

DEVELOPMENT OF ENTREPRENEURIAL SKILLS IN SECONDARY SCHOOL STUDENTS THROUGH SCIENCE, TECHNOLOGY AND MATHEMATICS (STM) EDUCATION

By

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Abstract

This study examined the competencies/skills needed by STM teachers to develop entrepreneurial skills in students, the entrepreneurial skills needed by students to be self reliant and also the methods that can be used to develop entrepreneurial skills in students through STM education. Three research questions guided the study. A descriptive survey design was used. The sample for the study consisted of 240 STM teachers drawn from 10 secondary schools in each of the six Education Zones of Anambra State. The validated instrument used for data collection was a 41 items structured questionnaire developed by the researchers. This instrument had a reliability index of 89 using Cronbach Alpha technique. The data collected after administering the instrument were analyzed using mean and standard deviation. The results obtained showed that there are competencies/skills which the STM teachers should possess to be able to develop entrepreneurial skills in students and most of the teachers do not have these competencies/skills. There are methods of teaching that can be used to develop these skills in students. Therefore our STM teachers should be adequately prepared to use these methods and even more to impart entrepreneurial skills in their student's conclusion was also made.

Education is seen as the chief agent for training the young for competent adult role performance and for socialization. Any nation in the 21st century that aspires to

prosper must have means of imparting technological occupational skills in her students. On this basis, science and technology education become a necessity to be pursued. Science, Technology and Mathematics (STM) are powerful tools for social economic and political development of any nation. Thus, many countries of the world have continued to invest enormous resources on STM education. It is important to make clear the various levels of occupation in science and technology for which requisite man-power must be produced by the educational system (Olayiwola and Emmanuel, 2009). This is because our current educational programme lacks the major ingredient that is necessary for adequate self reliance of its recipient. It is theoretically based with little or no practical skills acquisition foundations.

One of the major goals of National Policy on Education (FRN, 2004) is to equip every individual with skills and job competences for gainful employment. This is meant to help cement the partnership between education and labour as we prepare a competitive workforce with entrepreneurial skills. Therefore, there is an urgent need to overhaul our educational system to be able to minimize the problems of graduates' unemployment by inculcating or developing the right type of entrepreneurial skills in them. Ezeudu (2008) stated that STM education has a lot of problems in Nigeria which affects the skills development of its graduates. These problems include

1. Lack of adequate human and material resources.
2. Inadequate funding of science education
3. Mismanagement, bribery and embezzlement of public funds.
4. Lack of good policy implementation guidelines.
5. Poor attitude to work due to irregular salary payment and poor motivation.
6. Administrative problems and hindrances to advancement in science education.

In view of the above stated problems, our educational system particularly STM education should be restructured towards developing entrepreneurial skills in its recipient. This is because Nigerian graduates can no longer rely on the Nigerian labour market to provide them jobs. They have to invent an alternative source of employment which is self-employment. That is they have to be entrepreneurs.

An entrepreneur according to Uzoka (2005), is a person who organizes and manages a business, undertakes and assumes risk for the sake of profit. He tends to start ventures that builds on specific skills they have already acquired either through formal education or in a certain occupation or industry. The entrepreneur is the chief executive or leader of a one-man business (Uyiagbe, 2007). Nnamani (2007) sees the benefits of entrepreneurship education to include development of business awareness, economic empowerment, management acumen, ability to bear risk, self-reliance etc. Considering these importance of entrepreneurship education, it becomes eminent that

the inculcation of entrepreneurial skills in our youths should be emphasized in STM education.

Entrepreneurial skills are relevant skills and competencies that will enable an individual seek and run an enterprise successfully. It consists of effective utilization of ideas, information and facts that help a learner develop competencies or being productive employee of organization (Olibie and Obidike, 2008). Therefore STM education teachers need to lay the foundation for students to acquire the skills for income generation and self empowerment, self reliance and job competency, resource utilization and management and life-copying skills (Mkpa, 2003). The students can through training and practical work acquire these skills. To develop entrepreneurial skills in learners is to use some scientific method in teaching to develop learners meaningfully for scientific, technological and business breakthrough in the society.

Science has acceptable methods through which skills could be acquired. Nneji (2006) opined that teachers as the major operators of educational programmes need not only know these skills but also should be able to demonstrate and use them when teaching their students to develop entrepreneurial skills in them and help them become self employed and self reliant on graduation. This is because without entrepreneurial skills, these graduates will not be able to establish and manage small business enterprises on their own. Hence, there is need for integration of entrepreneurship education into Science, Technology and Mathematics (STM) curricula for secondary schools. This is to enable the STM teachers develop entrepreneurial skills in their students through STM education. This paper therefore examined how the STM teachers could develop entrepreneurial skills in secondary school students through STM education.

Purpose of the Study

The study specifically sought to

1. Identify the competencies/skills that are needed by the STM teachers for the development of entrepreneurial skills in students.
2. Identify the entrepreneurial skills needed by secondary school students through STM education.
3. Determine the methods that can be used to develop entrepreneurial skills in students through STM education.

Research Questions

The following research questions guided the study

1. What are the competencies/skill needed by the STM teachers towards the development of entrepreneurial skills in students.
2. What are the entrepreneurial skills that are needed to be developed in students through STM education?

3. What are the methods that can be used to develop entrepreneurial skills in students through STM education?

Research Method

The design for the study was a descriptive survey. The study was carried out in government owned secondary schools in the six Education Zones of Anambra State. The population of the study was made up of all the one thousand, eight hundred and twenty five (1,825) STM teachers in the two hundred and fifty-eight (258) government owned secondary schools in Anambra State of Nigeria. The sample for the study consisted of two hundred and forty (240) STM teachers who were selected by simple random sampling from 10 secondary schools in each of the six-education zones of Anambra State.

In each of the school selected, from Awka, Onitsha and Nnewi Education zones with fair population of teachers, 5 STM teachers either from Physics, Chemistry, Biology, Basic Science, Basic Technology, Mathematics, Computers Science and Agricultural Science were selected. While in Aguata, Otuocha and Ogidi zones with lower population of teachers, 3 STM teachers from the STM subjects listed above were selected. These teachers were randomly selected.

The instrument used for data collection was a structured questionnaire on Development of Entrepreneurial Skills In Students Through STM Education. The instrument was made up of two parts "A" and "B". Part "A" sought information on the personal data of the respondents such as name of school, zone, local government area, sex, teaching subject etc. Part "B" made up of 41 items consisted of three sections. Part 1 was constructed on a 3 point scale and weighted as follows, Very Much Needed (VMN) = 3, Needed (N) = 2 and Not Needed (NN) = 1. Part 2 and 3 were constructed on a 4 point likert scale and weighted as follows. Strongly Agreed (SA) = 4, Agree (A) = 3, Disagree (D) = 2 and Strongly Disagree (SD) = 1. The instrument was validated by 2 experts in STM Education from Nwafor Orizu College of Education, Part B1 of the instrument had a reliability coefficient of .88, part B2 and 3 had reliability coefficient of .88 and .91 respectively and the instrument as a whole had reliability index of .89 using Cronbach Alpha technique. The comments and suggestions of the experts helped in the final draft of the questionnaire. The researchers with the help of two research assistants administered the questionnaire. A total of two hundred and thirty two (232) copies of the distributed questionnaire was returned.

Mean and standard deviations were used to analyze the data collected. For part 1 on a 3 point scale, a mean of 2.00 and above indicated that the skill was needed by the teachers while mean of less than 2.00 indicated not needed. For part 2 and 3 on a 4

point scale, mean of 2.50 and above indicated agreement to the item while mean less than 2.50 indicated disagreement.

Results

The results were presented in tables according to the research questions.

Research Question 1

Table 1: Mean Ratings and Standard Deviations of the Respondents on the Competencies/Skills Needed by STM Teachers towards the Development of Entrepreneurial Skills in Students

S/N	Competencies	\bar{X}	SD	Decision
1	Conceptual/planning skills	2.54	1.05	Needed
2	Job/technical competence	2.70	1.43	Needed
3	Love for hands-on-activities/practical experiments.	2.27	1.10	Needed
4	High achievement drive.	2.47	1.11	Needed
5	Mental ability	2.20	0.86	Needed
6	Investigative/problem solving skills	2.85	0.50	Needed
7	Communication skills	2.00	0.96	Needed
8	Competitive skills	2.33	0.94	Needed
9	Ability to be creative and innovative	2.52	1.13	Needed
10	Income generation and self empowerment	2.13	1.20	Needed
11	Be ICT literate	2.72	1.41	Needed
12	Production skills	2.96	0.40	Needed
13	Supervisory/Guidance skills	2.23	1.14	Needed
14	Human relation skills.	2.10	1.00	Needed

In table 1, all the items had mean scores of 2.00 and above. This showed that all the skills listed in table 1 are needed by the STM teachers for imparting entrepreneurial skills in students.

Research Question 2

Table 2: Mean Ratings and Standard Deviations of the Entrepreneurial Skills Needed by Secondary School Students through STM Education.

S/N	Entrepreneurial Skills In STM Education	\bar{X}	SD	Decision
15	Fish pond	3.72	0.4	Agree
16	Wine brewing	3.68	0.66	Agree

17	Refuse/sewage disposal	2.96	0.40	Agree
18	Crop improvement	3.50	0.52	Agree
19	Extraction of colour and making of paint	3.33	0.82	Agree
20	Printing/ceramics	3.52	0.51	Agree
21	Making fertilizer	3.42	0.73	Agree
22	Electrical installation	3.75	0.59	Agree
23	Battery charging	3.29	0.80	Agree
24	Computers maintenance work	2.96	0.40	Agree
25	Rewiring/vulcanizing	2.86	0.44	Agree
26	Designing shapes/calibrated ruler	2.80	0.41	Agree
27	Plumbing/pipe-fittings	2.80	0.41	Agree
28	Soap making/detergents	3.90	0.46	Agree
29	Bottled/distilled water	3.95	0.44	Agree
30	Beverage production	3.86	0.48	Agree
31	Perfumes production	3.90	0.46	Agree

Table 2 revealed that the mean ratings of all the items on that table had mean above 2.50. Therefore the respondents agreed that all the entrepreneurial skills listed were needed by STM students to help them become self reliant after school.

Research Question 3

Table 3: Mean and Standard Deviation of the Method for the Development of Entrepreneurial Skills in Students through STM Education

S/N	Methods for Development of Entrepreneurial Skills	\bar{X}	SD	Decision
32	Problem solving method	3.52	0.63	Agree
33	Practical activity based method	3.85	0.67	Agree
34	Learners centred method	3.21	0.58	Agree
35	Demonstration method	2.96	0.55	Agree
36	Field trip/Excursion Method	3.14	0.48	Agree
37	Inquiry method	3.30	0.60	Agree
38	Guided discovery method	3.96	0.73	Agree
39	Conventional/lecture method	2.20	0.40	Disagree
40	Assignment/homework	2.35	0.42	Disagree
41	Science Technology Society	3.47	0.70	Agree

Items 39 and 40 in table 3 were not rated by STM teachers as methods that will help to inculcate entrepreneurial skills in students through STM education hence they had mean ratings less than 2.50. However, all the other items in the table had mean scores of

more than 2.50, hence they were accepted as methods that could be used to develop entrepreneurial skills in students.

Discussion

The findings of this study showed that all the competencies/skills in table 1 were needed by the STM teachers for the development of entrepreneurial skills in science students. This findings is in agreement with that of Ifeakor and Enemuoh (2009) who found out that STM teachers were not able to develop entrepreneurial skills in students because they lack the competencies/skills needed to do that. Therefore the STM teachers should be trained to possess the necessary skills/competencies needed for the development of entrepreneurial skills in their students. The result of this study also revealed that STM students needed all the entrepreneurial skills in table 2 and even more to help them become self reliant after school. This entrepreneurial skills if acquired by our students will encourage many who feel that getting employment after school is very difficult. It will also help them not only to become self reliant but contribute towards building a sustainable national economy.

The findings on the methods to be used for the development of entrepreneurial skills in students showed that conventional/lecture method and Assignment/homework cannot go a long way in the development of entrepreneurial skills in students. However, the STM teachers agreed that all the other methods on table 3 can help in the development of entrepreneurial skills in students. This is in agreement with the work of Ivowi (2006) who opined that if fully utilized, a combination of all or few of these methods can provide the necessary skills in our pupils.

Conclusion

The need to develop entrepreneurial skills in our youths has remained a necessity in Nigeria considering the level of unemployment and abundant opportunities we are endowed with as a nation. Thus our STM curriculum emphasizes the development of entrepreneurial skills that will make our graduate to be self-employed. To achieve this, it becomes necessary to employ methods of teaching that will inculcate in the learner creative skills which will enable him to be enterprising even outside the school. STM teachers should be adequately prepared to impart these skills to their students. This will help make our Science, Technology and Mathematics Education a functional one.

Recommendation

1. The Science, Technology and Mathematics (STM) teacher education programmes should be redesigned to include pedagogical content knowledge and entrepreneurial skill acquisition.

2. Students should be allowed to manipulate laboratory equipments and materials during practical lessons to enable them acquire entrepreneurial skills.
3. The current STM curriculum which has strong focus on learning of content should be restructured to include skill based curricula to meet the needs of the students and the society at large.
4. Teachers should be encouraged to use experimental, discovery, fieldtrip, demonstration methods in teaching Science, Technology and Mathematics.
5. Government should adequately fund secondary school education to provide facilities and materials for Science, Technology and Mathematics.
6. The science teachers association of Nigeria (STAN) should carefully study the problems encountered by science teachers and focus their conferences and workshops on ways of addressing them.

References

- Ezeudu, F.O. (2008). Restructuring Our Science, Technology and Mathematics (STM) Education for Entrepreneurship. *40th Annual Conference Proceedings of STAN*, 268-272.
- Ifeakor, A.C. & Enemu, J.O. (2009). Evaluating the Impact of Teacher Factors for the Development of Entrepreneurial Skills Through STM Education. *50th Annual Conference Proceedings of STAN*, 47-53.
- Ivowi, U.M.O (2006). Re-Engineering Primary Education for Scientific and Technological Skills In Education. *A Proceeding of EYES Workshops, Lagos: Mukugamu and Brother Enterprises.*
- Mkpa, M.A. (2003), Curriculum diversification as a Basis for Entrepreneurship, *Journal of the Curriculum Organization of Nigeria (CON)*. 10(1), 16-21.
- Nnamani, M. (2007). *Entrepreneurship Education for Secondary School*. Enugu: CIDT AP Printing Press.
- Nneji, N.G. (2006). Methods of Acquiring Scientific and Technological Skills at the Primary School Level. In Okafor, N. (Ed) *Enhancing the Status of Science Education, A Proceeding of EYES Workshops Lagos, Mukugamu and Brothers Enterprises.*
- Federal Republic of Nigeria (2004). *National Policy on Education* .Lagos NERDC Press.

Development of Entrepreneurial Skills in Secondary School Students through Science, Technology and Mathematics (STM) Education - Dr. Evelyn O. Egolum and Maureen U. Chukwuma

- Olayiwola, M.A. & Emmanuel, B. (2009). A Survey of Chemistry Teachers Qualification and Their Knowledge of Entrepreneurial Skill in Tertiary Institutions and some Selected Secondary School in Kano Municipality of Kano State, Nigeria. *50th Annual Proceedings of STAN Conference, 195-198.*
- Olibie, E.I. & Obidike, N.D. (2008), *Emerging Knowledge and Skills for Primary Education Curriculum for Social Change*. A Paper Presented at the 2008 National Conference of Curriculum Organization of Nigeria (CON). Nigeria: Sheda, Abuja.
- Uyiagbe, F.E.S (2007). *Fundamentals of Vocational and Technical Education in Nigeria*. Awka Benvicity: Press.
- Uzoka, F.A. (2005). Home Economics as a Tools for Entrepreneurship Education in the 21st Century. *Knowledge Review Multidisciplinary Journal*. 11, 83-90.