

Chemistry Students' Awareness and Interest on Usage of Chemical Concepts Knowledge in Tie & Dye for Entrepreneurial Skills Development in Kwara State

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Abstract

Entrepreneurship awareness and interest are part of basic necessities for average chemistry students that direct their minds towards entrepreneurship development after school which is capable of reducing unemployment, poverty and other social vices within the society. The study is to determine the awareness and the interest of chemistry students on the usage of chemical concepts in tie and dye for entrepreneurship skills development in Kwara State. The populations were all science students in the public secondary schools in Kwara state and the sample consisted of 110 SSII science students. Two instruments are used in collection of data. A pilot test was conducted involving 20 non participants and the reliability coefficient of $r = 0.82$ and $r = 0.83$ was established using Cronbach Alpha. Research questions were answered using means and standard deviation while research hypotheses were tested at $p = 0.05$ using t -test. The results showed that there is significant difference in the male and female awareness and interest at ($p > 0.05$). The study concluded that male and female secondary school students in Kwara State have high awareness and interest on the usage of knowledge of chemical concepts in tie and dye for entrepreneurship skills development in Kwara State. The study therefore recommended that there is an urgent need for the government and education stakeholders to develop a comprehensive framework to see how entrepreneurship skills acquisition could be part of core course in the chemistry school curriculum and teacher should see chemistry teaching beyond the classroom situation.

Keywords: Education, Awareness, Interest, Entrepreneurship, Chemical Concepts

Introduction

Unemployment in Nigeria is one of the significant threats to our national socioeconomic and political development and cohesion. In fact, the Nigeria government's inability to meet the socioeconomic need and aspirations of its citizen might not be unconnected to the apparent increasing unemployed population. Since the nation's population may continue to be on the

increase, there is an urgent need for the government to expand its approaches to human capital development and tailor it towards job creation. One of the ways to achieve this is by focusing on developing students' skills in sciences and entrepreneurship.

This suggests that the rate of graduate unemployment in Nigeria can be mitigated if science education is well attended to by the concerned stakeholders. It is sad to note that the unemployment rate in Nigeria in recent times has assumed a daunting trajectory. This is based on the explicating report of the Nigeria Bureau of Statistics (NBS, 2021) that the soaring youth unemployment rate between year 2017 – 2021 is alarming. This must bring about a renewed policy direction in the education sector which seems to be one of the major ways to halt the ugly downward trend.

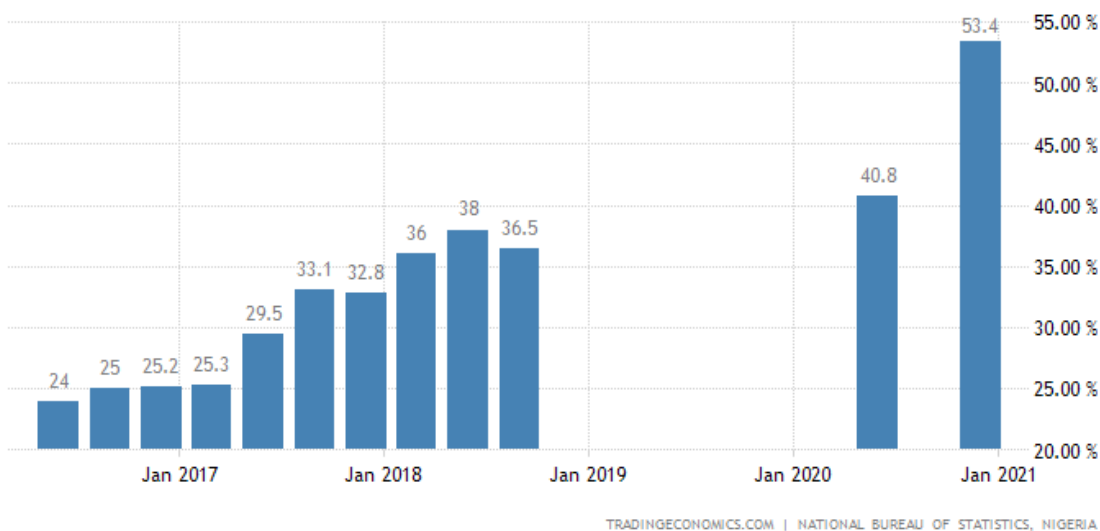


Figure 1: Unemployment rate in Nigeria (2017 – 2021), adopted from NBS (2021).

The figure 1 shows that the trend started from 24% in January 2017 to 53.4% in 2021. Also, the Foundation for Investigative Journalism (17th Aril, 2023) reported that Nigeria has maintained the second largest number of unemployed youths in the world.

Towards the actualization of developing students' skills in sciences, government may need to evolve comprehensive policies that will addresses various sectors such as education, health, and agriculture, with genuine holistic approaches that will equally foster qualitative and quantitative changes in the lives of the citizen through better education. There is the need to holistically look at better education that can cater for job independently and skills acquisition as an approach to apprehend this situation. Ademiotan et, al (2021) also view education as a social medium and

process of acquisition of relevant knowledge, skills and attitude for survival in the changing world. The change in education development would assist in meeting the global competitive depending on the use and application of technology while Adedo, Jimoh and Salman (2018) see education as a form of learning in which the knowledge, skills and habit of a group of people are transferred from one generation to the next through teaching, training or research methods. This indicates that the process of teaching and learning cannot only be factual but can take different methods when needs arise. Some of these science practical oriented skills can be achieve through oriented science education.

Science education is a field of study that exposes learners to the contents as well as the methodology (processes) of acquiring scientific knowledge for practical application in relevant areas of life endeavors. Opataye (2012) sees science education as making of efficient provision of preparation for citizens which have been observed to be possible when there is provision of scientifically literate teacher who have the idea of their global needs for teaching with the aim of instilling scientific and technological values in learner. It is therefore a good news that an average individual with sufficient amount of chemistry or biochemistry background coupled with a sound idea with interest can become job creators rather than job seekers. According to Jaksh (2022), the market is so broad, worthwhile and ready to keep rewarding those who are innovative to proffer solutions based on science. Hence, it is observed that a nation cannot develop without giving proper attention to science education.

The knowledge of human activities of products, production and supply of energy from different sources, means of transportation and communication as well as the inventions of machines and materials that has made life comfortable and enjoyable was derived from science education. Babajide (2015) also observed that by living on the planet, productions of essential human needs like soap of all kinds, creams drinks, petroleum and its bi-products, clothing, cosmetology, drugs, household utensils and chemicals for preservations of food items as well as textiles are all products and principles of Chemistry.

Chemistry is one of the most important branches of science, which enables learners to understand what happens around them and how to manipulate the limited resources. It is a core subject for medical sciences, textile science, agricultural science, synthetic industry, printing technology, pharmacy, medicine and chemical technology (Jegede, 2007). Meanwhile, Jaksch

(2022) noted that Chemistry is linked with more than 96% of majority of the world's synthetic goods today. In the last three decades, there seem to be, an emergence of innovative and disruptive chemical companies entering the labour market. These innovations are exhausting chemistry knowledge to make products that ranges from food, beverage, supplements, biofuel, drugs, diagnostics, skin care, cosmetics and others. Chemistry plays a vital role in every human endeavour such as production of soap, paint and dye, the question is why chemists becoming job seekers instead of job creators.

The integration of entrepreneurship education into chemistry education which was termed chemistry entrepreneurship would produce chemists that can convert chemical concepts learned into commercial or marketable products with a view to reaping individual financial benefits as well as providing opportunities for national economic development and a sure gate way from the present economic recession. Achieving this goal will now depend on the willingness and the interest of chemistry educationist. Professional chemists with training in entrepreneurship skills can initiate a commercialization of their innovative skills in chemistry to acquire great financial profits, become job creators and contribute positively to the national economy especially in global economic recession period.

Kuratko (2005) defines entrepreneurship as a dynamic process of vision, change, and creation. It requires energy, passion, and the application of new ideas and creative solutions. Key elements include a willingness to take calculated risks, the ability to form an effective venture team, resource mobilization skills, the ability to build a solid business plan, and the vision to recognize opportunities even in chaotic and confusing situations. While Odiagbe and Otemuyiwa (2021) stated that entrepreneurship is a process that involves idea generation and opportunity identification which should result in business or product creation. It is also about self-confidence which involves identification of a market and mobilizing necessary resources to serve that market through a business outfit. For a nation to achieve economic development, the citizens must acquire entrepreneurship skills to contribute meaningfully to the national economy. The need to become an entrepreneur in Nigeria is becoming more glaring in the face of increasing unemployment and over saturated labour market. This is the time to see how entrepreneurship education can be integrated.

Mohanty (2009) noted that entrepreneurial knowledge, interest and competency are set of skills needed to create, develop, manage, and grow a business venture. It also includes the ability to handle the risks that come with running a business. Among the competencies identified are: declarative knowledge, self-insight, marketing skills, resource skills, opportunity skills, entrepreneurial passion, self-efficacy, pro-activeness, uncertainty/ambiguity tolerance, innovativeness and perseverance. Incidentally, these skills are not directly taught in chemistry classroom. However, getting these skills lies in introducing entrepreneurship education into the school curriculum.

The awareness and interest of the chemistry students need to be ascertained if the incorporation and usage of entrepreneurial skills by the students is to be achieved. Awareness may mean the understanding of the nature and what makes entrepreneurship choices to be sacrosanct. In other words, being aware of what type of activities and actions are involve in the process of becoming an entrepreneur is likely going to have an impact in terms of promoting entrepreneurship skills acquisition among the students. Therefore, the researcher aims to explore the use of knowledge of chemical concepts in the awareness and interest of students as pathways to entrepreneurship in Tie & Dye production. By doing so, students will acquire a fundamental skill before graduating from secondary school, empowering them to be self-employed and contribute to society without solely relying on government jobs.

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The dropping out of students today might have contributed to unemployment and other social vices because the skill needed that can assist them to be useful within the society was not there. Regrettably, Thomas (2007) in his study stressed that secondary school chemistry students came out of schools with mere certificates that are almost useless in most labour markets and industries. There is inconsistencies between formal chemistry and the present day chemical market and industrial demands. The importance role being play by chemistry in the socioeconomic

development cannot be over emphasizes yet people are not aware and the curriculum failed to address the contents for which chemistry is planned for, the gap within the chemistry education curriculum seems to be the entrepreneurship orientation and competencies. Lack of practical knowledge for innovation by the students makes them to become job dependent instead of job creator this might have add to the number of unemployed whereas the available resources within their surrounding can be turn to wealth on their own. It is essentially about someone creating a market from his own resources. If chemistry plays a vital role in every human endeavour such as production of soap, paint and dye, then why are chemists becoming job seekers instead of job creators. This suggests that education sector has not over time offered the required job creation skills in the students.

The theoretical method of teaching by chemistry teacher need to change if student were to be made to understand basic chemistry concepts. Mohanty (2009) say that the theoretical teaching of most practical oriented concepts in chemistry had hinder the student to understand the basic scientific principles this are one of the factors that affect the acquisition of skill in chemistry. The challenges faced by entrepreneurs is time management, figuring out what kind of product or service to offer, marketing, hiring talents, delegating authority guarding cash flow and finding capital may part of the reasons why entrepreneurship is not done in the classroom. Mohanty (2009) noted that efforts at making chemistry students to be entrepreneur are frustrated by many factors which are not too different from other entrepreneurs.

Purpose of the Study

The purpose of this study was to investigate the awareness and interest of secondary school chemistry students on the usage of knowledge of chemical concepts in tie and dye for entrepreneurship skills development in Kwara State., Nigeria. The specific objectives of the study were to:

- i. determine the awareness of chemistry students on the usage of knowledge of chemical concepts in tie and dye for entrepreneurship skills development in Kwara State.
- ii. determine the interest of chemistry students on the usage of knowledge of chemical concepts in tie and dye for entrepreneurship skills.

- iii. investigate the influence of gender on the awareness of chemistry students regarding the use of knowledge on the usage of chemical concepts in tie and dye for entrepreneurship skills.
- iv. investigate the influence of gender on the interest of chemistry students on the usage of knowledge of chemical concepts in tie and dye for entrepreneurship skills development in Kwara State.

Research Questions

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

- i. Are chemistry students aware on the usage of knowledge of chemical concepts in tie and dye for entrepreneurship skills development among secondary school students?
- ii. What is the level of interest among chemistry students in utilizing the usage of knowledge of chemical concepts in tie and dye for entrepreneurship skills among secondary school students?

Research Hypotheses

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

- i. There is no significant difference in the awareness of male and female chemistry students regarding the usage of knowledge of chemical concepts in tie and dye for entrepreneurship skills development among secondary school students.
- ii. There is no significant difference in the interest of male and female chemistry students in utilizing the usage of knowledge of chemical concepts in tie and dye for entrepreneurship skills development among secondary school students.

Methodology

The study is empirical and quasi-experimental and descriptive survey design type, The population of the study consisted of all male and female senior chemistry secondary (SSII) students in public senior secondary schools in Kwara State, Nigeria. The sample for the study consisted of 110 Secondary School chemistry students using multi-stage sampling procedure. The multi-stage sampling procedure involved a number of separate stages. These stages are as follows: In the first stage, from the three senatorial districts in Kwara State, one was selected using simple random sampling technique. In the second stage, from senatorial district selected one Local Government

Area was selected using simple random sampling technique. In the third stage, two secondary schools were selected using purposive sampling technique. The basis for purposive selection was that such schools has a standard chemistry laboratory, at least a chemistry teacher, with number of students offering chemistry, and willingness and readiness of the school management to allow their students to participate in the study from the schools selected, one arm of the students was selected using option yes and no technique.

The instrument used was a self-constructed questionnaire consisting ten items each on the usage of knowledge of chemical concepts in tie and dye for entrepreneurship skills development on student Awareness and Interest (SAUKCCTDESD and SIUKCCTDESD) on 4-points Likert scale. The instrument undertook face and content validity two experts from the Department of Science Education. The reliability coefficient are $r = 0.83$ and 0.82 establish using Cronbach Alpha. The data collected were analysed using descriptive and inferential statistics. The research questions were answered using frequency count, mean and standard deviation. The hypotheses were tested using t-test, at 0.05 level of significance.

Results

Research Questions 1: Are chemistry students aware on the usage of knowledge of chemical concepts in tie and dye for entrepreneurship skills development among secondary school students?

Table 1: Descriptive Statistics on the level of Student Awareness

Description	Mean	Std. Deviation
1 Are you aware that the production of some consumable products is the knowledge of chemistry chemical concepts	3.55	.672
2 Are you aware that the production of some house made products is the knowledge of chemistry chemical concepts	3.50	.687
3 Are you aware that the production of some technological equipment's is the knowledge of chemistry chemical concepts	3.45	.711
4 Are you aware that the production of some home appliances equipment's is the knowledge of chemistry chemical concepts	3.38	.801
5 Are you aware that the production of some clothing design is the knowledge of chemistry chemical concepts	3.44	.807
6 Are you aware that the production of some preservatives agents in food is the knowledge of chemistry chemical concepts	3.30	.934
7 Are you aware that the production of some preservatives agents in drinks is the knowledge of chemistry chemical concepts	3.40	.848
8 Are you aware that the production of soap is the knowledge of chemistry chemical concepts	3.76	.487

Description	Mean	Std. Deviation
9 Are you aware that the production of cosmetic is the knowledge of chemistry chemical concepts	3.57	.598
10 Are you aware that the production of Kampala is the knowledge of chemistry chemical concepts.	3.52	.810

From the result in table 1 using the data obtained from the question items (1 – 10), on the awareness of chemistry students on the usage of knowledge of chemical concepts in tie and dye for entrepreneurship skills development among secondary school students. It was observed that all the mean of the respondents was between (3.30 - 3.76) and standard deviation between (.934 - .488) since the mean values were greater than 2.5, it implies that the respondents were aware of the usage of knowledge of chemical concepts in developing entrepreneurship.

Research Question 2: What is the level of interest among chemistry students in utilizing the usage of knowledge of chemical concepts in tie and dye for entrepreneurship skills among secondary school students?

Table 2: Descriptive Statistics on the level of Student Interest

Description	Mean	Std. Deviation
1 Practical production of pomade during teaching of cosmetology concept in the classroom will help to increase student interest in learning chemistry chemical concepts.	3.61	.576
2 Practical production of soap during teaching of saponification concept in the classroom will help to increase student interest in learning chemistry chemical concepts...	3.63	.522
3 Practical method of designing in clothing during teaching of textile concept in the classroom will help to increase student interest in learning chemistry chemical concepts.	3.61	.718
4 Practical production of insecticide during teaching of pesticide concept in the classroom will help to increase student interest in learning chemistry chemical concepts.	3.27	.899
5 Practical production of drinks during teaching of conservative agent concept in the classroom will help to increase student interest in learning chemistry chemical concepts.	3.52	.700
6 Practical production of beverages during teaching of conservative agent concept in the classroom will help to increase student interest in learning chemistry chemical concepts	3.42	.682
7 Practical production in generating electricity during teaching of electrolysis concept in the classroom will help to increase student interest in learning chemistry chemical concepts	3.55	.658

Description	Mean	Std. Deviation
8 Exposing student to use of knowledge acquired in chemistry chemical concepts in products production will help to increase student interest in learning chemistry as a subject.	3.58	.626
9 Exposing student to use of knowledge acquired in chemistry chemical concepts in products production will help to increase will improve student understanding in learning chemistry as a subject	3.67	.545
10 Exposing student to use of knowledge acquired in chemistry chemical concepts in products production will help student to become an entrepreneur.	3.52	.660

From the result in table 2 using the data obtained from the question items (11 – 20), on the level of chemistry students interest in utilizing usage of knowledge of chemical concepts for entrepreneurship skills development among secondary school students. It was observed that all the mean of the respondents is between (3.27- 3.67) and standard deviation of (.899 -.545) since the mean values ware greater than 2.5, it implies that the respondents have high interest in utilizing their usage of knowledge of chemical concepts in tie and dye for entrepreneurship skills development.

Hypotheses Testing

Hypothesis 1: There is no significant difference in the awareness of male and female chemistry students regarding the usage of knowledge of chemical concepts in tie and dye for entrepreneurship skills development among secondary school students.

Table 3: The t-test analysis of male and female students’ awareness on the usage of knowledge of chemical concepts in tie and dye for entrepreneurship skills development.

	Gender	N	Mean	t	df	sig
TOTAL AWARENESS	Male	46	31.91			
	Female	64	30.84	1.345	108	.171

The result from table 3 shows that, the t-value is 1.345 which is greater than the p-value 0.05. This implies that there is no significant difference in the male and female awareness of the usage of knowledge of chemical concepts as a pathway for entrepreneurship skills. The null hypothesis is hereby not rejected at 0.05 level of significant and concluded that there is no significant difference

on the awareness of male and female chemistry students on the usage of knowledge of chemical concepts in tie and dye for entrepreneurship skills development

Hypothesis 2: There is no significant difference in the interest of male and female chemistry students in utilizing the usage of knowledge of chemical concepts in tie and dye for entrepreneurship skills development among secondary school students.

Table 4: t-test analysis of Male and Female students' interest on the usage of knowledge of chemical concepts in tie and dye for entrepreneurship skills development.

	gender	N	Mean	Std. Deviation	Sig	t	Df
INTEREST	Male	44	35.6818	4.73862			
	female	64	35.0312	3.54996	.148	.815	.106

The result from table 4 shows that, the t-value is .815 which is greater than the p-value 0.05.. This implies that there is no significant difference in the male and female interest on the usage of knowledge of chemical concepts in tie and dye for entrepreneurship skills development. The null hypothesis is not rejected at 0.05 level of significant and concluded that there is no significant difference on the interest of male and female students in utilizing the usage of knowledge of chemical concepts in tie and dye for entrepreneurship skills development.

Discussion of Findings

The finding from the study revealed that students were aware in developing and have interest in the utilizing the use of knowledge of chemical concept as pathways for entrepreneurship among secondary school in Kwara State. The result was in line with the findings of Syden and Gordon (2014) where it was conducted that entrepreneurial awareness among high school students was very high. The result revealed that majority of the respondents heard about entrepreneurship and it suggests that entrepreneurship education can create awareness from the school level itself so that self-employment career option can instill at the earlier while the result was also in line with related study by, Malebana (2014) showed that students were more pulled rather than pushed into entrepreneurship. In other words, students were interested in entrepreneurship mainly as a result of positive factors such as the opportunity to make use of creative talents, independence and prospects for higher earnings than through negative factors such as high prevalence of unemployment Levenburg and Schwarz (2008) described entrepreneurship as the desire to be self-employed.

The finding from the study also revealed that there was no significant difference in the male and female chemistry students' awareness and interest of the use of knowledge of chemical concepts as pathways for entrepreneurship skills among secondary school students. In line with Fitzsimmons and Douglas (2005) examined the relationship between entrepreneurial attitudes, abilities and entrepreneurial intentions in India, China, Thailand and Australia. Using the OLS technique, entrepreneurial attitudes were found to be significant in explaining career decisions of individuals. Ownership attitude was shown to have the most influence on entrepreneurial intentions. Generally, individual's desire for more income, independence and less risk in making a career decision determined interest in entrepreneurship. From the two experimental studies, it was observed that the determination, the attitudes, the conditions and the situation in which one is facing at a particular time and period connate the interest of an individual to entrepreneurship acquisition shows that individuals' interest cannot be over emphasis.

Entrepreneur is a catalytic agent of change, who generates employment opportunities for himself and others. Therefore, paying attention to improving skills of entrepreneurs and their education is necessary to increase competencies skills (Omoniyi & Torru, 2017), it is noted by European Commission (2006) that the acquisition of entrepreneurship skills involves creativity, innovation and risk-taking, as well as the ability to plan and manage projects in order to achieve objectives, this were the foundations for acquiring more specific skills and knowledge needed by those willing to establish or contribute to social or commercial activity. This means that understanding of ethical values will promote good governance as a determine factors in the awareness and the interest differences. This shows that a good ability to turn ideas into action make individual aware and promote the understanding context of their work and able to seize opportunities that's available.

Conclusion

Based on the analysis of data and the interpretation of the results of this study, it can be concluded that that male and female secondary school students in Kwara State have adequate awareness and have interest in the use of knowledge of chemical concepts as a partway to entrepreneurship skill development.

Recommendations

In view of the results of the findings and conclusions reached in this study, the following recommendations are hereby offered:

- i. There is an urgent need for the government and education stakeholders to develop a comprehensive framework to see how entrepreneurship skills acquisition will be part of core course in the school curriculum.
- ii. There is need for chemistry teachers to see how some scientific concepts skills could be translated into entrepreneurship skills acquisition to complement the awareness and interest already developed by the chemistry students.
- iii. Organizing seminars and workshop that will assist the teachers involves to be acquainted with new innovations on entrepreneurship skills acquisition.
- iv. Organizing competition for entrepreneurship exhibition and give prize or incentive to the best this would serves to promote the interest and increase the awareness level.

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