

Entrepreneurial Skills' Training Packages on Disinfectant Production among Universities Chemistry Students in North Central, Nigeria

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Abstract. This study developed and determined the effect of entrepreneurial skill training package on disinfectant for undergraduate chemistry students' skill acquisition in North Central Zone, Nigeria. To guide the study, two research questions and two hypotheses were stated and formulated respectively. The design of the study was non randomized post-test only quasi experimental. The population of the study comprised 1,640 consisting of Chemistry Lecturers and Undergraduate Chemistry Students from four Universities within the Study Area. Sample of Two Hundred and Ninety Six (296) respondents were used for the study. The instruments for data collection were structured questionnaires which were developed by the researcher from literature. Five specialists validated the items of the instruments. The reliability coefficients of the instruments were computed using Cronbach Alpha method. The coefficients of 0.83 and 0.77 was established. The data collected were analyzed using mean (X), standard deviation (SD), and percentage (%) to answer the research questions, while the two hypotheses were tested at 0.05 level of significance using t-test statistic. The result of the finding revealed that 16 skills are required for disinfectant production. All the skills were accepted by respondents as necessary and required for the development of entrepreneurial skill training package in disinfectant production for undergraduate chemistry students. Hypotheses tested showed that there was no

significant difference in the performance mean scores of male and female Undergraduate Chemistry Students hence were accepted not rejected $p>0.05$ while result from the second hypothesis revealed that there was significant difference between the mean scores of state and federal undergraduate chemistry students, hence were rejected $p<0.05$. Some recommendations were made among others as a result of the study findings which were that: Chemistry teachers, lecturers and their students should make use of the developed skill training package to teach chemistry so as to understand its concepts and at the same time get the economic relevance and benefits of chemistry for self-reliance and sustainable economic development. Nigerian government should integrate the developed entrepreneurial skill training package on chemical product production for youths who wish to go into chemical products production on short term basis so as to enable them acquire the required entrepreneurial skills in chemical products production for employment.

Keywords: Entrepreneur, entrepreneurial skills, Training packages, self-reliance, development

1. Introduction

Entrepreneurship has become a global and unavoidable issue. The idea of becoming an entrepreneur is more and more attractive to

students, because it is seen as a valuable way of participating in the labour market without losing one's independence (Aurora, 2008). In the view of Rinji (2013), entrepreneurship education has become an important phenomenon in the lives of Nigerians and institutions of learning. Therefore, universities have seen the need to include entrepreneurship in their curriculum. The Nigerian government is advocating that entrepreneurship education be promoted and fostered among business and non-business students at all levels of education. This is because entrepreneurship is one of the drivers of the economy for Nigeria and all over the world, thus, the quest for entrepreneurial skill training package in the universities becomes essential.

Entrepreneurship as declared by Abdu (2010) is the "process of creating something different with value by devoting the necessary time and assuming the accompanying financial psychic and social risks and receiving the resulting reward of most personal satisfaction." It is about self-reliance, which involves identification of a market and mobilizing necessary resources to serve that market through a business outfit. It is essentially about someone creating a market from his/her own resources. Regarding entrepreneurship, the researcher opines that entrepreneurship education in science and in chemistry in particular is that which will help learners to redirect their minds towards the world of business and independence, increase innovative and creative spirit thereby increasing the number of employers than employees as well as ensuring stable national growth, development and sustainability.

Skills development is synonymous with the best mode of science learning that is, learning by doing; for it is only by practice that skills in doing things develop in individuals. Nigerian graduates lack the opportunity of learning chemistry by doing, as well as for entrepreneurship to create jobs for themselves and others. It is however sad to observe that even at the University level of education, undergraduates find themselves in an environment not fully prepared for teaching and learning practical skills due to lack of adequate teaching and learning facilities and especially the lack of an entrepreneurial training module. It

is in this respect that the Nigerian science graduate of chemistry in particular cannot stand out proudly and announce to the world that the Nigerian class has taught him/her how to be on his/her own after graduation. On the other hand, Coyert (2012) noted that "the class has taught him how one can successfully create one's own job, a skill that is very worthwhile in today's uncertain times."

Teaching chemistry practically, will lead to acquisition of skills and entrepreneurship that will ultimately promote employability of Nigerian youths. A developed entrepreneurial skill training package will be adequate for the teaching of chemistry practically which is directly related to the students' real life situations. This is in tune with Omosewo and Alex (2013) who noted that the need for introducing entrepreneurship education in the Nigerian educational system is a sure way of curbing the unemployment saga of the nation. It is only then that Nigerian youths can successfully create jobs for themselves and others. Elechi (2009) posits that the entrepreneurship is a concept that is attracting a lot of attention presently. Agbe (2013) defined entrepreneurship as employment for self and others. Bodang (2013) stresses that entrepreneurship education is the training of individuals to understand and develop key entrepreneurial skill and behavior. Entrepreneurial skills such as; creativity, innovativeness, quick decision making and risk taking are relevant to those who have interest in starting and growing their own business.

Entrepreneurship in the opinion of the researcher therefore presents an opportunity for chemistry graduates to lift themselves out of economic hardship if they are properly trained to become good entrepreneurs. To actualize this lifting Amwe (2013), enumerates five basic skills an individual needs which include; personal skills communication skills, negotiation skill, leadership skill and management skills. It is in this respect that Uzoechi (2014) asserts that, science education programmes should be able to produce citizens who can apply their knowledge, skills and experience to solve real life problems by harnessing the resources from their

environment for the betterment of the society. The author maintained that these skills are simply those skills that are attached to one's personality (they are characterized habits that are formed). On the other hand, characteristics of entrepreneurship and entrepreneur according to Pinson (2010) include: Creative activity, dynamic process, purposeful activity and risk. The characteristics of the entrepreneur according to the author are self-confidence being multi-skilled, confidence in the face of difficulties and discouraging circumstances, risk taking, innovative skills result-oriented and total commitment. In the same vein, Stephenson (2010) identified entrepreneurial characteristics as seriousness, planning ability, procedure and team work. Thus training will become effective if a skill training module is available for the teaching of chemistry for the purpose of entrepreneurship.

It was further observed by the researcher that the teachers at tertiary level of education teach their students theoretical knowledge of chemistry based on their syllabus. This is done just for the students to pass the examinations with good grades and consequently they suffer unemployment after graduation. The teaching and learning of chemistry for the purpose of entrepreneurship is practical-based approach and it is the key to breakthrough in science and technological advancement and consequently for economic development.

Adeyemo (2009) defined entrepreneurial skill as the ability to create something new with value by devoting the accompanying financial, psychic and social risk and receiving the resulting rewards of monetary and personal satisfaction and independence. Entrepreneurial Skills is the ability of an individual to exploit an idea and create an enterprise (small or big) not only for personal gain but also for social and developmental gain. On the other hand Training is the activity of imparting and acquiring skills. Training is generally organized to assist trainees to acquire skills for entry into occupations or assist those already in business to acquire professional skills for improving their businesses; trainers also train individuals to achieve a certain number of entrepreneurial

skills. Entrepreneurial skill training package will help the undergraduate chemistry students to acquire entrepreneurial skills leading to economic, political and social development. In the same vein, researchers such as Runge and Brase (2014) accepted that entrepreneurial behaviour remains a crucial engine of innovation and growth for the national economy and for individual companies. For Nigeria to be at par with the developed countries of the world there is the need to make science more interesting to the citizenry and ensure effective teaching of science in our schools (Arokoyo & Ugonwa, 2012). Hence the development of an entrepreneurial skill training package may enhance and increase the interest of learners since it is practical based and learner- centered, this confirms to a Chinese proverb that says what I hear, I forget, what I see I remember and what I do, I understand.

Chemistry being an investigative science subject which deals with the procedures and processes of making things would serve as a medium through which the basic chemical knowledge and skills required by chemistry graduates and youths to be employable are acquired. This is the reason why science in the opinion of Obiajulu (2014) has been acknowledged as the bed rock of national development and also that chemistry's contribution to quality of life and nation building are worthwhile in all aspects (Festus & Ekpote, 2012).

As a developing nation, Nigeria has turned out many graduates including chemistry graduates, who are roaming the streets in search of non-existing white collar jobs. This situation is contrary to the aims and objectives of Nigeria education, as contained in the National policy on Education, which stresses the development of a self-reliant nation. Also the goals of science education in Nigeria include among others; cultivating, knowing, inquiring and having rational mind for the conduct of good life and democracy, producing scientists for national development and providing understanding of the complexity of the physical world, the forms and the conduct of life (FRN, 2008: Effiong & Okon, 2012).

Chemistry graduates ought to have acquired sufficient skills that would make them self-reliant and prepared to enter into jobs and make progress. Chemistry education should prepare individuals to be self-employed in various enterprises, because as the backbone of all sciences, it is contextually versed with topics and concepts that have so much to offer, its students and graduates for self-employment. However, Nigerians are currently facing unemployment related problems because science education including chemistry education is not being taught in our universities to prepare the graduates to function well in the nation. In the same vein, Abdu (2014) lamented that the teaching of chemistry in Nigeria is not practically done as it ought to, that the practical relevance to the development of skills needed for entrepreneurial development is mostly theorized because of lack of competent teachers or lack of equipment to enable that. Hence, the resultant effects are students/graduates without hands on skills and minds on experience.

These lapses might include; the lack of a developed entrepreneurial skill training module for the teaching of chemistry which has to be properly tackled for our science education to produce chemistry graduates who might have sufficient skills for self-reliance. The present trend of mass unemployment in Nigeria shows that the science education including chemistry education in our Nigeria universities are not preparing the Nigerian graduates as it ought to. The Nigerian educational system is supposed to focus on the problem of its people particularly the youth. As noted by Susianna (2011), unemployment is the result of not only the limited job opportunities but also the job seekers incapability of meeting the requirements and qualifications required by the business sector. Thus, any job seeker needs to be equipped with certain knowledge, skills and attitude. The attitudes needed by anyone intending to become an entrepreneur and a job seeker are entrepreneurial attitudes.

2. Statement of the Problem

At the University Level of Education, the 400 level Undergraduate Chemistry Students are

required to display a high level of chemical knowledge skillfulness, be able to effectively apply what they have learned theoretically in the class for self-reliance. However, research evidences have shown that formal education in Nigeria has not provided school learners with functional education (i.e education for self-reliance) rather, it has continued to turnout half-baked graduates with mere certificates which are not justified by such graduates in most labour markets and industries.

Gender difference in diffusion of entrepreneurship has been a topic of many studies over decades. Numerous studies have shown a higher prevalence of entrepreneurship for man than that for women with similar backgrounds (Ferk, Maja, Posavek, 2013). Also this gender difference tends to be robust across countries and cultures. In an ideal world every person, regardless of age, gender, origin, and financial status should have an equal opportunity to realize his/her potential.

Taking in account this statement, the question about the potential of female entrepreneurship arises. If female and male characteristics are compared with regards to leadership and management abilities, started from the physical diversities, the basic difference is that female brain is defused and uses significant portions of both hemispheres, so it's able to multitask, whereby the male brain is specialized and uses specific parts of one hemisphere or the other, mainly the left one, in other to accomplish specific task.

Average weight of an adult male brain is 11 – 12 % more than the average brain weight of a female. Due to their larger corpus collosum women can transfer data between the right and left hemisphere faster than men. Furthermore, female are more creative and more aware of feelings whereby male are dominantly task-oriented, and their perceptual sense is vision. Females have broader perspective of things whilst males focus more on narrow issues.

In a decision making process, the female are less risk taking then male (Ferk, et al, 2013). Several large scale studies on female and male

entrepreneurship conducted on several nations revealed that female entrepreneurs are less successful in objective success measures, including lower sales, slower growth, and lower profits (Ferk, et al, 2013). If we compare female and male entrepreneurs, women entrepreneurs are less likely to seek start-up as well as angel financing. They also have less financial and human capital (i.e. education and quantity of work experience) invested in their start ups, and less access to business clients beyond their traditional household clientele. Women are to some extent discriminated at various stages of entrepreneurship that include lower salaries and the conflict between work activities and motherhood.

According to Ferk, et al (2013), general-held gender stereotypes exist in many countries against woman entrepreneurs and in this part of the paper we will focus on Female Entrepreneurship. Entrepreneurial career is generally associated with masculine characteristics. Several studies have demonstrated that these gender role stereotypes influence men's and women's intention to pursue an entrepreneurial career. These stereotypes may result in female entrepreneurs' stronger self-imposed barriers to growth and less favorable perceptions of themselves and the entrepreneurial environment, as compared to male entrepreneurs. Consequently, many women entrepreneurs tend to use entrepreneurship as a means of balancing work and family rather than achieving final success (Ferk, et al, 2013).

Chemistry which should be taught using hands-on and minds-on (practical) approach is basically taught theoretically which makes the learner not to benefit maximally from their education. It was also revealed that (Udofia & Ekong, 2014) understanding of the principles and applications of knowledge gained for cognitive growth as well as technological advancement, hence development of useful skill necessary for self-reliant living is lacking. Beside this, teaching of chemistry theoretically to students is difficult because they are likely to complain that "theory is boring! Lectures are boring! School is boring! And so everything in the chemistry lecture becomes irrelevant. The

purpose of teaching chemistry should be to assist the students to become skilled and be self-employed.

The present trend of mass unemployment in Nigeria shows that the science education including chemistry education being taught in schools do not prepare Nigerian graduates to function well in the nation undergoing transition from rural economy to modern economy. The researcher further observed that the lack of entrepreneurship ability among chemistry graduates could be attributed to the lack of skills occasioned by absence of training modules by teachers, thus, the concern of this research was to develop a training module that would be used in the teaching and learning of chemistry to enhance the chemical entrepreneurial skills of the graduates or youth so that they can acquire the right entrepreneurial habits, attitudes and saleable skills with which they can explore their environments as well as means of surviving the face of unemployment.

3. Research Questions

The following research questions were raised to guide the study.

- What are the entrepreneurial skills required for disinfectant production by undergraduate chemistry students?
- What are the performance mean scores of undergraduate chemistry students in disinfectant production using the developed entrepreneurial skill training module?

4. Hypotheses

The following null hypotheses were tested in the study at 0.05 level of significance.

- There is no significant difference between the performance mean scores of male and female undergraduate chemistry students who were trained using the entrepreneurial skill training packages for disinfectant production.
- There is no significance difference between the performance mean scores of

state and federal students who were trained using the developed entrepreneurial skill training package for disinfectant production.

5. Methodology

The study employed the non-randomized post-test only. A sample of 296 respondents out of 1640 and it consisted of all the 60 chemistry lecturers and 236 400 level undergraduates chemistry students using purposive sampling

techniques. The researcher developed instruments known as the Chemistry lecturer's questionnaire (CLQ), undergraduate Chemistry students' questions (UCSQ) and Chemistry lecturer written scale (CLRS) was used for data collection. The instrument was validated from five experts from Chemistry Department University of Jos and Department of Science Education University of Agriculture Markurdi. Then the instrument was pilot tested using Cronbach alpha (α) coefficient which yielded a coefficient 0.93.

6. Results

Research Question 1: What are the entrepreneurial skills required in disinfectant production by undergraduate chemistry students?

Table 1: Mean Responses of Chemistry Lecturers on Entrepreneurial Skills for Disinfectant Production (ESDP)

S/N	Entrepreneurial skills for disinfectant (lzal) production	N	$\bar{X}$	SD	Remark
	Ability to measure the mass of solid substance accurately.	15	3.11	0.90	Accepted
	Ability to measure the volume of liquid substances accurately.	15	3.28	0.84	Accepted
	Ability to measure the concentration of chemicals during disinfectant production.	15	3.20	0.88	Accepted
	Ability to prepare the standard solution of the substances accurately	15	3.13	0.91	Accepted
	Ability to dilute substances accurately	15	3.19	0.91	Accepted
	Ability to take safety measures	15	3.29	0.86	Accepted
	Ability to locate regular supply of raw materials	15	3.24	0.84	Accepted
	Ability for good record keeping for disinfectant production.	15	3.19	0.92	Accepted
	Ability to manage crisis during disinfectant production.	15	3.18	0.89	Accepted
	Ability for self-motivation to accomplish the task for disinfectant production.	15	3.15	0.91	Accepted
	Ability to identify and procure appropriate equipment and chemicals for disinfectant product very well.	15	3.22	0.89	Accepted
	Ability to package the disinfectant product very well.	15	3.15	0.95	Accepted
	Ability to register with regulatory body like NAFDAC/SON/MAN for my product.	15	3.19	0.92	Accepted
	Ability to estimate the cost of disinfectant production.	15	3.19	0.92	Accepted
	Ability to establish and sustain quality standards.	15	3.17	0.91	Accepted
	Ability to identify market for the product.	15	3.22	0.98	Accepted

Data from Table 1 revealed that all the 16 items on entrepreneurial skills required for disinfectant production were accepted by respondents and used in disinfectant production. The mean of the items ranged from 3.11 to 3.29 and were above the bench mark of 2.50. This showed that all the items are necessary and required for the development of entrepreneurial skill training module for undergraduate chemistry students in disinfectant production. The standard deviation ranged from 0.84 to 0.98. This implies that the respondents are not too far from the mean and from one another in their responses.

Research Question 2: What are the achievement mean scores of undergraduate chemistry students in disinfectant production using the draft entrepreneurial skill training module?

Table 2: Mean Rating of Chemistry Lecturers of Undergraduate Chemistry Students' on Entrepreneurial Skills for Disinfectant Production (ESDP)

S/N	ITEM	E	V.G	G	P	TF	F	%	$\bar{X}$	Remark
	The students' ability to measure the concentration of chemicals during disinfectant production.	9	6	1	0	16	15	93.8	3.73	High performance
	The students' ability to prepare the standard solution of the substances accurately.	9	7	0	0	16	15	100	3.80	High performance
	The students' ability to dilute substances accurately.	8	7	1	0	16	15	93.8	3.67	High performance
	The students' ability to take safety measure	9	7	0	0	16	15	100	3.80	High performance
	The students' ability to locate regular supply of raw materials	12	4	0	0	16	16	100	3.75	High performance
	The students' ability for good record keeping for disinfectant production	8	8	0	0	16	16	100	3.50	High performance
	The students' ability to manage crises during disinfectant production	9	6	1	0	16	15	93.8	3.73	High performance
	The students ability for self-motivation to accomplish the task for disinfectant production	9	7	0	0	16	16	100	3.56	High performance
	The students' ability to identify and procure appropriate equipment and chemical for disinfectant production	10	5	1	0	16	15	93.8	3.80	High performance
	The students' ability to package the paint product very well	9	6	1	0	16	15	93.8	3.73	High performance
	The students' awareness to register with regulatory body like NAFDAC/SON/MAN for their product.	11	5	0	0	16	16	100	3.69	High performance
	The students' ability to estimate the cost of disinfectant production	10	5	1	0	16	14	93.8	4.07	High performance
	The students' ability to establish and sustain quality standard	10	5	1	0	16	14	93.8	4.07	High performance
	The students' ability market for the product	9	5	2	0	16	14	87.6	3.93	High performance
	The ability of the student to estimate the cost of disinfectant production	10	4	2	0	16	14	87.5	4.00	High performance
	The ability of the student to establish and sustain quality standards	7	6	3	0	16	13	81.3	3.54	High performance
	The ability of the student to identify market for the product	9	6	1	0	16	15	100	3.73	High performance

Data from table 2 revealed that all the 17 items on students' entrepreneurial skill for disinfectant production (ESDP) were demonstrated during Izal production using the developed entrepreneurial skill training module for disinfectant production. The mean scores of undergraduate students by their lecturers ranged from 3.50 – 4.07 and were above the bench mark of 2.50. This showed that the module on disinfectant production had an effect on the students and hence displayed entrepreneurial skills during training using the developed module.

Hypothesis 1: There is no significant difference between the mean scores of male and female undergraduate chemistry students who were trained using the draft entrepreneurial skill training module for disinfectant production.

Table 3: Independent sample t- test analysis for male and female undergraduate chemistry students on disinfectant production.

Independent variables	N	Mean	SD	DF	t-cal	P- value
Male	173	50.38	8.37	224	-1.803	0.073
Female	9.23	52.72	-2.34	96.23	-1.72	
Total	182.23					

From Table 3, the result shows that p-Val is 0.073 which is greater than 0.05. Based on the result, the null hypothesis was accepted it was revealed that there is no significant difference between the skills and competences acquired by males' undergraduate chemistry students and female undergraduate chemistry students in disinfectant production.

Results on Table 3 indicate that learning took place and that male undergraduate chemistry students learned as much as female undergraduate chemistry students. This reveals that if male and female undergraduate student are engaged with the right equipment, positive result would be achieved.

Hypothesis 2: There is no significance difference between the mean scores of state and federal students who were trained using the developed entrepreneurial skill training module for disinfectant production.

Table 4: Independent sample t-test analysis for federal and state undergraduate chemistry students on disinfectant production

Independent variables	N	Mean	Std Dev	Df	t-cal	P- value
Federal university	167	50.30	8.45	234	-2.24	0.026
State university	69	53.08	8.70	1125.3	-2.21	

Table 4, the result shows that p-Val is 0.026 and is less than 0.05 i.e. p-Val; (0.026) < at 0.05 based on the result, the null hypothesis was rejected. It was revealed that there is no significant difference between the skills and competences acquired by federal undergraduate chemistry students in disinfectant production and the state undergraduate chemistry students. This indicates that the training module developed for disinfectant production does not have the same effect on both federal and state university undergraduate chemistry students.

7. Discussion of Findings

This research investigated the skills required by undergraduate chemistry students for the development and determination of the effect of entrepreneurial skill training modules in disinfectant production for the undergraduate chemistry students in North central zone, of Nigeria. Data were collected, analyzed and a number of findings were discussed as follows:

The results of the findings revealed that, there is no statistical significant difference between the mean score of male and female. This shows that there was no significant difference between the skills and competences acquired by male and female undergraduate chemistry students in disinfectant production. The module developed has effect on both male and female in acquiring entrepreneurial skills and competences in

disinfectant production. This implies that most of the skills, equipment, materials chemicals and processes involved in disinfectant production were required or demanded for the development of entrepreneurial skill development for the undergraduate chemistry students in North central zone of Nigeria. This finding is in consonance with that of Nbioho and Daodu (2014) who found out the skills required for the development of entrepreneurship skill training module of planning fish breeding and hatching occupational. In the same vein, Obiyai, Ekpedu and Ekubo (2011) found out the skills required for the development of entrepreneurship skill training module for farmers in fish feed production and marketing occupation.

Students' performances on displaying their skills during disinfectant (izal) production is using the developed entrepreneurship skill trainings module in disinfectant (izal) production was very high. This finding is in agreement with that of Adeyemo (2009) that entrepreneurial skill is the ability of an individual to exploit an idea and create an enterprise (small or big) not only for personal gain but also for social and developmental gain.

The result in Table 1 answered research question one and it showed that the mean and standard deviation scores of the chemistry lecturers on undergraduate chemistry students on

entrepreneurial skills for disinfectant production (ESDP) were above the bench mark of 0.05

This finding is consistent with that of Obiayai, Osimem and Agbulu (2010) who found that from their research that certain skills are required for the development of a skill training module for fish feed production for fish farmers, therefore, they displayed a high level of performance in terms of entrepreneurial skill, competences and attitudes.

Their findings also revealed that three clusters of skill are required for the development of entrepreneurial skill training modules in fish preservation and marketing occupation. The clusters are planning, feeds processing and marketing of fish feeds, planning consisted of 10 essential skills and marketing has 5 essential skills. The findings were very important for the fact that for any business enterprise to achieve success, the entrepreneur must possess certain entrepreneurial skill.

The finding of this current study, is also consistent with that of Obiayai, Ekpebu and Ekubo (2011) who accepted the research and development (R & D) to identify skill in fisheries, industries, Agricultural extension agent and fisheries experts for use in the development of training module on fish feed production. Sudarwatis (2013) in his own study found that developing an integrated module on entrepreneurship to improve ability in making business plans worked on individual learning on entrepreneurship materials implementing the integrated module the student and they could successfully develop business plans. The individuals also learnt development of entrepreneurial spirit, running the business and practice making business plans.

The result in Table 2 revealed all the items in entrepreneurial skills for disinfectant production, and the results also implied that the undergraduate chemistry students have mastered the skills for disinfectant or Izal production therefore performed excellently. The undergraduate chemistry students were able to identify the equipment the materials, the

chemical and the process involved in disinfectant production very well.

The finding of this current study, nevertheless, is contrary to the findings of Ezeudu, Gertrude, Chiahia, Anazor, Eze and Omeke (2015) who concluded that males performed better than females in chemistry. On the other hand, Hudson (2014) concluded that females generally performed slightly better on multiple-choice than did males in chemistry. This finding is consistent with Olasehinde and Olatoye (2014) who opined that there is significant difference between male and female students general achievement and attitude towards science namely biology, chemistry and physics.

The Test of Hypothesis one as shown in table 3 showed that there is no difference between the mean scores of male and female undergraduate chemistry students who were trained using the developed entrepreneurial skill training module on disinfectant production. The findings from this study is consistent with the findings from Olasehinde and Olatoye (2014) whose study revealed that there is no significant difference between male and female students in science achievements.

The test of Hypothesis two as shown in table 4 showed that the independent sample t- test analysis on mean scores of federal and state undergraduate chemistry students after training on disinfectant production using the module developed. The test of hypothesis 1 and 2, showed that $p < 0.05$ hence null hypothesis was not rejected. This implies that there is a significant difference between the scores of state and federal university chemistry students.

8. Conclusion

From the foregoing discussion on the finding of the study, it was concluded that:

- The entrepreneurial skills required for the development of entrepreneurial skill training package for disinfectant production for undergraduate chemistry students in north central zone, Nigeria was developed.

- The effect of the developed entrepreneurial skill training package on the 400 level undergraduate chemistry students yielded a positive result as they performed moderate, high and very high in chemical products production.
- The students learnt the ability to take safety measures, locate raw materials, prepare standard solutions for good record keeping, to manage crisis during production, be self-motivated, procure the right equipment, materials and chemicals, to package products well, to register with NAFDAC, to estimate the cost of production, to establish quality and sustain good quality and standard products and ability to identify the market.
- The findings are very important for the fact that for any business enterprise to achieve success, the entrepreneur must possess certain entrepreneurial skills. The skills are necessary in boosting the chemical products production industry, as well as stimulate interest and competences in undergraduate chemistry students.

9. Recommendations

For efficient and successful training of undergraduate chemistry students for self-reliance, skills in various of chemistry products production are required and hence the development of entrepreneurial skill training package is very necessary. The study therefore recommends that:

- Chemistry teachers, lecturers and their students should make use of the developed package to do chemistry so as to understand its concepts and at the same time get the economic relevance and benefits of chemistry for self-reliance for sustainable economic development.
- Nigerian government should integrate the developed entrepreneurship skill training modules on chemical product production youth who wish to go into chemical product production on short

term basis as to enable them acquire the required entrepreneurship skills in chemical products production for employment.

- Curriculum planners should allocate enough time for teaching chemistry in secondary school, colleges of education and universities. And should adopt the training modules in to the learning institutions.
- Loans with low interest rates should be given to graduates especially chemistry graduates who have shown interest in chemistry product production
- The entrepreneurs can also make use of the module whenever they are conducting interviews to select qualified people in order to improve their production.
- Schools, colleges and tertiary institution should establish chemical products factories and demonstration rooms to arouse and sustain the interest of students to have high retention, positive attitude towards chemistry as a subject and perform well in internal and external examination like WAEC, NECO and JAMB and can still acquire chemical knowledge for – self-employment after graduation
- Refresher courses should be organized by the government periodically to retrain those already in the system doing the chemical products but lack the chemical knowledge so that they can produce qualitative chemical products.
- Government should earnestly pursue the aim and objectives of Nigerian policy on education which stresses the development of a self-reliant nation.\
- Chemistry lecturers or science lecturers in general should be trained to get them well equipped with entrepreneurial skill in chemical products production. This is to enhance their capability to retrain undergraduate chemistry students.
- Government or non-governmental organizations should give take-off grants to youths who have interests in chemical products production and have been trained to enable them start

chemical products production and marketing.

- Government should also establish chemical products production places to reduce incidences of shortage in supply of the products since we use them on a daily basis.
- Chemistry lecturers should go for regular seminars, conferences, workshops for capacity building to be more efficient in educating undergraduate chemistry students on modern technologies and subsequent adoptions.

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