

EFFECTS OF USING KNOWLEDGE OF CHEMICAL CONCEPTS ON COSMETOLOGY PRODUCTION AS PATHWAYS FOR ENTREPRENEURSHIP SKILLS, AMONG SECONDARY SCHOOL IN KWARA STATE, NIGERIA.

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Abstract

Fermentation process is one of chemical concept that can be demonstrated inform of practical teaching and a necessities for average chemistry students to partake in it. This could have directed their minds towards entrepreneurship development after school that is capable of reducing unemployment, poverty and other social crimes within the society. This study was therefore set out to determine the effect of cosmetology on chemistry students regarding the use of knowledge of chemical concepts as pathway to entrepreneurial skills development. The study is empirical and adopted descriptive survey and quasi experimental research design using multi-stage sampling procedure. The populations were all science student in the public secondary school in Kwara state and the sample consist of 110 SSII science students. Three instruments were used they are Chemistry student Achievement Test (CAT) and Students Awareness and Interest of the use of Knowledge of Chemical Concept in cosmetology as pathways for Entrepreneurship Skill Acquisition using Questionnaire with Linkert scale. A pilot test was conduct among 20 non participants and the reliability coefficient of 0.82, 0.83 and 0.72 using Cronbach Alpha formula. Research questions were answered using means standard deviation while research hypotheses were tested at $p = 0.05$ using t-test. The results showed that there is significant difference in the performance and the achievement of student at $p = 0.05$). The study concluded that the use of knowledge of chemistry concepts had effect on entrepreneurial skills and achievement on secondary school students as pathways for entrepreneurship skill 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; teacher should see chemistry teaching beyond the classroom situation and the government should ready be to give adequate financial support in the realization of the objective.

Keywords: Unemployment, Education, Entrepreneurship Education, Chemistry, Chemical Concepts.

Introduction

Lack of basic understanding of the scientific principle by chemistry student had contributed to low knowledge on how chemistry concepts could have been translated into materials and products as Entrepreneurship skill acquisition this had led to unemployment that have negative consequence on the economy. Entrepreneurship skills are a veritable tool that can assist chemistry students to confront unemployment, reduce poverty and create wealth towards becoming self-reliant. 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 achieving this is by focusing on developing students' skills in sciences and entrepreneurship.

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 years 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.

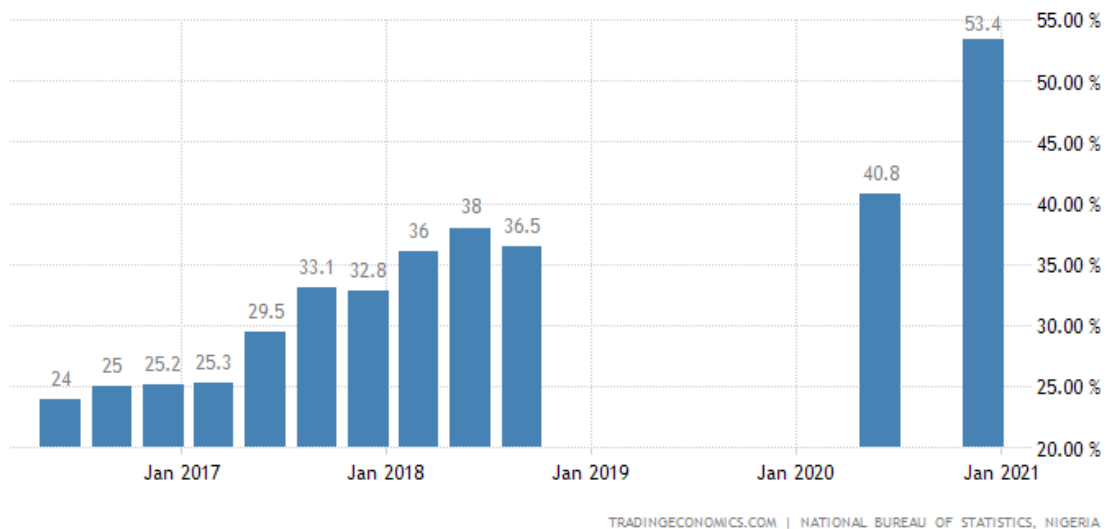


Figure 1: Unemployment rate in Nigeria (2017 – 2021), adopted from NBS (2021).

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.

A nation committed to the progress and advancement of its citizens must have an

education system that reflects the changing needs of the country. These changes should arise from the goals, needs, and aspirations of both individuals and the government, serving both immediate and long-term objectives. In order to take action, individuals need to have an understanding of economics, the ability to mobilize and manage resources, and be comfortable with uncertainty and ambiguity (Sarasvathy, 2008; Venkataraman, 2011; Gibb, 2011;

Moberg, 2014; Neck, Greene, & Brush, 2014). This highlights that in way to reduce unemployment education should be based on students engaging in hand-on activities this would enable individuals to become self-employed through skills acquisition.

Sadly, the Nigerian system of education relied mostly on certificates rather than skill acquisitions; most of our teaching focuses more on theory rather than practical because most school administrators in secondary schools hide under the guise of lack of finance, equipment, ill-equipped laboratories and lack of qualified teachers as some of the factors which made it difficult for students to acquire the required skills needed to support their certificated courses this skills could have regarded as entrepreneurship skills in our educational programed which had negate the entrepreneurship education objective. Federal Republic of Nigeria (FRN, 2013) in the National Policy on Education (NPE, 2013), that the proposed objectives for teaching and learning entrepreneurship education focus on skill acquisition

Education is a fundamental tool that we use in our daily lives to sustain ourselves. It can be acquired formally within educational institutions or informally outside of them. Education institutions play a crucial role in helping individuals understand their functions, Ademiotan., Jimoh., Yusuf., Adedo, & Abdulrauf, (2023) 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. There is the need for government to look for a way to incorporate skill acquisition programme into our educational system which is known as entrepreneurial courses in the teacher training

institutions as well as the secondary schools. It's not that introducing entrepreneurial skills in school is aimed at inflicting cognitive load on the learners, but an avenue to instill on the students a form of functional knowledge; rather it is aimed at equipping the learners with the type of knowledge that will enable them to be financially capable and relevant anytime and anywhere (NPE, 2004). Entrepreneurial skill involves the ability to exploit an idea and create an enterprise, regardless of its size, for personal gain as well as social and developmental benefits (Olagunju, 2004; Adeyemo, 2009).

This means that teacher needs to see entrepreneurship teaching process beyond the classroom situation. Entrepreneurship is not only about improving one's own life but also about engaging in activities that enhance the living standards of society and contribute to the overall economy. According to Schumpeter (1949), entrepreneurship acts as a catalyst that disrupts the stationary circular flow of the economy and initiates and sustains the process of development by placing human agents at the center, entrepreneurship is driven not only by profit but also by a sense of achievement. Another viewpoint is that entrepreneurship is the process of starting a business, a startup company, or other organizations, where the entrepreneur develops a business plan, acquires the necessary resources, and assumes full responsibility for the success or failure of the venture (Omoniyi & Torru, 2017). People are yet to see the contributory factors of chemistry to entrepreneurship endowments.

Chemist plays around with the use of chemical which can be transformed into products formation. The term "chemical" is used to refer to both pure chemical substances and mixtures, while in the realm of chemistry, the term

"chemical substance" is a precise technical term synonymous with "chemical" (Oxford Online Dictionaries, 2017). Chemical substances are utilized by chemists for various purposes and experiments, depending on their intended applications. Understanding how to handle chemical substances in the production of different materials can serve as a pathway to acquiring entrepreneurship skills. The process of learning chemical concepts involves reasoning and mental activities that occur in the cognitive domain, in conjunction with prior knowledge, to generate new knowledge. Taber (2014) argues that meaningful learning is "active" in the sense that learners actively connect new knowledge to their existing ways of understanding the world, even if not always consciously. Therefore, conceptual learning in chemistry is an iterative process in practical demonstration.

Thus, any society that aspires to be great must pay adequate attention to the teaching of chemistry to its citizenry considering its pivotal role and its multipurpose skills acquisition programme embedded in the subject contents. Chemistry entrepreneurship education therefore involves the process of converting innovations in chemistry concept into marketable products for commercial gain. Chemistry, being an essential subject among the sciences, is offered at the Senior Secondary level in Nigerian schools to help students grasp important scientific concepts that are applicable in their immediate environment (Lawrence & Avaa, 2011). Chemistry was introduced into the Senior Secondary School curriculum in Nigeria due to its educational value and relevance to the needs of individual learners and society as a whole (Ogunleye, 2010; Lawrence & Avaa, 2011). These can be conceived as a form of entrepreneurship education given in order to achieve the Sustainable Development Goals (SDG) of the

Federal Government of Nigeria. Chemistry content carries most of these acquisition skills that can serve as entrepreneurship education.

Odiagbe and Otemuyiwa (2021) revealed that entrepreneurship education is a type of learning which directs one towards self-reliance and conceived it as a reasonable channel that will greatly assist in curbing unemployment, reducing poverty thereby promoting national development. They posited that if entrepreneurship education is introduced, the problem of unemployment, poverty and insecurity will be greatly reduced, if not totally solved. The European Commission (EUC, 2011) defines entrepreneurship education as a process that equips learners with a wide range of competencies, leading to individual, social, and economic benefits. The knowledge gained through entrepreneurship education can be applied in various aspects of life, including establishing profitable businesses while Enu (2012) highlights entrepreneurship education as an emerging agenda for transforming Nigeria's tertiary education

The government should pay more attention to skill acquisition and entrepreneurship education by packaging it into functional and practical trainings, this will serve its own quota to economic development and equally empower the students to be self-employed and contribute to society without solely relying on government jobs. Osuala (2004); Duru (2006) observe that entrepreneurship education can be seen as a transformative training provided to students for self-reliance. The introduction of entrepreneurship education into secondary school education is inevitable, as it bridges the gap and serves as an instrumental tool for national development (FGN, 2013; Odiagbe & Otemuyiwa, 2021).

Entrepreneurship education at the senior secondary education level, as defined by

Odiagbe & Otemuyiwa (2021), refers to teaching and learning at the post-basic level aimed at instilling entrepreneurial skills in learners to become self-reliant. According to the Federal Republic of Nigeria (FRN, 2013) in the National Policy on Education (NPE, 2013), the proposed objectives for teaching and learning entrepreneurship education focus on skill acquisition and job creation while the goals was stated in the NPE (FGN, 2004), to Providing trained manpower in applied sciences, technology, and business, particularly at the craft, advanced craft, and technical levels. ii. Providing training and imparting the necessary skills to individuals for economic self-reliance. iii. Producing skilled, self-reliant, and enterprising craftsmen and technicians who can apply their technical knowledge and vocational skills to solve industrial, agricultural, and economic problems in the nation.

The need for integration of entrepreneurship education into our secondary school education is inevitable. Researchers have expressed concern that entrepreneurship education is evolving separately from entrepreneurship research, resulting in important insights and advancements from the latter field not being effectively incorporated into educational practices (Hägg & Gabrielsson, 2017). That's why the researcher wants to see the effects of the use of knowledge of chemistry concept on cosmetology as pathways for entrepreneurship skills by exposing the student into practical.

Purpose of the Study

This study aims to determine the performance and achievement in the use of knowledge of chemistry concepts as pathway for entrepreneurship among secondary school students in Kwara state, Nigeria. The specific objectives of the study are to:

Examine the student's performance scores on cosmetology skill.

Examine the effect of practical chemistry concepts on entrepreneurship skill.

Examine the difference in the male and female students' achievement in cosmetology concepts as pathways for entrepreneurship in Kwara State?

Research Questions

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

Is there any difference in student's performance in cosmetology skill prior to the intervention?

Would there be a difference in the student's achievement in cosmetology when exposed to practical as pathways to entrepreneurship?

Research Hypotheses

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

There is no significant difference in the student's achievement in cosmetology concepts when exposed to practical as pathways to entrepreneurship.

There is no significant difference in achievement scores of male and female students in cosmetology concepts as pathways for entrepreneurship.

Significance of the Study

The study's significance will be felt in the following area

It will improve the knowledge of literature on the effectiveness of using the knowledge of chemistry in reducing youth unemployment and restiveness.

The result will provide adequate information needed by chemistry teachers on the need to shift from the emphasis on primordial theoretical teaching approaches to a more pragmatic and skill-oriented approaches with a view to making job creators rather than job seekers after secondary school

The students will come to the full glare of the potentials of chemistry concepts knowledge as those that could bail them from perpetual poverty, and make them have the fundamental basic knowledge on chemical concepts.

It will go a long way at relieving the parent from the challenge of sourcing for school fees as the students can continue to generate fund from their knowledge of cosmetology and other products production

The educators and researchers will benefit with a view to making sure that adequate policy are formulated and implemented to the guide the students' mind for entrepreneurship development. It will assist the society towards mitigating the dreaded effect of unemployment, insecurity and reduces social crimes in our society.

Methodology

The research design for this study was a combination of quasi-experimental and descriptive survey. The population of the study consisted of all students offering chemistry in secondary school (SSII) in public senior secondary schools in Kwara State, Nigeria. The state have sixteen Local Government divided into four senatorial zone, one senatorial zone was selected using random sampling, from the selected zone one Local government area was selected, two senior science secondary school was selected using purposeful method. The sample for the study consisted of 110 Secondary School chemistry students in an intact class from the two selected schools. Three instruments were used in the study: (1) Chemistry Achievement Test (CAT). (2) Students' Awareness (SAKCCCESA) and Interest (SAKCCCESA) of the Use of Knowledge

of Chemistry Concepts on cosmetology as Pathways for Entrepreneurship Skill Acquisition (SAKCCCESA). The CAT consisted of three questions with sub sections of thirty fill in the gap and attract 1mark each of sum total 30marks while the questionnaire consisted of two sections of ten items questions each of sum total twenty items using Linkert scale. The three instruments used in the study underwent content and construct validity checks by the expert from the Department of Science Education, Adekunle Ajasin University, Akungba Akoko, Ondo State, the instruments were trial tested by administering them to 20 non-participating students and were analyzed using the Cronbach Alpha reliability test and the reliability coefficient for CAT was ($r = 0.82$), SAKCCCESA ($r = 0.83$), and SIKCCCESA ($r = 0.72$) respectively. The collected data were analyzed using descriptive and inferential statistics and the hypotheses were tested using t-test, Analysis of Variance (ANOVA) and Analysis of Covariance (ANCOVA) at 0.05 level of significance.

Data Analyses

Research Question 1: Is there any difference in student's performance in cosmetology skill prior to the intervention?

Table 1

Comparisons of Mean Scores of Students in the Experimental groups A and control group B Pre-test Scores Descriptive Statistics

	N	Mean	Std. Deviation
Pre-test Performance Group A	63	11.6349	4.74954
Pre-test Performance Group B	47	10.2766	3.21479
Mean Difference		1.3583	
Valid N (listwise)	47		

Table 1 shows that there was no much difference in the mean scores of both experimental groups A ($\bar{x} = 11.6349$) and the control group B ($\bar{x} = 10.2766$)

with the mean difference ($\bar{x} = 1.3583$). This shows that both groups enter the experiment with homogeneous level of academic performance in cosmetology.

Research Question 2: Would there be a difference in the student's achievement in cosmetology when exposed to practical concepts as pathways for entrepreneurship?

Table 2

Descriptive Statistics

Treatment	Mean	Std. Deviation	N
Experimental group	62.75	13.241	63
Control group	31.00	11.002	47
Total	49.18	19.992	110

Table 2 shows that the post-test mean scores of experimental groups A ($\bar{x} = 62.75$) with deviation of 13.241 was significantly higher than that of control group with the mean score ($\bar{x} = 31.00$) with deviation of 11.002 with the mean difference ($\bar{x} = 31.75$). This suggests that there is difference on student's achievement when exposed to practical teaching on cosmetology concepts as pathways for entrepreneurship.

Paired Samples Test

		Paired Differences				T	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error	95% Confidence Interval of the Difference		
					Lower	Upper	
Pair 1	Pre-test Performance Group						
	Post-test Performance Group	5.079	5.877	.740	-.972	1.988	.495
	A						

Table 3 showed that the t value ($t = 1.686$) is significantly higher than the p value ($p < 0.005$) indicated a significant effect of the intervention/treatment on the student's achievement in cosmetology concepts as pathways for entrepreneurship. Based on the results, the hypothesis is hereby rejected. There is significant difference in the student's

Table 4

Analysis of Pre-test and post-test Scores of Students' Achievement in Cosmetology Concepts in the Experimental groups A and control group B

Hypothesis 1: There is no significant difference in the student's achievement in cosmetology concepts when exposed to practical as pathways to entrepreneurship.

Table 3

Paired t-test analysis of students' achievement in chemistry concepts

achievement in cosmetology when exposed to practical concepts as pathways for entrepreneurship

Hypothesis 2: There is no significant difference in achievement scores of male and female students in cosmetology concepts as pathways for entrepreneurship.

Independent t-test of male and female students' achievement scores

Independent Samples Test

		Levene's Test for Equality of Variances		Testt-test for Equality of Means						
		F	Sig.	T	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Achievement Group A	Equal variances assumed	5.088	.028	.449	61	.655	.49087	1.094	2.679	1.697
	Equal variances not assumed			.439	52.13	.662	.490	1.117	2.732	1.750

The Levene's test is not significant at ($F = 5.088$, $P = .028$) this showed that equal variance assumed will be considered. The t-value ($t = .449$, $P = .655$) showed a significant difference in the achievement of male and female students in cosmetology concepts as pathways for entrepreneurship. Based on the results, the hypothesis is hereby rejected. There is significant difference in the achievement scores of male and female students in cosmetology as pathways for entrepreneurship.

Results

The results of data analysis for the study showed that:

Entrepreneurship skills have effects on the student's achievement on cosmetology concepts as pathways for entrepreneurship.

Entrepreneurship skills have effects on the male and female student's achievement on cosmetology concepts as pathways for entrepreneurship skill

The use of knowledge of chemistry concepts as effects on Entrepreneurship skills

Discussion of Findings

The finding revealed in hypothesis 1 indicated a significant effect of the intervention/treatment on the student's achievement that's every individual

perform better if expose to practical teaching. This is in line with Olatunbosun (2019) observed that science practical work plays a vital role in developing scientific knowledge and enhancing scientific skills, attitude and enquiry-based learning that student learn by performing concrete activities by comparing experimental activities to normal learning this have an effect on learning achievement.

The finding revealed in hypothesis 2 showed a significant difference in male and female achievement scores this is in line with Asoegwu (2008) observed from it study breaking gender barrier on performance in science, he used hand-on and minds-on science that students either male or female that were expose to scientific process oriented learning, students engagement, manipulation of materials due assist in problem solving skill in respect of the gender that any group expose to experimental activities will surely make difference this may be linked to different factors. .

Challenges

In adequate in the availability of materials needed make it difficult to assess the ability of every individual's student towards acquisition of entrepreneurship skills.

High cost of the chemicals and the materials involved make it difficult to allow reproducibility by individual's student they were form in group.

It consumed time which makes it difficult to use the allocated time for the subject.

The readiness and the interest of the students and the custodial determine the success of the experiment

Conclusion

Looking at the results of this study, it can be concluded that the use of knowledge of chemistry concepts influences the students' achievement. It can also be concluded that it's significantly influences the entrepreneurship skills development and have effects on the male and female student's achievement based on the use of knowledge of chemistry concepts as pathway for entrepreneurship skills among secondary school in Kwara State.

Recommendations

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

The Federal and State government should give financial assistance and support in form of grants to any students who have acquired entrepreneurship skills to start and set up a business of their own after the completion of the school to stimulate the economy and reduce job dependence.

The government and education stakeholders to see it has urgent need to develop a comprehensive framework on how entrepreneurship skills acquisition could be integrated as part of core course in the school curriculum.

Secondary school students should recognize entrepreneurship towards a professional development of the teachers towards enrichment as a course offer to enable the pre-serving teachers to acquire the necessary content knowledge on entrepreneurship skills acquisition.

Chemistry teachers need to see how some scientific concepts skills could be translated into entrepreneurship skills acquisition and to see it as a course that is beyond outside the classroom.

Necessary attention should be given to the training and retraining of chemistry teachers to be acquainted with some of the scientific concepts that can be translated into entrepreneurship skills acquisition in secondary schools syllabus.

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