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CHEMISTRY EDUCATION AND ACQUISITION OF EMPLOYABILITY AND PRODUCTION SKILLS: A CASE STUDY.

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ABSTRACT
The study investigated Chemistry graduates' self-perceived extent of possession of employability and production skills acquired and employability skill development opportunities they were exposed to during the course of their studies in chemistry education. The research design was survey. Four research questions and two null hypotheses guided the study. One hundred and twenty-seven (127 (80 males, 47 females) 2020 Batch A Corp members posted to Anambra state made up the sample for the study. Four instruments namely: Employability Skill Assessment Questionnaire (ESAQ), Employability Skill Development Exposure (ESDE), Chemical Products Production Skill Survey (CPPSS) and Teaching Strategies Applied (TSA) were used for data collection. The instruments were adapted from Muo (2016), University of Oregun 2018 Employability Skill Survey, and Orji (2013) scales, modified and tested for reliability using Cronbach alpha and the reliability coefficient obtained are 0.82 and 0.89 respectively for ESAQ and ESDE. Frequencies, percentages mean scores and standard deviation were used to analyze and interpret data obtained. The result of the study showed that, the Chemistry graduates do not possess employability skill as well as the production skills for some common chemical products. The graduates were not sufficiently exposed to employment skill development opportunities and finally, the lecture method was mostly applied by their lecturers and in all the aspects investigated, gender had no influence. The findings were discussed which informed the recommendations made.

Keywords: Chemistry Education; Acquisition; Employability; Production Skills.

Introduction
The objectives of education in Nigeria according to her National Policy on Education (NPF) FRN (2014), include the acquisition of appropriate skills, multi-dimensional competencies and abilities for self- reliance and societal development, the development of proper values and intellectual capabilities. Education prepares people for the challenges of life, empowers them to appreciate their environment, and take informed decisions for personal and societal benefits (Muo,2016). Furthermore, education facilitates cultural transmission, adaptability, institutional building, ensures better material conditions and reduces uncertainty. While the purpose of tertiary education, according to Philips Consulting (2014) is the preparation of responsible graduates with expertise for the job market and sustainable employment by enhancing technical and supportive skills for the field of work. The success and relevance of such education, researchers (Muo 2016; UNESCO 1998), maintain should be assessed on the basis of the 'fit' between what the society, employers, and other stakeholders (including the graduates themselves) expect of the institutions, as regards the quality of graduates produced. It also needs to assess the ability to fulfill its societal objectives of commensurate and sustainable full employment, increased productivity, increased income and economic growth, considering the fact that the educational goals, objectives and any other such policy documents while portraying a country's educational aspirations for individual learners, equally reflects the societal socio-economic and national values.

On a sad note, the products of Nigerian Universities have been reported by some researchers (Sodipo 2014, Umar 2019) as unemployable, half-baked, full of theory but lacking in practical content, of dubious quality, deficient in skills and attitude, to the extent that

the National Universities Commission NUC (2014) as cited in Muo (2016) doubts the ability of our graduates to meet the requirements of employers. While others reported that in addition to lacking in both content and quality, they are excessively theoretical, overloaded with irrelevancies, obsolete and disconnected from the labor market and therefore inadequate to attend to the needs of the 21st century society, (Barmiro, Adedeji, & Pitan 2013, Wasagu 2019). This among other factors may have led to the present level of massive unemployment in Nigeria. In his own contribution Philips Consulting (2014) indicted the current education system when he reported that the system seems not to be producing graduates with generic and essential skills which has resulted in the continuous increase in the rate of youth unemployment. The report further stated that 24million jobs are needed to reduce the prevailing status of unemployment level by half, but however lamented that majority of graduates have consistently been found incapable of meeting up with the requirements of workforce and thus resulting in inability to secure or keep a job. Researchers (Sodipo 2014, Pitan 2016a), have attributed this ugly situation to insufficient curriculum content these graduates were exposed to which does not produce professionals with lifelong skills necessary for securing a job, and being successful in these jobs.

Graduate unemployment is an issue that has become alarmingly resilient; therefore, it can never be over flogged until it is resolved, and the resilience broken and so, it has continued to be at the front burner of discuss both nationally and internationally. The situation is increased by the continuous churning out of graduates annually. To worsen the situation, Sodipo (2014) reported that employers of labor do not readily fill the few existing vacancies that occasionally crop up because these graduates are said to be unemployable. In the first instance, this poses a great challenge to the traditional layman's concept of university education, and the relevance of education at such a high level is therefore questioned. Before now, the expectation of a good and high-income job soon after graduation is not out of place, but rather rational from the perspective that a major determinant of the demand for higher education is that expectation of higher earnings over an individual's lifetime. Naturally, higher income is necessary to compensate for the high costs associated with acquiring higher education. In consideration of the reality before everyone, Pitan (2016) says, this expectation is a mere illusion for many graduates and the society at large.

Youth unemployment has very adverse consequences on the citizens as well the entire nation. Sodipo (2014) sees unemployment rate, as one of the variable indices for assessing the health of a nation considering its multifaceted social and economic implications such as concomitant high rate of crime and criminality, including mass murder, insurgency, militancy, armed robbery, kidnapping, cultism, terrorism, drug abuse, among many others. As if this situation is not scary enough, a labor minister Ngige(2020) projected that the unemployment rate for Nigeria will reach 43.5% and even more by 2021, with consequences that are better imagined, if the trend is not urgently reversed. In the words of the minister to the youths, "embrace creative skills, don't wait for government jobs" Continuing, he justified his message to the youths by stating that the richest youths of the world, aged between 21 and 31 years are not government employees but smart entrepreneurs, who distinguished themselves in creative skills in various areas. (Dr Chris Ngige, Premium Times Friday 11th February 2020). Even those with employability skills, the minister says no job for the Nigerian youth. Therefore, the need arises to seek the solution from other angles and the one that quickly comes to the mind of a Chemist is the application of acquired skills and being small entrepreneurs as a possible way out. But the question is; Do these Chemistry graduates possess these production skills and to what extent? This is part of the problems of this study. The Mckinsey Global Institute cited in Muo (2016) predicted a potential global shortage of 38 to 40 million high skills workers in 2020 because employers believe that a gap exist between the required skill set and the skills that

employees entering the workforce possess. Sodipo (2010) surveyed the level of competency of tertiary education graduates employed in Oyo state, Nigeria and reported that these graduates lacked relevant skills for effective performance and suggested the integration of this relevant skills into the curriculum and programs of tertiary institutions as a means of stemming the tide.

In corroboration, Philip Consulting (2014), Pitan (2016a), Sodipo (2014), Muo (2016), reported a high extent of skill mismatch between the 'received' and the 'needed' – life skills for the navigation of the waters of life which has rendered many graduates unemployable and therefore advocated for a balance between the 'needed' and the 'received'. The difference between the skills possessed by graduates ie the 'received' and those required by the employers ie the 'needed', forms the scope of skill mismatch. The skills required for getting a job, keeping the job and being effective and successful in the job, researchers (Sodipo 2014, Muo 2016) refer to as employability skills.

According to Pitan (2016a), employability is the ability of graduates to possess and exhibit the knowledge, skills, attributes and attitudes needed to get and maintain jobs in which they can be successful and fulfilled. They are skills that enable employees to get along with their colleagues and ultimately become good ambassadors for the organization (Sodipo 2014). These skills are non-technical competencies involving little or no interaction with machines, equipment and tools within and across different occupations, but help individuals to obtain positive social interactions, relationships and contribute to the work environment.

In this study, employability skills refer to a set of transferrable, essential and general skills, personal qualities and values, in addition to academic qualification which enables one to get hired, be effective, to thrive and to succeed in any workplace. In literature, they are also referred to as 'soft skills', 'foundation skills', work/job-readiness skills or generic skills. There seems not to be a general consensus on what constitutes the set of employability skills, as different authors/researchers come up with different sets of skills, with some skills overlapping with another. Corroborating, Martin et al (2008) cited in Orji (2013), opined that the employability landscape is complex, with the skills for employability dependent on varied factors such as job type, industrial sector and career stage and for this reason, it is difficult to create one universally relevant definition or list of employability skills. He however identified and based his study on 14 employability skills namely; communication, teamwork, problem solving, vocational job seeking, literacy, numeracy, general IT, time keeping, business awareness, customer care, enterprising, personal presentation, enthusiasm/commitment and advanced job specific skills.

However, Learner (2012) reported that in Australia, eight skills are nationally regarded as employability skills and they are; communication, planning and organizing, teamwork, problem solving, self-management, initiative and enterprise, information technology and learning. While Rodger, (2012) reported that, in the United States of America, the Secretary's Commission on Achieving Necessary Skills (SCAN), in collaboration with all stake holders, identified eight required competencies and skills namely; Basic, Information, Thinking, Interpersonal, Personal qualities, System management, Recourse management and Technology use skills, which the various stake holders including parents, teachers, institutions and employers are urged to help students achieve. In literature, the researchers did not see any document as nationally adopted set of employability skills in Nigeria. However, Orji (2013) identified and worked with the following 10 skills namely; communication, problem solving, teamwork, planning and organizing creativity, innovation, independent study, numeracy, ICT skills, self-management and time management. Considering the overlaps in these skills, this study worked with the following 10 skills; communication, teamwork, problem solving, planning and organization, learning, self-management, ICT, creative and innovative, time management and laboratory safety.

Chemistry, by its' nature is a practical oriented subject, providing lots of opportunities for the development of skills. Whether they are called 'soft skills', 'generic skills', 'transferable skill' or 'employability skills', that will take graduates beyond Chemistry knowledge into the world of Chemical professionals. Chemistry is expected to provide the graduates with a wide range of valuable and useful skills and knowledge that will be highly valued by employers in all sectors and in lots of other different jobs. This can be achieved, through the provision of experiences and resources that may help develop/incorporate these skills, whilst maintaining the Chemical content of the curriculum. For instance, the graduate would have developed analytical thinking, problem solving, scientific, technical skills and many more, through examining and interpreting experimental results and making evaluations which have been reported as employability skills. Chemistry has been noted as a basic requirement for economic, scientific and technological development of any nation. Chemistry cannot be isolated from other lives since human beings have been in contact with a variety of chemical products. Chemistry is the only science subject that is embedded in all science-oriented disciplines and this attests to its usefulness and diversity. Chemistry has been described in a variety of ways by scholars such as 'the bride of science' Ibole (2009) and the oracle of modern science Gwandu (2010) to buttress its pivotal role in industrial set up (eg fertilizer pharmaceutical), the execution of other professions (Engineering, Medicine, Agriculture) and the improvement of quality of life of the citizenry. Employability skill is as diversified as Chemistry, and also multi-disciplinary and therefore can be promoted in all disciplines. Evidently, Chemistry education occupies an indispensable position in wealth creation thereby putting a check on the unemployment rate. If the students acquire the embedded production and life skills for the production of some basic goods, they can stand on their own on graduation

Thinking beyond Chemistry and incorporation of these skills should not be neglected or simply bolted on as an afterthought or hoping that students will magically develop such skills or inherently have them. There is need for carefully structured and designed experiences to be vigorously pursued in order to develop these skills necessary for effective and productive professionals. Development of these skill will help students meet up with demands of the 21st century due to rapidly changing patterns of work, new sectors emerging, with technology and globalization significantly reforming the workforce (Pitan 2016). This implies that, mere possession of a good degree is not enough, they should also possess the skills and attributes to compete and collaborate in a dynamic knowledge driven economy. Researchers, (Muo (2016), Sodipo (2014), Orji, (2013) & Griffin (2012) opined that some strategies could be devised to enhance the development of these skills some of which are; maintaining a working relationship between school and employers, adapting new approaches to teaching and learning, engaging in extracurricular activities, extensive hands-on experimental work, design and research projects, group work/team learning, peer assessment industrial attachment/teaching practice career seminars among others.

Studies on employability skills are few and most of them mostly list different generic skills and attributes that employers demand but fail to treat ways of enhancing and developing these skills in the students as well as other employability vestiges. This study filled this gap, by exploring the extent of exposure to employability skill development opportunities and instructional strategies employed by their lecturers. Most of the studies on employability reviewed are rooted on the development of employability skills scale (Wilbrow, 2011, Griffin, 2012, SCANS-CAREERS 2018), emphasizing the need for development of employability skills, (Sodipo, (2014), Aloysius, Ismail, Suandi ,& Arshad. 2018), assessing the employability skill possessed by new graduates in a particular sector (Sodipo, 2010), and the skills requirements of employers for specified jobs. However, Orji (2013), based his study on secondary school graduates while investigating the extent/level of employability skills of Chemistry students. While these studies encouraged the integration

of employability skills within the curriculum and classroom yet not much details are provided on strategies for integration. The present study focused on university graduates for the following reasons; firstly, these graduates are more matured, have been exposed to higher education, are supposed to have a sharper focus and sense of direction. Secondly the unemployment index is usually based on products of tertiary institutions. Furthermore, the extent of possession of skills and knowledge for the production of some Chemical products, the graduates' perceived extent of integration of employability skill enhancing teaching strategies as well as the extent of exposure to employability skill development opportunities were also investigated in this study. The presence or absence of gender effect was equally investigated.

In this study, 10 employability skills as noted earlier were focused on. The purpose of the study was to investigate how Chemistry education in Nigeria has fared in; developing employability skill in Chemistry students, exposing the students to opportunities/experiences for the development of employability skills, and empowering students with skills to go into production of some chemical products of innovation and research in Chemistry which will obviously make them entrepreneurs, job creators, self-reliant and then wealth creation; thus, reducing unemployment, resulting in overall natural economic development.

Research Questions

The following research questions guided the study

1. What is the extent of Chemistry graduates' self-perceived acquisition/possession of employability skills based on gender?
2. What is the level of exposure of Chemistry graduates to employability skill development opportunities?
3. What production skills are acquired and held by these graduates with respect to gender?

Hypotheses

The following hypothesis was formulated and tested at 0.05 level of significance

HO_1 There is no significant difference in the level of acquisition of employability skills by Chemistry graduates based on gender.

HO_2 There is no significant difference in the mean production skills acquired and held by the Chemistry graduates based on gender

Research Method

The descriptive survey research design was adopted. The population comprised all the 2020 Corp members Batch 'A' Stream 1, posted to Anambra State, who studied Chemistry. The sample comprised 127 graduates (80 males, 27 females) selected through the convenient sampling technique.

Four instruments were used for data collection namely,

1. The Employability Skill Assessment Questionnaire (ESAQ)
2. The Employability Skill Development Exposure (ESDE)
3. Chemical Products Production Skill Survey (CPPSS)
4. Teaching Strategies Applied (TSA)

The ESAQ is a 98-item instrument adapted from Muo (2016), University of Oregun (2018) Employability Skills Survey and Orji (2013) scales, and modified. The ESDE is a 24-item instrument developed by the researchers while the CPPSS comprises a set of 20 common Chemical products and processes. And finally, the TSA is a list of 8 teaching strategies which researchers reported could enhance skill acquisition. All items being dichotomously scored, all the instruments were subjected to Cronbach alpha for reliability and were found to be reliable r = 0.82 for ESAQ and r = 0.89 for ESDE. The instruments were administered to the respondents while they were in the National Youth Service Corp (NYSC) Orientation Camp. Data was analyzed using frequency, mean, standard deviation. Both instruments followed a four-point, Likert type format. The ESAQ items were grouped according to the 10 skill categories. The researchers used a convenience sampling technique. A convenience sampling

technique is a non-probabilistic sampling technique whereby the researchers select the participant, based on their immediate/convenient accessibility and proximity to the researcher.

Presentation of Results

Research Question 1: What is the extent of Chemistry graduates' self- perceived possession of Employability Skills?

Table 1: Frequency, Mean and Standard deviation of Chemistry graduates' responses on the extent of possession of Employability Skills.

S/n	Employability skills	Skill statements	N	Weighted mean	Std. Deviation	Grand mean(std. Deviation)
1	Initiative & Enterprise	Statement 1	127	1.72	.835	2.11 (.440)
		Statement 2	127	1.94	.898	
		Statement 3	127	2.89	.737	
		Statement 4	127	1.74	.779	
		Statement 5	127	1.77	.847	
		Statement 6	127	2.01	.812	
		Statement 7	127	2.00	.926	
		Statement 8	127	2.10	.862	
		Statement 9	127	2.93	.704	
		Statement 10	127	2.02	.850	
2	Problem solving	Statement 1	127	3.04	.739	2.32 (.560)
		Statement 2	127	2.94	.920	
		Statement 3	127	1.72	.806	
		Statement 4	127	2.22	.967	
		Statement 5	127	1.54	.676	
		Statement 6	127	1.77	.847	
		Statement 7	127	2.13	1.011	
		Statement 8	127	2.60	.838	
		Statement 9	127	2.20	.926	
		Statement 10	127	3.04	.739	
3	Teamwork	Statement 1	127	2.73	.980	2.61 (.326)
		Statement 2	127	2.02	.917	
		Statement 3	127	3.02	.873	
		Statement 4	127	2.76	.963	
		Statement 5	127	2.17	1.016	
		Statement 6	127	2.83	.958	
		Statement 7	127	2.75	1.000	
		Statement 8	127	2.88	1.059	
		Statement 9	127	2.34	.857	
		Statement 10	127	2.60	1.033	
4	Communication	Statement 1	127	2.93	.936	2.33 (.258)
		Statement 2	127	2.03	1.046	
		Statement 3	127	2.27	.963	
		Statement 4	127	2.02	1.000	
		Statement 5	127	2.24	1.035	
		Statement 6	127	2.43	.939	
		Statement 7	127	2.20	.976	
		Statement 8	127	2.33	.926	
		Statement 9	127	2.43	1.123	
		Statement 10	127	2.30	1.025	
5	Lab safety & management skills	Statement 1	127	2.16	.990	2.46 (.257)
		Statement 2	127	3.03	.835	
		Statement 3	127	2.76	.980	
		Statement 4	127	2.66	.986	
		Statement 5	127	2.02	.999	
		Statement 6	127	2.73	.849	
		Statement 7	127	2.65	.947	
		Statement 8	127	2.22	1.038	
		Statement 9	127	2.03	.999	
		Statement 10	127	2.34	.915	
6	Self-Management	Statement 1	127	2.65	1.138	2.54 (.115)
		Statement 2	127	2.57	1.117	
		Statement 3	127	2.72	1.103	
		Statement 4	127	2.56	.997	
		Statement 5	127	2.58	1.057	

		Statement 6	127	2.61	1.017	
		Statement 7	127	2.41	1.072	
		Statement 8	127	2.35	.972	
		Statement 9	127	2.48	1.015	
		Statement 10	127	2.44	1.036	
7	Technology Skills (ICT)	Statement 1	127	2.46	1.160	2.56 (.115)
		Statement 2	127	2.33	1.106	
		Statement 3	127	2.55	1.111	
		Statement 4	127	2.80	1.026	
		Statement 5	127	2.50	1.133	
		Statement 6	127	2.63	1.053	
		Statement 7	127	2.74	1.041	
		Statement 8	127	2.46	.982	
		Statement 9	127	2.69	1.096	
		Statement 10	127	2.39	.977	
8	Learning Skills	Statement 1	127	2.53	1.104	2.55 (.072)
		Statement 2	127	2.52	.991	
		Statement 3	127	2.60	1.100	
		Statement 4	127	2.56	1.013	
		Statement 5	127	2.63	.998	
		Statement 6	127	2.58	1.080	
		Statement 7	127	2.47	1.119	
		Statement 8	127	2.43	1.051	
		Statement 9	127	2.48	1.104	
		Statement 10	127	2.65	1.079	
9	Planning & Organization	Statement 1	127	2.54	1.067	2.50 (.109)
		Statement 2	127	2.61	.984	
		Statement 3	127	2.35	1.072	
		Statement 4	127	2.57	1.109	
		Statement 5	127	2.55	1.006	
		Statement 6	127	2.54	.990	
		Statement 7	127	2.39	1.048	
		Statement 8	127	2.57	1.012	
		Statement 9	127	2.59	1.101	
		Statement 10	127	2.31	1.153	
10	Time Management	Statement 1	127	2.31	1.123	2.39 (.180)
		Statement 2	127	2.35	1.051	
		Statement 3	127	2.52	1.075	
		Statement 4	127	2.02	.968	
		Statement 5	127	2.40	1.049	
		Statement 6	127	2.35	1.020	
		Statement 7	127	2.59	1.101	
		Statement 8	127	2.54	1.153	

Results in Table 1 show that 47 mean responses of the graduates to the 98 employability skill statements were below the assessment point (2.5) ranging from1.52 to2.48 while 51 mean responses were above the acceptance point, ranging from 2.50 to 3.04. On the basis of the 10 employability skill categories, mean scores of 2.11, 2.32, 2.61, 2.33, 2.46, 2.54, 2.56, 2.55, 2.50 and 2.39 were obtained for Initiative and Enterprise, Problem solving, Team work, Communication, Lab safety and management, Self-management, ICT, Learning/Independent study, Planning and Organization. and Time management skills respectively, giving a mean response range of 2.11 to 2.62. From the skill category response means, the Chemistry graduates perceived themselves as possessing the following employability skills namely Team work, ICT, Learning/Independent study, Planning and Organization and Self-management skills considering that the mean scores of each of the above-mentioned skill category is above the 2.5 acceptance point. Furthermore, that result shows that Time management, Laboratory Safety and Management, Communication, Problem solving, Initiative and Enterprise skills are lacking because their mean scores are below 2.5. The overall response mean score for the 10 employability skills is 2.43 and this implies an overall no possession of these skills by the Chemistry graduates.

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Research Question 2: What is the level of exposure of Chemistry graduates to employability skill development opportunities?

Table 2: Mean scores and Standard deviations of responses on Employability Skill Development Opportunities the graduates were exposed to during the cause of their studies

S/N	Employability Skills	N	Weighted Mean	Std. Deviation	Grand Mean (Std. Dev.)
1	Hands on experimental work	127	3.09	.343	2.10 (.817)
2	Independent research project	127	2.25	.882	
3	Visit to industries	127	1.41	.596	
4	Excursion and field trips	127	1.83	.788	
5	Lecture/seminars from scientist and industrialists	127	1.43	.624	
6	Career seminars	127	2.18	.886	
7	Student talk shows	127	2.65	.760	
8	Student oral/written presentations	127	1.86	.915	
9	Laboratory work-measurement, analysis	127	2.82	.717	
10	Team/group work-working with others	127	2.78	.975	
11	Course on employability skills	127	1.31	.463	
12	Skill acquisition program/course	127	1.53	.665	
13	Industrial attachment/teaching practice	127	3.93	.258	
14	Part time work experience	127	1.87	1.026	
15	Training on trade/entrepreneurship	127	1.71	.846	
16	Extra curricula activities	127	3.73	.556	
17	ICT training	127	1.88	.842	
18	Internet Research/Information retrieval course	127	1.85	.909	
19	Accounting/business subjects (as electives)	127	1.28	.573	
20	Interaction with job/work placement agencies	127	1.17	.438	
21	Career guidance and counselling sessions	127	2.98	.672	
22	Writing lab reports	127	2.70	.694	
23	Laboratory safety & management	127	1.33	.550	
24	Improvisation skills	127	0.89	.547	

Table 2 shows that the top seven employability skill development opportunities the graduates were exposed to are; Industrial attachment/Teaching practice (3.93), Extracurricular activities (3.78), Hands-on experimental work (2.98), Writing lab reports (2.98), Team work (2.78), and Students' talk shows (2.65) while they were least exposed to Production of common Chemical products (1.13), Career guidance and counselling sessions (1.17), Organized interaction with employers/job placement agencies (1.28), Course on employability skill (1.31), Training on improvisation of simple/common laboratory apparatus and reagents (1.33) Visit to discipline related industries (1.43), and Students' 0ral and written presentations (1.48). With reference to the acceptance point, it follows that out of the 24 employability skill development opportunities investigated in the study, the graduates had no meaningful exposure in 17 of them representing 70.8% while the remaining 29.2% of the opportunities were available at low extents.

Research Question 3 What production skills for some common Chemical products are held by the graduates?

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Table 3: Mean scores and Standard deviation of Production skills for some common Chemical products held by the graduates

S/N	Items	N	Weighted Mean	Std. Deviation	Grand mean (Std. Dev.)
1	Mosquito Repellants	127	1.42	.541	1.66 (.423)
2	Hand Sanitizers	127	2.08	.896	
3	Insecticides/Disinfectants/Antiseptics	127	1.72	.776	
4	Extraction of oil from seeds	127	1.65	.706	
5	Face powder	127	1.06	.229	
6	Dyes	127	1.23	.552	
7	Biofuels from Biomass	127	1.12	.348	
8	Hair Cream	127	1.58	.791	
9	Body Creams	127	1.54	.732	
10	Cleaning agents like bleach	127	1.58	.672	
11	Shoe Polish	127	1.50	.665	
12	Soap	127	2.94	.970	
13	Perfume	127	2.29	.837	
14	Butter	127	1.52	.561	
15	Tooth Paste	127	1.56	.498	
16	Gum	127	1.61	.702	
17	Ethanol from fermentation	127	1.73	.672	
18	Candle	127	1.60	.646	
19	Nail Polish	127	1.82	.858	
20	Match sticks	127	1.50	.561	

Table 3 reveals that the Chemistry graduates possess the production skill for only item 12, representing 5%, while 95% of the skills were not acquired,

Research Question 4: What teaching strategies were applied by their lecturers?

Table 4. Mean Score and Standard Deviation of the graduates' responses on the teaching strategies applied by their lecturers

	Teaching Strategy	N	Weighted Mean	Std. Deviation	Grand mean (Std. Dev.)
1	Lecture	127	4.00	.000	1.706 (.959)
2	Team Learning	127	1.63	.795	
3	Case Studies	127	1.50	.825	
4	Problem Based Learning	127	1.46	.688	
5	Project Based Learning	127	1.62	.766	
6	Peer Assessment	127	1.44	.897	
7	Simulation/Roleplay	127	1.00	.000	
8	Inquiry	127	1.00	.000	

Table 4 reveals the lecture method (4.00) was mostly employed by their lecturers while the other 7 activity oriented, and skill development enhancing strategies were poorly utilized considering their low mean scores ranging from 1.00 to 1.63

Table 5: Effect of Gender on Extent of Acquisition of Employability Skill, by the graduates

Employability skills	Gender	N	Mean	Std. Deviation	Std. Error mean	F	Sig
Initiative and enterprise	Male	80	20.738	3.306	.370	.437	.510
	Female	47	21.766	3.252	.474		
Problem solving	Male	80	23.000	3.280	.367	.240	.625
	Female	47	23.553	3.374	.492		
Teamwork	Male	80	26.100	3.286	.367	.056	.814
	Female	47	26.106	3.225	.470		
Communication	Male	80	22.925	4.738	.530	.039	.845
	Female	47	23.809	4.707	.687		
Lab safety skills	Male	80	26.238	3.187	.356	1.122	.291
	Female	47	26.149	3.617	.528		
Self-management	Male	80	25.438	4.791	.536	.915	.341

	Female	47	25.255	3.986	.581		
Technology	Male	80	25.638	4.007	.448	.219	.641
skills(ICT)	Female	47	25.404	4.127	.602		
Learning skills	Male	80	25.363	3.719	.416	.562	.455
	Female	47	25.617	3.910	.570		
Planning and	Male	80	24.975	3.721	.416	3.151	.078
organization	Female	47	25.745	4.522	.660		
Time management	Male	80	19.013	3.050	.341	1.969	.163
	Female	47	19.192	3.585	.523		

Table 5 reveals no significant influence of gender on extent of acquisition of employability skills by the Chemistry graduates

Table 6: Mean Difference in Gender on the Extent of Possession of Production skill by the graduates

	Gender	N	Mean	Std. Deviation	Std. Error mean	F	Sig
Production	Male	80	30.800	10.441	1.167	.595	.442
Skill	Female	47	32.830	11.805	1.722		

Table 6 shows that the observed differences in the mean scores of male and female participants is not significant at $p > .05$ with F = .595

Discussion of Findings

Based on the 10employability skills investigated, the findings reveal that the Chemistry graduates do not possess a meaningful measure of the skills and so are not competent enough to demonstrate these skills effectively, considering the overall unimpressive low extent of their self-perceived level of possession of the employability skills under review. For instance, procrastination due to over indulgence in 'time wasters'(social media, games, movies etc) is a very big threat to their time management skill while vocabulary and proper use of tenses, challenges their Communication skills. This finding is in line with Aluko (2014) who reported that the inability of many university graduates to write and speak fluently has compelled many employers to invest in training and retraining of new graduate employees. Other dark areas of no competence include Teamwork, Initiative and enterprise. The lack of possession of employability skills as reported in this study is consistent with Sarkar et al (2016), Aluko (2014), Sodipo (2014), and Griffin (2012) but at variance with Orji (2013), though his work was at the secondary school level where immaturity on the part of the students, could have played some pranks. This finding poses a very big problem for the graduates themselves, parents, Universities, employers of labor and the society at large. At the forefront of factors responsible for this avoidably ugly situation is the curriculum content and mode of delivery which are more theoretical than practical in orientation (Sarkar et al 2014, Pitan 2016)

Furthermore, it was also revealed that the graduates were not exposed enough, to employability skill development opportunities. Their highest exposure being Industrial attachment/Teaching practice which unarguably is bedeviled by lots of anomalies, such as poor funding, poor supervision, rejection of students by companies resulting in some students dodging this all-important part of their program and submitting fake/fictitious reports at the end of the exercise. Another area of good exposure is in extracurricular activities. This report gives credence to Orji (2013) who also reported an overall lack of exposure to employability skill development opportunities except for membership of JETS club which is insignificant. Similarly, Pitan (2016) reported that extra-curricular activities were found to have no significant relationship with enhanced students' employability, rather, real world activities such

as engagement in research and internships, skill acquisition programs, extensive hands–on experimental work, analysis, report writing/presentation using ICT among others, make the highest contribution to the development of employability skills in students. It was also revealed that the teaching method mostly applied by their lecturers is the lecture method which by its nature cannot enhance the acquisition of employability and production skills.

Finally, findings also revealed that the Chemistry graduates do not poses the production skills for the selected common Chemical products. There was no significant effect of gender. This result is in line with Njelita et al (2010), who equally reported that both the Chemistry teachers and students do not poses sufficient production skills for the Chemical products and as the saying goes, one cannot give what he/she does not have. Could it be that the lecturers also lack proficiency in these skills? Sarkar et al (2014) puts the blame on the structuring of the present curriculum which does not emphasize practical as much as it does theory, and consequently, evidence basedbehaviours and skills are not the criteria for demonstrating competence. Obviously, skills can only be acquired through practical experience of the theoretical concepts

Chemical products are ubiquitous in our daily lives and the skills for their production should be impacted on the Chemistry students at all levels ubiquitously, not merely mentioned in passing as one unassessable 'Greek god'. The unemployment market will be significantly de-populated if Chemistry education empowers the recipients with the production skills of common consumable Chemical products because with proficiency in such skills, many will opt to be self- reliant, creating jobs for themselves and even becoming employers of labor.

Conclusion

Graduate employability is a burning global issue and literature is replete with empirical evidence of a significant mismatch between the skills graduate poses and those required by employers resulting in steady increase in the already high rate of unemployment. The results of this study give further credence to the reported lack of unemployment. The present curriculum content, structure and mode of delivery have been blamed in a variety of ways, all pointing undue emphasis on theory at the expense of practical. The employability skill development opportunities in the curriculum should be given the pride of place they deserve, based on practice not theory. Lecturers should incorporate components of employability skills in their teaching by consciously laying more emphasis on practical work, adopting activity oriented, metacognitive, problem based instructional strategies and then in the evaluation of learning outcomes. While the universities should do more in providing more than enough employability and productive skill development opportunities, employers should understand that considerable employability skill related learning actually takes place in the work place and therefore should be willing to fund in service training and retraining of staff especially new graduates and also patiently give them time to adjust to the demands of the job.

Recommendation:

From the findings, the following recommendations were made.

1. Policy and curricular statements should be reviewed to include a wide range of well-defined skills, pedagogies and assessment methods. Framework for the standards and guidelines must be well spelt out.
2. Professional development programs should be organized periodically for teachers/lectures in terms of competencies/skills as well as practical examples of classroom approaches to lesson planning and implementation
3. Universities to establish and maintain close relationship/synergy with relevant industries.
4. Funding; Government needs to adequately provide for physical facilities, (Labs and Libraries), equipment and materials(chemicals), for ICT driven teaching and learning.

5. Government, lecturers, and students should take the SIWES program more seriously and companies/industries that refuse to accept students for the program should be seriously sanctioned by government.

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