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Effect of innovative and entrepreneurial skills in basic science education for job creation in Nigeria

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Abstract
Innovative and entrepreneurial skill acquisition in Nigeria entails focusing on what should be done to bridge the gap between the school and labor market, where the learner will work after graduation, so as to be self-reliant in the society. Specifically, the study seeks to be determined: The innovative and entrepreneurial skills needed in basic science education for job creation and the teaching strategies required. The study was carried out in Rivers State and was guided by two research questions (RQs). A descriptive survey research design was adopted. The population of the study was made up of 150 principals and 250 basic science teachers. While the Sample consist of 100 science teachers and 50 Principals. The instrument used for data collection was a 20-item questionnaire. Mean and standard deviation statistics were used to address the two RQs. The findings revealed that a lot of skills were needed in Basic Science for job creation, the teachers were required to use practically oriented methods in teaching the students.

Keywords: basic science education, job creation, innovative and entrepreneurial skills

Introduction

The rising rate of unemployment in Nigeria and job creation has raised concern for innovative entrepreneurial skill in Basic Science Education. The Federal Republic of Nigeria recognized the important role of the development of entrepreneurial skills at the basic science school level when it noted that basic science education should provide science and technological skills for economic development (FRN 2004) [5]. Therefore, the quality of instructional delivery should be geared towards inculcating the right type of value and attitude in the learners. Hence, the acquisition of appropriate skills and the development of mental, physical and social competence were necessary for the individual to live in and contribute to the development of the society. Basic science education is that aspect of education that lays foundation for sustainable lifelong learning. It involves the acquisition of innovative skills and application of the knowledge of science that leads to particular occupation and for the improvement of man's environment (Onwuachu and Okoye, 2012) [15].

This includes vocations like medicine, engineering, pharmacy, agriculture, business, home economics, etc. One of the essentials of the Nigeria National Economic Empowerment and Development Strategy (NEEDS) is "growing in the private sector." Incidentally, Nigeria like other nations has accepted this market-driven or private sector led economy as the model to achieve rapid economic growth and development, efficient resource allocation, and utilization. It was also recommended by the World Economic Forum (2011) [19] that governments should improve their entrepreneurial ecosystem by bringing entrepreneurship to the classroom so that every student in the basic, secondary, and tertiary level of education should learn entrepreneurial principles, welcome new ideas, and give support to all types of entrepreneurs. The initiative taken by the Nigerian government to encourage entrepreneurial activity includes the infusion of entrepreneurship education into the basic education curriculum and developing up to 34 trade subjects in the post-basic education curriculum, of which senior secondary school students must learn at least one of them before graduation. To this effect, all institutions in the country are required to incorporate entrepreneurship programs into their curriculum and provide young people the opportunity to acquire an entrepreneurial orientation and skills. This inclusion of entrepreneurial studies into basic science education is meant to provide the young science and technical students the mind-set for creating and sustaining innovations. Such an infusion might also produce availability for job creation, alleviation of poverty, and possibly launch Nigeria into the production market. The 17th Commonwealth Conference of Education Ministers in 2009 led to the restructuring of school curriculum jointly by the Universal Basic Education (UBE) Commission and the. Nigeria Educational Research and Development Council (NERDC) to reflect these community needs and aspirations. Even the curriculum review for primary and secondary schools reflects the government's reforms as spelt out in the NEEDS, which has its focus on poverty reduction, wealth creation, and employment generation. Innovativeness is the ability of introducing or using new ideas or ways of doing things. The process of innovation involves thinking creatively: Using imagination to manipulate instruments or variables, to formulate models, to discover possibilities, and to construct objects and images that never existed before. Innovation can be a change made in established laws and practices by the introduction of

something new, with the purpose of improving quality, quantity, output, or procedures. Mbanefo and Chiaha (2014) stated that innovative learning environments focus on the facilitation and utilization of new knowledge acquisition modes, adoption of problem-solving strategies, integration of knowledge from diverse sources, utilization of self-directed learning, and knowledge extension through elaborate creative expression. While entrepreneurial skills are business skills, which an individual acquires personally to function effectively in business as an entrepreneur and be self-reliant (Umunadi, 2014; Nwafar, 2009) [17].

The skills consist of effective utilization of ideas, information, and facts that help a learner develop competencies, services, or become productive employees of organizations. Entrepreneurship has to do with a system of ideas and values that are not ordinarily treated as part of the curriculum, it is the process of using private initiative to transform a business concept into a new venture or to grow and diversify an existing venture or enterprise with high growth potential (Mkpa, 2014; Ugwoke and Abidde, 2014) [9, 16]. Therefore, entrepreneurship could be seen as the act of identifying, initiating, organizing, and bringing an idea or vision to life, be it a new product, service, process, strategy, or market. It is all about self-employment, which is very important for improving an individual's quality of life and national development. Consequently, entrepreneurship education leads to the acquisition of entrepreneurial skills for efficient and effective living; it gives the youths more opportunities to exercise creative freedom, higher self-esteem, and a greater sense of control over their own lives. An entrepreneur is one who undertakes the risk of organizing and managing a business. The entrepreneur looks inward into his/her environment to identify problems confronting people (or business opportunities) and introduces new products and services for the purpose of making profit (Ugwoke and Abidde, 2014) [16].

Moemeke (2013) [10] stated that an entrepreneur is, therefore, not only an innovator but also a lifelong learner, a creative person, an initiator, and a potential industrialist. Thus, the destiny of nations lies with the entrepreneurs since they shape, actualize, and bring the developmental dreams and economy of any nation to reality. Therefore, it becomes eminent that entrepreneurial skills should be inculcated into the basic science curriculum for the youths. Consequently, the basic science curriculum, which is in use in Nigeria for science teaching and learning, has built in strategies where learners are required to be involved in inquiry and related activities that can develop critical and creative thinking skills, in junior secondary schools. Thus, the objectives of basic science and technology curriculum (revised 2012) are to enable learners to: Develop interest and acquire basic skills in science and technology, apply their scientific and technological knowledge and skills to meet societal needs, take advantage of the numerous career opportunities offered by science and technology, and become prepared for further studies in science and technology. The themes that form the integrating threads for the curricula are basic science, basic technology, physical and health education, and information technology, while the sub-themes for basic science are as follows: Learning about our environment; you and energy; and science and development. One of the concepts infused into the curriculum content from primary to junior secondary school is entrepreneurship education (Nigeria Educational Research and Development Council, 2009). Various types of skills are required for the students to be successful entrepreneurs. Igbo and Hisrich in Umunadi (2014) [17] identified many categories of competencies or skills needed for success in entrepreneurship such as managerial, accounting and financial competencies, marketing and sales skills, and general business skills. The inclusion of these skills into the basic science education program will reduce the rate of dependence on government for job, instill in the students the right mindset, the ability to be creative, and innovative, and be able to create job out of their chosen career.

Moemeke (2013) [10] stated that innovative skills in science singularly can not only produce individuals with useable skills but also without the necessary initiative and impetus for utilizing them at the functional level enough to create wealth. The implementations of innovative and entrepreneurial skills infusion into basic science education curriculum are as follows:

- The implementation of the content of basic science education curricula will change to link training for job creation and employment.
- The teachers need to be trained on the strategies for imparting of these skills to students; and provision of the necessary facilities required for the development of business mindset and knowledge in the business world.
- The science entrepreneurs need to thrive in entrepreneurial physical environment, which has four elements according to the World Economic Forum (2011) [19], namely, personal enablers, financial enablers, business enablers, and environmental enablers. Some of these enablers are either few or ineffective in Nigeria because of the population of the country. Personal enablers are adviser/mentors and education (formal and informal), while the advisers are people, experienced entrepreneurs that are willing to share knowledge and their experience. They can offer moral support and be a source of motivation for the young entrepreneur to take a risk in starting the business. Seminars and workshop can offer informal education while the schools offer entrepreneurship courses to nurture the entrepreneurial spirit and give students the skills to start a successful venture. Entrepreneurship spirit arises at the early age of life and can be highly encouraged by the educational system which can guide the students and help innovation spread.

Statement of the Problem

Despite the clamor for self-reliance and job creation in Nigeria, the planning of basic science education in the country has not given enough attention to quality, relevance, and functionality of education. This is evident in

students that have graduated from the junior secondary schools that are not yet self-reliant and cannot even do anything for themselves (Double Gist, 2017) [4]. Secondly, although it is basic science education that prepares the students for post-basic and tertiary education, the planning of education for job creation has been shifted to the last two levels of education (the post-basic and tertiary levels). Consequently, the need to investigate the innovative and entrepreneurial skills integrated into basic science education and see how the skills are being imparted to the students for job creation. The study assessed the opinion of the principals and the teachers on the acquisition of innovative and entrepreneurial skills in basic science education for job creation. Specifically, the study sought to determine the innovative and entrepreneurial skills needed in basic science education for job creation, the teaching strategies required for the acquisition of innovative and entrepreneurial skills in basic science education and the factors that pose challenges for the acquisition of entrepreneurial skills in basic science education for job creation.

Purpose of the Study

The intent of this study is to explore the innovative and entrepreneurial skills needed in basic science education for job creation and identify the areas where teaching techniques can enhance acquisition of innovative and entrepreneurship skills in basic science education.

Objectives

1. To identify innovative and entrepreneurial skill needed in job creation in Basic science education.
2. To ascertain the teaching techniques required for acquisition of innovative and entrepreneurial skills in Basic science education.

Research Questions

1. What are the innovative and entrepreneurship skills needed in Basic science education for job creation?
2. What are the teaching techniques required for acquisition of innovative and entrepreneurship skills in Basic science education?

Significance of the Study

The findings of this study will be significant to the teachers, learners and principals. This study will be beneficial to the learners in the sense that it exposes the learners to the innovative and entrepreneurial skills needed in basic science education for job creation and inculcates in the learner, the skills of being independent, imaginative and constructive for introducing or using new ways of doing things and coming up with innovative ideas, business managerial skills for establishing, managing, and sustaining businesses.

The findings of this study will be an asset of teachers to identify the teaching strategies required for the acquisition of innovative and entrepreneurial skills in basic science education where the use of multiple modes of inquiry such as guided-inquiry, collaborative project work, field trip, etc. as opined by Adikwu (2015) [1] that teaching strategies should inculcate entrepreneurial skills in children at the basic level which includes student-oriented, teacher-oriented, assignment oriented, games and stimulation methods that will help the student explore opportunities for innovation and creative ideas through practical and involvement in the activities of industries Obasi and Ohio (2014) [14] also stated that entrepreneurship education was practically oriented, designed and packaged to equip the students with the practical skills, knowledge and orientation for entrepreneurial life which was targeted toward job creation. Hence, special training given for the acquisition of vocational, technical, management skills and capacity for self-reliance and employment thus it created job, wealth and reduced unemployment, poverty, corruption and crime which the youths were prone to as a result of unemployment.

Methods

The study was carried out in Rivers state, Nigeria. The descriptive survey research designed was adopted in the study. It is appropriate because it sought to elicit people's opinion on the acquisition of innovative and entrepreneurial skills in Basic science education (Ary *et al*., 2010) [2].

The population of the study was 400 principals and 500 basic science teachers in Emohua Local Government Area of Rivers State. [Source: Rivers State Universal Basic Education Board (2018)]. The sample was selected through random sampling techniques (50 principals were selected from 400 public schools and 100 science teachers from the 500 number of science teachers in the state). The respondents were 100 science teachers that were directly involved in teaching students basic science and technology and 50 principals that were involved in the school management.

The researcher designed 20 item instruments titled the innovative and entrepreneurial skills needed in basic science education for job creation and the teaching strategies required for the acquisition of innovative and entrepreneurial skills in basic science education. Questionnaire was used for the collection of relevant data. The instrument passed through face and content validity by three (3) experts in the department of curriculum studies.

The reliability coefficient of 0.70 using Pearson product moment correlation was used to establish the data collected.

Result and Discussion of Findings

Table 1: The innovative and entrepreneurial skills needed in basic science education for job creation

Item	N	Mean±SD	Decision
Innovative skills of being independent, imaginative, and constructive thinker	474	3.55±0.56	Accepted
Skills for introducing or using new ideas/ways of doing things	480	3.47±0.61	Accepted
Skills to be critical to come up with innovative ideas	464	3.14±0.70	Accepted
Entrepreneurial skills for recognizing and using tools and materials for production	476	3.36±0.61	Accepted
Collaborative skills (associative partnership) needed for joining corporative societies such as producer and consumer corporative	476	3.17±0.65	Accepted
Skills for accessing funds and accounting	472	2.86±0.70	Accepted
Personal entrepreneurship skills: Ability to persistently research and find relevant information	480	3.45±0.61	Accepted
Ability to organize and build network	456	3.23±0.67	Accepted
Business managerial skill for establishing, managing and sustaining businesses, for example, for record keeping such as inventory of production, sales, purchase, and profit and loss account	456	3.23±0.69	Accepted
Cluster summary	484	0.64	Accepted

SD: Standard deviation

Table 1 shows the mean ratings and standard deviation of the teachers and principals responses on the innovative and entrepreneurial skills needed in basic science education for job creation. The cluster mean of 3.22 revealed that the respondents strongly agreed that all the skills were needed in basic science education for job creation. The table revealed that the items had their standard deviation range from 0.56 to 0.70 which showed that the respondents were close to the mean of one another. The cluster standard Teaching deviation of 0.64 shows that degree of variance from the mean is not much.

Teaching techniques Required for acquisition of innovative and entrepreneurial skills in Basic Science Education.

Table 2

Item	N	Mean±SD	Decision
Use of multiple modes of inquiry, for example, guided inquiry	484	3.31±0.73	Accepted
Use of students' collaborative project work	462	3.25±0.67	Accepted
Use of lecture method	468	2.22±0.99	Not Accepted
Use of facilitation technique that allows for sharing ideas and freedom to innovate	480	3.35±0.57	Accepted
Use of field trips (visit to factories, etc.)	484	3.45±0.58	Accepted
Cluster summary	484	3.12±0.71	Accepted

SD: Standard deviation

Accepted Table 2 shows the mean ratings and standard deviation of the teachers and the principals responses on the teaching techniques required in the acquisition of innovative and entrepreneurial skills in basic sciences education. There are five items in the cluster, only one has a mean of 2.22. The cluster mean of 3.12 revealed that all the teachers and principals considered the teaching techniques were required for acquisition of innovative and entrepreneurial skill in basic science education except for the use of lectures method. The standard deviation of 0.71 shows, the degree of variance from the mean is not much.

Discussion of Findings

One sought to investigate the innovative and entrepreneurial skills needed in basic science education for job creation. The results revealed that the teachers and the principals agreed that innovative and entrepreneurial skills were needed in basic science education for job creation. It was their perception that innovative skills of being independent, imaginative, and constructive; skills for introducing or using new ways of doing things and come up with innovative ideas; business managerial skill for establishing, managing, and sustaining businesses, for example, for record keeping such as inventory of production, sales, purchase, and profit and loss account were needed in the basic science curriculum for job creation. This is in line with the skills identified by Igbo and Hisrich in Umunadiand (2014) [17] stimulation methods that will help students explore opportunities for innovation and creative ideas through practical and involvement in the activities of industries. Obasi and Ohio (2014) [14] also stated that entrepreneurship education was practically oriented, designed, and packaged to equip the students (beneficiaries) with practical skills, knowledge, and orientation for entrepreneurial life, which was geared toward job creation. It was, therefore, a special training given for the acquisition of vocational, technical skills, management skills, and capacity for self-reliance and employment. Thus, it created job and wealth and

reduced unemployment, poverty, corruption, and crime, which the youths were prone to as a result of unemployment. They also disagreed with the use of lecture method.

Recommendations

The following recommendations are made based on the findings of the study:

1. The scope of the basic science curriculum should be extended to have more entrepreneurial experiences for teachers to lead students through the path of productivity, self-reliant, and job creation.
2. Teachers should be trained to use teaching strategies that foster innovative and entrepreneurship skills acquisition instead of relying so much on lecture method.
3. Government should provide enabling environment (facilities and equipment) that are necessary for creativity and innovation and develop policy frameworks that will encourage network associations, banks, incubators, and professional services to support young science entrepreneurs. All the stakeholders (financial, business and regulatory bodies in Nigeria) should motivate students in the entrepreneurial skill acquisition that will make them employers rather than employees of labor.

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