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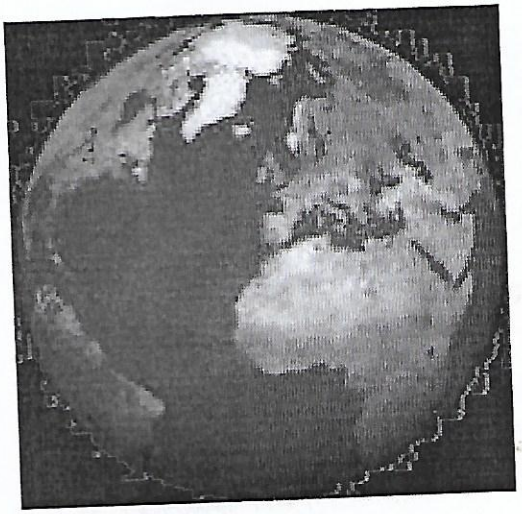

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6) A list of non-standard **Abbreviations** should be added. In general, non-standard abbreviations should be used only when the full term is very long and used often. Each abbreviation should be spelt out and introduced in parentheses the first time it is used in the text.
7) The **Introduction** should provide a clear statement of the problem, the relevant literature on the subject, and the proposed approach or solution.
8) The **methodology** should be complete enough to allow possible replication of the research. It should contain the

research design, population, sampling procedure, sample size, instrumentation, test for reliability, validation, method of analysis and level of significance. Slight variations are allowed.

9) The **results** should be presented with clarity and precision. It should be presented under the directional/research questions or hypotheses. It should be written in the past tense when describing author's findings, but references to previous findings should be written in the present tense. The results should be explained.
10) The **Discussion** should relate the research findings to the findings of earlier researches that are relevant to the study. Justification should be made for deviation from expectation and previous studies.
11) **Tables** should be kept to a minimum and be designed to be as simple as possible. No table should exceed a page. Each table should be on a separate page, numbered consecutively in Arabic numerals and should bear a title. Tables should be self-explanatory without reference to the text.
12) **References** should be in the latest American Psychology Association (APA) bibliographic format.

CONTENTS

Triggers of Turnover Intentions of Early Career Teachers in the Cape Coast Metropolis in Ghana
Francis Ato-Davies & Janet Alberta Koomson ..... **1 – 16**

Managing Universal Basic Education Programme and Security Challenges: Imperative for Child's Education Quality and National Development
Alabi, Christianah Oluwakemi & AwololaOluwatoyin Isaiah ..... **17 – 27**

Awareness Levels and Technical Know-How of University Pre-Service Integrated Science Teachers for Job Opportunities
Babajide V.F.T. & Yewande, R.O ..... **29 – 42**

Geo-Political Zoning and Workers' Earnings in Nigeria
Beatrice Ayodeji Fabunmi ..... **43 – 57**

Leadership and Management Implications of Millennium Development Goals (Mdg)S Zones of Exclusion for Children with Disabilities in Ghana
Dora Baaba Aidoo ..... **59 – 76**

Variants of Academic Culture and Efficiency of University Management
Irene .U. Berezi, ... **77 – 93**

Community Participation and School Effectiveness in Ilorin- South Local Government Area, Kwara State
Lawal, Abdulmumin Abubakar. Oduwaiye, Rhoda O. & Murtala, Abdulyaqin Tukur ..... **95 – 103**

Challenges of Teacher Education and Teaching in Nigeria
Ojo-Maliki Victoria Abiodun, Jimoh Basil Olatunbosun & Onoguere Ejiroghene Ohio ..... **105 – 117**

.....1 – 16

..... 17 – 27

..... 29 – 42

..... 43 – 57

..... 59 – 76

..... 77 – 93

.....95 – 103

.. 105 – 117

The Myth of Free Education and Third World Reality
Osiobe, I. Comfort ..... **119 – 133**

AWARENESS LEVELS AND TECHNICAL KNOW-HOW OF UNIVERSITY PRE-SERVICE INTEGRATED SCIENCE TEACHERS FOR JOB OPPORTUNITIES

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Abstract
The study investigated the awareness levels and technical know-how of pre-service integrated science teachers for job opportunities in University of Lagos using sex and year of study as moderator variables. The study is an ex post-facto research design. The population of the study consisted of all 200, 300 and 400 level students Pre-service Integrated science teachers in University of Lagos. The sample consisted of 128 pre-service integrated science teachers of University of Lagos. A purposive sampling technique was then used to select pre-service integrated science teachers at 300 and 400 levels. Two research questions guided the study and three hypotheses were tested at 0.05 level of significance. A structured and validated questionnaire was used in collecting data. The reliability coefficient value r=0.812 for awareness section using Cronbach alpha and r=0.764 for technical know-how session using KR20 formula. The data collected were analysed using a descriptive and inferential statistics; mean, standard deviation, independent t- test and Pearson moment correlation. The findings of this study showed that the pre-service integrated science teachers possessed high level of awareness but moderate level of technical know-how. Also, 400 level pre-service teachers were significantly superior to 300 level in terms of their

technical know-how. Researchers recommended that technical know-how should be strengthened through constant exposure to practical aspect with the provision of fund to purchase materials.

Key words: Awareness levels, technical, know- how, job opportunities, pre-service teachers.

Word count 214

Introduction

One of the most critical problems in Nigeria today is that of unemployment. This problem is primarily caused by corruption, negligence and adverse policies, mis-management and under-utilisation of human and material resources, which resulted into poverty and diseases. Nigeria is endowed with diverse and infinite human and materials resources which have not been honestly and effectively utilized in order to yield maximum economic benefits; rather, it gave birth to unemployment, poverty and diseases in the country. The problem is common among graduates of all sectors. For instances, the secondary-school graduates consist of the principal fraction of the unemployed accounting for nearly 35% to 50%. Also, the rate of unemployment within the age group of 20 to 24 years is 40% and between 15 to 19 years is 31% (Economy 2010).

Many graduates of higher education are jobless. Akanmu (2011) reported that Nigeria has a serious employment challenge, despite her average economic growth rate and good performance by global standard. The employment is estimated to have declined by about 30%. The researcher reported that this strong performance has not been translated into jobs and real life opportunities for many Nigerian youths. Graduates of higher education cannot find work; being highly educated does not increase the chance of finding a job. The graduates are then forced to accept marginal jobs that do not use their qualification in sales, agriculture and manual labour according to the British Council sponsored Nigeria-Next Generation Report. The problem of unemployment has social consequences as it increases the rate of crime. Egunjobi (2014) reported the consequences of Nigerian's unemployment problems as: food crises, hunger, poverty, low access to basic life and health needs, exposure to different risk activities, and waste of country's resources leading to low production and income as well as low capital income.

What then is the solution to this problem? Different educators and researchers have proposed some solutions among which are: Onwioduokit (2006) proposed an increase in Gross Domestic Product (GDP) while Adebayo (1999) recommended the promotion of growth and growth enhancing strategies. Egunjobi (2014) recommended self-employment type of education, and that the curriculum of higher education should be towards entrepreneurship. In another dimension, Economy (2010) suggested the provision of the right skills for people. With all these suggestions, the problem of unemployment has not been successfully solved, its increases daily. The current researchers are of the opinion that one of the practical solutions is for individual to take practical actions by doing something not just propounding theories but putting theories into real action. Hence, the need for the adoption of the knowledge of science is of paramount importance. What then is science?

There are diverse definitions of science by different science educators and scientists. Erinosho (2009) asserted that science entails activity and doing, the researcher views science as an organised body of knowledge about the world; a set of logical and empirical methods for the investigation and understanding of natural phenomena. Okeke (2007) opines that science is a systematic investigation of nature with a view to understanding and harnessing them for man's need. Generally, science involves activities that cumulate into testable and verifiable body of knowledge. But within the context of this study the perspective that views science as human activities in search of food, clothing, shelter, and basic human needs for self actualisation and reliance was adopted. Science and technology are like sides of a coin, they cannot be separated from one another (Raimi, Bolaji & Babajide, 2003). The principles involved in production of objects is the science aspect and technical know-how is the technology aspect.

Science and Technology has become an indispensable and essential part of man's culture in the world. This is due to the fact that the economic and political strength of any nation depends on her scientific and technological achievement (Adepitan, 2003; Olagunju, Adesoji, Iroegbu and Ige, 2003). It, therefore, implies that for any meaningful solution to the problem of unemployment, science and technology is of paramount importance and very relevant to be adopted. The principal components of science are

biology, physics and chemistry but this paper focused on physics and chemistry aspects because of their practical applications in production and inventions of materials which are sources of job and employment creations.

The knowledge of physics has led to so many inventions such as the production, application and utilization of integrated circuits, production and use of machines and other contrivances. The discovery and production of hydroelectric power, gas turbine and thermonuclear power plant, telephones, refrigerators, heaters and cookers, the discovery and production of modern technologies such as Information and Communication Technology (ICT) which has made the world a global village are also part of the benefits of physics. Also, the knowledge of chemistry has led to the production of basic human needs such as soap of all kinds, perfumes, creams, plastics, textiles, petroleum, cooking and industrial gas, oils etc. All these are sources of job creation for science students who can apply the acquired knowledge of science in their production. The basic question then is, are science students aware of this golden opportunities? Have they acquired the technical know-how knowledge to bring this knowledge into reality?

It is against this background that this study investigated the awareness level and technical know-how for job opportunities of University pre-service integrated science teachers with the aim of making recommendations from the result to solve problem of unemployment in Nigeria.

Pre-service integrated science teachers are undergraduate science students in the Faculty of Education at the University level. These students take courses in physics, chemistry and biology which include the production of simple materials for man's use which can make them to acquire some entrepreneurial skills in science to produce and market some materials such as: soap, creams, toothpaste, detergent, liquid soap, etc. using the knowledge of chemistry while the production of light from different sources, simple electric circuit, simple periscope, telescope, ray boxes, lens holders, sound from different sources etc. can all be produced using the knowledge of physics. In another dimension, a competent pre-service science teacher can organise home or private lessons to each basic science at the junior secondary schools which can be a brief relief to financial problem and sources for job opportunities while in school and after graduation.

Awareness levels of Job Opportunities: Pre-service integrated science teachers have low awareness when they scored one-third and below of the total points (0.00-32.00). Moderate awareness of job opportunities implies a score slightly above one-third to two-third of the total score (32.01-64.00).They have high awareness when they score from above two-thirds of the total awareness score (64.01 and above). They have high awareness of such job opportunities when they score above 50.00% of the total points and they also demonstrate high technical know-how when they score above 50.00% of the total points.

Levels of Technical Know-how for Job Opportunities: This implies having the required knowledge and ability to apply relevant concept taught in a way as to create a job. Low technical know-how implies a score up to one-third of the total score (0.00-10.00). Moderate technical know-how denotes a score above one-third of the total score up to two-third of the total score (10.01-20.00). High technical know-how implies scores above two-third of the total score (20.01 and above).

Job Opportunities: In this study, job opportunities refer to the potential application of knowledge and skills taught to pre-service integrated science teachers that could enable them to be self-employed with regard to the concepts that they were taught.

Statement of the Problem

Job opportunities with regard to white-collar jobs have become extremely competitive, difficult to secure as well as exploitative in most cases for those who have graduated in science based disciplines. Integrated science education graduates are expected to take different courses in core science subjects such as: chemistry, physics and biology before they graduate from the university. In addition, some science education courses equipped them with skills to improvise, produce materials as well as equipment for sale and this is expected to equip them to be able to create job opportunities on their own. Some studies have shown that there is a gap between what the industry requires as well as what is taught in the university and this might cause a discrepancy in being aware of what to do in terms of creating job opportunities for themselves and the actual technical know-how, which is required to create a job opportunity in

terms of being self-employed based on what an individual has gained or learnt in the university. There are dearth of studies investigating whether relationship exist between awareness and technical know-how of integrated science education pre-service teachers before they are turned into the labour market. This study sought to find out as well as whether their levels of study and gender have effects on their awareness and technical know-how of job opportunities.

Purpose of the Study

The purpose of the study was to investigate the awareness level and technical know-how of pre-service integrated science teachers' job opportunities. Specifically, the objectives are stated as follows:

(i) To determine levels of awareness and technical know-how of pre-service integrated science teachers for job opportunities.

(ii) To ascertain whether relationship exists between pre-service integrated science teachers' awareness and technical know-how for job opportunities.

(iii) To investigate whether there is gender difference on pre-service integrated science teachers awareness and technical know-how for job opportunities

(iv) To determine whether levels of study has any significance difference on pre-service integrated science teachers, awareness and technical know-how for job opportunities.

Research Questions

1. What are the levels of:
   (i) Pre-service integrated science teachers' awareness for job opportunities?
   (ii) Pre-service integrated science teachers' technical know-how for job opportunities?

Hypotheses

H_o1: There will be no significant relationship between pre-service integrated science teachers' awareness and technical know-how for job opportunities

H_o2: There will be no significant gender difference of pre-service integrated science teachers' (i) awareness for job opportunities (ii) technical know-how for job opportunities

H_o3: There will be no significant effect of level of study on pre-service integrated science teachers' (i) awareness for job opportunities (ii) technical know-how for job opportunities

Methodology

The study adopted an ex post-facto research design. An ex post facto design is a design that is suitable for conducting research in which the variables are inherently non manipulable in order to establish a cause-effect or correlational relationships when a true or quasi-experimental design is not ethical or feasible. The population of the study consists of all 200, 300 and 400 level students Pre-service Integrated Science teachers in University of Lagos, Nigeria. 100 level students are not taken as they are deemed not to have acquired much awareness as well as technical know-how of job opportunities in their discipline.

Two course of study levels in the integrated science group were purposively randomly selected for the main study while one level was selected for the validation exercise. 300 and 400 levels pre-service integrated science teachers were randomly selected. Systematic random sampling technique was then used to select every four out of five of pre-service integrated science teachers at 300 and 400 levels. A total of 128 students comprising 72 students from the 400 level and 56 students from 300 level were randomly selected. The sample was also componential of 66 males and 62 females.

The instrument was a self-developed one by the researchers which was used to ascertain levels of awareness and technical know-how for job opportunities of pre-service integrated science teachers. It consists of three sections. The first section deals with demographic information consisting of gender at two levels: male and female as well as the level of course of study at two levels: 300 and 400. The second section consists of 24 items on awareness of job opportunities in integrated science with four response formats of: Very Great Extent (VGE), Great Extent (GE), Moderate Extent (ME) and Little Extent (LE). Section C consists of 30 items on Technical know-how of pre-service integrated science teachers with regard to job opportunities. The statements were responded to in a True or False manner.

The scoring for the awareness section was such that Very Great Extent was scored 4 points, Great Extent-3 points, Moderate

H_o3: There will be no significant effect of level of study on pre-service integrated science teachers' (i) awareness for job opportunities (ii) technical know-how for job opportunities

Methodology

The study adopted an ex post-facto research design. An ex post facto design is a design that is suitable for conducting research in which the variables are inherently non manipulable in order to establish a cause-effect or correlational relationships when a true or quasi-experimental design is not ethical or feasible. The population of the study consists of all 200, 300 and 400 level students Pre-service Integrated Science teachers in University of Lagos, Nigeria. 100 level students are not taken as they are deemed not to have acquired much awareness as well as technical know-how of job opportunities in their discipline.

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The scoring for the awareness section was such that Very Great Extent was scored 4 points, Great Extent-3 points, Moderate

Extent-2 points and Little Extent-1 point. In the technical know-how section, correct statement whether in True or False form was scored 1 while an incorrect one was scored 0. The instrument was face validated and content validated by the two researchers. The reliability was done section by section. The reliability for the awareness section was computed using Cronbach alpha and it gave a value of 0.812. The reliability for the Technical know-how section was computed using Kuder-Richardson Formula 20 Formula and it gave a value of 0.764. These values are indicative that they are reliable as they effectively accounted for over 50.00 per cent of variances.

Data were analysed on the basis of research questions and hypotheses. The research questions were analysed using descriptive statistics of mean and standard deviation. The benchmark for low level of awareness was put at an aggregate mean of 32.00 and below for 24 items, moderate level from 32.01-64.00 while high level was put at an aggregate mean of 64.01 and above. In the case of technical know-how, the benchmark for low level of technical know-how was put at 10.00 and below for 30 items, moderate level was put at10.01-20.00 while high level was put at 20.01 and above for the same number of items. Hypothesis 1 was analysed using Pearson Moment Correlation Coefficient while hypotheses two and three were analysed using t-test at 0.05 level of significance. The data were tested for linearity, normality and homogeneity of variance and they were found to meet the assumptions underlying the usage. Data were analysed using Statistical Package for Social Scientists (SPSS) Version 16.0.

Ethical Considerations

The principles of informed consent, honesty and trust, confidentiality and anonymity, research integrity as well as correct use of data and results were the focal points of ethical considerations for this research.

Results

Research Question1

What are the levels of:

(i) Pre-service integrated science teachers' awareness for job opportunities?

(ii) Pre-service integrated science teachers' technical know-how for job opportunities?

Table 1: Descriptive Statistics of Mean and Standard Deviation of Integrated Science Teachers' Awareness of Job Opportunities

Variable	N	Minimum score	Maximum score	Mean	Standard Deviation
Awareness	**128**	**34.00**	**96.00**	**64.93**	**12.12**

Low level- 0.00 -32.00 Moderate Level: 32.01-64.00 High Level: 64.01-96.00

Table 1 shows that the mean score of Integrated science teachers' awareness for job opportunities was at a high level ($\bar{x}$ =64.93; SD=12.12). This is further reinforced by the minimum score which was at the moderate level ($\bar{x}$ =34.00) and the maximum score which was at the high level ($\bar{x}$ =96.00).

Table 2: Descriptive Statistics of Mean and Standard Deviation of Pre-Service Integrated Science Teachers' Technical Know-how of Job Opportunities

Variable	N	Minimum score	Maximum score	Mean	Standard Deviation
Technical Know-how	**128**	**8.00**	**23.00**	**16.10**	**3.15**

Low level- 0.00 -10.00 Moderate Level: 10.01-20.00 High Level: 20.01-30.00

Table 2 indicates that the mean score of Pre-service Integrated science teachers' technical know-how for job opportunities was at a moderate level ($\bar{x}$ =16.10; SD=3.15). The minimum score indicates a mean score at the low level ($\bar{x}$ =8.00) while the maximum score indicates a mean score at the high level ($\bar{x}$ =23.00).

Hypothesis 1

H_o1: There will be no significant relationship between pre- service integrated science teachers' awareness and technical know-how for job opportunities.

Table 3: Pearson Moment Correlation Coefficient between Pre-Service Integrated Science Teachers' Awareness and Technical Know-how for Job Opportunities

Awareness		Technical Know-how	
Awareness	Pearson Correlation	1.000	-.046
	Significance		.606
	N	128	128

Significant at p < 0.05

Table 3 shows that there was no significant relationship between Integrated science pre-service teachers' awareness and technical know-how for job opportunities (r=-.046, N=128, p>0.05). The null hypothesis (H_o1) was therefore not rejected. This implies that pre-service integrated science teachers' awareness and their technical know-how did not significantly correlate. The pre-service teachers must have overestimated their technical know-how.

Hypothesis 2.

H_o2: There will be no significant gender difference of pre-service integrated science teachers' (i) awareness for job opportunities (ii) technical know-how for job opportunities

Table 4: Independent t-test of Effect of Gender on Pre-service Integrated Science Teachers' Awareness and Technical Know-how of Job Opportunities

Variable	Level	N	Mean	SD	Df	t-value	Significance
Awareness	Male Female	66 62	65.48 64.34	 12.27 12.03	126	0.533	0.595
Technical know-how	Male Female	66 62	15.83 16.39	3.34 2.93	126	0.994	0.322

Significant at p < 0.05

Table 4 shows that no significant gender differences exist between male and female pre-service integrated science teachers in their awareness for job opportunities (t= 0.533, df: 126, p>0.05). Similarly, there was no significant gender differences between male and female pre-service integrated science teachers in their technical

know–how of job opportunities (t= 0.994, df: 126, p>0.05). Hence, the null hypothesis (H_o2) stated was not rejected.

Hypothesis 3

H_o3: There will be no significant effect of level of study on pre-service integrated science teachers' (i) awareness for job opportunities (ii) technical know-how for job opportunities

Table 5: Independent t-test of Levels of Study on Pre-service Integrated Science Teachers' Awareness and Technical Know-how for Job Opportunities

Variable	Level	N	Mean	SD	Df	t-value	Significance
Awareness	400 Level	72	65.64	13.31	126	0.749	0.456
	300Level	56	64.02	10.43			
Technical Know-how	400 Level	72	16.60	2.763	126	2.044	0.043
	300 Level	56	15.46	3.51			

Significant at p < 0.05

Table 5 shows that there was no significant effect of level of course of study on pre-service integrated science teachers' awareness for job opportunities (t= 0.749, df: 126, p > 0.05). Hence, this null hypothesis was not rejected. On the other hand, Table 5 indicates that there was a significant effect of levels of study on pre-service integrated science teachers' technical know-how for job opportunities (t= 2.044, df: 126, p < 0.05). This implies that the null hypothesis H_o3 (ii) was not rejected and it can be inferred that 400 level pre-service integrated science teachers were significantly better than their 300 level pre-service integrated science teachers in terms of technical know-how.

Discussion

The findings show that pre-service integrated science teachers possessed a high level of awareness but a medium level of technical know-how. This is due to the fact that the pre-service integrated science teachers have been exposed to the practical and theoretical

aspects of the contents but may not have enough opportunities to further practice what they have been exposed to due to insufficient materials and lack of sufficient money to purchase materials needed. Hence, they possess moderate technical know-how but high awareness.

Also, the result showed no significance relationship between awareness and technical know–how of pre-service integrated science teachers for job opportunities. This mean that awareness and technical know-how does not significantly correlate. Gender does not have any significance difference between awareness and technical know-how of pre-service integrated science teachers for job opportunities. This implies that boys and girls have equal potentials for awareness and technical know-how.

There was no significant effect of level of study on pre-service integrated science teachers' awareness for job opportunities but there was significant effect of level of study on pre-service teachers' technical know- how for job opportunities. The 400 level pre-service integrated science teachers are significantly superior to the 300 levels in terms of their technical know-how. This is because they are higher than them in years of study, hence must have acquired more practical experience than their counterparts 300 level pre- service teachers.

Conclusion

The result obtained shows that pre-service science teachers possessed high awareness but moderate technical know-how knowledge (that will develop their entrepreneurial skills). Also; no significant difference existed between awareness and technical know-how of male and female. But there existed a significant effect of level of study on technical know-how; with 400 level pre-service integrated science teachers significantly better than 300 level in terms of technical know-how.

Recommendations

1. Pre-service integrated science students at the university levels' technical know–how should be strengthened through continuous and direct exposition to the practical aspect of their science courses. This will develop their entrepreneurial skills in each course.

2. Government should make sufficient money available to purchase materials of both consumable and non consumable items so that the pre-service science teachers entrepreneurial skills will be developed. They have the opportunities to produce materials continuously and this will increase their technical know –how for job opportunities and be productive while on training and out of training.
3. Male and female pre-service science teachers should be given equal opportunities in terms of awareness and technical know-how. This is because gender has no significant effect on both awareness and technical know-how.
4. Pre-service science teachers should be exposed to the technical know –how from the beginning of their study to the end, e.g from 100 level to 400 level. This will make them to acquire enough technical know–how knowledge that will make them to produce local materials marketable while in school and at the end of their course rather than hunting for white colar-jobs.

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Abstract

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