



## Teaching for Acquisition of Entrepreneurial Skills Components in Chemistry Curriculum of Senior Secondary School in Anambra State

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### Abstract

The growing rate of unemployment in Nigeria and world at large is posing a serious economic and social problem which is eluding solutions. Because of this, Nigeria included acquisition of entrepreneurial skills for self-employment in her educational curriculum. This study investigated the extent of teaching for the acquisition of these entrepreneurial skills components in Chemistry-by-chemistry teachers. Four research questions, four null hypotheses and a descriptive survey design were used in the study. The study which was carried out in Awka Education Zone used all the 64 chemistry teachers from the 61 secondary schools in the zone. Data was collected with a researcher made questionnaire named Teaching for Acquisition of Entrepreneurial Skills Components in Chemistry (TAESCC) with a reliability coefficient of 0.87. Mean scores were used to answer all research questions, while all null hypotheses were tested using  $X^2$  (chi-square). From the analysis, the researcher found out that: 1. Selected chemistry topics that embedded the entrepreneurial skills are taught theoretically. 2. Practical works are not carried out until WAEC and NECO examinations. 3. Entrepreneurial material/equipment for the teaching for acquisition of these skills were neither provided nor used. 3. There is significant difference in two of the hypotheses based on location and no significant difference in the other two. Based on the above, five recommendations, limitations and suggestions were given.

### Introduction

Many tertiary institutions and secondary schools in Nigeria produce thousands of various cadres of graduates annually. These graduates enter into the labour market seeking for employment, but only few succeed in securing jobs while millions do not. That is why Agummuoh (2017), said that Nigeria is seriously facing unemployment problem which its solution is not in sight. According to world statistics as cited in Bakere (2013), the rate of unemployment among the youths exceeds 38 percent. The secondary school leavers and rural dwellers who account for 75 million among the population of over 150 million people are the most affected strata. According to Uka (2015), the implication of this scenario is that if the rate of unemployment is not checked, it could escalate into youth involvement in all forms of social vices. Viewing from the perceptive of the recent events in the Middle East where unemployment and poverty among others play a key role in the uprising, one can only conclude that Nigerian's unemployment poses a threat to its development, security and peaceful coexistence. There is no doubt that unemployment causes poverty and poverty is one of the major causes of social vices such as armed robbery, destitution, prostitution, political thuggery, rebellion and so on which Nigeria is currently facing. Because the wealth or poverty of a nation depends on

her quality of education, National Policy on Education (FGN, 2017), stated that education maximizes the creative potential and skills of the individual for self-fulfillment and general development of the society. Ikemba (2016), referred to Secondary School Education as Education for career development which aims at providing trained manpower in the applied science, technology and commerce at the sub professional grades.

The problem with Nigerian educational programme is that too much emphasis is laid on certificate rather than the knowledge and skills to be acquired by the holders of the certificate. Okojie (2008), in line with this statement stated that undergraduates struggle hard to attain the 'Golden fleece' which is certificate rather than the knowledge and skills which would make them self-reliant. Okojie added that this is not unconnected to our masters that handed down a lot of theoretical disciplines through our educational programmes in which they lay much emphasis on theories rather than combining it with practical that will enable the recipient acquire appropriate skills for self-reliance and become good entrepreneurs on graduation. However, the NPE (2017), have designed a functional education for the promotion of a progressive and united education hence she stated that school



programmes should be relevant, practical and comprehensive and that its goals among other things should develop appropriate skills, mental, physical abilities and competencies to empower the individual to live in and contribute positively to the society and promote functional education for skill acquisition, job creation and poverty reduction. This call for entrepreneurial skill acquisition programmes to improve citizens' employability. Entrepreneurship is a power of vision, change and creation. It requires application of energy and passion to the creation and implementation of new ideas and creative solutions (Samuel 2014). Skill is the ability to do "something" well, usually gained through training experience. Entrepreneurship skills are those skills which when acquired enables an individual to be self – reliant. However, entrepreneurship skills may not be efficiently and effectively acquired without the knowledge of scientific concepts, process of science and scientific attitudes which are components of science education taught in schools. By implication, Nigeria educational programmes should be loaded with opportunities for science education. This means that for Nigeria to advance well in technology, she must be well rooted in science.

Science which comes from a latin word "scientia" meaning knowledge, is a process, content and product which its education fosters a culture of scientific thinking and use of evidence-based reasoning for decision making, confidence, knowledge and skills for contribution to the increasing complex scientific and technological world. Science is divided into pure and applied sciences. The main branches of pure science include biology, chemistry, physics agriculture, health science and physical education.

Chemistry which in one of the most important branches of pure science and also a physical science, deals with the structure, composition, properties and uses of matter and also goes into the preparation of new substances from things around us (Ababio,2005). In the teaching of sciences in secondary schools for example chemistry, students should be taught to develop entrepreneurial skills, to equip young people with the knowledge and skills needed to be self-reliant and job creators (entrepreneurs) not job seekers. The knowledge of chemistry is used in the production of good water, drug fabrics for (clothing). Chemistry knowledge is also very important for the production of material for construction of industries, road, automobiles and

houses. It is also needed in careers in science and science-based discipline like pharmacy, agricultural science, nursing, medicine, textile, fine art, engineering, laboratory technology, geology et cetera. The old senior secondary school science curriculum had been in existence for past three decades but the way they are taught, though they gave fundamental knowledge that serve as a foundation to doing other courses in the universities, but not enough knowledge/skills are got for the expected skills for self-reliant. Hence, the federal government in 2008 launched a new senior secondary school curriculum which contains an array of 35 entrepreneurial skills. Entrepreneurial skill is an individual's ability to turn ideas into action. Entrepreneurial skill is a combination of technical, management and personal skill for problem-solving ability. Unemployment rate in Nigeria is a serious national problem which could be connected to the type and quality of Nigerian education programme which laid more emphasis on theory and certificate rather than practical and skill acquisition. This informed Nigeria to include entrepreneurial skills for self-employment in her education curriculum with chemistry inclusive. The question is, Are chemistry teachers aware of these entrepreneurial skills? To what extent are these entrepreneurial skills components of chemistry taught for the acquisition of the required expected skills in senior secondary school curriculum in Anambra state?

### **Statement of the problem.**

Acquisition of entrepreneurial skills by graduates of senior secondary schools and higher institutions will help stem the tide of unemployment which is presently getting out of hand in Nigeria especially with the present world economic melt-down. Lack of these skills among school leavers is pinpointed as the major impediments to sustainable development as well as increasing unemployment in the country. This is why the researcher intends to determine the extent of teaching for acquisition of entrepreneurial skills components in the chemistry curriculum of the senior secondary school in Anambra State.

### **Purpose of the Study**

The purpose of the study is to determine the extent of teaching for acquisition of entrepreneurial skills components in the chemistry curriculum in senior secondary schools in Anambra State. More



specifically, the study sought to determine how the entrepreneurial skills components embedded/buried in the chemistry topics: Electrolysis, lead, gases, acids, salts, organic chemistry and carbon and its compounds are taught for the acquisition of the entrepreneurial skills components in the chemistry curriculum of the senior secondary school in Anambra State.

### Research Questions

The following research questions have been formulated to guide the study:

1. What are the chemistry related entrepreneurial skills components taught in the senior secondary school in Anambra State?
2. How regular are the practical works carried out on entrepreneurial skills related to chemistry curriculum of senior secondary school in Anambra State?
3. To what extent are the teaching materials for chemistry related entrepreneurial skills in senior secondary school in Anambra State provided?
4. To what extent are the teaching materials for chemistry related entrepreneurial skills in senior secondary school in Anambra state used?

### Methodology

The study adopted descriptive survey research design and was carried out in Awka education zone of Anambra State. All the 64 chemistry teachers from the 61 state owned secondary schools in the zone were used. A polytomously scored questionnaire named Teaching for Acquisition of Entrepreneurial Skills

Components in Chemistry (TAESCC) developed by the researcher was used for data collection. In the instrument, one instrument sought for topics Taught/NotTaught in some selected chemistry topics where the entrepreneurial skills were embedded and the last three tables used 5 likert scale (SA, A, UD, D, SD) on statements on Regularity of practical work, Availability of practical materials and Usage of the practical materials. The instrument was validated by three lecturers in the faculty of Education, Nnamdi Azikiwe University, Awka. The reliability of the instrument was established using Cronbachs' Alpha technique and the internal consistency coefficient was found to be 0.87. Cronbachs' Alpha was used for the reliability because the responses to the questions are not 'YES' or 'NO' answers. The researcher administered the copies of the questionnaires personally to the chemistry teachers in the schools and after collected all back. Data collected were analyzed using descriptive statistics of percentages to answer research questions while inferential statistics of  $X^2$  (Chi-square) to test the hypotheses at alpha level of  $\leq 0.05$ . The percentage score greater or equal to fifty ( $\geq$ ) is taken as a good pass mark and therefore accepted while a percentage score less than ( $< 50$ ) is not a good pass mark and therefore rejected.

### Results.

**Table 1: Frequencies and percentages on the chemistry related entrepreneurial skills components taught by chemistry teachers in senior secondary schools.**

S/N	Entrepreneurial Skills	Chemistry components	Freq.	%	Remark
1	Auto mechanical work	Electrolysis and lead accumulator	34	53.1	Taught
2	Air conditioning refrigeration	Gas- natural gas	36	56.3	Taught
3	Welding & fabrication engineering craft practice	Organic chemistry-Oxyacetylene flame	3	46.9	Not Taught
4	Block laying, brick laying and concrete work	Carbonates of Ca, Na, Mg, etc	0	53.1	Taught
5	Painting and decoration	Organic chemistry - varnishes	34	50.0	Taught
6	Catering craft practice	Ammonia compounds for production of Fertilizer	32	65.6	Taught
7	Dying and bleaching	Chlorides and chlorine	42	78.1	Taught
8	Photographing	Silver nitrate (nitrates)	50	59.4	Taught
9	Cosmology	Perfumes, soap (organic Chemistry)	3	75.0	Taught
10	Crops production	Ammonia compounds/ (Production of fertilizer)	8	65.6	Taught



Table 1 indicates that with bench mark of 50%, nine out of the ten entrepreneurial skills components in chemistry curriculum were taught by chemistry by majority of the teachers of chemistry in secondary schools.

**Table 2: Frequencies and percentages on the regularity of the practical works carried out in entrepreneurial skills related in chemistry in secondary schools**

Responses	Freq.	%	Remark
Practical work rarely carried out	8	12.5	Not Accepted
Practical work often carried out	2	3.1	Not Accepted
Practical work carried out given opportunity	14	21.9	Not Accepted
No practical work until during WAEC/NECO exam	34	53.1	Accepted
Practical work always carried out	6	9.4	Not Accepted
<b>Total</b>	<b>64</b>	<b>100</b>	

In table 2, it was observed that bench mark of 50%, the practical works are not carried out in entrepreneurial skills related in chemistry in secondary schools until during WAEC/NECO examinations in the area of study.

**Table 3: Frequencies and percentages on how teaching materials for chemistry related entrepreneurial skills in secondary schools in the area of study are provided**

S/N	Entrepreneurial Skills	Freq.	%	Remark
1	In the entrepreneurial skills related topics in chemistry, the teacher provides instructional materials for teaching them	50	79.1	Accepted
2	In the entrepreneurial skills related topics in chemistry, the teacher provides enough chemicals for teaching them.	56	87.5	Accepted
3	In the entrepreneurship studies related topics in chemistry, the teacher improvises most instructional materials that are not available.	38	59.4	Accepted
4	all the entrepreneurship studies related topics in chemistry, the teacher teaches the topics for passing examinations only because of lack of teaching materials.	38	59.4	Accepted
5	In all the entrepreneurship studies related topics in chemistry if there is no teaching material, the teacher does not improvise.	48	75.0	Accepted

Table 3 indicates that with bench mark of 50%, the teaching materials for teaching chemistry related entrepreneurial skills in secondary schools in the area of study are provided by both the teachers and the school management.

**Table 4: Frequencies and percentages on how teaching materials for chemistry related entrepreneurial skills in secondary schools in the area of study are used.**

Entrepreneurial Skills	Freq.	%	Remark
1 In the entrepreneurial skills related topics in chemistry, the teacher uses instructional materials to teach	52	81.3	Accepted
2 In the entrepreneurial skills related topics in chemistry, students use instructional materials to learn during teaching period	50	78.1	Accepted
3 In the entrepreneurial skills related topics in chemistry students use instructional materials to practice and practicalize what they were taught.	38	59.4	Accepted
4 In the entrepreneurial skills related topics in chemistry, if teaching materials are not available, the teacher uses improvised teaching materials to teach.	44	68.8	Accepted
5 In the entrepreneurship studies related topics in chemistry, the students perform the skills after teaching.	44	68.8	Accepted



**Table 5: Chi square on the chemistry related entrepreneurial skills components taught in secondary schools in the area of study based on school location**

S/N	Skills	Urban	Rural	Cal. X <sup>2</sup>	df	Crit. X <sup>2</sup>	Remark
1.	Auto mechanical work	10	22	0.059			
2.	Air conditioning refrigeration	10	26	0.005			
3.	Welding and fabrication engineering	10	20	0.758			
4.	Craft practice	12	22	1.844			
5.	Block laying, brick laying and concrete work	10	22	0.309			
6.	Painting and decoration	6	22	11.576			
7.	Catering craft practice	14	36	0.002			
8.	Dying and bleaching	12	36	0.552			
9.	Photographing	10	26	5.050			
10.	Cosmology	8	38	4.980			
	<b>Total</b>	<b>102</b>	<b>34</b>	<b>25.135</b>	<b>9</b>	<b>14.68</b>	<b>S</b>

Table 5 reveals that at 0.05 level of significance and 9df, the calculated X<sup>2</sup> 25.135 is greater than the critical X<sup>2</sup> 14.68, the first null hypothesis is rejected. Therefore, there is significant difference in the chemistry related entrepreneurial skills components taught in secondary schools based on school location.

**Table 6: Chi square on the regularity of the practical works carried out on entrepreneurship skills related in chemistry in secondary schools in the area of study due to school location**

Responses	Urban	Rural	Total	Cal. X <sup>2</sup>	Df	Crit. X <sup>2</sup>	Rmk
Rarely	1	7	8				
Often	0	2	2				
Give opportunity	8	6	14				
Until during WEAC	7	27	34				
Always	2	4	6				
<b>Total</b>	<b>18</b>	<b>46</b>	<b>68</b>	<b>8.616</b>	<b>4</b>	<b>9.49</b>	<b>NS</b>

Table 6 shows that at 0.05 level of significance and 4df, the calculated X<sup>2</sup> 8.919 is less than the critical X<sup>2</sup> 9.49, the seventh null hypothesis is not rejected. Therefore, there is no significant difference in the regularity of the practical works carried out on entrepreneurial skills related in chemistry in

secondary schools in the area of study due to school location.

**Table 7: Chi square on how the teaching materials for chemistry related entrepreneurial skills in secondary schools in the area of study are provided based on school location**

S/N	Skills	Urban	Rural	Cal. X <sup>2</sup>	df	Crit. X <sup>2</sup>	Remark
1	In the entrepreneurial skills related topics in chemistry, the teacher provides instructional materials for teaching them	13	46	0.002			
2	In the entrepreneurial skills related topics in chemistry, the teacher provides enough chemicals for teaching them.	14	42	2.164			
3	In the entrepreneurship studies related topics in chemistry, the teacher improvises most instructional materials that are not available.	8	30	2.314			
4	all the entrepreneurship studies related topics in chemistry, the teacher teaches the topics for passing examinations only because of lack of	6	32	7.041			



5	teaching materials. In all the entrepreneurship studies related topics in chemistry if there is no teaching material, the teacher does not improvise.	16	32	2.576			
<b>Total</b>		<b>58</b>	<b>172</b>	<b>14.097</b>	<b>4</b>	<b>9.49</b>	<b>S</b>

In table 7 it was observed that at 0.05 level of significance and 4df, the calculated  $X^2$  14.097 is greater than the critical  $X^2$  9.49, the eighth null hypothesis is rejected. Therefore, there is significant difference on how the teaching materials for chemistry related entrepreneurial skills in secondary

schools in the area of study are provided based on school location

**Table 8: Chi-square on how the teaching materials for chemistry related entrepreneurial skills in secondary schools in the area of study are used based on school location**

S/N	Skills	Urban	Rural	Cal. $X^2$	df	Crit. $X^2$	Remark
11.	In the entrepreneurial skills related topics in chemistry, the teacher provides instructional materials for teaching them	16	36	0.959			
12.	In the entrepreneurial skills related topics in chemistry, the teacher provides enough chemicals for teaching them.	12	36	1.924			
13.	In the entrepreneurship studies related topics in chemistry, the teacher improvises most instructional materials that are not available.	8	30	2.314			
14.	all the entrepreneurship studies related topics in chemistry, the teacher teaches the topics for passing examinations only because of lack of teaching materials.	12	32	0.051			
15.	In all the entrepreneurship studies related topics in chemistry if there is no teaching material, the teacher does not improvise.	14	30	0.950			
<b>Total</b>		<b>62</b>	<b>166</b>	<b>6.198</b>	<b>4</b>	<b>9.49</b>	

Table 8 indicates that at 0.05 level of significance and 4df, the calculated  $x^2$  6.198 is less than the critical  $x^2$  9.49, the ninth null hypothesis is not rejected. Therefore, there is no significant difference on how the teaching materials for chemistry related entrepreneurial skills in secondary schools in the area of study are used based on school location.

education in Nigerian secondary school is at low level. Ogunleye (2007) said that the hallmark of an effective chemistry teacher is the knowledge and skills for selecting different strategies or mixing them in the classroom teaching of chemistry in order to develop entrepreneurship capabilities in students. Will this happen when the teachers do not teach the entrepreneurial skills? No.

**Discussion**

Teaching for acquisition of the entrepreneurial skills component in selected chemistry topics as seen from table 1, Teaching for acquisition of the entrepreneurial skills component in selected chemistry topics were taught but table 2, showed that no practicals were done except during external examinations. This implied that the topics were taught on the concept and theoretical level. This is in agreement with Arokwu and Nwafor (2018) who found out in their study that the entrepreneurship

**Conclusion**

The result reveals that the Chemistry teachers, teach the entrepreneurship skills components as embedded in the selected Chemistry topics theoretically neglecting the practical aspects thus the extent of teaching for the acquisition of the entrepreneurial skills components in the Chemistry curriculum of senior secondary schools in Anambra State is very low and far behind being achieved.



### Recommendations

Based on the results of the findings and the implications of this research work, the following recommendations are made:

1. Supervisors of schools should enforce the practical teachings of these entrepreneurship skills components in the Chemistry curriculum of senior secondary school in Anambra State.
2. Government, Non-governmental Organizations (NGOs) and professional bodies to invest more in science education by providing science practical equipment needed for these entrepreneurship skills in schools.
3. Teachers and students should be monitored by the supervisors to ensure that the entrepreneurship materials are used judiciously and as when due.
4. The State Ministry of Education should be organizing regular exhibition of students' entrepreneurship products from time to time to encourage both teachers and students to improve on the practical aspect of the entrepreneurship skills. Prizes should be given to schools, teachers and students that did well to motivate them.
5. Examination bodies like WAEC, NECO, NABTEB et cetera should be testing students' skills on the production of goods and services in entrepreneurship skills. For example, making of soap, perfume, etc to enforce seriousness on students, teachers and schools;

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