

## **SCIENCE EDUCATION: A TOOL FOR SKILL ACQUISITION AND ENTREPRENEURSHIP DEVELOPMENT OF NIGERIAN STUDENTS**

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### **Abstract**

This paper highlights the indispensable role of science education as a means of inculcating acquired and entrepreneurship skills in students. It advocates the use of infusion and integration as approaches to be adopted in the classroom for channeling goals towards meeting entrepreneurial needs of various science subjects or courses. It also highlights a platform that an individual can use to acquire skills with the right attitudes which are necessary for entrance and progress into an occupation thereby sustaining national development in terms of skill acquisition. This paper equally examines skill acquisition and its impact to nation building. In conclusion, it recognizes that the world is embracing a knowledge-base economy and we need to acquire more knowledge and skills for economic growth because every sector needs better skills to keep it running. By accommodating this, we need to equip the youths and working adults with employment skills and knowledge to meet the increasing demand for manpower by various sectors of the nation's economy through science education as advocated in this study. Recommendations given at the end includes among others, mandatory entrepreneurial development in schools especially in science subjects so as to help the students master skills learnt in various subjects in such a way that they will see the relationship between what is learnt in class and what is obtained in the world of work.

**Keywords:** Science Education, Tool, Skill Acquisition, Entrepreneurship Development.

### **Introduction**

It is quite glaring that no nation can develop without proper exploitation of her national resources for the benefits of the people. The development of infrastructure (road, railways, power, pipe borne water, communication, health-care etc) is a paramount value to enhance the economy of such a nation. In order to make the economy grow strong and stable in this era of global economic meltdown, we must increase the productivity of all factors of production (land, labour, capital). This will inevitably lead to the development of the industrial, agricultural, tertiary healthcare and export sector of the economy. It will equally increase employment rate, national income and growth rate of the economy. Science is a great enterprise which nations depend on in order to make the economy grow strong and stable.

Science is the intellectual and practical activity encompassing the systematic study of the structure and behaviour of the physical and natural world through observation and experiment (Ondigi, 2012). Science therefore, is receiving much emphasis in education because of its significance and relevance to life and society. Education is the most powerful weapon we can use to change the world. It means acquiring knowledge by learning. It is also the process of receiving or giving systematic instruction especially at a school or university. Education is equally the process of facilitating learning or the acquisition of knowledge, skills, values, beliefs and habits (Iweala, 2012). It is through education that science can be explored and shared. Science education is a field, concerned with sharing science contents and processes with individuals not traditionally considered part of the scientific community. Science education can be used as a tool for acquisition of skills that is, skills can be acquired through science education and skill is the ability to carry out a task with predetermined results often within a given amount of time, energy or both. Skill is very important in the life of every human being. The reason many technicians earn more than some university graduates is because the technicians acquire more practical skills than the theories unlike the graduates who were fed with theoretical experiences while in the universities. It can take you to places you do not expect to find yourself. Every skill acquired is either learnt or taught.

Acquisition is the act of getting new knowledge or skill that can be transferable on and to the job. From all indication skill acquisition can be said to be the ability to be trained on a particular task or function and become expert in it. From the definition above, do you think there is any relationship between someone who has acquired skill on how to perform a particular job and make money from it and unemployment? The answer is NO because the skill he/she has acquired can always speak for him/her. It is a pity that there is "huge" parading of unemployed youths in many parts of the world today and this is partly as a result of our long system of education that is more of grammar and not much of practical learning. The truth remains that the major causes of unemployment among these vibrant youth is lack of skill to back up what they learnt from their institutions of learning. It is evident that the highest number of unemployed is found in the African continent especially in Nigeria and this brought about rapid growth in crime. Reverse would have been the case if, Nigerian students are being trained and taught through science education the various skills that will enable them on graduation, become good entrepreneurs of the nation and become successful overtime even when they are not gainfully employed by the government.

The word entrepreneur originates from the French word "entreprendre" which means to undertake businesses. In a business context, it means to start a business. An entrepreneur is a person who makes plans for a business or a workplace and gets it going, taking on financial risks in the hope of profit. The entrepreneur is the chief coordinator, controller and organizer of the production process.

Entrepreneurship refers to the concept of developing and managing a business venture in order to gain profit by taking several risks in the corporate world. Simply put,

entrepreneurship is the willingness to start a new business (Swartland, 2012). Entrepreneurship was initially conceptualized in the economy theory by economists such as Schumpeter (1934) and Kirzner (1979). The concept was initially seen as akin to starting a new business. Entrepreneurship however started to attract the attention of other scholars from other fields like biology, psychology and management studies. This explains why recent scholars, present an analysis of entrepreneurship with other concerns like the psychological and sociological outlook of entrepreneurship.

Starting a business is not the main component of entrepreneurship because entrepreneurship is concerned with stimulating economic progress through innovation and actions. Entrepreneurship is recognized as a key factor for fostering economic growth based on innovation (European Commission, 2012). Employers want employees who can use their abilities and skills to evolve the organization. The place of skill acquisition cannot be over emphasized in the rapid development of other sectors of the economy. For this to be actualized, policies and goals on skill acquisition must be put in place and well implemented.

The standard of education in Nigeria has fallen that those who go through it have difficulty in gaining employment in the formal sector because they are mostly considered unemployable. These young Nigerians after leaving school cannot create jobs for themselves in the informal sector, realizing the urgent need to adopt strategies for empowering these young people with knowledge and appropriate skills to improve their chances of getting employed or becoming self employed made the federal government to introduce entrepreneurship education (Iweala, 2012). This is to run alongside the various core school subjects or courses in schools. The best way to solve the current unemployment problem is by ensuring that students in institutions of higher learning undertake compulsory entrepreneurship study. Entrepreneurship education is an organized and well planned set of educational activities that is aimed at developing entrepreneurship related competencies. The competencies that can be developed through entrepreneurship education are identified by Ondigi (2012) as:

- (1) Specific knowledge: (e.g. knowledge of the workings of the economy)
- (2) Skills: (e.g.) planning, organization, analysis, communication, negotiation, working individually and in teams, risk assessments.

These competencies achieved through entrepreneurship education can equally be attained through science education if theories are taught alongside with practical for that will enhance entrepreneurship development.

Entrepreneurship development is the process of improving the skills and knowledge of entrepreneurs through various trainings and classroom programmes. The whole point of entrepreneurship development is to increase the number of entrepreneurs. By doing this, the pace at which new business or ventures are made gets better at a wider level, this makes room for employment and improves the economy of a business or country. Entrepreneurship development aims at individuals who want to start or possibly expand a business. Entrepreneurship development also focuses a lot on enhancing the idea and

potential of an entrepreneur, that is, someone who has acquired enough skills to start a business of his or her own.

### **Science Education Classroom Practices in Skill Acquisition and Entrepreneurship Development**

Science education classroom practices are the various activities that go on in the science education classroom in the course of instruction. These include the process that go into making a successful lesson. These activities include: content of the instruction, objectives, exercises, instructional materials, time and modality of instruction, organization of lessons, presentation of lesson and the sequence of presentation, student activities, classroom management, evaluation and application of instructional activities. Classroom practices center around the teacher and how he is able to present information and skills such that the students see it's application even outside the classroom (Ondigi, 2012; Hindle, 2012; Mitchell & Chesteen, 2012). To achieve this will require science education teacher preparation in terms of professional development of the teacher as well as his/her readiness to implement the ideas of entrepreneurship development in the classroom using appropriate classroom practices.

#### **Science education improves entrepreneurship skills in students through:**

1. **Teaching of relevant skills:** This involves planning, organization, and analysis, communication, working individually and in teams.
2. **Teaching of the right attitude:** Attitude is the sense of initiative, pro-activity, independence, motivation and determination to meet objectives. Every successful entrepreneur has a failure/unsuccessful story behind their success. Study of science helps students value failure and make them understand that being defeated is a temporary position, giving up is permanent
3. **Intellect:** This comprises of intelligence, logical and an understanding on how to do research. It is said that science students are well suited to learning the skill they need to navigate the entrepreneurial pathway because they are intelligent and logical and they understand how to do research.
4. **Courage:** The study of science makes one to embrace risk because they don't need to have all the answers before taking action.
5. **Leveraging others:** Science education teaches us that a good scientist recognizes the importance of the opinions of his/her fellow scientist. This helps the entrepreneur recognize their limitations and leverages the expertise of others, with the people skills to lead cross-functionally. It is important to realize that just because you are the smartest in the building doesn't make you capable to run a company.
6. **Consistency and patience:** A science student must have the patience it takes to undergo years of work that might be required to make a discovery in a scientific field. A sense of optimism keeps a scientist performing experiment after experiment, even if most of them fail. So as entrepreneurship requires a very consistent and patient minded person, in order to be a successful entrepreneur, you have to cultivate the habit of being consistent and patient.

7. Analytical: It involves detail oriented, ability to notice even tiny observations, remembering and recording them, analytical mind, ability to categorize data in an efficient way so it can be recalled later are skills inculcated by science education which are necessary for entrepreneurship.
8. Open mindedness: Being open minded is very critical for a successful entrepreneur. A good scientist will accept whatever outcome his/her work has and not try to force the result into a performed opinion.

A scientist also has good ethics and will not give false results or shade an experiment to fulfill the expected outcome. There is also the willingness to accept the solutions of others, even when they conflict with his/her own and readiness to give up old ideas when new ones come along are what contributes to building a successful entrepreneur. Learners in a normal science education classroom setting are expected to be equipped with school-to-work life skills which are necessary. This is in order for them to enjoy maximum benefits of their educational growth and development. According to Marzano, Pickering and Pollack (2014), effective pedagogy consists of 3 elements. Instructional strategies, management techniques and curriculum design. There is therefore need for science education classroom teachers to relate content to the national goals of education and prepare learners for the world of work Ondigi (2012).

### **Relating Content to the National Goals of Education**

In achieving this, different strategies can be employed in a science education classroom. For the purpose of this paper, infusion and integration are suggested as strategies to be adopted in relating the content of education to the national goals of education.

#### **Infusion**

Infusion is having the principles of the newly introduced concept brought into materials outline in the school curriculum. Here the main content of a subject does not need to be expanded. All the teacher needs to do is to bring entrepreneurship development exercises, activities and examples while teaching a particular science topic provided for on the main curriculum. In infusion, the importance of skill acquisition entrepreneurship awareness and the content of entrepreneurship education are incorporated into the various science courses and topics in such a way that it carries all learners along. This is to provide learners with frequent encounters of entrepreneurship. In infusion, the main content of the subject is not altered; instead, elements of entrepreneurship are fused into the main content of various topics.

#### **Integration**

Integration has to do with expanding the main content of a subject to include application of all entrepreneurship strategies (Canale & Swain, 2012). Here, for every science topic treated, its entrepreneurship application is also examined. This entrepreneurship has to do with strategies or skills to be developed through the topics treated.

In integration, the contents of what needs to be integrated are added to the main content of the course thereby widening the scope of the coverage of the course content. Entrepreneurial education can be integrated into carrier subjects through common or strongly related topics. In a chemistry class for example, the development of business ideas can be linked to soap making processes after treating topics like saponification. Other ideas relating to other topics include; distillation, brewing, pomade and perfume making, paint making. The list is in exhaustive.

In biology, emphasis on the entrepreneurial application needs to be made in various class activities like reproduction. In snails (snail rearing business) and pond/care of ponds can give students business idea of how to start fish trade. Bee keeping/horticulture is also another topic that business idea can be linked to i.e. honey business.

In physics topics like electricity will help one become a self employed electrical engineer who can wire a whole building, fix sockets and light bulbs. Mechanics and energy are also another topic taught in physics that can make the students master energy and how to assemble machine parts, fix machines and get them working.



Anyaegebu (2012): A man displaying skills acquired through physics.

Mathematics call for creativity- keeping records, fixing selling price, simple and compound interest, knowledge of quantity and also improves analytical and calculative skills in the students and they can run a small scale trade business and keep records easily.

Computer science helps one become a professional at operating computer systems and also makes him/her a computer expert, thus they can open a computer training centre and teach people or even a cyber café and be self-employed. They can also start their own company, and become programmers and employ people under them.



Anyaegebu (2012): An Entrepreneur Training People in Computer Learning Programs

Food and nutritional sciences teaches one all they need to know about food and nutrition, helps students become independent entrepreneurs and achieve real success in the food industry.



Anyaegebu (2012): Students Acquiring Skills in Food and Nutrition



Anyaegebu (2012): Students Acquiring Skills in Food and Nutrition i.e Baking

Other entrepreneurial skills like self-advocacy can be taught through encouraging students' active participation in class, encouraging them to ask and answer questions, encouraging them to even challenge answers, make oral presentation and engage in all forms of open discussions. Similarly, skills like innovation, decision making and problem solving skills needed in daily life can equally be introduced in the classroom through integration and infusion approaches.

### **Skill Acquisition and Entrepreneurship Development through Science Education in relation to Nation Building**

Nigeria needs people who are skilled in modern agricultural methods to handle the use of modern equipments, new techniques in seed planting, land cultivation, harvesting and storage. These people will ensure that adequate food is produced for Nigerians increasing population. Nigeria is rapidly expanding her roads network system to improve the movement of goods and services. Such construction jobs require not only experts and dedicated workers but skilled engineers who are able to operate and service the heavy duty equipment used in road construction. Modern industries are being established in all parts of the country. These industries need skills and well-trained workers to ensure that goods manufactured in Nigeria are as good as those manufactured in other parts of the world. These portray that making science education



a tool for entrepreneurship development and skill acquisition can never be over emphasized.

Two decades after Nigeria's independence, opportunities for employment abound for Nigerian graduates. In fact, it was the case that each recent graduate had at least three jobs from which to choose. Furthermore, the movement from school to job was virtually automatic. Today, it is very pathetic that the storyline has changed as there is a disconnection between the world of learning and the world of work. Each job that appears in the labor market is now pursued by many old and new unemployed graduates because of the growing population. There are increasingly fewer occupational opportunities for the unfortunate youths who lack the basic skills and knowledge.

By implication, unemployment rate will increase which will be a menace to the society, thereby slowing down the pace of development because of the untapped potentials or talents that are lying idle. Therefore, there is need for the unemployed individuals to learn and acquire new skills which would make them self employed by setting up their own businesses to create jobs for others too.

### **Impact of Skill Acquisition and Entrepreneurship Development through Science Education to Nation Building**

The skill acquired by young graduates through science education will prepare them for any specific job with a lifelong opportunity for self-development. This is because there will be competency, interest and job satisfaction to the highly skilled person to effectively and efficiently carry out that job successfully for higher productivity Shaffer (2012).

The acquisition of skills through science education will prepare the individual to fit in readily for employment in all sectors of the company. Entrepreneurship development and skill acquisition through science education can help in the formulation of ideas, their integration for national development and the interaction of persons and ideas. This skill acquisition will provide people who could apply relevant knowledge to be able to make positive changes within the society.

Entrepreneurship development and skill acquisition through science education in other words could advance the nation in the following ways:

- ❖ A well trained entrepreneur will be much more productive in the society, if he/she receives the required guidance in picking the right career. Such an individual will no longer be a burden to the nation.
- ❖ It will make an individual to cultivate better attitude to work.
- ❖ Any individual who acquires skills will be able to showcase his/her talents, make intelligent use of the brain in terms of new discoveries and innovations that will even upgrade individual status within the society and become a successful entrepreneur.
- ❖ When a skill is acquired in any discipline, it is assumed that the future gains that would result from it are of greater significance to productivity.

## **Conclusion**

It is not in doubt that the standard of education has fallen such that young school leavers cannot get employment or create jobs for themselves. This is because they lack both entrepreneurial and acquired skills. The science education curriculum can be remodeled in such a way that a link is created between activities carried out in the school and the world of work. Apart from science education, there is need to have students exposed to entrepreneurship strategies on daily basis and in different guises. This can be done using the infusion and integration approaches where the students will encounter the various skills they need in different subject areas and topics as a result of which the students will be exposed to opportunities where they can apply and transfer learning to a variety of entrepreneurship avenues. Also, the world is embracing a knowledge/base economy and we need to acquire more knowledge and skills for economic growth because every sector needs better skills to keep it running. By accommodating this, we need to equip the youths and working adults with employment skills and knowledge to meet increasing demand for manpower by various sectors of the nation's economy either through science education as advocated in this study.

## **Recommendations**

In the light of the above, the following recommendations are made.

1. Entrepreneurial development must be mandated in our schools especially in science subjects to solve the problems of economic meltdown in our country.
2. There must be more practical work to complement theory in our institutions of learning, to provide skilled labour for the economy.
3. All teachers and not just those in business studies or other related fields need to be trained on entrepreneurship in order for them to understand the skills needed by their students for facing the challenges of the world of work.
4. Teachers need to be trained on how they can adapt the various topics in their subjects to match the entrepreneurial needs of students by choosing teaching and learning methods that matches the learning needs of the students.
5. Teachers equally need to be trained and retrained on the use of teaching methods that promote active learning, including hands on learning, real world and experimental learning.
6. Teachers should from time to time be encouraged to map out specific areas that will provide opportunities for students to apply and transfer learning to a variety of situations. This will help the students to master the skills learnt in the various subjects.
7. The wide gap between the classroom and the industry should be bridged by skill acquisition policy on every ramification. In fact, the ratio of theoretical to practical should be 30:70 because you learn what you see, you remember what you touch.
8. The Students' Industrial Work Experience Schemes (SIWES) programmes should be extended to the secondary schools during school vacation period while the fresh graduates go for one year industrial training after graduation.
9. Teachers should ensure that work opportunities that are entrepreneurial in nature are explored, presented and even discussed in class together with the students.

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