation most important assets (Iyun, 2013). Achieving chemistry entrepreneurial skills produce chemists who will create new ideas, new products and entirely new industries. It will provide the technical skills and quantitative literacy needed for individual to earn livable wages and make better decision for themselves, their families and their communities. It will strengthen our democracy by preparing all citizens to make informed choices in an increasing technological world.

Furthermore, acquiring entrepreneurial skills through chemistry entrepreneurship education will equip graduate with skills to incubate business ideas, and gradually establish small and medium size

enterprises and probably serve as a catalyst for economic growth (Aroguidade, 2011). Therefore the purpose of entrepreneurship education lies in its focus or orientation towards the realization of job opportunities and elimination of unemployment among graduates.

THE WAY FORWARD

- 1) Science teachers and chemistry teachers in particular should adopt active learning strategy as the method of instruction.
- 2) Emphasis should be given to practical activities to enhance acquisition of entrepreneurial skills.
- 3) Youth should be encouraged to acquire entrepreneurial skills for self-reliance.
- 4) Final year chemistry students should be given project topics that will help them to develop entrepreneurial skills For instance production of soap, detergents, shampoo, candles, pomade and so on.
- 5) There should be provision for small scale loans to chemistry graduates to enable them practicalise the skills.

CONCLUSION

Entrepreneurship education requires special attention due to high rate of youth unemployment and poverty. For chemistry students to acquire entrepreneurial skills, they must develop basic attitudes such as creativity and open mindedness in addition to expected skills needed such as taking risk, persistent working and commitment. On the other hand, chemistry teachers should guide the learners to acquire knowledge and develop skills using appropriate teaching strategies.

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