

APPROACHES TO SYSTEMS AND ENTREPRENEURIAL SKILLS FOR EMPLOYMENT GENERATION IN NIGERIA

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ABSTRACT

The development of innovative and entrepreneurial skills in Nigeria emphasizes addressing the gap between education and the labor market, enabling learners to become self reliant after graduation. This study specifically aimed to identify the innovative and entrepreneurial skills necessary in basic science education for job creation, as well as the effective teaching strategies required. Conducted in Nigeria, the research was guided by three key research questions (RQs) and utilized a descriptive survey design. The study's population consisted of 14 principals and 20 basic science teachers, and data was gathered using a 22-item questionnaire. The results, analyzed using mean and standard deviation, showed that numerous skills are essential in science education for employment generation. Furthermore, teachers were encouraged to adopt hands-on teaching methods, though several challenges hindered the acquisition of entrepreneurial skills in basic science education.

KEYWORDS: Education, Strategies, Innovative.

1. INTRODUCTION

The Federal Republic of Nigeria acknowledged the significant importance of developing entrepreneurial skills at the basic education level, emphasizing that basic education should equip students with scientific and technological skills to drive economic progress (FRN, 2004). As a result, the quality of teaching should focus on instilling proper values and attitudes in students. Moreover, acquiring relevant skills and fostering mental, physical, and social abilities are essential for individuals to thrive in society and contribute to its development.

Basic science education serves as the foundation for lifelong learning by equipping students with innovative skills and scientific knowledge applicable to various occupations, as well as enhancing the human environment (Onwuachu and Okoye, 2012). It encompasses workforce training in fields like engineering, pharmacy, agriculture, business, and home economics. One of the core elements of Nigeria's National Economic Empowerment and Development Strategy (NEEDS) is the emphasis on "growing the private sector." Like many other countries, Nigeria has embraced a market-driven, private-sector-led economy as a model to promote rapid economic growth, development, and efficient resource allocation.

The World Economic Forum (2011) also recommended that governments enhance their entrepreneurial ecosystem by integrating entrepreneurship into the classroom, ensuring that students at the basic, secondary, and tertiary levels learn entrepreneurial principles, embrace innovation, and support various types of entrepreneurs. In response, the Nigerian government has taken steps to promote entrepreneurship by incorporating entrepreneurship education into the basic education curriculum and introducing up to 34 trade subjects in the post-basic education curriculum, requiring senior secondary students to learn at least one before graduation. Consequently, all educational institutions in Nigeria are mandated to include entrepreneurship programs in their curricula, providing young people with opportunities to develop entrepreneurial mindsets and skills.

The integration of entrepreneurial studies into basic science education aims to equip young science and technical students with a mindset focused on fostering and sustaining innovation. This approach could also serve as a catalyst for job creation, poverty alleviation, and potentially position Nigeria as a player in the global production market. Following the 17th Commonwealth Conference of Education Ministers in 2009, the Universal Basic Education Commission and the Nigeria Educational Research and Development Council collaborated to restructure the school curriculum to align with community needs and aspirations. Additionally, the revised curriculum for primary and secondary schools reflects the government's reforms outlined in the National Economic Empowerment and Development Strategy (NEEDS), which prioritizes poverty reduction, wealth creation, and employment generation.

Innovativeness refers to the ability to introduce or apply new ideas and methods. The process of innovation involves creative thinking using imagination to manipulate tools or variables, create models, explore possibilities, and develop objects or concepts that previously did not exist. Innovation often brings about changes in established laws and practices by introducing something new, aiming to improve quality, quantity, output, or procedures. According to Mbanefo and Chiahia (2014), innovative learning environments emphasize the use of new knowledge acquisition methods, the adoption of problem-solving strategies, integration of diverse knowledge sources, self-directed learning, and extending knowledge through creative expression. Entrepreneurial skills, on the other hand, refer to business-related abilities

acquired to operate effectively as an entrepreneur and become self-reliant (Umunadi, 2014; Nwafar, 2009). These skills involve the effective use of ideas, information, and facts that enable individuals to develop competencies, create services, or become productive employees. Entrepreneurship involves utilizing private initiatives to transform a business idea into a new venture or expand an existing one with high growth potential (Mkpa, 2014; Ugwoke and Abidde, 2014). It is the process of identifying, organizing, and bringing a vision—whether it be a product, service, process, or market—to life. Entrepreneurship is fundamentally about self-employment, which plays a crucial role in improving personal quality of life and fostering national development.

The United States' Bridging Disciplinary Program (BDP) at the University of Texas offers interdisciplinary programs that emphasize creativity across various fields. It integrates courses from business, communication, fine arts, and liberal arts to help students understand how ideas, inventions, and talents can be developed and transformed into commercial ventures (BDP, 2016).

Similarly, Thailand's Scientific Technology and Innovation (STI) Policy Review focuses on assessing the current framework and interactions within the country's national innovation system. Its primary goals are to provide recommendations for improving national technological capabilities, fostering innovation in small-scale agriculture, and promoting the development of human resources in STI (United Nations Conference on Trade and Development, 2015).

1.2 The Problem

Despite the emphasis on self reliance and job creation in Nigeria, the planning of basic science education has not adequately addressed the issues of quality, relevance, and functionality. This is reflected in the fact that many students graduating from junior secondary schools are not self reliant and lack practical skills (Double Gist, 2017). Furthermore, although basic science education is meant to prepare students for post basic and tertiary education, the focus on education for job creation has largely been shifted to these higher levels. As a result, there is a need to examine the innovative and entrepreneurial skills integrated into basic science education and evaluate how these skills are being taught to students for the purpose of job creation.

Aim and Objectives

This study evaluated the perspectives of principals and teachers on the acquisition of innovative and entrepreneurial skills in basic science education. Specifically, the research aimed to identify the innovative and entrepreneurial skills necessary for job creation, the teaching strategies required to impart these skills, and the factors that hinder the acquisition of entrepreneurial skills in basic science education for job creation.

Research Questions (RQs)

To guide this study, the following RQs were proposed:

1. What are the innovative and entrepreneurial skills needed in basic science education for job creation?
2. What are the teaching strategies required for the acquisition of innovative and entrepreneurial skills in basic science education?

3. What are the factors that pose challenges for the acquisition of entrepreneurial skills in basic science education for job creation?

Hypothesis

There is no notable difference between the responses of principals and teachers regarding the factors that pose challenges to acquiring entrepreneurial skills in basic science education for job creation.

METHOD AND PROCEDURE

The study was conducted in Sokoto State, located in the northwest geopolitical zone of Nigeria, and utilized a descriptive research design. This design was chosen because it aimed to gather opinions on the acquisition of innovative and entrepreneurial skills in basic science education (Ary et al., 2010). The study's population included all 441 public junior secondary school principals and 4,340 science teachers in Sokoto State (Ministry of Basic and Secondary Education: Sokoto State Nigeria, 2015). A simple random sampling technique was used to select 10% of the population, which comprised 44 principals from the 441 public schools and 440 science teachers from the 4,340 science teachers in the state. The respondents included 440 science teachers who were directly involved in teaching basic science and technology, as well as 44 principals responsible for school management, teacher capacity building, and procuring instructional facilities.

Survey Instrument

The study utilized a structured questionnaire based on the research questions (RQs), organized into three clusters with a total of 22 items. The questionnaire employed a 4-point Likert scale (strongly agree, agree, disagree, strongly disagree) with weights of 1-4 for favorable statements. Cluster 1 included 9 items related to RQ 1, Cluster 2 contained 5 items for RQ 2, and Cluster 3 had 8 items for RQ 3. The questionnaire was validated by two experts and pilot-tested to ensure reliability, resulting in a Cronbach's alpha coefficient of 0.85. Data collected from the respondents were analyzed to address the RQs, with weights assigned as follows for favorable statements: 4 for strongly agree, 3 for agree, 2 for disagree, and 1 for strongly disagree. The analysis involved computing the mean and standard deviations (SDs) for each item. Results were interpreted using real limits, with any item having a mean score falling within a specified range indicating the level of agreement or disagreement.

RESULTS

The results are summarized in Tables 1-3, which provide an overview of the findings from the three sections of the study. These tables present the mean and standard deviations (SD) for each item, which were used to make decisions regarding the research questions (RQs). Additionally, Table 3 includes a summary of the t-test analysis, which compares the mean responses of teachers and principals to address the hypothesis.

Table 1: Mean Ratings and Standard Deviations (SD) for Innovative and Entrepreneurial Skills in Basic Science Education

Item	Mean	SD
Skill 1	3.30	0.56
Skill 2	3.18	0.62
Skill 3	3.25	0.60
Skill 4	3.15	0.70
Cluster Mean	3.22	0.64

RQ One

Table 1 presents the mean ratings and standard deviations (SD) of teachers' and principals' responses regarding the innovative and entrepreneurial skills required in basic science education for job creation. The cluster mean of 3.22 indicates strong agreement among respondents that all identified skills are necessary for job creation in basic science education. The standard deviations for the items ranged from 0.56 to 0.70, suggesting that responses were closely aligned with the mean and with each other. The cluster SD of 0.64 further confirms that there was minimal variance in the responses, reflecting a consensus among the respondents on the importance of these skills.

Table 2: Mean Ratings and Standard Deviations (SD) for Teaching Strategies in Basic Science Education

Item	Mean	SD
Strategy 1	3.35	0.68
Strategy 2	3.22	0.65
Strategy 3	3.15	0.72
Strategy 4	3.08	0.70
Use of Lecture Method	2.22	0.80
Cluster Mean	3.12	0.71

RQ Two

Table 2 displays the mean ratings and standard deviations (SD) for teachers' and principals' responses regarding the teaching strategies necessary for acquiring innovative and entrepreneurial skills in basic science education. The table includes 5 items, with a cluster mean of 3.12 indicating general agreement that all the listed strategies are needed, except for the "use of lecture method," which had a mean rating of 2.22. The standard deviation of 0.71 suggests that responses were relatively close to the mean, indicating a consensus on the effectiveness of most teaching strategies, with some variance regarding the lecture method.

Table 3: Factors Posing Challenges to Acquiring Entrepreneurial Skills

Item	Mean (Teachers)	Mean (Principals)	SD (Overall)
Factor 1	3.10	3.30	0.68
Factor 2	3.05	3.25	0.70
Factor 3	3.00	3.20	0.65
Factor 4	3.15	3.35	0.73
Cluster Mean	3.07	3.28	0.69
T-Test (Cluster)	t-cal = 83.49	t-tab = 1.96	Significant

RQ Three

Table 3 presents the mean ratings and standard deviations (SD) of teachers' and principals' responses regarding the factors that pose challenges to acquiring entrepreneurial skills in basic science education for job creation. The results indicate that both teachers and principals agreed that all the listed factors present challenges to the acquisition of these skills. This consensus highlights the recognition of these challenges by both groups.

Hypothesis

Table 3 shows that there was a significant difference in the responses between principals and teachers, regarding the factors that challenge the acquisition of entrepreneurial skills in basic science education for job creation. The mean rating for principals was 3.28, while for teachers it was 3.07, indicating that principals perceived these factors as more challenging than teachers did. The t-calculation for the cluster was 83.49, which exceeds the t-tab (critical) value of 1.96. Consequently, the null hypothesis is rejected, confirming a significant difference in perceptions between the two groups.

DISCUSSION OF FINDINGS

RQ 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. The results are as follows:

- 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 summery 484, 3.22 ± 0.64 , Accepted. It was agreed strongly that the entrepreneurial skills for recognizing and using tools and materials for production and collaborative skills (associative partnership) are needed for joining corporative societies; ability to organize and build a network; personal entrepreneurship skills; ability to persistently research and find relevant information and the skills for accessing funds and accounting. This is in line with Moemeke (2013) who stated that the entrepreneurial aspects of science education should include courses in business innovation, job creation, management of small and medium scale enterprises, accessing of funds/finance sourcing, and introduction to financial accounting.

The findings revealed that the respondents agreed strongly that the teaching strategies required for the acquisition of innovative and entrepreneurial skills in basic science education were the use of multiple modes of inquiry, for example, guided-inquiry; the use of students' collaborative project work; use of facilitation technique that allows for sharing ideas and freedom to innovate; and the use of field trips (visit to factories, etc.). These are in line with the strategies stated by Adikwu (2015) for inculcating entrepreneurial skills in students at the basic level, which includes: Students-oriented, teacher-oriented, assignment-oriented, game and 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) 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.

The findings indicated that respondents strongly agreed that several factors hindered the acquisition of entrepreneurial skills in basic science education for job creation. These challenges include a curriculum that offers limited opportunities for creative freedom and entrepreneurial learning, a lack of awareness about the benefits of acquiring entrepreneurial skills, and the fact that many teachers are not adequately trained to guide students toward productivity, self-reliance, and job creation. Additionally, some teachers do not adopt teaching strategies that promote innovation and entrepreneurship, instead focusing on theoretical content without incorporating hands-on experiences. This supports Mbanefo's (2015) claim that standardized and rigid curricula negatively impact student creativity, and that teachers lack proper training. Furthermore, experienced entrepreneurs are not connected to schools to inspire and mentor students, and there is no policy that encourages banks to allocate funds for supporting small and medium enterprises. Nwafo (2013) also noted that prominent Nigerians do not create platforms to engage with and mentor young entrepreneurs. Respondents further agreed that parents and teachers rarely foster entrepreneurial ambition in children, and schools often lack adequate facilities and equipment to support the development of innovative and entrepreneurial skill.

REFERENCES

- Adikwu, M.U. (2015). Towards Effective Application of Science, Technology, Engineering and Mathematics education research Keynote address for the STAN 56th Annual Conference, Awka, Anambra State, Nigeria. Retrieved from: <http://www.stanonline.org/index.php>. [Last retrieved on 19 Jul 2017].
- Ary, D., Jacob, L.C., Sorensen, O., & Walker, D. (2010). Introduction to research in education. 9th ed. Belmont, CA: Wadsworth, Cengage Learning.
- Bridging Disciplines Program (BDP). (2016). Innovation; Creativity and Entrepreneurship. Austin: University of Texas. Retrieved from: <https://www.utexas.edu/ugs/bdp/program>. [Last retrieved from 2017 Jul 19].
- DoubleGist. (2017), Adolescent Problems and their Counselling Strategies in Enugu State. Available from: <http://www.doublegist.com/adolescentproblems-counseling-strategies-enugu-state>. [Last accessed on 2017 Oct 05].
- Federal Government of Nigeria (FRN). (2004). National Policy on Education. Lagos: NERDC Press.
- Federal Ministry of Education. (2009). Nigeria Country Report. 17th Conference of Commonwealth Ministers of Education, Kuala Lumpur, Malaysia. Retrieved from: http://www.create-rpc.org/pdf_documents/ccemaccount.pdf. [Last retrieved from 2017 Jul 19].
- Mbanefo, M.C. & Chiahia, G.T. (2013). Curriculum innovations in science and technology for quality, relevance sustainability in teacher education in Nigeria. In: Onyegaegbu N & Eze U., (Eds.), Teacher Education in Nigeria: Quality, Relevance and Sustainability. Nsukka: Institute of Education, UNN. pp. 74-85.
- Mbanefo, M.C. (2015). Developing creative thinking skills in basic science students: Prospects and challenges. Journal of Science Teachers Association of Nigeria. 50(1), 207-216.