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INTEGRATING ENTREPRENEURIAL SKILLS INTO CLASSROOM CHEMISTRY TEACHING: IMPLICATION FOR NATIONAL DEVELOPMENT

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Abstract

This study was on integrating entrepreneurial skills into classroom chemistry teaching: Implication for sustainable national development. Three research questions guided the study. Using simple random sampling technique, a total of 125 chemistry teachers were selected from Uyo Municipality as the sample size. Data collected were analysed using descriptive statistics of mean. The results of the study showed that chemistry teachers approved 7 out of the 10 entrepreneurial skills enumerated for integration into the chemistry curriculum. It was also found out that chemistry teachers have a low level of knowledge on the entrepreneurial skills to be integrated into the curriculum. These teachers equally agreed on all the strategies suggested for effective integration. Implications for sustainable national development were discussed and finally conclusions were made.

Introduction

Nigeria is getting saturated with young graduates of various disciplines that are unemployed. The number of young graduates produced from Nigerian Universities yearly are so enormous that absorbing them into the labour market is becoming quite impossible. Unemployment has assumed serious dimensions in recent times (Fayomi 2007) and therefore needs urgent attention.

One possible way of solving this problem is through arousing youths' interest to appreciate self employment by applying their entrepreneurial skills in participating in the private sector ventures. Unfortunately, it has been revealed that Nigerian contemporary graduates are apparently not well prepared to meet the challenges of participation in the private sector that is becoming the dominant sector to the Nigerian economy (Fayomi 2007).

It is expected that science, technology and mathematics (STM) education would help to ameliorate the situation since science is for life and technology is the bedrock for societal growth and transformation, and this will be actualized through the kind of approach science teaching adopts. Selecting entrepreneurial skills for a particular concept for classroom lesson delivery is an important aspect of teachers lesson plan that helps to integrate effectively, skills that heighten students' interest towards productivity. Olayiwola and Adedibu (2008), suggested that there is a missing link in the selection and application of resources for meaningful results requiring entrepreneurial skills.

The 21st century student- centred approach to learning should innovate novel ways of teaching and learning in classroom situations for entrepreneurial skill development, using well developed lesson contents that stimulate, orientate and motivate students' interest towards entrepreneurial skill acquisition and individual sustainability. Umoren (1998), suggested that it is necessary to provide students with an accurate picture of the requirements and opportunities involved in the multitude of careers available in chemistry education. Consequent upon this, the researchers think that chemistry lessons should evolve creative ways of integrating entrepreneurial skills into chemistry curriculum contents involving models of learning as a challenge to helping teachers think about teaching and learning for self-reliance.

Purpose

The purpose of this paper is to determine specifically:

- The kind of entrepreneurial skills that can be integrated into chemistry curriculum?
- Chemistry teacher level of knowledge on entrepreneurial skills.
- Determine strategies that are needed for effective implementation of these entrepreneurial skills.

Research Questions

The following research questions were generated to guide the study.

- What entrepreneurial skills are to be integrated into chemistry curriculum?
- What are chemistry teachers' level of knowledge on the entrepreneurial skill to be integrated into the curriculum?
- What are the strategies needed for effective integration of these entrepreneurial skills?

Methodology

Design: This is a survey research design.

Population, Sample and Sampling Technique: All the Chemistry teachers in Uyo municipality formed the population of the study. Using simple random sampling technique, a total of 125 chemistry teachers were selected as the sample size for the study.

Instrument for Data Collection

The instrument used for data collection was Entrepreneurial Skills Integration in Chemistry Questionnaire (ESICQ) developed by the researchers and validated by 2 test and measurement lecturers in Science Education. The questionnaire was a 4-point likert type scale of very high (VH) = 4 points, high (H) =3 points, Average (A) = 2 points and Low (L) = 1 point.

Method of Data Collection: The instrument was given to the subjects and collected from them the same day before school dismissal. A total of 120 questionnaire were collected back from the subjects and used for data analysis.

Method of data analysis: The data collected were analysed using descriptive statistics of mean. The mean was interpreted using the following guide:

2.50-4.00-Agree &High for Tables 1&2 respectively
1.00-2.49-Disagree & Low for Table 1&2 respectively

Results

Table 1: Mean Ratings of Chemistry Teachers on the Entrepreneurial Skills to be integrated into chemistry Curriculum.

S/N,	ENTREPRENEURIAL SKILL	SA	A	D	SD	$\bar{X}$
1	Ethanol production from palmwine, cassava, potatoes and other stem tubers	81	19	13	17	3.53
2	Soap and detergent making from seeds of palm, groundnut and coconut	69	31	15	5	3.37
3	Fish culture and farming for the study of pH and butter solutions	53	39	11	13	3.03
4	Production of pomades from carbonated materials of shelled animals, cocoa & cashew nuts	71	25	11	13	3.28
5	Pulp and paper from gmelina plants	65	41	9	5	3.04
6	Fibres from plantain, banana plant peels	24	12	49	35	2.20
7	Food additives from plant acids and dyes	19	39	19	43	2.28
8	Reagent making from bark of trees, flowery seeds for organic chemicals	51	25	33	11	2.97
9	Glass-making from glazed sand and clay	12	28	37	43	2.08
10	Plastic containers from waste polybags & styrene for polymer study and vulcanization	45	29	35	11	2.90

Results on Table I above showed that seven out of the ten enumerated entrepreneurial skills had mean ratings of between 2.90 and 3.53, while only three entrepreneurial skills which include fibres from plantain, banana, plant seeds, food additives from plant acids and dyes and glass-making from glazed sand and clay had mean ratings of less than 2.50. In other words, they are of the opinion that all the entrepreneurial skills listed out except the about three should be integrated into the chemistry curriculum.

Table 2: Mean Ratings on the Chemistry Teachers' Level of Knowledge on Entrepreneurial skills.

S/N	ENTREPRENEURIAL SKILL	SA	A	D	SD	$\bar{X}$
1	Ethanol production from palmwine, Cassava, potatoes and other stem tubers	63	34	11	12	3.23
2	Soap and detergent making from seeds of palm, groundnut and coconut	72	29	12	7	3.38
3	Fish culture and farming for the study of pH and buffer solutions.	31	27	19	43	2.38
4	Production of pomades from carbonated materials of shelled animals,	59	42	13	6	3.28
5	Pulp and paper from gmelina plants	23	25	17	45	2.30
6	Fibres from plantain, banana plants peels	30	37	22	31	2.55
7	Food additives from plant acids and dyes	27	13	35	45	2.18
8	Reagent making from bark of trees, flowery seeds from organic chemicals	21	10	35	54	1.98
9	Glass-making from glazed sand, clay.	19	28	30	42	2.19
10	Plastic containers from waste polybags and styrene for polymer study and vulcanization	20	36	25	39	2.30

Results on Table 2 above showed that only four out of the ten entrepreneurial skills enumerated had mean ratings of 2.55 and above. In other words, chemistry teachers' level of knowledge on four entrepreneurial skills which include ethanol production from cassava, potatoes and other stem tubers, soap and detergent making from seeds of palm, groundnut and coconut, production of pomades from carbonated materials of shelled animals, cocoa and cashew nuts and fibres from plantain plant peels are high. The level of knowledge on the remaining six skills is low.

Table 3: Strategies for effective integration of entrepreneurial skills into the chemistry curriculum.
Table 3 indicates that about 90% of the population indicated that the following strategies should be employed for the effective integration of the entrepreneurial skills.

- Employing a team-teaching approach to the teaching of topics involving entrepreneurial skills.
- Inviting resource personnels with different entrepreneurial skills related to those in the chemistry curriculum to come and teach students.
- Preparing holiday programmes for teachers in the field to receive training from resource personnels.
- Introducing entrepreneurial skills programmes into the curriculum of teachers on in service training.
- Adequate funding of schools for the provision of all the necessary requirements for entrepreneurship training.
- Employing field-trips to industrial sites as a teaching approach to the teaching of topics with entrepreneurial skills.

Discussions

The results of the findings indicate that chemistry teachers are of the view that seven out of the ten entrepreneurial skills listed by the researchers should be integrated into the chemistry curriculum. This is an indication that chemistry curriculum contents lack important entrepreneurial skills. The fact that 3 out of the 10 entrepreneurial skills enumerated are rejected show that chemistry teachers still need to broaden their knowledge on and develop creativity skills on how to use them to maximize productivity. Teachers' agreement on integration of up to 7 entrepreneurial skills into the curriculum is in agreement with Ezeudu

(2008) who had a list of up to eleven practical concepts that could be taught to SS3 chemistry students as entrepreneurial skills.

On the other hand, chemistry teachers' low level of knowledge on seven out of the 10 entrepreneurial skills enumerated is an indication that they are ill-prepared for the entrepreneurial skills needed for students. The kind of training given to them lacks entrepreneurial skills and as such, they cannot give what they do not have. The three skills in which they had a very high mean rating could even be as a result of their demand in the society which has made some of them to go to local producers to learn. For instance, the researchers have observed that many families produce soap and detergents that they use in their homes and some of them are not even scientists.

For strategies on effective integration of entrepreneurial skills, the results of the study showed that chemistry teachers are all in support of all the suggested strategies for effective integration of entrepreneurial skills. The issue now becomes that of implementation. There is a need for all concerned to cooperate and see that these strategies are meaningfully implemented.

Implication

- The importance of integration of entrepreneurial skills into chemistry curriculum content does not only end with helping the recipients to become self reliant, but contribute towards building a sustainable national development as well. Chemistry teachers should therefore be encouraged to integrate and help to develop more entrepreneurial skills into curriculum contents for varieties of opportunity in the labour market.
- The high number of low level of knowledge on the entrepreneurial skills enumerated in Table 2 is suggesting that much work is needed in the area of teacher preparation. Teacher education programmes for the training of prospective science education teachers need to be visited and introduced as entrepreneurial skills into their programmes. There is, a need therefore for the creation of avenues for the training of those presently in the field for the job.
- The need for effective implementation of the suggested strategies calls for the cooperation of all concerned and not only the government for the workability of these laudable ideas. From the strategies mentioned in Table 4, teachers cooperation is highly important and as such, need to be encouraged by way of incentives.

Conclusion

The researchers have X-rayed the need to integrate entrepreneurial skills into chemistry curriculum contents in a country like Nigeria. Since thousands of young graduates are being pumped in the labour market that cannot absorb them every year, there is, as a matter of urgency, the need for self-employment. The Nigerian educational system as a whole should reflect on this idea for sustainable national development.

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