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**MINUTES OF MEETING OF PUBLICATION OF JOURNAL COMMITTEE HELD ON THE 26<sup>TH</sup> MARCH, 2019 AT THE CONFERENCE HALL OF CENTRE FOR RESEARCH, INNOVATION AND DEVELOPMENT (CRID)**

**ATTENDANCE:-**

1. Engr. E. O. Edet
2. R. I. Egwa
3. Professor A. A. Segymola
4. Professor M. I. Rilwan
5. Dr. N. A. Musa
6. A. C. Aizebioje Anthony
7. Dr. E.U. Tonukari
8. Dr. TPL. M. S. Jimah
9. Rev. G. E. Okpeodua
10. Idalu E. A. (Mrs.) Secretary

**Opening Prayer:-** The opening prayer was said by Dr. N. A Musa at about 10.17am

**Presentation of the Proposed Agenda:-**

1. Opening prayers
2. Welcome address/brief on Journal Publication
3. Any other business (A.O.B)
4. Closing prayer

**Welcome Address:** - The Assistant Director (CRID) welcomed everybody to the meeting and appreciated members of the Committee for their commitment. He briefed the house on what is required for the publication of the Journal. He mentioned that the papers, henceforth, should be vetted by a staff of the department, before sending them for external assessment. The Assistant Director thanked the members for attending the meeting despite the short notice and equally that they should disseminate the information to the Polytechnic to vigorously engage in publication of papers.

**Brief on Journal Publications:-** The Assistant Director briefed members of the Publication Committee on the way forward for the proposed publication of the Journal. That he wants the house to bring up ideas on how the vetting should be

done before the external assessment will be carried out. The Committee unanimously agreed on the following:

1. Vetting of the papers should be done by three persons either within the institution or outside, and TETFund should pay for the vetting.
2. That the papers should be checked meticulously before being sent out for assessment. It was resolved that the vetting should be done by experienced professionals before sending the papers for external assessment.
3. That a staff from each School should be given the assignment of allocating the papers to capable hands for vetting. The Committee members representing each school are as follows:

- |                     |                    |
|---------------------|--------------------|
| 1. Dr. Wilfred      | ICT                |
| 2. Akhalume P. B    | School of Business |
| 3. Engr. Akele      | Engineering        |
| 4. Mr. Balogun P.O  | General Studies    |
| 5. Dr. Festus Otoba | Art Design         |
| 6. Al-Hassan        | Environmental      |

4. That two members of the Publication Committee should finally go through the papers to ensure that they are error-free before collation.

**A.O.B:-** Mr. Balogun P.O. said it's very good to co-author a paper. That it has more advantages than one person authoring it. He also said that it's not good to put more than two papers from the same source in one journal. And that it is desirable to have papers published in the University Journals or International Journals as such publications would be easily accepted and considered valued.

A. C. Aizebioje Anthony moved a motion for adjournment at 11.17 am and supported by Dr. E.U. Tonukari who equally led the closing prayers at about 11:18am.

.....  
**Mr. R. I. Egwa**

.....  
**Idalu E. A. (Mrs.)**  
**Secretary**

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**EVALUATION OF THE FREE RADICAL SCAVENGING AND ANTIBACTERIAL PROPERTIES OF  
CRUDE EXTRACT AND COLUMN FRACTIONS OF *BUCHHOLZIA CORIACEA* (*CAPPARACEAE*)**

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## Abstract

This present study evaluated the free radical scavenging and antimicrobial properties of crude extract and column fractions of *Buchholzia coriacea* using *in vitro* models. 1000 g of air dried powdered seeds of *B. coriacea* were extracted with methanol using maceration for 72 hours and was concentrated in vacuum with rotary evaporator. The crude extract was subjected antimicrobial test, using five clinical isolates of; *Bacillus subtilis*, *Escherichia coli*, *Staphylococcus aureus*, *Pseudomonas aeruginosa* and *Klebsiella pneumonia*, and total antioxidant assay using 2, 2 – diphenyl-1-picrylhydrazyl radical. 25 g of the remaining extract was used in column fractionation using gradient elution method (n-hexane, chloroform, ethyl acetate and methanol) in increasing order of polarity. The fractions were bulked based on similarities in thin layer chromatography (TLC) into six column fractions (CF1-CF6). Their percentage yields include 1.20, 2.80, 8.89, 19.80, 27.04 and 23.60 % . The antioxidant assay for the crude extract and all the fractions was done using concentration ranges of 20-100 µg/ml. The antimicrobial test was done using concentrations range of 200-1000 mg/ml for crude extract and 150-200 mg/ml for column fractions (CF4-CF6). For antimicrobial and antioxidant test, 2 mg/ml Ampicillin-Cloxacillin and Vitamin C were used as positive controls respectively. Findings from this research showed that, the crude and column fractions have antibacterial activities in a concentration dependent manner ( $P \leq 0.05$ ). Moreso, a low antioxidant activity was observed for both sample and column fractions. In conclusion, this work may have justified some of traditional uses of *G.latifolium* in the management of human diseases.

**KEY WORDS:** Antibacterial property, crude extract, column fractions, radical scavenge.

## **1.0 Introduction**

The use of medicinal plants is based on the belief that they have low toxicity and cost less than the semi-synthetics or synthetic drugs, and there is recent increase in the search for natural products of plant origin with insecticidal and antimicrobial properties for the control of a variety of pest insects, pathogens and vectors because they are safe, effective, inexpensive, environment friendly, biodegradable and target specific against pests / parasites. *Buchholzia coriacea* belongs to the Capparaceae family (Keay, 1989). It is commonly known as "Wonderful kola" and known in the world as Memory nut. (Adediran, 2013). It is a tropical plant that have been used in traditional medicine in the treatment of infectious diseases, management of diabetes mellitus, hypertension, rheumatism, cold, cough and catarrh by traditional healers. (Adjanohoun *et al.*, 1996; Kamaraj *et al.*, 2009; Adisa *et al.*, 2010). There is currently scanty information on the phytochemical constituents, total antioxidant and antibacterial properties of the methanol crude extract and Column fractions of *Buchholzia coriacea* (wonderful kola). However, the aim and objectives of this research is to determine the radical scavenging and antimicrobial properties of crude extract and column fractions of *B. coriacea*.

## **2.0 Materials And Methods**

### **2.1 Chemical Reagents**

2, 2- diphenyl-1-picryl hydrazyl (DPPH) (Sigma Aldrich, Cat.No. D913-2), Sodium Dodecyl Sulfate, SDS, (75746), acetic acid (338826), EDTA E 9884, CuSO<sub>4</sub> (61245), FolinCiocalteu's phenol reagent (47641), FeCl<sub>3</sub> (157740), vitamin C, quercetin, gallic acid, tannic acid, methanol, chloroform, ethyl acetate, distilled water, Silica gel 60-120 MESH Size, TLC plates, H<sub>2</sub>SO<sub>4</sub>. All other chemical reagents were obtained from Sigma Aldrich, Fluka and other standard chemical suppliers.

### **2.2 Plant Collection**

Wonderful kola nuts were brought in Auchi market, Edo State Nigeria, the plant was authenticated by Mr. Emmanuel Amodu at Herbarium of Paxherbal Clinic and Research Laboratories, Edo State were voucher specimen was deposited and herbarium number (PAX/H/1367) was given.

### **2.3 Preparation Of Inocula**

The bacterial strains grown on nutrient agar (Muller Hinton broth) at 35°C for 72 h were suspended in a saline solution (0.9%, w/v) NaCl and adjusted to a turbidity of 0.5 Mac Farland standard ( $5 \times 10^5$  CFU/ml) Konaté, *et al.*, 2012.

### **2.4 Preparation Of Test Samples**

The stock solutions of sample were dissolved in 10% dimethylsulfoxide (DMSO) in water (Baltimore, 1997 and Starke, 1998) at a final concentration of 800 µg/ml. The stock solutions were sterilized by filtration through 0.22 µm sterilizing Millipore express filter.

## **2.5 Extraction Of Plant Material**

The seeds were cut into small pieces, air dried and pulverized into coarse powder. After which they were macerated using absolute methanol for 72 hours and was concentrated to dryness in vacuum using rotary evaporator. The crude extract was later stored in the refrigerator for 4°C until use.

## **2.6 Preliminary Photochemical Screening**

The phytochemical composition of the extract was done using methods described by Sofowara, 1993, Trease and Evans, 1996.

## **2.7 Gradient-Elution fractionation**

As devised by Desreux *et al.*, (2000). Conventional open column chromatography (30cm long and 5cm diameter) of the crude extract was done. The silica gel used was kieselgel 70-230 mesh size (0.063-0.200mm) particle size. The Si gel was loaded on top of the column and allowed to settle. Crude extract (25 g) was diluted, adsorbed onto kieselgel and poured on top of the column which was eluted with hexane, chloroform, ethyl acetate and methanol mixtures ( increasing order of polarity). Eluates (151 fractions x 10ml) were collected into test tubes and bulked according to their TLC characteristics (Silica gel 60-120 MESH Size, hexane: ethylacetate, 2:3; H<sub>2</sub>SO<sub>4</sub> spray reagent) into 6 main column fractions (CF<sub>1</sub>-CF<sub>6</sub>), dried and weighed. Some of the column fractions were subjected to prep-TLC (commercial type) with hexane: ethylacetate (2: 3). Bands were scrapped, eluted with methanol, filtered and evaporated in a fume cupboard to yield needle-shaped crystals.

## **2.8 Antimicrobial Activity Assay**

The organisms used were bacteria isolates such as *Bacillus subtilis*, *Escherichia coli*, *Staphylococcus aureus*, *Pseudomonas aeruginosa*, *Klebsiella pneumonia*, obtained from the Microbiology Laboratory of Pax Herbal Clinic and Research Laboratories, Ewu-Esan, Edo state and the purity was checked by a Microbiologist in the same institution and maintained at 4°C in slants of nutrient agar. The extract sample was assayed for their antimicrobial sensitivity using the Agar diffusion technique by Kirby-Bauer as described by Isu and Onyeagba, 1998 and Ibekwe, *et al.*, 2001; with some modifications. The sterile Mueller Hinton Agar (MHA) plates were seeded with standardized broth culture of the test organisms containing 10<sup>8</sup>cfu/mls Equivalent to 0.5 McFarland standards and 6mm diameter of hole were made with sterile cork borer and the following concentrations ranges from 100-200 mg/ml were dispensed into the cut holes on the plates with the aid of micropipette and allowed to stand for diffusion for about 1 hour on a bench in Laminar flow cabinet chamber. They were incubated at 37°C for 24 hours and observed for zones diameters of inhibition against various tested organisms. The zones diameters were measured with a transparent rule and the result recorded in millimeters (mm). Sterile Dimethyl Sulfoxide (DMSO) was also poured into a hole created on the plates as negative control and 2 mg/ml of Ampicillin-Cloxacillin (Ampiclox) as positive control.

## **2.9 Minimum Bacteriocidal Concentration (MBC)**

Macro Broth Dilution Method as modified by Baltimore (1997) and Starke (1998).

## **2.10 Minimum Inhibitory Concentration (MIC)**

Minimum inhibitory concentration (MIC) was determined by the microdilution method in culture broth as recommended by Krogstad and Smith, (1998); National Committee for Clinical Laboratory Standards, (2011); Konaté *et al.*, (2012) with low modifications. All tests were performed in triplicate and the bacterial activity was expressed as the mean of inhibitions produced. The MIC was defined as the lowest concentration of substance / sample at which no colony was observed after incubation. So, the MIC was defined as the lowest concentration where no change was observed, indicating no growth of microorganism.

## **2.1 Determination Of Antioxidant Activity**

Radical scavenging activity of plant extract and fractions against stable DPPH (2, 2<sup>1</sup>-diphenyl-1-picrylhydrazyl, Fluka) was determined with a UV/visible light spectrophotometer (JENWAY 6505 UV/ Visible Instruments, USA) at 517 nm as described by Meda *et al.*, (2005). Sample solutions were prepared by dissolving 10 mg of dry extract in 10 ml of methanol. The samples were mixed with 1 ml of methanolic DPPH solution (20 mg/ml). After 15 min in the dark at room temperature, and was measured. All experiments were performed in triplicate and expressed in mmol Ascorbic Acid Equivalent.

## **2.12 Determination Of Total Phenol Contents**

The total phenol content of the extracts of *B. coriacea* was determined according to the method of Singleton *et al.*, 1999 with some modifications. Briefly, 200 µl of each sample was mixed with an equal volume of water. Folin - Ciocalteu reagent (2.5 ml) and 2 ml of 7.5% sodium carbonate were subsequently added, and the absorbance was measured at 765 nm after incubating at 45°C for 40 min. The amount of phenols in both extracts was expressed as gallic acid equivalent (GAE)

## **2.13 Determination Of Total Flavonoid Content**

The flavonoid content of the extracts of *B. coriacea* was determined according to the method of Meda *et al.*, 2005, using quercetin (0.01 g / 20 ml methanol) as a reference compound. Briefly, 500 µl of stock solution of extract was mixed with 50 µl of aluminum trichloride (AlCl<sub>3</sub>) and potassium acetate according to Meda *et al.*, (2005). The absorbance (using Spectrum lab digital spectrophotometer) at 415 nm was read after 30 min incubation at room temperature. All determinations were carried out in triplicate. The amount of flavonoids in methanol extract of *B. coriacea* was expressed as quercetin equivalent (QE).

### 3.0 Results

The results of the entire research are shown in tables below.

**Table 1: Preliminary phytochemical screening of crude extract**

Phytochemicals	Crude extract
<b>Alkaloids</b>	-
<b>Anthraquinones</b>	-
<b>Cardiac glycosides</b>	-
<b>Flavonoids</b>	+
<b>Saponoids</b>	++
<b>Steroids</b>	++
<b>Tannin</b>	
<b>Terpenoids</b>	++

**KEY:** ++ = moderate amount; + = minute amount and - = not detected

**Table 2: Antimicrobial susceptibility study on Crude Extract on some pathogenic organisms**

TEST ISOLATES	1000 mg/ml	750 mg/ml	500 mg/ml	AMPICLOX 2 mg/ml	DMSO (5%)
<i>Bacillus subtilis</i>	28	13	9	30	0
<i>Escherichia coli</i>	21	18	10	10	0
<i>Klebsiella pneumonia</i>	18	10	7	20	0
<i>Pseudomonas aeruginosa</i>	0	0	0	0	0
<i>Staphylococcus aureus</i>	27	20	14	18	0

**Table 3: Minimum Inhibitory Concentration (MIC) and Minimum Bactericidal Concentration (MBC) of crude extract of *B. coriacea***

TEST ISOLATES	MIC (mm)	MBC (mg/ml)
---------------	----------	-------------

<i>Bacillus subtilis</i>	40	80
<i>Escherichia coli</i>	20	40
<i>Klebsiella pneumonia</i>	160	320
<i>Pseudomonas aeruginosa</i>	0	0
<i>Staphylococcus aureus</i>	40	80

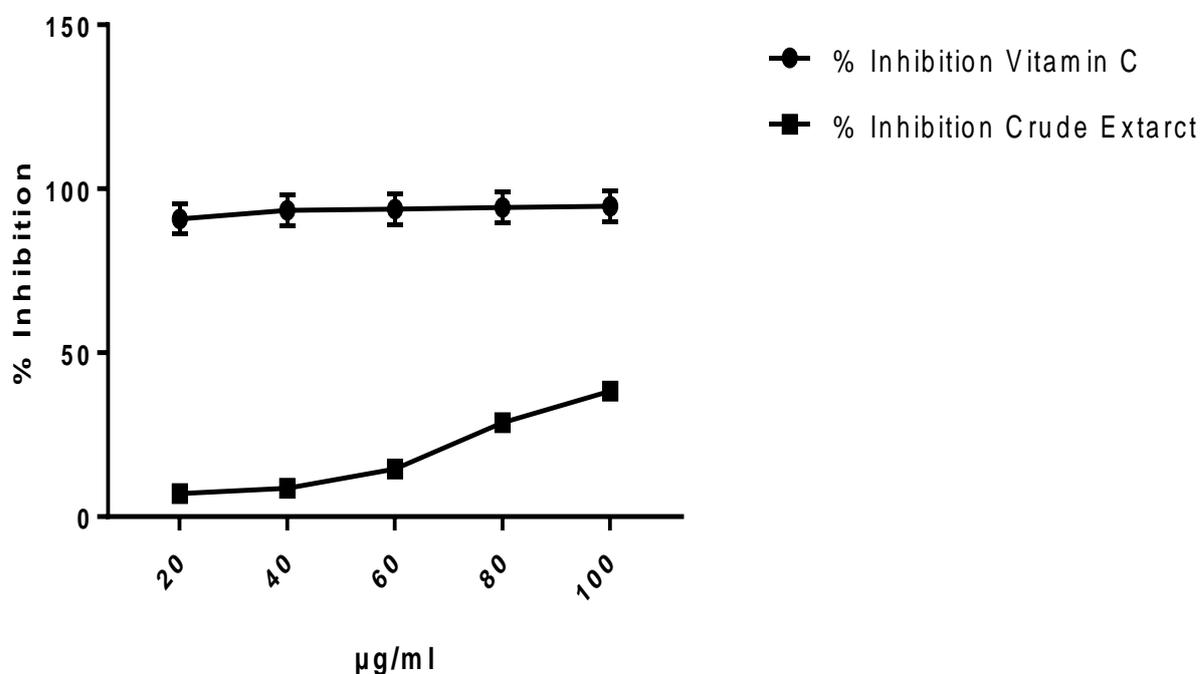


Figure 1: Total antioxidant of crude extract using DPPH

TABLE 4a: Anti-microbial susceptibility testing on column fraction four CF4 of *B. coriacea*

TEST ISOLATES	200 mg/ml	150 mg/ml	100 mg/ml	AMPICLOX 2 mg/ml	DMSO (5%)
<i>Bacillus subtilis</i>	16.00	16.66	15.00	35.00	0.00
<i>Escherichia coli</i>	15.66	19.33	12.00	10.00	0.00

<i>Klebsiella pneumonia</i>	18.33	19.66	7.00	25.00	0.00
<i>Pseudomonas aeruginosa</i>	13.33	15.00	5.00	0.00	0.00
<i>Staphylococcus aureus</i>	14.00	13.80	9.30	23.00	0.00

**TABLE 4b: Anti-microbial susceptibility testing on column fraction five CF5 of *B. coriacea***

TEST ISOLATES	200 mg/ml	150 mg/ml	100 mg/ml	AMPICLOX 2 mg/ml	DMSO (5%)
<i>Bacillus subtilis</i>	16.00	10.00	9.00	35.00	0.00
<i>Escherichia coli</i>	16.66	16.66	16.00	10.00	0.00
<i>Klebsiella pneumonia</i>	16.66	13.00	12.23	25.00	0.00
<i>Pseudomonas aeruginosa</i>	18.00	14.33	14.23	0.00	0.00
<i>Staphylococcus aureus</i>	14.23	16.00	8.00	23.00	0.00

**TABLE 4c: Anti-microbial susceptibility testing on column fraction Six (CF6) of *B. coriacea***

TEST ISOLATES	200 mg/ml	150 mg/ml	100 mg/ml	AMPICLOX 2 mg/ml	DMSO (5%)
<i>Bacillus subtilis</i>	13.00	11.66	11.66	35.00	0.00
<i>Escherichia coli</i>	13.66	12.00	11.33	10.00	0.00
<i>Klebsiella pneumonia</i>	12.66	12.00	7.00	25.00	0.00

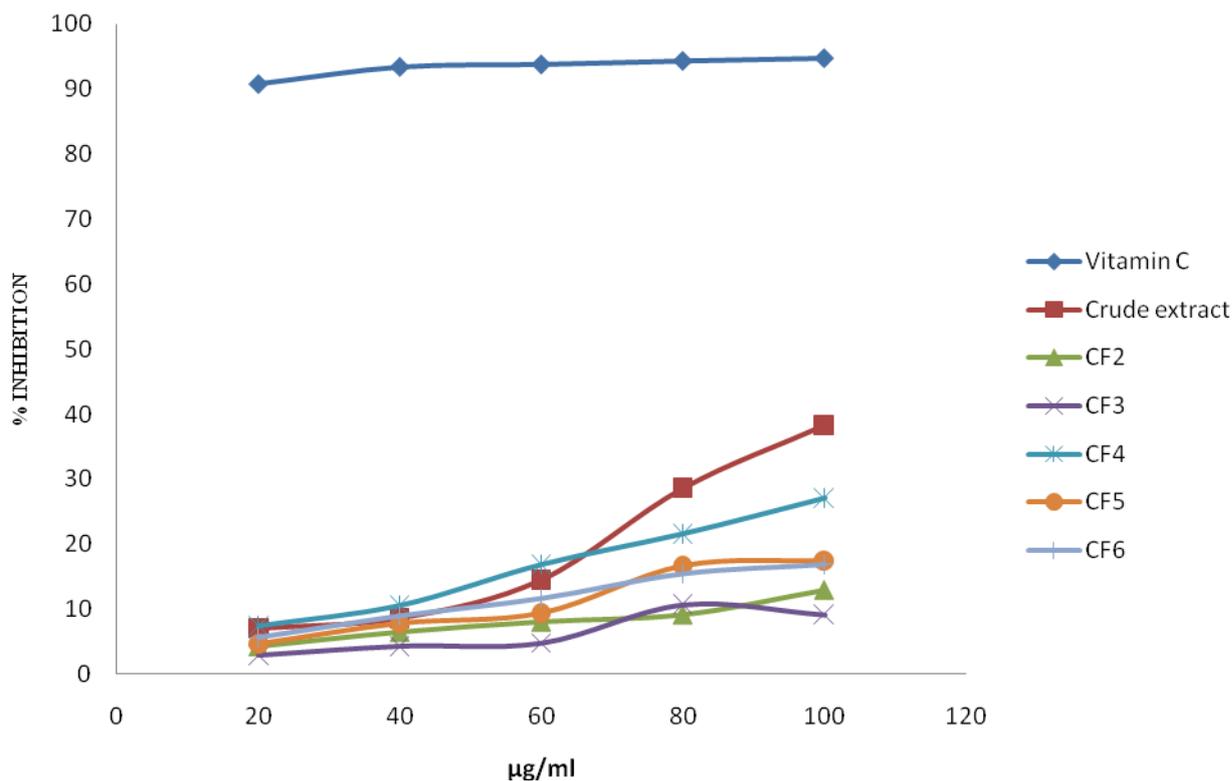
<i>Pseudomonas aeruginosa</i>	12.66	14.66	10.00	0.00	0.00
<i>Staphylococcus aureus</i>	15.33	13.00	10.00	23.00	0.00

**TABLE 5: Minimum Inhibitory Concentration (MIC) of the various column fractions of *B. coriacea***

TEST ISOLATES	CF4	CF5	CF6
<i>Bacillus subtilis</i>	25	25	25
<i>Escherichia coli</i>	50	25	25
<i>Klebsiella pneumonia</i>	25	25	25
<i>Pseudomonas aeruginosa</i>	25	25	25
<i>Staphylococcus aureus</i>	25	25	25

**TABLE 6: Minimum Bacteriocidal Concentration (MBC) of the various column fractions of *B. coriacea***

TEST ISOLATES	CF4	CF5	CF6
<i>Bacillus subtilis</i>	50	25	25
<i>Escherichia coli</i>	75	50	25
<i>Klebsiella pneumonia</i>	25	25	25
<i>Pseudomonas aeruginosa</i>	25	25	25
<i>Staphylococcus aureus</i>	25	25	25



**Figure 2: Total Antioxidant of Crude and Solvent Fractions**

#### 4.0 Discussion

Plants are the best sources of active secondary metabolites which are beneficial to mankind. Many plants origin drugs have been reported with biological properties like antibacterial, antifungal, antioxidants, anti-inflammatory and hypoglycemic (Boron and Fingold, 1990; Mbata and Onwumelu, 2009). According to WHO report, 80% of the world population is taking interest in indigenous herbal medicines usually being seed in form of fruits, vegetables, drugs or their extracts for the treatment of diseases and for maintenance of health (Davidson, 2002; Ajayeoba *et al.*, 2003).

Preliminary phytochemical results as shown in Table 1, revealed the presence of reducing sugars, flavonoids, saponin, steroid, terpenoid, and phenolic compounds. Although, saponins have been reported to have a wide spectrum of activity as antifungal and antibacterial agents, lowering blood cholesterol and inhibition of cancer cell growth (Davidson, 2002; Ajayeoba *et al.*, 2003; Mbata *et al.*, 2009).

Moreover, a concentration dependent increase in antimicrobial activity of crude extract was noted in Table 2. With no significant difference between the activity of crude at 750, 1000 mg/ml and Ampiclox 2 mg/ml (positive control) at  $P \leq 0.05$ . It was noted that the Minimum Inhibitory Concentration, MIC, and Minimum Bacteriocidal Concentration, MBC, were very high for *Klebsiella pneumonia*, at 160 mm and 320 mm respectively, whereas both were observed at zero, 0 mm, for *Pseudomonas aeruginosa* as depicted in Table 3.

Also, the fractions, CF4-CF6, with the yields of 19.80 %, 27.04 % and 23.60 % respectively, showed a significant zone of inhibition against these tested isolates of bacteria with column fraction, CF6 having the highest antibacterial activity compared to column fraction four and five, CF4-CF5, most especially on *Streptococcus aureus* and *Klebsiella pneumonia* and *Escherichia coli* in concentration dependent manner (Table 4a-c). At 200 mg/ml, the zone of inhibition for CF4 was highest for *E.coli*; *Klebsiella pneumonia* for CF5; and *Streptococcus aureus* for CF6. Whereas at 100 mg/ml for these fractions, antibacterial activity was very high for *Klebsiella pneumonia*, CF4 and CF5; but *Streptococcus aureus* for CF6. However, the Minimum Inhibitory Concentration, MIC, Table 5, for all tested isolates, except for *Pseudomonas aeruginosa*, which was 50 mm, was observed at 25 mm. Again, *Pseudomonas aeruginosa* had the highest Minimum Bacteriocidal Concentration, MBC, at 75 mm for CF4, as shown in Table 6, which is relatively high compared to other fractions, CF5 and CF6, with other isolates.

The DPPH photometric assay of the crude extract and solvent fractions of *B. coriacea* showed depreciable antioxidant activity with DPPH radical scavenging method. At highest concentration, 100 $\mu$ g ml<sup>-1</sup>, the samples exhibited a mean activity of 38.4 %, while ascorbic acid produced 94.7 %, as shown in Figure 1 and Table 4. However, at the lowest concentration of 20  $\mu$ g ml<sup>-1</sup>, the samples had 71.0 % inhibition of DPPH radicals compared to 90.8 % for ascorbic acid, signifying a very low antioxidant activity compared to our standard, (Vitamin C), ( $P \leq 0.05$ ). Although, CF4 showed a relatively low activity in concentration dependent manner at 20 - 60  $\mu$ g ml<sup>-1</sup>, compared to other fractions. These observations may be attributed to the difference in the degree of solubility of the bioactive ingredients, particularly those with antioxidant properties; such as flavonoids and phenolics, in the solvent systems used, as well as its degree of polarity.

## Conclusion

In conclusion, the evaluation of the free radical scavenging and antibacterial properties of crude extract and column fractions of *Buchholzia coriacea* shows that it is endowed with potentially exploitable antibacterial activity. Further purification of the active compounds and other antimicrobial activity evaluation are therefore suggested for further studies.

## Data Analysis

The data were expressed as Mean Standard deviation (SD) of three determinations. Statistical analysis (ANOVA with a statistical significance level set at  $p < 0.05$  and linear regression) was carried out with XLSTAT 7.1. Results were analysed by one-way ANOVA followed by Dennett's *t*-test using Prism 4 software. The level of significance was accepted at  $p \leq 0.05$ .

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**CHARACTERISATION OF ACETYLATED PULVERIZED  
JACK BEAN (*Canavalia ensiformis*) SEED COATS**

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## **Abstract**

The seed coats of jack bean (*Canavalia ensiformis*) were pulverized, modified via acetylation process and evaluated for their chemical properties, Gas Chromatography-Mass Spectroscopy (GC-MS) profile, Fourier Transform Infra-Red (FTIR) spectral profile, X-ray and morphological patterns. The unmodified sample possessed higher pH and ash content than the modified whereas an opposite trend was obtained for them in terms of moisture content and iodine absorption number. GC-MS indicated possible constituents as cyclononasiloxane, octadecamethyl, n-hexadecanoic acid and hexadecanoic acid, ethyl ether, which were in correlation with the observations obtained in the FTIR profile. The acetylated sample showed (O-H) spectral of normal polymeric hydroxyl group which had a characteristic signal of lignocellulosics. The XRD profile showed peaks of both the modified and unmodified as mixes of A- and B- polymorphs, that is, C-type, with high proportion of silicone. Though the pattern of the unmodified sample remained unchanged after modification, the crystallite size of the unmodified sample increased from 8.60 to 9.50. The micrographs of unmodified sample showed irregular shapes of the granules while those of the acetylated derivative were mixes of rod-like and irregular shapes. From the surface outlook, the acetylated sample appeared more crystalline and fibrous than the unmodified. This was carried out with the view to unveiling jack bean seed coats as potential filler.

**Keywords:** Acetylated, jack bean, pulverized, crystallite size

## **Introduction**

Jack Bean (*Canavali aensiformis*), tropical climber producing long pendant green bean, belongs to the family of the *leguminasae*. It is a native of West Indies and Central America, but is now found scattered throughout the tropics and sub-tropics (Akpapunam and Sefa-Dedu, 1997). The jack bean seed, which is white in colour and nearly oblong in shape, is one of the neglected under-utilized legumes (Akpapunam and Sefa-Dedu, 1997).

It can be grown relatively easily and produce high yields in the region of low altitude; high temperature and relative humidity. The environment of different locations plays an important role in the determination of quality and quantity of seed proteins. Location effect is relatively more important than that of cultivar or effect of protein content (Vadivel and Janardhanan, 2011).

Presently, scanty reports on food and non-food applications of jack bean exist. Its nutritional values, anti-nutritional substances and suitability as food supplements for man, animals and fish have been reported (Osuigwe *et al.*, 2006; D'Mello, 1995; Francis *et al.*, 2001). Hydroxypropylation and ozone-oxidation of jack bean starch have been reported (Francis *et al.*, 2001; Oladebeye *et al.*, 2013; Oladebeye, 2014).

The present work was borne out of curiosity to know the chemical constituents of jack bean seed coat, which, hitherto, is considered as a waste, and turn it to a useful raw material. As at the time of this research, the authors are not aware of any article on the characterization of seed coats of jack bean.

This paper is aimed at: (i) isolating and pulverizing seed coats of jack beans (*Canavalia ensiformis*), (ii) modifying the pulverized seed coats via acetylation, and (iii) characterizing both the unmodified and modified jack bean seed coat with a view to proposing its possible non-food application, especially as potential filler.

## **Methodology**

### **Materials**

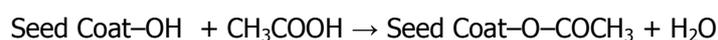
Jack beans (*Canavalia ensiformis*) were freshly harvested from a farm in Auchu, Etsako-West Local Government Area, Edo State, Nigeria. All the reagents used were of analytical grade.

### **Preparation of Pulverized Jack Bean Seed Coat**

The seed coats of jack beans were manually separated from the embryo, dried in direct sunlight for 4-6 days, followed by thorough manual removal of notable foreign materials such as dirt, broken cotyledons and immature seeds. The dry seed coats were pulverised in a Willey Mill (Scientific Equipment), sieved into a fine particle (250  $\mu\text{m}$ ) and the sample packaged in a transparent polythene bag prior to analysis.

### **Preparation of Acetylated Pulverized Jack Bean Seed Coat**

40 g of unmodified pulverized sample was soaked in 2 % sodium hydroxide solution for 1 h at room temperature. This mixture was soaked in glacial acetic acid for 1 h at room temperature, followed by decantation. This was further soaked in 30% acetic anhydride, containing 1 drop of conc. tetraoxosulphate(VI) acid for 5 min. Thorough washing with distilled water was done, followed by drying at room temperature for 48 h before oven-drying for 2 h at 100 °C.



### **Chemical Compositions**

Ash content, moisture content and pH values of the unmodified and acetylated samples were carried out by adopting the standard chemical method of AOAC (1975). Iodine absorption number was determined. 2 g of the sample was weighed into a glass vial containing 250 ml of standard iodine solution and stoppered immediately. The iodine filler mix were shaken vigorously for 1 min, centrifuged at 1600 rpm for 5 min and the iodine solution was decanted completely in one smooth motion into a 50 ml beaker. 20 ml of the decanted solution was pipetted into 250 ml Erlenmeyer flask and filtered with standard solution of sodium thiosulphate ( $\text{Na}_2\text{S}_2\text{O}_3$ ) until a pale yellow colour was observed. Upon addition 5ml of starch indicator, titration continued until a drop of sodium thiosulphate changed blue colour to colourless. The volume of  $\text{Na}_2\text{S}_2\text{O}_3$  was recorded as volume S while the volume of  $\text{Na}_2\text{S}_2\text{O}_3$  solution, which was titrated against 20ml black sample to the neutral point, was recorded as volume B.

Iodine Absorption Number =  $\frac{(B-S) \times V \times N \times 126.96}{B}$  where, S = ml of  $\text{Na}_2\text{S}_2\text{O}_3$  required for the sample, B = ml of  $\text{Na}_2\text{S}_2\text{O}_3$  required for the blank; V = volume of iodine solution used; N = molarity of sodium thiosulphate.

### **GC-MS Analysis**

10 g of the sample was weighed and 99.9 % n-hexane was used to extract the active ingredient with thorough mixing using an ultra sonicator for 5 h. The mixture was allowed to stand for 72 h, followed by filtration and consequent washing with n-hexane. The filtrate obtained was concentrated to 1 ml in the vial bottle and was taken for analysis on Gas Chromatography-Mass Spectrometer for chemical composition. The gas chromatographic analysis was performed on an Agilent Technologies (Model: 7890A) interfaced with Mass Selective Detector (Model: 55975C). The electron ionization was at a 70 V with an ion source temperature at 250 °C. Highly pure helium gas (99.9 % purity) was used as carrier gas while HP-5ms (30 mm × 0.25 mm × 0.325 μm) was used as the stationary phase. The oven temperature was at 80 °C held for 4 min and ramped to 270 °C at the rate of 3.5 °C/min holding for 6 min. 1 μl was auto injected.

### **Fourier-Transform Infrared (FTIR) Spectroscopy**

Fourier Transform Infra-red (FTIR) spectra of the sample were obtained with a Nicolet AVATAR 360 Fourier Infra-red spectrometer using KBR disks. 1 mg of the sample was dispersed in a matrix of KBR (100 mg) and pressed to form packet. The spectral was measured at a resolution of  $4\text{ cm}^{-1}$  and 32 scans were recorded per sample.

### **X-Ray Diffractometry (XRD)**

The X-ray diffraction studies were carried out using a Siemens D5000 X-ray powder diffractometer ( $20\text{ }^{\circ}\text{C}$  geometry, USA). The fine samples was filled into a sample holder and packed as a density as possible. Then, the sample was mounted into a X-ray diffractometer and copper ka,  $2\lambda$  ( $\lambda = 1.540\text{ }\mu\text{m}$  and  $1.544\text{ \AA}$ ;  $35\text{ mA}$ ) will be generated to determine X-ray pattern. The scan was made from a distraction angle ( $2\theta$ ) of  $1.5$  to  $70$  at a  $0.05$  step size with a count time of  $35$ . From the resulting X-ray pattern, peak positions were identified using the instrument's software and these positions were used to determine the crystalline nature of the filler samples (Jayakody *et al.*, 2007).

$$\text{Crystallite Size, } D_{(hkl)} = \frac{k\lambda}{B_{(hkl)} \cos \theta}$$

where,  $k$  = Scherer constant ( $0.84$ ),  $\lambda = 1.54\text{ }\mu\text{m}$ ,  $B_{(hkl)}$  = FWHM (Full Width Half Maximum) and  $\theta$  = Bragg's angle corresponding to FWHM

### **Scanning Electron Microscopy (SEM)**

The samples were sprinkled onto the aluminum specimen stubs with double-sided adhesive tape and coated with a  $30\text{ nm}$  layer of gold using a sputter coater [Polaron (Fisons) SC 515 VG Microtech, Sussex, UK]. The coated samples were observed using a Scanning Electron Microscope (FESEM Leo Supra 50 VP, Carl-Zeiss SMT, Oberkochen, Germany). Images were captured at different magnifications for morphological studies.

## **Results and discussion**

### **Chemical Compositions**

The pH of the unmodified sample is  $6.48$ , which indicates that the sample is less acidic (Table 1). That is, the acidity of the sample is very weak and this could lead to retardation of the cure rate of the sample. However, the inclusion of an anti-retardant will help overcome this set back. For the modified (acetylated) sample, the pH is  $4.47$ , which indicate that the sample is very acidic. That is the acidity of the sample is very strong, and this could lead to the acceleration of the cure rate or making the sample susceptible and thereby giving rise to a proper cure rate.

The moisture content is used to indicate the sample properties to moisture absorption. From Table 1, the moisture content of the acetylated and the unmodified samples are  $4.76\%$  and  $14.3\%$  respectively, a low moisture content, which implies that the sample will have low resistance properties and agglomeration of the sample particles.

The ash content determines the carbon content that is present in the sample. From the results obtained, the ash content of both the acetylated and unmodified samples are  $20.09\%$  and  $12.50\%$  respectively. This indicates that the sample may possess low resistance to ageing.

The iodine absorption is used to confirm the reinforcing ability of the sample. The acetylated sample and the unmodified are 2.17 % and 1.98 % respectively. This simply indicates that the unmodified sample has lower absorption surface area than the acetylated derivative.

### ***GC-MS Profile***

The possible constituents of jack bean seed coats as revealed by GC-MS analysis are cyclononasiloxaneoctadecamethyl, n-hexadecanoic acid and hexadecanoic acid ethyl ester (Fig. 1). The presence of these constituents is confirmed by the FTIR patterns.

### ***FTIR Patterns***

The spectral characteristics of the unmodified and acetylated pulverized jack bean seed coats are presented in Fig. 2. Skeletal vibration, similar to silicon oxy-groups (of organic siloxane or silicone) and cyclohexane ring, is observed at absorption band,  $1048\text{ cm}^{-1}$  in unmodified sample. Very strong N–O of nitro group is observed at  $1540.26\text{ cm}^{-1}$ , which disappears upon modification. This may account for the differences in the pH values of the samples. Nitro groups have high dipole moments, that is, greater polarity, resulting in low solubility in water. Hence, the disappearance of this group in the modified derivative of the sample may favour the relative solubilisation of the acetylated pulverized jack bean seed coat in water.

From the spectra, there are  $3628.30$ ,  $3735.00$  and  $3821.64\text{ cm}^{-1}$  absorption bands observed for the acetylated sample, indicating free hydroxyl group (O–H) stretch. Hence, the modified derivative of the sample assumes a hydrophilic network for its inherent molecules. This, among other things, may portend the susceptibility of acetylated pulverized jack bean seed coat to moisture absorption and swelling.

The absorption bands of  $3419.08\text{ cm}^{-1}$  and  $3466.00\text{ cm}^{-1}$  observed for unmodified and acetylated samples respectively, are indications of (O–H) stretch of normal polymeric hydroxyl group. Broad peak of  $3418\text{ cm}^{-1}$  signal as cellulose hydroxyl group to be a characteristic signal of lignocellulosics has been reported (Abdul-Khalil et al., 2011).

### ***X-ray Patterns***

Table 3 shows the characteristics of three major X-ray diffraction peaks of the unmodified and acetylated pulverized jack bean seed coats. X-ray diffraction peaks for the unmodified sample appear at  $24.09^\circ$ ,  $18.31^\circ$  and  $47.57^\circ\ 2\theta$ , corresponding to interplanar d-spacing of  $3.69\text{ \AA}$ ,  $4.84\text{ \AA}$  and  $1.19\text{ \AA}$  (Fig. 4.1). Likewise, the acetylated sample exhibits X-ray diffraction peaks, which appear at  $24.19^\circ$ ,  $18.38^\circ$  and  $28.85^\circ\ 2\theta$ , corresponding to interplanar d-spacing of  $3.67\text{ \AA}$ ,  $4.82\text{ \AA}$  and  $3.09\text{ \AA}$  (Fig. 3). The modification process does not significantly alter the diffraction peaks and patterns of the unmodified samples. These peaks are indicative of mixes of A- and B- polymorphs. Hence, both the unmodified and acetylated samples are of C-type pattern. The elemental profile of the samples reveals high proportion of silicon. This is in agreement with the results of GC-MS analysis of the unmodified pulverized jack bean seed coats, showing high proportion of silicon in the sample. The proportion of silicon in the sample is unaltered by modification.

### ***Scanning Electron Microscopy***

Table 4 shows the particle properties of unmodified and acetylated samples with the aid of SEM (Scanning Electron Microscope). From the table, the unmodified sample possesses higher particle properties than its acetylated derivative in terms of major axis, circumference, convex hull, circumscribed circle diameter, pixel count and elongation.

The micrographs of the unmodified and acetylated samples observed with scanning electron microscope are displayed in Fig. 4. The granules of the unmodified sample do not assume a conventional shape. Hence, they are irregular, non-uniform granules. The granules of the acetylated sample are mixes of rod-like and irregular shapes. The surface outlook of the acetylated sample appears more crystalline and fibrous than the unmodified.

### **Conclusion**

The pulverized jack bean seed coat has been studied to ascertain its physical behaviour and possible constituent. The unmodified pulverized jack bean seed coat is weakly acidic with low moisture content, high susceptibility to oxidative degradation and low surface area compared to its acetylated derivative. Absorption bands resembling the characteristic signal of lignocellulosics is observed in the acetylated derivative of the pulverized jack bean seed coat. The XRD profiles show that the crystallite size is more favoured by modification. Both the unmodified and the modified derivative exhibit the same XRD pattern of C-type, which is a mix of A- and B- polymorphs. The SEM analysis shows irregular shapes of the unmodified granules and mixed shapes of the acetylated granules. Both unmodified and acetylated can possibly serve as fillers in rubber compounding.

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**Table 1: Chemical composition of unmodified and acetylated pulverized jack bean seed coats**

Sample	pH	Moisture Content (%)	Ash Content (%)	Iodine Absorption Number
<b>Unmodified</b>	6.48±0.10 <sup>b</sup>	4.76±0.01 <sup>a</sup>	20.49±0.10 <sup>b</sup>	1.98±0.01 <sup>a</sup>
<b>Acetylated</b>	4.47±0.10 <sup>a</sup>	14.30±0.02 <sup>b</sup>	12.50±0.11 <sup>a</sup>	2.17±0.01 <sup>b</sup>

Results are means ± standard deviation of the triplicate determinations. Values in the same row with the same superscript letters are not significantly different ( $p < 0.05$ ).

**Table 2: Major peak characteristics of unmodified and acetylated samples**

Sample	Peak I				Peak II				Peak III			
	I	2θ	D	RI	I	2θ	d	RI	I	2θ	D	RI
<b>Unmodified</b>	1954	24.09	3.69	100	574	18.31	4.84	27	328	47.57	1.19	22
<b>Acetylated</b>	1224	24.19	3.67	100	291	18.38	4.82	22	340	28.85	3.09	19

*I* = Intensity (counts); *2θ* = Bragg’s angle; *d* = *d*-spacing; *RI* = relative intensity

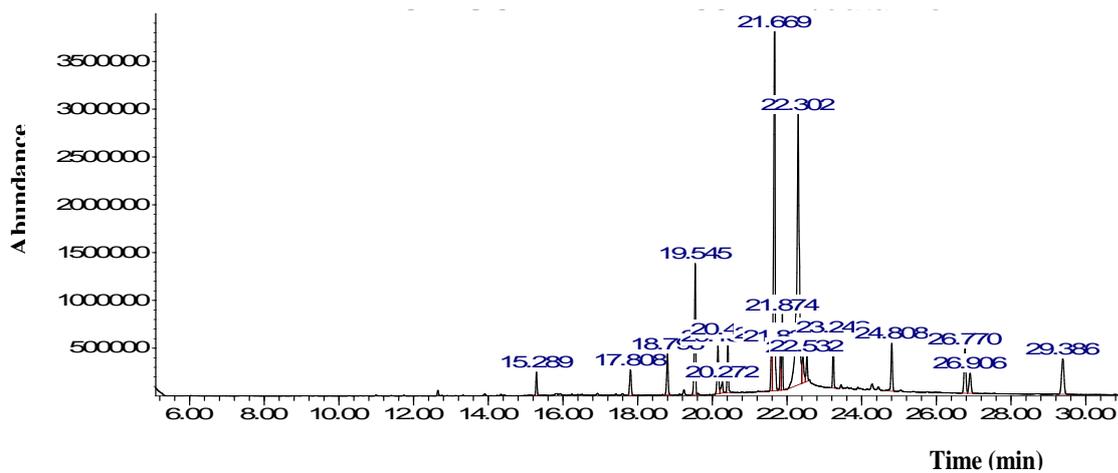
**Table 3: Crystallite sizes of unmodified and acetylated samples**

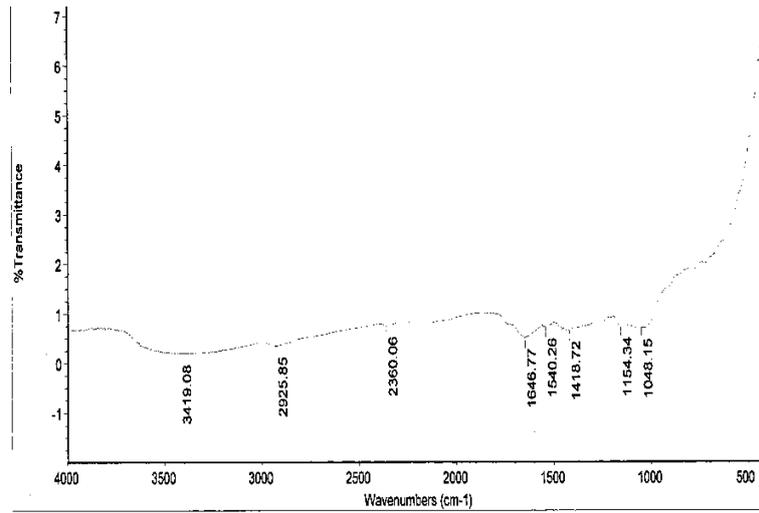
Sample	B(hkl)	$\theta$ (2 $\theta^\circ$ )	Crystallite Size, D(hkl)
Unmodified	0.17	24.09	8.60
Acetylated	0.15	24.19	9.50

$$B(hkl) = \frac{FWHM \text{ (Full Width Half Maximum)}}{k\lambda}, \theta \text{ (corresponding Bragg's angle to FWHM); } D(hkl) = \frac{k\lambda}{B(hkl) \cos \theta}$$

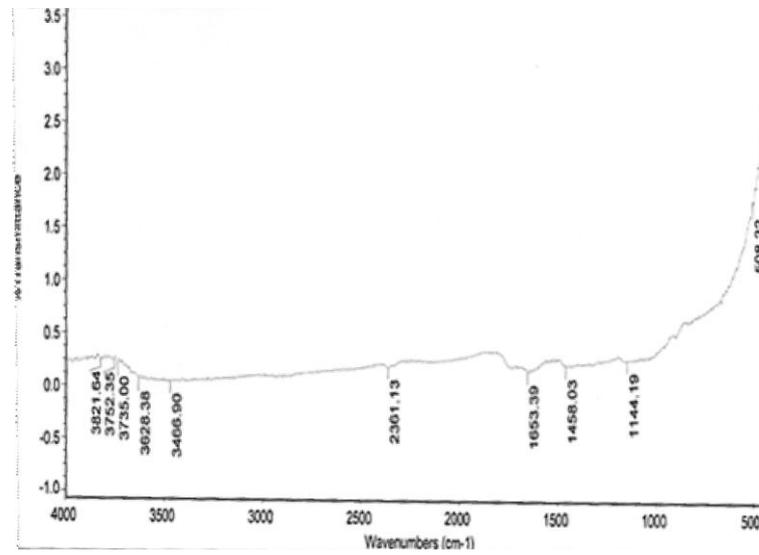
**Table 4: Particle properties of unmodified and acetylated pulverized jack bean seed coats**

Property	Sample	
	Unmodified	Acetylated
Circle equivalent diameter ( $\mu\text{m}$ )	90.20	92.60
Major axis ( $\mu\text{m}$ )	118.00	115.00
Minor axis ( $\mu\text{m}$ )	70.00	75.40
Circumference ( $\mu\text{m}$ )	518.00	408.00
Convex hull ( $\mu\text{m}$ )	375.00	337.00
Circumscribed circle diameter ( $\mu\text{m}$ )	147.00	130.00
Area ( $\mu\text{m}^2$ )	$7.34 \times 10^3$	$7.91 \times 10^3$
Volume by area ( $\mu\text{m}^3$ )	$5.46 \times 10^5$	$6.28 \times 10^5$
Pixel count	9309.00	6925.00
Elongation	0.375	0.343

**Figure 1: Chemical constituents of jack bean seed coat**

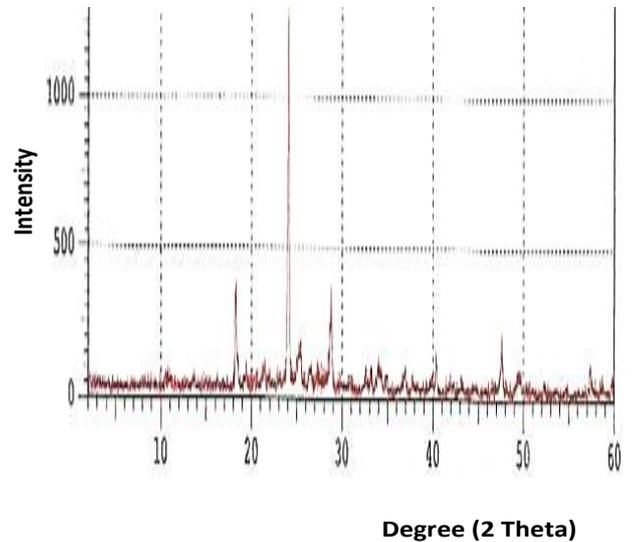
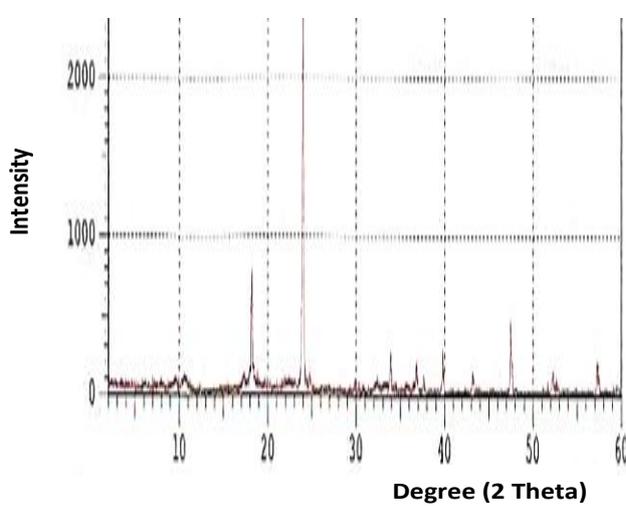


(a)



(b)

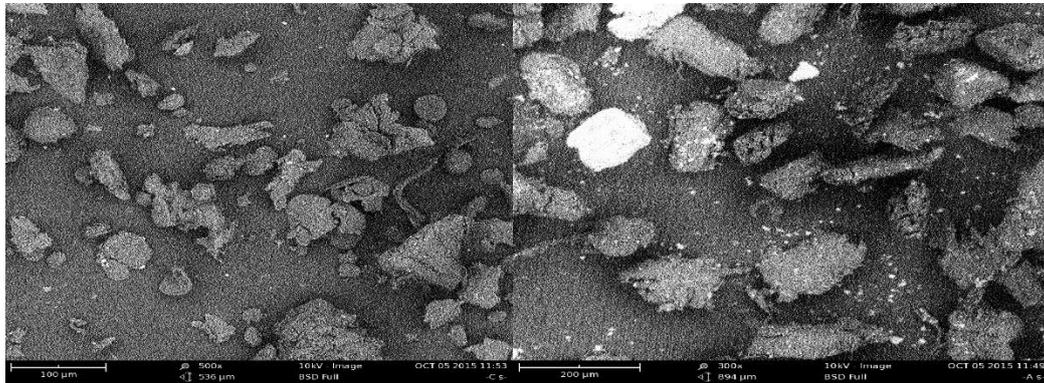
**Figure 2: FTIR spectra of: (a) unmodified and (b) acetylated pulverized jack bean seed coat**



(a)

(b)

**Figure 3: X-ray patterns of: (a) unmodified, (b) acetylated pulverized jack bean seed coat**



(a)

(b)

**Figure 4: Scanning electron micrographs of: (a) unmodified and (b) acetylated samples**

**MARKETING STRATEGY AND SMALL SCALE BUSINESS SUCCESS**

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## **Abstract**

*Small scale businesses have been recognized to be critical players in national economic development and world trade. No business can successfully operate without marketing which has been described as the engine room of any business. Businesses exist to produce and market goods and services that can satisfy human needs and for the economic growth and development of any nation. The objective of this paper is to show the importance of marketing strategy in small scale businesses for the economic development of a nation. The paper highlights the businesses that can be run on a small scale basis, challenges faced by small scale businesses, policies and incentives put in place by the Nigerian government to help small scale businesses, contributions of small scale businesses to the economic development of Nigeria, the impact of marketing strategy in helping small scale businesses grow and perform better. The findings from previous studies and publications are what the writer used here, to show the importance of marketing strategy in small scale business for economic growth and development. The paper recommends that prospective small business owners be made to register their businesses and attend business and marketing seminars for a few weeks in the industrial development centres (IDCs), closest to them, before their registration certificates are issued to them. This is to ensure that there are little or no business failures since an economy's development is determined by the rate of growth of its businesses. Of course, no business and no economy can do well without the help of marketing operations.*

**Key Words:** *Marketing, small scale business, economic growth and development, pricing strategy, innovation,, forest based industries, and employment generation.*

## **Introduction**

Increasingly, economic development experts are abandoning traditional approaches to economic development that relies on recruiting large enterprises with tax breaks, financial incentives, and other inducements. Instead, they are relying on building businesses from the ground up and supporting the growth of existing enterprises. This approach has two complementary features. The first is to develop and support entrepreneurs and small businesses. The second is to expand and improve infrastructure and to develop or recruit a highly skilled and educated workforce. Both efforts depend in large part on improving the quality of life in the community and creating an attractive business climate. The reason for the shift in approaches is clear. Experience suggests that economic development strategies aimed at attracting large firms are unlikely to be successful, or successful only at great cost (Edmiston, 2007).

Small scale businesses have been recognized to be critical players in national economic development and world trade (Usman, 2017). No business can successfully operate without marketing which has been described as the engine room of any business. Businesses exist to produce and market goods and services that can satisfy human needs and for the economic growth and development of any nation. It is a known fact that an economy develops only as fast as its businesses develop and businesses cannot develop successfully without marketing operations.

The management of a business studies the needs and wants of many customer groups (with the help of marketing), to discover economic opportunities not yet met. Products are designed and produced, requiring the employment of research, engineering and supervisory talent; packaging and transportation operations are initiated, test marketing is carried out, distribution channels are set up whereby the products can be made available to the market, not to talk about financing, insurance, and other facilitating functions that are involved( Asore, 2011).

All of these, no matter how soundly planned and carried out, are of little benefit, if a sale is not made. Sales of products are made possible by marketing, and since marketing is at the beginning and the final step of a total business operation, its success is necessary for the earlier steps to be of value.

## **Objectives of the Paper**

The objectives of the paper are:

- i) To show the importance of small scale businesses in economic development
- ii. To ascertain the manner in which marketing strategy can help small businesses to achieve the purpose of economic development.

## **Method of writing**

The writer has attempted to adopt an analytical and exploratory approach. The method adopted is analytical in that it seeks to understand the meaning and basic functioning of small businesses and their contributions to economic development with the help of marketing strategy.

## **Conceptual clarification**

The conceptual clarification for the paper will cover the concepts of marketing, small scale business, economic development and economic growth. These concepts are used conceptually and operationally.

**Marketing** has been defined variously by different authors, but the most current one is defined as the activity, set of institutions, and processes for creating, communicating, delivering, and exchanging offerings that have value for customers, clients, partners, and society at large (AMA, 2013). The most basic concept underlying marketing is that of meeting human needs, and human needs are states of felt deprivation.

These needs, according to Maslow (1943), include basic physiological needs for food, water (or drinks to quench thirst and/or for celebrations), clothing, shelter; safety and security needs (including financial security); social and belongingness needs; personal and ego needs, and self actualization needs. These needs were not created by marketers; they are a basic part of human make-up (Kotler, 2010).

What businesses do is to provide market offerings - products, services and experiences; customer value and satisfaction; exchanges and relationships to satisfy these needs (Ghose, 2016), and this has led to the concept of a market. Meanwhile, a market consists of people who have needs and wants to satisfy, purchasing power to satisfy the needs and wants, and the willingness to spend the money (utilize the purchasing power) ( Etzel, Stanton & walker, 2001).

Marketing helps to boost the sales of a business by the following marketing activities which could also help increase the sales revenue of a business. (1) Developing new product lines (2) finding new customers (3) finding new markets (in other countries). (4) Improvement in customer service and customer relationships. (5) Retail displays and promotions and sometimes giving price discounts (Gross, 2016).

**Small scale businesses** have been defined by the Bank of Industry (BOI), UNIDO and UNDP (2017) as enterprises whose number of employees should be between 11 and 50 , total assets should be between 5 and 100 million Naira and annual turnover should be less than or equal to 100million Naira. Before this 2017 definition, there were others which are no longer relevant. A primary characteristic of small businesses, often used as a promotional benefit, is their participation in local communities. Small businesses are often situated in a single village or town, state or local region and become a familiar presence in that area. Because they are based in a local community, employ local citizens and pay taxes in local markets, small businesses often attract a number of loyal customers who prefer to support local businesses versus large chains.

The organizational structure of a small business is generally simpler than that of a larger corporation. In the smallest sense, a small business could simply be an owner-operator or an owner-manager-employee setup. Marketing budgets are limited to affordable media such as local radio, local newspapers and local television which are commonly used to present advertising messages to customers. Small businesses also do not often have the massive network of suppliers common to

large companies (Kokemuller, 2017). Marketing is the engine room or live-blood of any business, because without marketing, as will soon be seen, no business can survive.

**Economic development** is the process by which a nation improves the economic, political, and social well being of its people. The term has been used frequently by economists, politicians and others in the 20th and 21<sup>st</sup> centuries. Modernization, westernization, and especially industrialization, are other terms people have used while discussing economic development. Economic development has a direct relationship with the environment and environmental issues (O'sullivan & Sheffrin, 2003). It indicates an increase in citizens' quality of life and is often measured using the human development index.

The integration of the social and the economic, is a main part of marketing, argues African economist (Aiyeku, 2002). This means that products and services being produced and marketed become a part of the social and cultural life of the people. The role of merchants and small businesses is central here, since this stratum is largely responsible for developing a real local and national market. This integration strengthens the role of small businesses who create capital and opportunity, while providing needed services and products for society, leading to the economic development of a nation (Johnson, 2017).

**Economic growth** is a narrower concept than economic development and its determinants are : human resources, natural resources, capital formation , technological development, political and social factors . It is an increase in a country's real level of national output which can be caused by an increase in the quality of resources ( like education), increase in the quantity of resources and improvements in technology ,or in another way, an increase in the value of goods and services produced by every sector of the economy. Economic growth can be measured by an increase in the country's Gross Domestic product (GDP).

#### **Businesses that can be run on a small scale Basis**

1) **Agro Based Enterprises:** Canning and preservation of fruits, poultry farming, fish farming and animal husbandry. Canning and preservation of vegetables (2) **Forest Based Industries.**(3) **Mineral Based / Chemical and Allied Groups.**(4)**Textile And Associated Industries** (5)**Traditional Craft And Cultural Heritage** (Akinyemi,1988).(6)**Noodles preparation business.**(7) **Cyber Café and E- Service centers** ( Edom, 2017 ).

#### **Challenges faced by small scale business operators**

1) Financial Problems or Paucity of Funds.(2).Poor or Lack of Infrastructural Facilities (3) Marketing Problems– Competition and middlemen, distance to markets, procurement of raw materials, threshold of demand to justify location of support services (3)Management Problems–Lack of technical Knowledge (4) Legal formalities intricacies (5) Poor quality of goods produced at the beginning (7)Human Resources management Problems (8)Negative attitude of people towards small businesses.(9) Risk element. (10) Absence of other small businesses. (11) Absence Of Industry cluster (Ewer, 2017 and Roth, 2017).

## **Nigerian Government policies and incentives put in place to encourage Small and Medium Scale Business Enterprises in Nigeria**

The Nigerian government's role in the development of small and medium scale businesses first started in 1961, with the establishment of the first Industrial Development Centre (IDC), in Owerri. The Nigeria Bank for Commerce and Industry (NCBI), Nigerian Industrial Development Bank (NIDB), the National Fiscal Economic Reconstruction Fund (NERFUN), and the World Bank SME I and SME II loan schemes. Nigeria Export-Import Bank (NEXIM) to stimulate export loan facilities to SMEs, and export duty draw-back schemes administered by the Nigeria Export Promotion Council, (NEPC) (Carmichael,2017). The provision of manpower training, appropriate machinery selection and installation, machine repairs and maintenance, and extension services. These services are provided by institutions such as the Industrial Development Centers (IDCs) in every state of the federation, the Centre for Industrial Research and Development (GIRD), the Center for Management Development (CMD), Project Development Agency (PRODA) and the Raw Materials Research and Development Council (RMRDC) Export Free Processing Zone (EPZ), Manufacturers In-Board Scheme (MIBS) Micro finance Banks, Small and Medium Enterprises Developing Agency of Nigeria (SMEDAN). National Directorate of employment (NDE), established in 1986, Small Scale Industries and Graduate Employment Programme. The Job Creation Loan Guarantee Scheme, Mature peoples Scheme (for Retirees), School leavers Loan Scheme, Entrepreneurship Development Programme (EDP), Enterprise Management Support Scheme, Agricultural Sector Employment Programme Fund For Small Scale Industry (FUSSI), Small Scale Industry Credit Scheme, Bank Of Industry (BOI), Youth Enterprise with Innovation in Nigeria (You-WIN).

### **Some Contributions Of Small Scale Businesses To The Economic Development Of Nigeria**

Small businesses constitute a major force in any economy. According to Anudu (2016),there are 37million SMEs in Nigeria and they contribute 47% of the country's GDP. In 2012, the National Bureau of Statistics noted that the number of SMEs in Nigeria, was 17,286,671. Out of this number, there are approximately 17,261,753 or 99.87 per cent **micro-enterprises**, 21,264 or 0.12 per cent **small enterprises**, while approximately 1, 654 or 0.01 per cent are **medium enterprises**. One can imagine the increase from about 17million in 2012 to 37million in 2016.

The millions of individuals who have started businesses in Nigeria have shaped the business world as we know it today. Some small business founders like **Innoson** for vehicle manufacturing, has even gained a place in history. Others include **Adenuga (Globalcom)**, **Jim Ovia (Banking-Zenith group)**, **Njoku (Iroko Tv- mobile entertainment and internet platform)**, **Tony Elumelu (Entrepreneurship development foundation-trains youths from 54 African countries and gives them \$5,000 seed money after training)**, **Dokpesi ( Daar communication)**, **Femi Otedola (Zenon- energy sector)**, and internationally, **Larry Page and Sergey Brin (Google)**. They have changed the way business is done today. Still millions of others have collectively contributed to an improved standard of living in many communities.

Aside from contributions to our general economic well-being, founders of small businesses also contribute to growth and vitality in specific areas of economic and socio economic development. Many small businesses can be started at a low cost and on a part-time basis, while a person continues a regular job with an employer.

**1) Job creation/ employment and encouraging Local Economic Growth:** At any given point in time, a lot of small businesses are started and some expand. These small businesses need workers and so hiring takes place. But the survival and expansion rates for small firms is poor, and so, again at any given point in time, many small businesses close or contract and workers lose their jobs. Fortunately, over time more jobs are added by small firms. Small businesses are job creators, and most of those jobs are local jobs (Nugent, 2017). Rather than having to commute to cities, employees work closer to home. Supporting local businesses also helps fellow community members who work at them.

When a community has a vibrant commercial center, it also creates ample opportunities for these workers to shop at other local small businesses. They take lunch or dinner from local restaurants, run errands on their break, and take drinks from local bars. This keeps money local and further creates a tight-knit community vibe. Small firms contribute to local economies because they bring growth and creativity to the communities they serve. They also take on those workers who may not be employable by larger corporations (YesGrowth, 2014). In Nigeria the MSMEs as at 2015, employed a total of 60million Nigerians (Aganga, 2015).

## **2) Spark innovation which impacts socio economic objectives**

Innovation is an essential driver of economic progress that benefits consumers, businesses and the economy as a whole. New ideas and technologies are developed and applied, generating greater output with the same input .More goods and services are produced, stimulating wages and business profitability. Innovation generally refers to changing processes or creating more effective processes, products, and ideas into action.

Innovation is very possible in small businesses. In these tiny enterprises, employees usually work in close proximity to consumers and learn firsthand about their needs (like the case of the creation of a disposable camera capsule to detect a stomach problem). Also, these small businesses typically have few ranks of managers separating line workers from the business owner. Employees can help their organizations grow by sharing ideas that will benefit consumers. In turn, business owners must go through less bureaucracy to put employees' new ideas into action. This reality accounts for why some innovative workers prefer to work in smaller businesses.

Innovation and productivity growth bring vast benefits for consumers and businesses. As it has been pointed out earlier, as productivity rises, the wages of workers increase. They have more money in their pockets, and so can buy more goods and services. At the same time, businesses become more profitable, which enables them to invest and hire more employees (Europa, 2017). Edom (2017)

reports that, in Nigeria, two young small business men created **Quick-Zap and Net Premise**. **Quick Zap**: This simple but amazing app was built by Wellsoft; and *it lets one recharge his/her mobile phone without an internet connection*. **Net Premise**: This brilliant product was created by VNTS, and it simply transmits high speed data across any office building without having to install any new cables.

Small business owners are also particularly adept at finding new ways of doing old things. In 1994, for example, a young computer-science graduate working on Wall Street came up with the novel idea of selling books over the Internet. During the first year of operations, sales at Jeff Bezos's new company—Amazon.com—reached half a million dollars. In less than twenty years, annual sales had topped \$34 billion (Makeda, 2017). Not only did his innovative approach to online retailing make Bezos enormously rich, but it also established a viable model for the e-commerce industry. Amazon also used **drones** in 2016, to deliver goods to a customer on the 7<sup>th</sup> of December. This innovation speeds up the distribution process in the marketing of goods.

### **3) Small businesses contribute to the success of big businesses**

Large and small businesses exist in an ecosystem. While it might seem as if mighty corporations could do without the tiny small businesses, their relationships are vital. Winston (2016) opines that, small businesses help large businesses in the following areas:

**a) Supply chain for parts and services:** Big manufacturers making complex products rely on hundreds of smaller suppliers to make specific parts. In fact, in 2010, the Business Roundtable produced a report that showed U.S. multinationals get almost one-quarter of their total inputs from small businesses. Small firms really complement large firms in a number of ways. They supply many of the components needed by big companies. For example, the U.S. automakers depend on more than 1,700 suppliers to provide them with the parts needed to make their cars. While many of the suppliers are large, there are hundreds of smaller companies that provide a substantial portion of the 8,000 to 12,000 parts that go into each vehicle (Wilson, 2014).

Small firms also provide large ones with such services as accounting, legal, marketing, insurance, food service, cleaning service, and so on. Many small firms provide **outsourcing** services to large firms—that is, they hire themselves out to help with special projects or handle certain business functions. A large firm, for example, might hire a small one to handle its billing or collection services or to manage its health care benefits. A large company might contract with a small information technology firm to manage its Web site or oversee software upgrades.

**b) Provide innovation for big businesses:** Research and development can be cumbersome for a large business, but many creative ideas often come from small, nimble businesses. Large corporations, which used to have extensive research and development operations, are now increasingly looking for innovative start-ups to partner with or to buy outright. The small business

comes up with the great idea, and the big corporation takes on the task of commercializing and marketing it. A 2012 market research report estimates that by 2018, big pharmaceutical and medical device companies will have outsourced \$65 billion worth of contract research to smaller entities.

**c) Serve as customers:** Small companies form an essential customer base for many big businesses, especially service-oriented companies. Many large corporations such as Xerox or Bank of America create specialized small business service solutions expressly to cultivate this sector of the market. Large manufacturers also outsource sales to smaller businesses, who undertake the final step of retailing products to consumers. For example, automobile dealerships, which are generally small businesses, sell vehicles for the big car makers. Local sporting goods stores sell athletic shoes made by industry giants, such as Adidas and Nike (Frieswick, 2015). Most retailers in Nigeria sell products made by large companies, such as Coca-Cola and Nivea .

**d) Provide adequate workforce:** There tends to be a revolving door between large and small businesses in similar industry when it comes to workforce talent. Young workers with energy and ideas might get their start at a small business. Once they have gained experience, the longer career ladder and better benefits at a corporation could tempt them to make a move. Thus, the big business benefits from the training provided by smaller businesses.

## **Marketing strategy**

Marketing strategy is a vital prerequisite of Industry's ability to strengthen its market share and minimize the impact of the competition (Adewale, Adesola, & Oyewale, 2013). Owomoyela, Oyeniyi & Ola, (2013.) also see marketing strategy as a way of providing quality product that satisfies customer needs, offering affordable price and engaging in wider distribution and back it up with effective promotion strategy (Adewale et al, 2013).

Marketing strategy is the marketing logic by which a business hopes to create customer value and achieve profitable relationships. This strategy in the areas of marketing goods and services involves the company deciding which customers it will serve (**segmentation and targeting**), and how it will serve them (**differentiation and positioning**). It identifies the total market, then divides it into smaller segments, selects the most promising segment and focuses on serving and satisfying customers in these segments (Kotler & Armstrong, 2008).

Market segmentation is the subdividing of a market into homogenous (or similar) subsets of customers where any subset may conceivably be selected as target markets to be reached with a distinct marketing mix (Kotler, 2010). There are many segmentation variables. The generic segmentation models comprise geographic, demographic, psychographic, behaviouristic and product or benefit based segmentation (Swarbrook & Horner, 1998 & Williams, 2008).

Targeting a market segment is a very important step in successful product and service marketing, as it makes the promotion, pricing and distribution of products or services in a particular segment easy. Targeting evaluates the attractiveness of each segment by its buying power, size, growth of the market, competitiveness, etc. Nitie (2013) argues that, there are about five patterns of target market selection – single segment, Concentration, selective, specialization, and full market coverage.

Differentiation and positioning strategies in marketing are very important. A sound understanding of consumers demand allows businesses to achieve effective differentiation. Product differentiation can be defined as the process of distinguishing the differences of a product or offering from others, to make it more attractive to a particular target market. For example, market segmentation could reveal that newlywed couples have a different preference of tourist destinations compared to children who would prefer more of theme parks (Dolnicar, 2010).

Positioning has come to mean the process by which marketers try to create an image or identity or value in the minds of their target markets for their products, brands or organization (*Andrei, et al, 2010*). It is the "relative competitive comparison" the product occupies in a given market. Generally, there are three types of positioning concepts :(1) Functional positioning (solve problems, provide benefits to customers and get favourable perceptions); (2) Symbolic positioning (self image enhancement, ego identification, belongingness, social meaningfulness and affective fulfillment); (3) Experiential positioning (provide sensory stimulation, provide cognitive stimulation).

Still under marketing strategy, the 4ps of the marketing mix are a big help to small business owners. The 4ps of the marketing mix are made of the product, the price, promotion or marketing communication and place/distribution.

### **Small scale business and marketing product strategy**

Product strategy is a marketing plan for a product, based on the characteristics of the target market, market share objectives, desired product positioning within the market, and profit objectives. Strategic plans for a product are based on decisions regarding the four P's (product, place, price, and promotion), financial targets and budgets, and tactical plans. Product strategy helps in the allocation of resources.

According to Kotler and Armstrong (2008), a product is anything that can be presented to the market for attention, acquisition, and use, that can satisfy the needs and wants found in the market. There are five levels of a product-the core benefit of the product, the generic product, the expected product and the augmented product and the potential product.

To be successful in business the small business owner has to make decisions concerning the following variables, whether the product is a consumer product or an industrial product. The quality of the product (whether high or low quality), whether the product will have special **features** or not (remote control), the **design** of the product ( shape, colour, aesthetics ,etc) ; **style, branding, packaging, guarantees** and **warrantees**.

### **Small scale business and marketing pricing strategy**

Price is the amount that customers pay for the product or service. The different pricing strategies that a small business owner can use to price his or her products are, penetration pricing, skimming pricing, competition pricing, product line pricing, bundle pricing, premium pricing, psychological pricing, optional pricing, cost based pricing, cost plus pricing and value based pricing (Learnmarketing.net, 2018). These are explained below:

**a) Penetration pricing:** Here the business sets a low price to increase sales and market share. Once market share has been captured, the firm may well then increase its prices.

**B. Skimming pricing:** The business sets an initial high price and then slowly lowers the price to make the product affordable to a wider market. The objective is to skim profits off the market layer by layer.

**(c) Competition pricing:** This involves setting a price in comparison with competitors. In reality, a business has three options, and these are to price lower, price the same or price higher than competitors.

**(d) Product line pricing:** Pricing different product lines within the same product range at different price points.

**(e) Bundle Pricing:** The business bundles a group of products at a reduced price. Common methods are buy one and get one free promotions often or BOGOF as they are now called.

**(f) Premium pricing:** The price is set high to indicate that the product is exclusive.

**(g) Psychological pricing:** Here, the business will consider the psychology of price and the positioning of price within the market place. The seller will charge N199 instead of N200 to give the impression that it is a one hundred Naira price range. Meanwhile it is closer to N200 hundred.

**(h) Optional pricing:** The organization sells optional extras along with the product to maximize its turnover.

**(i) Cost-plus pricing:** The price of the product is its production cost plus a set amount (mark-up) based on how much profit (return) that the company wants to make. Although this method ensures the price covers production cost, it does not take into consideration consumer demand or competitive pricing, which could place the business at a competitive disadvantage.

**(j) Cost based pricing:** This is similar to cost plus pricing in that it takes cost into account but it will consider other factors such as market conditions when setting prices.

**(k) Value based pricing:** This pricing strategy considers the value of the product to the consumers rather than how much it cost to produce it. Value is based on the benefits it provides to the consumer, for example, convenience, well-being, reputation, or joy (technology, medicines, and beauty products).

### **Small scale business and marketing distribution or place strategy**

Distribution generally, is the process of making a product or service available for use or consumption by a consumer or business, using direct means (without intermediaries), and/ or indirect means (with intermediaries). Asore (2011), opines that, distribution involves the various activities a company

undertakes to make its product(s) easily accessible and available to target customers. These activities are the identification, recruiting and linking of various middlemen and marketing facilitators; so that the company's products and services are efficiently supplied to the target market. It also involves an understanding of the various types of retailer, wholesalers, agents and physical distribution firms and how they make their decisions (Trethewey, 2016). There are two basic distribution strategies that a business can use to distribute its products, and they are the **push and pull strategy**.

The **push strategy** uses the manufacturer's sales force, trade promotion money, and other means to induce intermediaries to carry, promote, and sell the product to end users. Examples are as follows:(a)Trade show promotions to encourage retailer demand,(b)Direct selling to customers in showrooms or face to face,(c)Negotiation with retailers to stock your product,(d) Efficient supply chain allowing retailers an efficient supply (e) Packaging design to encourage purchase(f) Point of sale displays ( Gibson,2017).

The **pull strategy**, on the other hand, takes the opposite approach. The goal of pull marketing is to get the customers to come to you, hence the term pull, where marketers are attempting to pull customers in. It makes use of advertising and other forms of communication to persuade consumers to demand the product from intermediaries. Examples are as follows: **a)** Advertising and mass media promotion, **(b)** Word of mouth referrals, **(c)** Customer relationship management, **(d)** Sales promotions and giving of discounts (Robertson, 2018). **There are three other broad options that the small business owner can use in the distribution of his/ her products. These are also intensive distribution strategy (Bhasin, 2017), selective distribution strategy, and exclusive distribution strategy (Macho, 2017).**

#### **Small Scale Business Promotion and / or Marketing Communications Strategy**

Communication should take into account communication goals, audiences, key messages, communication channels and a means of measuring the effectiveness of the communication tactics used (Richards, 2018). Marketing communications are the means by which businesses can attempt to inform, persuade, and remind consumers, directly or indirectly, about the products and brands they produce and sell.. The marketing communications mix consists of eight major modes of communication (Nurhasleea , 2014)

**Advertising:** Any paid form of non-personal presentation and promotion of ideas goods, or services by an identified sponsor via print, broadcast, network, electronic and display media. **Sales**

**promotion:** A variety of short-term incentives to encourage trial or purchase of a product or service, including consumer, trade, and business and sales force promotions.

**Events and experiences:** Company-sponsored activities and programs designed to create daily or special brand-related interactions with consumers, including sports arts, and cause events. 4. **Public**

**relations and publicity:** A variety of programs directed internally to employees of the company or externally to consumers, other firms, the government, and media to promote or protect a company's image or its individual products.

**Direct marketing:** Use of mail, telephone, fax, email, or the Internet to communicate directly with or solicit response or dialogue from specific customers and prospects.

**Interactive marketing:** Online activities and programs designed to engage customers or prospects and directly or indirectly raise awareness, improve image, or elicit sales of products and services.

**Word-of-mouth marketing:** People-to-people oral, written, or electronic communications that relate to the merits or experiences of purchasing or using products or services.

**Personal selling:** Face-to-face interaction with one or more prospective purchasers for the purpose of making presentations, answering questions, and procuring orders.

## **Conclusion**

Small scale businesses have been recognized to be critical players in national economic development and world trade. No business can successfully operate without marketing which has been described as the engine room of any business. Businesses exist to produce and market goods and services that can satisfy human needs leading to an improved standard of living in an economy whereby leading to development and growth. Marketing can help these businesses in their attempt to develop the nation in various ways, by using specific marketing strategies like market segmentation, targeting and positioning and especially in the areas of the 4ps- product, price, promotion (marketing communication), and place or distribution; which can really help the small businesses to be successful in bringing about national and economic growth in Nigeria.

## **Recommendations**

**(1)** The various local governments under which these businesses operate, should make it compulsory for these businesses to be registered

**(2)** Before the registration certificates are given to these prospective business owners, they should be made to attend compulsory business seminars with emphasis on marketing and marketing strategy for a few weeks (with educational take home packs in hard and soft copies), for a small fee.

**(3)** These businesses and marketing courses can be run in the Industrial Development Centres (IDCs), provided by the government in every state of the federation, that are closest to the prospective business owners' domicile. . This is to ensure that more and more small businesses do not fail and that, they continue in their function of national development.

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**MARKETING SUCCESS IN A BUSINESS ORGANIZATION: THE ROLE OF INFORMATION  
AND COMMUNICATION TECHNOLOGIES**

**Abstract**

*The business sector produces and markets products and services for profit. Information and communication technology describes any technology used to create, process, and disseminate information that is critical to business performance. The objective of this paper is to show how various ICT tools can help marketers to improve on their marketing operations to bring about customer satisfaction and thus increase their market share and profits. The drawbacks associated with use of ICTs are also highlighted. With regards to the methodology, this is a review article that attempts to show the various ways that specific ICT tools can help marketers achieve success in their operations. The findings from other studies, which the paper hinges on show that the contributions of ICTs to marketing are enormous and this has enabled businesses to carry out anytime, anywhere, marketing, to the convenience of customers, while the marketers smile to the bank. The paper recommends that ICT in marketing must be brought to a new paradigm, where the tools of ICT will be used maximally, effectively and efficiently to gain business value and competitive advantage business organizations invest heavily on ICTs infrastructure, and give their staff regular up- dating ICT training, because this is what can help transform their businesses and allow them operate more effectively on the global stage.*

***Key Words: Marketing, Information communication technologies, customer relationship, E- commerce, Computers, Blogs, Social media marketing.***

## **Introduction**

Marketing is the centre of the business universe, and is saddled with the responsibility of creating, communicating and delivering value to customers. It has to manage customer relationship as well, and in ways that benefit the organization and its stakeholders. With these tasks and others, there is no way marketing would have been able to succeed without the use of ICTs in this 24/7/365 world we now live in. Before now, marketers had to spend large amounts of money creating billboards and trying to reach and satisfy their customers all over the world, with the then archaic, government owned and unreliable post and telecommunication services. But now, with the use of e-mails, e-commerce, e-purchasing and other ICT tools, and with the aid of computers enabled by the internet, marketers are able to engage in online research, online advertising, telemarketing and others such as these, at reduced costs.

Information has been described as the life blood of any business and is also seen as those cues which have the potential to affect managerial decisions (Nigel and Evans, 2014). Since marketing has been described as the centre of the business universe, three developments according to Kotler (2008), as cited in Boundless (2015.) have rendered the need for especially marketing information stronger than at any time in the past. (i) From local to international marketing (business), (ii) from buyer needs to buyer wants, and (iii) from price to non-price competition which has to do with branding, packaging, product differentiation, and so on.

According to Riley (2012) and Rosenweig (2010), businesses and other organizations need information for about eight major purposes: planning, organizing, staffing, directing, coordinating, controlling, reporting and budgeting. Generating the above information is important but much more important is communicating it for the purposes of decision making, providing information for staff and customers, maintaining business records and providing effective communication for the essence of the global market and the 24/7 world we now live in (BBC Radio 1, 2010). This is where information communication technology comes in. ICT is very important in the business and marketing world.

Anyone in a leadership position knows that technology drives change and change demands technology. Certainly, ICT has favoured a multiplicity of changes in several industries – manufacturing, health, banking, tourism, and so on. . Thus a major challenge for business has been the exploding advancement and the ever growing ICT developed within the past few decades (Cela, 2005).

### **Objectives of the paper**

The major objective of the paper is:

- i) To determine the effects of the ICTs as facilitators of marketing activities for a greater business performance.
- ii) . Highlight the drawbacks associated with the use of ICT tools in organizations.

## **Method of writing**

The writer has attempted to adopt an analytical and exploratory approach. The method adopted is analytical in that it seeks to understand the meaning and basic functioning of ICTs and their contributions to marketing success in a business organization.

## **Conceptual clarification**

**Information and communication technology** (ICT) is another extensional term for [information technology](#) (IT). It stresses the role of [unified communications](#), and the integration of [telecommunications](#) (telephone lines and wireless signals), computers as well as necessary [enterprise software](#), [middleware](#), storage, and audio-visual systems, which enable users to access, store, transmit, and manipulate information ( Murray, 2011 ).

The term ICT is also used to refer to the [convergence](#) of audio-visual and [telephone networks](#) with [computer networks](#) through a single cabling or link system. There are large economic incentives (huge cost savings due to elimination of the telephone network) to merge the telephone network with the computer network system using a single unified system of cabling, signal distribution and management. The broadness of ICT covers any product that will store, retrieve, manipulate, transmit or receive information electronically in a digital form, e.g. personal computers, digital television, email, robots.

Rouse (2014.), argues that, ICT is an umbrella term that includes any communication device or application, encompassing: radio, television, cellular phones, computer and network hardware and software, satellite systems and so on; as well as the various services and applications associated with them such as video conferencing and distance learning. ICTs are spoken of in a particular context such as ICTs in education, marketing, health care or libraries.

Walton (2012.), also agrees that ICT is a vast field encompassing virtually all technologies that can receive, store and transmit signals electronically. He also agrees with Rouse (2014), that there are different perspectives of ICT that must be considered. From an economic and managerial view point, ICTs have been regarded as: (1) a social construction, (2) an information provider, (3) an infrastructure hardware and software, and a business process and system.

From a marketing point of view ICTs have been viewed as: (1) a variety of separate applications (internet and customer data bases, power point), (2) a marketing channel, (3) a communication/promotional medium, (4) a marketing technique, and (5) a tool for relationship marketing. Obviously, ICTs are more than just computers. From database development, website design to market research, translation software, direct mail marketing and training, the application of ICT is critical for a economic success.

**Marketing** has been defined as the management process through which goods and services move from concept to the customer. It includes the coordination of four elements called the 4 Ps of marketing :( 1) identification, selection and development of a product. (2) Determination of its price (3) selection of a distribution channel to reach the customer's place, (4) development and implementation of a promotional strategy.

A more modern definition of marketing is the activity, set of institutions and processes for creating, communicating, delivering, and exchanging offerings that have value for customers, clients, partners, and society at large (AMA, 2013).

The relevant literature on marketing has analyzed the companies' source of success, recognizing marketing and innovation activities – and their correct management – as the key success factors. In this sense, Achrol and Kotler (1999), Badaracco (1991), and Webster (1992), among others, consider that these activities provide the principal axis on the consumer's value creation process, and their integration make possible to increase firms' competitiveness and productivity.

### **What are the tools of ICT that are used in business and marketing activities?**

According to Sharmac (2009) the tools for communication can be either synchronous or asynchronous. The **Synchronous** ones are: Skype, Google talk, Yahoo messenger, and Video messaging. The **Asynchronous** ones are: E-mail, Blogs, Wikis, News papers, Podcasts, RSS, YouTube, Audio graphics and On-line Forums. Other tools of ICT according to Millea, et al (2005) are as follows: They are divided into computing, Social Networking, Course evaluation assessment, Knowledge based, File compression, File-to-file conversion and Technology tools.

**Computing Tools:** Word processors, spread sheets, presentation software and data base maintenance. **Social networking tools:** Face book, Ning, Orkut, Twitter and My Space. **Course Evaluation Assessment:** e-portfolio. **Knowledge based:** On-Line Encyclopedia, On-line Libraries, On-line journals, and on-line magazines. **File Compression:** Win Zip, Win Rar, Truokit, Zipit, Stuffit. **File-to-file Conversion:** Word-to-pdf, Flip 4 Mac. **Technology tools:** Blue tooth, Ipad, Portable video player, Web Cam.

### **What are the uses of ICTs in Marketing?**

ICT use has brought about a fundamental transformation at all levels of organizations, and the marketing function has been one of the main beneficiaries. Most of the authors cited here agree that ICT use in the development of marketing activities can be a true source of competitive advantage for any company improving innovation processes and their outcomes (Bond and Houston, 2003; Prasad et al., 2001; Roberts, 2000; Tatikonda and Stock, 2003; Tzokas and Saren, 1997). As Argyres (1999) and Tzokas and Saren (1997) show an important part of the benefits arising from the use of ICT as a source of acquisition and generation of market information. ICTs are one of the most appropriate media for getting close to the environment and acquiring or creating knowledge about the different agents that are part of it. Thus, the company gains access to a vast quantity of relevant and up-to-date information quickly, easily and cheaply.

Using ICT is crucial to most businesses and it is because of this, that the digital economy is regarded as 'The Economy' and ICT is now an everyday tool for most things we do; business transactions, information retrieval, communications, service delivery and service access; information

analysis, market intelligence, access to customers and so on. Below are some of the major uses of ICTs in Marketing.

**Customer Relationship Management (CRM):** Customer relationship management (CRM) is a leading new approach to business, which has already become established in the literature (Szeinbach, Barnes, & Garner, 1997). Indeed, CRM refers to all business activities directed towards initiating, establishing, maintaining, and developing successful long-term relational exchanges (Heide, 1994; Reinartz & Kumar, 2003). One of the results of CRM is the promotion of customer loyalty (Evans & Laskin, 1994), which is considered to be a relational phenomenon (Chow & Holden, 1997; Jacoby & Kyner, 1973; Sheth & Parvatiyar, 1995; cited by Macintosh & Lockshin, 1997).

This is a term that refers to practices, strategies and technologies that companies use to manage and analyze customer interactions and data throughout the customer lifecycle. This is with the goal of improving business relationships with customers, assisting in customer retention and driving sales growth (Rouse, 2014).

The benefits of customer loyalty to a provider of either services or products are numerous, and thus organizations are eager to secure as significant a loyal customer base as possible (Gefen, 2002; Reinartz & Kumar, 2003; Rowley & Dawes, 2000). Recent developments in Internet technology have given the Internet a new role: to facilitate the link between CRM and customer.

Customer relationship management systems are designed to compile information on customers across different channels or points of contact, between the customer and the company. This can include the company's website, telephone, live chat, direct mail, marketing materials, and social media. CRM systems can also give customer-facing staff detailed information on customer's personal information, purchase history, buying preferences and concerns.

All banks in Nigeria and service companies like Star-Times, Dstv, MTN, GLO, Airtel and Etisalat have well established and well-maintained CRM systems. The banks often send information to their customers on their bank account balances, birthdays and other public holiday greetings, while the entertainment and telecommunication companies chat with customers to know how they feel about their services.

Boundless (2014), adds that CRM systems for marketing help the enterprise identify and target potential clients and generate leads for the sales team. A key marketing capability is the ability to track and measure multichannel campaigns, including e-mail, search, social media, telephone and direct mail. Metrics monitored include clicks, responses, leads, deals and revenue. These activities may include such things as free downloads (musical videos and music (MP3)) on-line video content (YouTube), and online web presentations (products for sale). This revolution in CRM has been referred to as the new "mantra" of marketing (Winer, 2001).

**Key benefits of Customer Relationship Management (CRM) are as follows:**

- Improved customer/client service facilitated by a central, accurate source of customer/client/supplier information that can be shared across the business.
- Improved business analysis, ability to access and analyze sales/prospect lead data, business win/loss information, sales pipeline details, sales performance data [business.gov.au.,2010]

**E-commerce:** Eichetti (2013) and business.gov.au (2010) agree that, electronic commerce is the buying and selling of products and/or services over the internet. It draws on other technologies such as electronic funds transfer, online transaction processing, electronic data exchange (EDI) and inventory management systems. This is commonly done by Jumia and Konga in Nigeria and Alli express and Asos, international e-commerce companies in the United Kingdom.

**Key benefits of e-commerce:** According to Khurana (2015) the benefits of e-commerce to shoppers and sellers are enormous: (1) Overcomes geographical limitations, (2) gains new customers with search engine visibilities, (3) lowers costs, (4)locates the product quicker, (5) eliminates travel time and cost, (6) provides comparison shopping, (7) enables deals, bargains coupons, group buying, (8) provides abundant information, (9)increase targeted communication, (10) remains open all the time 24/7/365, ( ATM in banks), (11) creates market for niche products,(12) makes International marketing easier.

**Social media marketing:** Social media is hot. Social Media is now the trend, and for businesses it represents marketing opportunity that transcends the traditional middleman and connects companies directly with customers. This is why nearly every business on the planet—from giants like Starbucks and IBM to the local ice cream shop—are exploring social media marketing initiatives. Mashable (2015) sees social media marketing as the process of gaining website traffic through social media sites. Social media marketing programmers usually center on efforts to create content that attracts attention and encourages readers to share it across their social networks. Here is a breakdown of what the little companies revealed as the main uses of social media marketing: 75% have a organization web page on a social media website. 69% publish position up-dates or articles of interest on social media websites. 57% develop a network through a website such as LinkedIn. 54% monitor reviews about the organization. 39% maintain a weblog ( Stelzner ,2015).

Boundless (2014), agrees with Mashable (2015), and adds that social media marketing involves using peer recommendations, building brand personality and addressing the market as an heterogeneous group of individuals. It also uniquely encourages customers (consumers) to create their own content and buzz around a product. In other words, programmes usually center on efforts to create content that attracts attention and social networks. Hence, this form of marketing is driven by word – of – mouth (viral marketing), and this means it generates results in earned media rather than paid media by use of facebook, twitter, linkedin, pinterest, you- tube, flicker, wikis, blogs, myspace, orkut, ning, and so on.

**Key benefits of social media marketing: (1)** Generating exposure to businesses.(2) Increasing traffic/subscribers. (3) Building new business partnerships.(4) Rise in search engine rankings. (5) Generating qualified leads due to better lead generation efforts. (6) Selling more products and services. (7) Reduction in overall marketing expenses. (8) Ability to gauge customers’ opinions,

demands in real time. (9) Creates brand awareness and dynamic customer engagement and relationship development (Neti , 2011)

### **Internet – Based Communication Skills – VOIP, Video Conferencing, Web Conferencing:**

According to Beal (2015), VOIP is short for Voice Over Internet Protocol. It is a category of hardware and software that enables people to use the internet as the transmission medium for telephone calls by sending voice data in packets using IP rather than by the traditional circuit transmission of the public switched telephone network (PSTN). VOIP is also known as internet telephony, IP telephony or voice over the internet, (VOI). These tools enable virtual meetings with Colleagues and customers located in different geographical locations rather than speaking with them on the telephone or meeting face – to – face. Sherman (2014) writes that both web and video conferencing use the internet to cut the cost of travelling to meetings. With video conferencing, one can connect two or more locations by the use of webcam for an interactive meeting with customers and clients. Web conferencing or webinars dispense with video though they sometimes include and are not necessarily interactive. In addition to installing a video conferencing application, participants require a high-speed broadband connection to ensure a smooth, real time streaming video experience.

VOIP applications and services are similar to a regular telephone call, with the key difference being that the call is transmitted over the internet (rather than over communication networks). VOIP is cheaper and easier to maintain than traditional circuit – switched telephone systems. Unuth (2015) also agrees, and adds that VOIP applications (for example, skype, iphone, iPod touch and ipad are networked hand-held devices via an internet service provider (ISP).

**Key benefits of VOIP and others:** Cost savings and improved efficiency and cost reduction due to reduced travel.

**Cloud services:** Samara (2012) argues that , cloud computing is the use of third party software, storage or infrastructure that can be accessed by multiple users over the internet. Teach-ICT.com (2013) also sees it as IT service that provides computing power and storage away from one's company or organization. The 'cloud' just means a remote data center is handling the services required rather than a local IT system. For example, Amazon (book publishers) has 17 infrastructure built to deal with its own business. But they realized that they had a lot of idle computing power and storage, so they had to rent it out to other people and companies, and it is called 'S3' service. Another huge company – Google – also has lots of space capacity in its data centered on the world, so they too, are offering companies the ability to rent that resource.

**Key benefits of Cloud Services:** Ability to gauge customers opinions and demands in real time, brand awareness, dynamic customer engagement and relationship development, reduced upfront cost, access to enterprise strength, IT resources (including security infrastructure) and business flexibility and agility.

### **E- Mail Marketing**

E-mail marketing occurs when a company sends a commercial message to a group of people by use of electronic e mail. Most commonly through advertisements, requests for business, or sales or

donation solicitation. Any e-mail communication is considered e-mail marketing if it helps to build customer loyalty, trust in a product or company or brand recognition. E-mail marketing is an efficient way to stay connected with a business while also promoting one's business ( Kagan, 2016).

With e-mail marketing, one can easily and quickly reach target markets without the need for large quantities of print space, television or radio time or high production costs. With effective e-mail marketing software, a business can maintain an e-mail list that has been segmented ,based on several factors including the length of time addresses have been on the list, customers' likes and dislikes, spending habits and other important criteria. E-mails are then created and sent out to specifically target members of a business e-mail list, providing them with a personalized e-mail detailing information that they are interested in or have requested. This helps promote trust and loyalty to a company while also increasing sales.

There are several examples of **e-mail marketing campaigns**, starting with a welcome e-mail that thanks the new contact for opting in to a business' subscription. Welcome letters can not only give valuable information about one's company, they can also request key information about one's new client, helping the business put the person in the correct category for future marketing efforts. Additional e-mail campaigns include sending out announcements on products or services, a newsletter regarding the company and/or products, coupons for future purchasing and much more. Every e-mail one sends out should have company information on the bottom, giving potential clients a chance to learn more about your company as well as 'opt-in' to get future e-mails. Incentive programs that give members a 'promotion code' to collect discounts on purchases also allow the business to monitor the effectiveness of the business campaigns as well as what the contacts are interested in (Forootan, 2016).

With the help of e-mail marketing software, e-mail marketing is an effective way to not only reach one's target markets but also to stay connected with one's purchasing base. Through efficient use of e-mail marketing, the business can retain current clients while also targeting new markets. The business can easily monitor how effective a marketing campaign is, and see that the business return on investment is substantially higher than with other, more traditional marketing campaigns. Let the internet help guide your customers to you again and again with an effective email marketing campaigns.

### **Telemarketing**

Telemarketing is a marketing strategy that involves connecting with customers over the telephone or, more recently, through web-based video conferencing. It is one of the most divisive strategies in modern marketing because many organizations have been known to use irritating or unethical practices in telemarketing. One of the most negatively-perceived versions of telemarketing is known as "robo-calling," a practice that involves using a pre-recorded message delivered through an automatic dialing machine that can contact thousands of people every day. Because of these and

other unpopular methods, there are many government regulations of telemarketing in several countries throughout the world (Marketing- schools.org., 2012).

Despite generating an estimated \$500 billion per year worldwide, telemarketing is resoundingly negative in the public perception. The term itself is mostly associated with cold calls to private individuals at home, which can skew some statistics that don't survey businesses or individuals in a professional capacity.

Telemarketing can help a wide variety of organizations achieve improved results in different ways. Though the most obvious form of telemarketing involves company calls to individuals at home to pitch them products, telemarketing is also a significant strategy in business-to-business sales, event promotion, political campaigning, and lead generation for more sophisticated sales procedures (Dickens, 2015).

Companies that wish to promote an event that appeals to a specific demographic segment can also use telemarketing to reach potential participants. For instance, a company that organizes continuing education conferences for dentists, could use telemarketing to contact a large number of dental practices to raise awareness about an upcoming conference, and encourage the dentists to attend.

Political campaigns use telemarketing extensively to raise funds and convince people to vote for the campaign's candidate or cause. Large campaigns, like those for presidential elections, tend to use automated systems to reach the largest number of people possible. Local campaigns for positions like mayor or congressional representative, or for local ballot measures, often employ live telephone representatives instead. A similar method is used for universities and nonprofit organizations that wish to raise funds and increase participation.

According to Kotler (2011) marketing campaigns can be refined to choose only people meeting the right criteria for a given product or service, hopefully improving the response rates to the campaign. One reason that consumers find 'junk mail' so irritating is that much of it is poorly targeted; whereas many do buy as a result of receiving information about products they are actually interested in.

### **Blogging**

The term **blog** comes from the combination of "web" and "log" or "weblog," and was eventually shortened to "blog" ( Duermyer, 2017). Blog marketing is the process of reaching your home business' target market through the use of a blog. The greatest power of blog marketing comes from the viral effect of some blog posts. News travels very fast via blogs. In addition to the above, blogging benefits marketers .Readers pick up interesting stories and blog about them to others, third-party blogs. Their readers in turn spread the word to others. All this is done at very little cost to the advertiser, and often has a snowball effect that can be started off with just a few strategically placed blog entries and comments on others' blogs ( Divehi , 2007). A blog also is an additional tool that is not only capable of reaching new customers, but can also build a dynamic community which

exchanges information, solutions, reviews and opinions about a business and its products, services and reputation. Reaching new customers, developing brand or personality, gathering feedback, reviews and testimonials and responding to and managing complaints are also additional benefits of blogging to marketers ( gov. au.,2016).

### **On-line advertising**

Advertising is a paid form of non-personal communication by an identified sponsor to the world at large (Kotler, 2011). So, on-line advertising is a broad term used to describe the paid advertisement that publishers put on their websites to enable the 'Surfers' get content and services for free. A tourism agency in Nigeria, Waka.com often does this. What most people hear about is a specific type of online advertising that is tailored to their likely interests by companies promoting their products or services. This is known as Interest-Based Advertising (IBA) or Online Behavioral Advertising (OBA),(NAI, 2014). Many hospitality businesses in Nigeria like hotels and motels often do this. Many businesses advertise through "banners" and similar advertisements on other websites and this offers potential customers a quick and easy way to respond to an advertising message.

Tutor 2u (2012) adds that, there is so much on-line advertising that careful targeting is essential, otherwise effort is wasted. The good news is that large popular websites such as Google have very sophisticated systems to help ensure that advertisements on their websites are presented according to what the particular 'surfer' seems to be looking for on that website.

**Key benefits of on-line advertising:** keeping content and services free, providing content and advertisement that are better matched to 'surfers' interest, fewer intrusive or annoying advertisements, and helping business better serve 'surfers'

**Corporate Websites:** A corporate website is an informational website operated by a business or other private enterprise such as a charity or nonprofit foundation (Adams, 2013). Most medium to large businesses and many small businesses maintain a website. This will usually include basic contact information as well as key marketing messages about its business and its products. The website offers a good place to keep public relations information, such as press releases and other announcements about their products. For example Procter and Gamble,( marketers of Ariel laundry detergent, always feminine hygiene products ,crest tooth-paste, etc) and PZ Cussons, Nigeria Plc, (marketers of morning fresh, canoe soap, Venus body cream, rub, premier soap, etc.); maintain corporate web-sites ,and, many websites are also electronic stores.

**Geo – demographics:** Kestle (2011) opines that, geo-demography is a branch of market research that assigns the attributes of small areas, usually neighborhoods, to the consumers who live within them, and based on this assignment divides the consumer market place into meaningful segments that are locatable and reachable.

The discipline leverages spatial and mathematical patterns on how people live and shop, to help marketers make inferences about consumer behaviour. These techniques have been widely used since the early 1970s to answer the marketing question, "who are my customers", "where do they live and "how can I reach them".

Still-well (2009) writes that, this is software package that overlays demographic data over a map. For example, a retailer might choose its location partly on the basis of the demographic make-up of the global population. This could help them place their store in the most convenient place for a suitable size of target market. Demographics is all about measuring and classifying population according to criteria such as age, sex, income, level of education, household composition, and so on.

**Market expansion:** Using media such as the internet allows business to break through geographical barriers to promote products and services faster. Advertising a product on a website can extend an offer to potential customers in any part of the world. However, this assumes that the potential customers have access to the internet. Sending e-mails to potential customers is faster and comes with cost effectiveness, targeting audiences better and is extremely interactive. This makes possible anytime, anywhere, marketing (Wavomba, 2013).

**Product tracking:** In marketing logistics, radio frequency identification (RFID) tags, grant businesses unprecedented control of their products and supply chain. Each RFID chip contains stored information such as product identification number, manufacturing date, and a shipping location that can be transmitted and then received via special electronic reading devices. Companies store the collected information in data bases and use it to track products, improving delivery times and reducing the effort needed to locate misplaced items (Heyn, 2014).

**Warehousing:** Enhanced product tracking, detailed digital information archives, and extensive computer networking combine to improve product warehousing. Businesses can now know exactly how much inventory is on hand and can monitor its ebbs and flows, staying one step ahead of harmful shortages. Accurate data collection also enables more efficient use of warehouse space, ensuring that the most profitable items are receiving the most attention, and taking full advantage of market supply and demand( Lynch, 2012).

### **What are the drawbacks associated with the use of ICTs in business?**

People use technology not only for entertainment but also for business. On the surface, technology in business appears to be "all rosy", but it also holds **disadvantages**. Business people have to weigh these disadvantages against the advantages before they implement technology in the workplace. **(1)**

**Implementation expenses:** Henderson (2012.), reveals that, the initial capital outlay of buying new equipment, installing the equipment, acquiring the necessary software, as well as maintenance is quite expensive. The cost of training the staff on how to use the equipment is also expensive (BBC Radio 1, 2010).

**(2) Inadequate communications and power infrastructure and security breaches:** Although information technology systems allow businesses to be conducted at a faster pace, they are not without their flaws. Information technology systems are vulnerable to security breaches, particularly when they are accessible via the internet. If appropriate measures are not put in place, unauthorized individuals may access confidential data. Information may be altered, permanently destroyed, or used for unsavory purposes. Many banks in Nigeria have suffered this through their ATMs (Olatunji, 2016). **(3) Breakdowns:** Machinery and equipment may suffer breakdowns which

will affect production. Machines work on electricity and if there is no electricity and there are power cuts it will affect work done. **(4) Demoralized staff:** Employees motivation may suffer, if part of their job is replaced by ICT machines. This de-skilling of their job may make workers feel that they are vulnerable to being made redundant.

### **Conclusion**

In today's world it is unlikely that a business can be successful, without applying ICT solutions. Much of the world's economy is driven and managed by ICT, and it provides companies with a range of tools especially those crucial to marketing success. A properly developed, communications infrastructure can help give the enterprise/marketer a competitive advantage; the ability to satisfy current and potential customers quickly, cheaply and effectively, which is rapidly becoming a key differentiator for enterprises that wish to succeed over the long term.

### **Recommendations**

- 1) ICT in marketing must be brought to a new paradigm, where the tools of ICT will be used maximally, effectively and efficiently to gain business value and competitive advantage
  
- 2) Business enterprises must invest heavily on ICTs and see their networks as strategic platforms that can help transform their business and allow them operate more effectively on the global stage.
  
- 3) For the Nigerian government, provision and maintenance of infrastructural facilities necessary for ICTs development, such as reliable supply of electricity, telecommunication and transportation are important.

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**COMPLIANCE TO MAINTENANCE SCHEDULE: A REVIEW OF MINI POWERHOUSES OF  
AUCHI POLYTECHNIC, EDO STATE**

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**BEING A PAPER PRESENTED**

**TO THE JOURNAL OF ARTS, MANAGEMENT, SCIENCE AND TECHNOLOGY  
AUCHI POLYTECHNIC, AUCHI, EDO STATE**

**Abstract**

There is no gainsaying that public power supply is grossly inadequate in Nigeria today. Most establishments have continued to rely on generators and mini powerhouses for power supply. In order to keep them running, good and functional maintenance practices must be in place. This paper examined the level of compliance to maintenance schedule in the mini Power Houses of Auchi Polytechnic, Edo State and subsequently benchmarked and evaluated the practices with the world best maintenance practices. The relationship between maintenance practices and plant performance in terms of availability, operation and maintenance costs was also determined. The case study was done with a target population of all the three operational areas namely, campuses 1 & 11 and Rector's quarters. The study used primary data which was gathered by means of a self-administered questionnaire issued to respondents and secondary data which was extracted from internal operational reports in works and maintenance department of the school. The average response of each item on the questionnaire was calculated and the quantity identified to evaluate the maintenance practices at works and maintenance department while benchmarking them with the world best practices. The study established that Auchi Polytechnic has in place good maintenance practices. The study established that, although Auchi Polytechnic has good maintenance practices in place but when benchmarked with world best practices, it was apparent that breakdown maintenances works were significantly high. However, it was observed that the high breakdown maintenances works recorded was as a result of poor maintenance works. It is the view of this paper that, there is need to have adequate and the proper facilities that would enhance the various maintenance works for effective and efficient generation and distribution of power to meet the desired expectations of the school. This therefore calls for improvement of maintenance practices to meet world best practices by building internal capacities and having proactive internal technical trainings and audits.

**Keywords-** Maintenance, Powerhouse, Benchmarking and Compliance

## **Introduction**

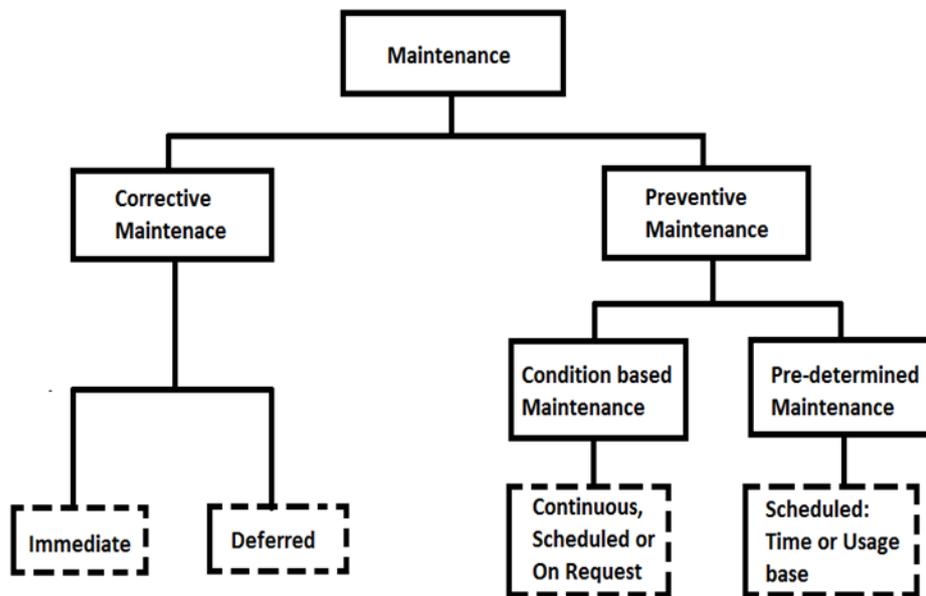
A production system requires different types of equipment to achieve the desired goals; all equipment must have a high availability and reliability in order to ensure a stable process. The maintenance department is responsible for keeping the equipment in good working condition and also to ensure that it can deliver according to the specifications (Al- Turki, 2011). According to Bellgram and Saften (2010), it is widely known that the maintenance currently is viewed by management as a big expense and it is not an unusual opinion since maintenance does not include any value adding activities. In recent times it is increasingly common for establishments to work with maintenance as a center point of profit (Alsyouf, 2007). Maintenance policies and practices are aimed at minimizing the downtime of equipment and facilities to ensure that proactive maintenance is properly being used to sustain the availability of all the facilities (Rils and Thorsteinsson, 1997). This study reviews the existing maintenance practices in the power generating facilities referred to as mini powerhouses of Auchi polytechnic.

Campbell and Reyos-Picknell (2006.), in a number of surveys conducted in industries throughout the United States have found that 70% of equipment failures are self-induced and that maintenance personnel who are not following what is termed as "Maintenance Schedule" substantially contribute to these failures. Olufunke (2011.), in his study posited that between 30% and 50% of the self-induced failures are as a result of maintenance personnel not knowing the basics of maintenance. He also found that maintenance personnel, who, although skilled, choose not to follow best maintenance repair practices, potentially causing another 20% to 30% of those failures. This case study focuses on best maintenance practices necessary for maintenance personnel to keep equipment operating at peak reliability with a view to reducing breakdown costs and increasing productivity and capacity. The potential cost savings can often be beyond the understanding or comprehension of management. Therefore, the maintenance function must ensure that generating sets are in optimum operating condition. The normal practice of quick response to failures should be replaced with maintenance practices that will sustain optimum operating condition of all plant systems (Ighodora, 2009). The plant should not only be operating but reliably without creating abnormal levels of product quality problems, preventive maintenance downtime or delays.

## **Approaches to maintenance**

Several maintenance approaches, strategies and concepts have been implemented by practitioners or suggested by intellectuals. Maintenance approaches and their development have been discussed by many authors. Usually, maintenance actions are aimed at minimizing failure and the consequences of failure of industrial plant, machinery and equipment as far as possible (Bavilacqua and Braglia, 1991). These actions can take several forms such as breakdown maintenance, preventive maintenance (PM), i.e. replacing components at a pre-determined time using statistical models based on collected historical failure data, or condition-based maintenance (CBM) by monitoring the condition of the component using one (or more) condition monitoring (CM) techniques (Atiba and Fauad, 2005). However, in all cases, the decision maker needs to select from all the applicable maintenance approaches and the right policy for each component, module or equipment (Campbell and Reyos-

Picknell , 2006). A study by Fernando and Gilbert (2009) revealed that the availability of a system is strongly associated with its parts reliability and the maintenance policy adopted. The identification and implementation of the appropriate maintenance policy will enable the managers to avoid premature replacement costs, maintain stable production capabilities, and prevent the deterioration of the system and its components (Bavilacqua and Braglia, 1991). According to ISO/SS 13306 standards, maintenance approaches has been divided into two groups, such as Corrective maintenance and Preventive maintenance as shown in Fig 1, and in practice there are many combinations of these two approaches. The corrective approach is further subdivided into immediate and deferred. The preventive maintenance has two subgroups such as Condition based maintenance and predetermined maintenance. This states that the preventive maintenance approach can be condition or time concerned. The preventive maintenance is proactive while the corrective maintenance is reactive form of maintenance and, for all the approaches time plays an important role (ISO, 2002).



**Fig 1: Maintenance overview according to ISO/SS 13306 standard**

**A description of a mini powerhouse**

Generally, a Mini Powerhouse provides limited power in the event of a power outage. They consist of an engine, a generator, control panels, and possibly a fuel storage tank. The engine drives the generator to create electrical power. NFPA defines two classes of electric generators: Level-1 generators provide support for life safety systems, such as emergency lighting, fire protection and ventilation to provide for safe egress in the event of an emergency; Level-2 generators encompass all other uses such as backup power for data centers, auxiliary systems, process controls, refrigeration, and HVAC systems. For the purposes of this recommended practice, Level-1 generators are referred to as emergency generators and Level-2 generators as standby generators. Emergency generators are typically 200 kW or smaller and run on gasoline, natural gas or diesel fuel. Standby generators are typically much larger diesel engine units, often between 200 kW and 2,000kW (Sani etal, 2011).

In Auchu polytechnic, the standby generators are in use and are usually stationary units permanently wired into the building's electrical distribution system through a transfer switch. As at the time of this study, Auchu polytechnic was being served by over 8 standby generators located on the two campuses and the Rectors' quarters.

### **Maintenance practices in Auchu polytechnic**

Best maintenance practices are defined in two categories: Standards and Methods. Standards are the measurable performance levels of maintenance execution; methods and strategies must be practiced in order to meet the standards. The combination of standards with methods and strategies provides the elements of an integrated planned maintenance system. Achievement of the best maintenance practice standards (maintenance excellence) is accomplished through an interactive and integrated series of links with an array of methods and strategies (Chandras et al, 2015). Auchu Polytechnic has its maintenance management system (Plant Maintenance, PM) integrated with the institution's Estate and Works department. All maintenance works are captured on work orders. This includes planned/scheduled, corrective, emergency, etc. The work order is the primary tool for managing labor resources and measuring department effectiveness. The PM output provides maintenance, engineering, operations, supply chain and upper management with accurate and effective reports needed for evaluation and management.

The types of reports and data tracking obtained from a PM includes: open work orders, closed work orders, mean time between failures (MTBF), cost per reports, scheduled compliance, plant maintenance overdue, labor allocation, spare parts demand and usage reports.

### **Methodology**

This is a case study of cross sectional nature which adopted a description research design. This research was designed to focus on identifying the existing maintenance practices at mini power houses of Auchu Polytechnic, Auchu, comparing them with world best practices and determining the influence it has on the generators' availabilities and performances. Three research questions comprising of various related items were formulated. They are;

1. The general understanding of the types of maintenance strategies, maintenance provisions and works employed to ensure that the mini Powerhouses of Auchu Polytechnic are functional and available.
2. Types of maintenance approach and the respective mix adopted in Auchu Polytechnic mini powerhouses.
3. Benchmarking mini powerhouses in Auchu Polytechnic maintenance practices with world best.

The population of study was drawn from Campus 1, Campus11 and Rectors quarters' mini power stations of Auchu Polytechnic under review since they produce almost the entire Polytechnic's power supply in the absence of public power supply. Stratified random sampling method was used to select sample unit. According to Kothari (2004), a sample of 25 percent of the population is adequate when the sampling frame is well stratified.

Both primary and secondary data were used in this study. The primary data was gathered through objective observations and survey. The main instrument for data collection was a structured set of questionnaires that have been authenticated and certified by professionals before they were administered. The questions were constructed so as to address specific objectives and provide a variety of possible responses. The respondents included Foremen, Engineers, Technical officers and Technicians. The study targeted a sample population of 39 maintenance staff in all the three operational areas of a population of 150 staff. The questionnaires were administered to 39 maintenance staff of work department of Auchi Polytechnic working at the mini powerhouses in Campus 1, Campus 11 and Rectors quarters, 37 of them responded and this translates to 94.87% response rate. The entire return rate is statistically representative, therefore, enhancing generalization of the research results. The statistical results were triangulated with extensive literature to draw lessons learnt from other similar research works. More so, 45.95% of the respondents had attained National diploma or Higher national diploma level of education, 43.24% had degree level of education and 10.81% had masters' degree. This indicates that the level of educational attainment of the plant maintenance staff is adequate for them to have acquired the necessary technical skills.

The study used quantitative method of data analysis. To ensure ease of analysis and minimize the margin error, the questions were coded according to each of the separate variables. Available data analysis tools and software packages were used to analyze the primary data. The statistical technique of regression analysis was specifically used to analyze the secondary data to determine the relationship between the generators' availability against the generator breakdowns and operation and maintenance costs. The raw quantitative data was keyed into the computer and analyzed using Statistical Package for Social Sciences (SPSS) program. The findings of the study were presented by use of tables and charts as applicable to convey the visual impressions of the meaning or to clarify information that may otherwise be hidden within the data. Study conclusions were based on the summary of the data analysis. The model used in the study is given as:

$$Y = a + \beta_1 X_1 + \beta_2 X_2,$$

$\beta_1, \beta_2$  = Correlation coefficients

Y = Generators' Performance in terms of availability

$X_1$  = Operation and Maintenance costs

$X_2$  = No of Breakdowns

## **Results and discussion**

The responses from the various respondents have been summarized and presented in terms of percentages with respect to the items on each research question.

Table 1 addresses research *question 1* on the general understanding of the types of maintenance strategies, maintenance provisions and works employed to ensure that the mini Powerhouses of Auchi Polytechnic are functional and available.

**Table 1:** Responses on the general understanding of the types of maintenance strategies, maintenance provisions and works employed to ensure that the mini Powerhouses of Auchi Polytechnic are functional and available

	Description of item	Frequency	
		Yes	%
1	Are you familiar with corrective maintenance?	37	100
2	Are you familiar with preventive maintenance?	37	100
3	Are you familiar with condition based maintenance?	37	100
4	Are you familiar with plant maintenance module in System application products (SAP)?	5	13.5
5	Does your plant have maintenance procedure for all its equipments?	35	94.89
6	Do you use plant maintenance in management of your maintenance works?	34	91.89
7	Is this maintenance procedures (checklist) followed during maintenances?	34	91.89
8	Are the measured parameters during maintenance works benchmarked to any known standard?	33	89.19
9	Does your station have an annual training plan for every maintenance staff?	21	56.76
10	Do you have a service level agreement for provision of spares with manufacturers?	5	13.51

As shown in table 1, all the respondents (100%) were familiar with the three types of maintenances (BD, CBM and PM) and only 13.5% of them are conversant with the use the plant maintenance software module in system applications products (SAP) in their maintenance management works. More so, over 90% of the respondents use maintenance procedure & checklist in their maintenance activities and 89.19%, agreed that the measured parameters are in line with standards. The respondents were divided in the ratio of 21:16 on existence and non existence of an annual training program for the maintenance staff. However, majority (86.49%) of them indicated that there were no service level agreements (SLA) between Auchi Polytechnic and spare manufacturers or suppliers or Original Equipment Manufacturers (OEM).

It is observed that with the revelation above, Auchi Polytechnic can upgrade its maintenance approach by introducing a plant maintenance software module in their SAP system to make operations more efficient. The scores recorded on the respondent’s awareness of maintenance practices and aspects of maintenances is a confirmation of establishment of a good maintenance system. However, the low score on service level agreement (SLA) with manufacturers was expected, since it is not common practice to find government organization having SLA in place and requires a major transformation initiative which may require time to be implemented. The respondents’ position on training program is satisfactory which is an indication of the existence of training programmes, and it is the view of this paper that there is need to increase the number of trainings on maintenance.

Table 2 presents a summary in tabular form of the findings with regards to research *question* 2 on the types of maintenance approaches adopted in Auchi Polytechnic mini Powerhouses.

**Table 2:** Responses on the types of maintenance approach and the respective mix adopted in Auchi Polytechnic mini powerhouses.

Type of maintenance	Campus 1		Campus11		Rector’s quarters	
	Frequency	%	Frequency	%	Frequency	%
Corrective	1	5.88	1	11.11	1	9.09
Preventive	9	52.94	1	11.11	4	36.36
CBM based	0	0.00	1	11.11	2	18.18
All	7	41.18	6	66.67	4	36.36
Total	17	100	9	100	11	100

As shown in table 2, a mix of the 3 types of maintenance approaches, namely corrective, preventive and condition based maintenances (CBM) scored relatively high marks from the respondents of all the areas with campus11 recording the highest score of (66.67%), followed by

Campus1 (41.18%) and rectors quarters (36.36%). Preventive maintenance was dominant on campus 1 recording a high score of 52.94% from the respondents.

A full establishment of CBM is a cost intensive exercise and the system is yet to be properly established in Auchi Polytechnic, this would explain the low score recorded on CBM. Corrective maintenance on the other hand is not popular and the staff members were reluctant to disclose their weaknesses, hence the low score under this aspect and high score in favour of the other maintenance approaches. Therefore, it is believed by the researchers that the three types of approaches to maintenance are the most applicable in all the power generating houses with the Mini powerhouses in campus 1 adopting mostly the preventive maintenance option.

Table 3 addresses research *question 3* used for the benchmarking and evaluation of Auchi Polytechnic's maintenance practices as it compares with world best practices. In the analyses, values assigned to the items as world best standards were compared to the values obtained from the responses of the respondents.

**Table 3:** Benchmarking and evaluation of Auchi Polytechnic's maintenance practices as it compares with world best practices

	Description	Auchi Poly Mini powerhouse mean	Standard Deviation	Benchmark	% Variation
1	Plants availability BM(95)	90.25	0.73	95	4.98
2	Percentage of daily work allocated to staff is preventive maintenance BM(> 95)	55.34	3.2	65	14.86
3	Variance between maintenance work and budgeted amount BM(5%)	5.93	0.53	5	(18.60)
4	Percentage of maintenance work carried by a work order BM(90)	73.43	3.87	100	26.57
5	Percentage of programmed work is done as scheduled BM(100)	60.49	3.05	90	32.79
6	Percentage of work orders that are closed in a month BM(100)	64.44	3.92	100	35.56
7	Percentage of work orders generated is planned before the outage BM(90)	57.49	3.85	90	36.12
8	Technical training days to staff per year BM (15%)	7.14	0.65	15	52.40
9	Percentage of total overtime against total maintenance time BM (5%)	9.86	0.84	5	(97.20)
10	Percentage of PM and CBM costs to the total maintenance cost BM (15-30%)	45.01	3.3	22.5	(100.04)
11	Callouts per month BM(< 2)	4.27	0.46	2	(113.50)
12	Percentage of work orders generated by breakdown maintenance BM(10)	44.28	4.46	10	(342.80)

As shown in table 3, there were four parameters where the Mini Powerhouses of Auchi Polytechnic's maintenance practices variance against the world best practices were in the range of 26.52% to 36.12% close. These variables were percentage of maintenance work carried by a work order, percentage of programmed work done as scheduled, and percentage of opened work orders that are closed in a month and percentage of work orders generated and planned before the outage.

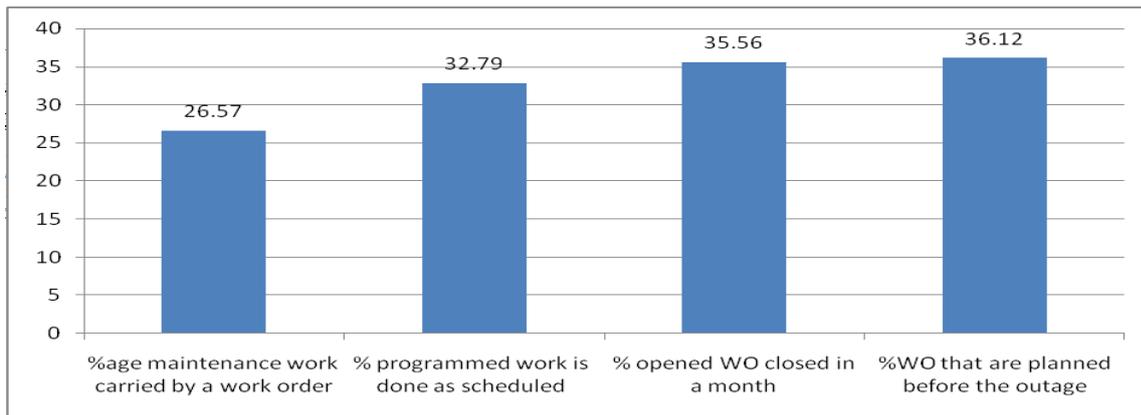


Figure 2: Variance against Benchmarked Items Related to Work order (WO)

All the four aspects of maintenance practices could be easily seen in the graph as shown in fig 2. There was an area of concern where the variances were extremely high as shown in fig 3. This indicated that there is poor response to breakdowns and funding of breakdown maintenance activities.

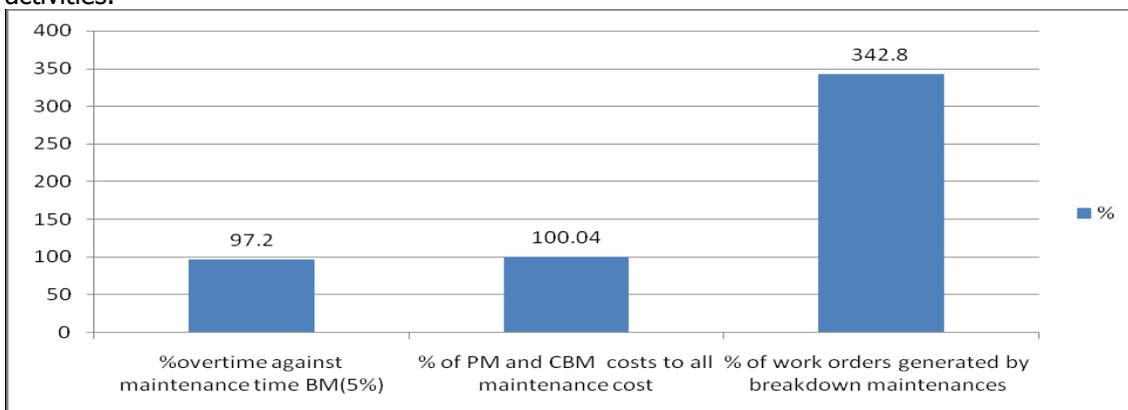


Figure 3: Variance against Benchmarked Items Related to Machine Breakdown

Figure 3 above compares maintenance aspects that are directly related to machine breakdowns and this gives an indication of the quality of the maintenance works done. With the highest score of 342.8% recorded on percentage of work orders generated by breakdown maintenances, the overtime and maintenance cost would also be expected to be high. This really compromises the reliability and quality of power generated and supplied (World Energy Council, 2004). Comparatively, the plant's availability recorded the best performance of a small variance of 4.98%. This could be due to the relatively low variance recorded by the daily work allocated to staff for preventive maintenance activities when benchmarked with world best practices, indicating an above average compliance in this regards.

The only major gap as observed from majority of the respondents was lack of service level agreements which they indicated was lacking. From the analysis of the internal reports there is an indication of good overall generating sets performances but however, the major concern was the high percentage of work orders generated for breakdown maintenance works which recorded an extremely high variance of 342%. This compromises the reliability and quality of the power generated and requires to be addressed. There was a weak relation between O&M cost, number of breakdowns and the plant availabilities. This could be attributed to poor records of the expenses incurred during all the types of maintenances, which should be well captured and differentiated.

## **Conclusion**

The study found that the maintenance practices are well established in works and maintenance department of Auchi Polytechnic and the mini powerhouses, even without maintenance software in place to enhance it. The main approach to maintenance was found to be mainly a mix of corrective, preventive and condition based maintenances in the three operational areas used for this research but with preventive maintenance being the dominant practice in campus 1. There were no spares contract between the Institution and the manufacturers and the level of breakdown maintenances were found to be extremely high compared with world's best practices. The generating sets availability was the best performance on the benchmarked categories. The study further showed that the numbers of breakdowns in generators have a profound effect on generators availability and operations and maintenance costs.

With these findings, the works and maintenance department has fairly implemented the methods and strategies aspect of maintenance practices but the standards of the maintenance execution are yet to be achieved. This agrees with the survey conducted in the industries in United States where it indicated that between 30% and 50% poor maintenance failure are due to maintenance personnel not executing maintenance activities using world best standards as checklist and this usually impart negatively on costs. There is therefore need for Auchi Polytechnic to develop and implement both preventive and corrective maintenance tasks that would ensure the maximum use of maintenance resources and the production capacity in accordance with World Best Practices. As revealed, the relationship between mini powerhouses' availability and O&M costs and maintenance activities leads to the conclusion that maintenance practices has a direct relationship with the mini powerhouses' performance. It is important that all the expenses incurred on maintenance works are well captured to help the management in realizing the benefits of good maintenance practices.

## **Recommendations**

As a result of the findings of this work, the following recommendations are made;

- Auchu Polytechnic should undertake a quantitative survey to determine the actual impact of improving maintenances practices in terms of improving the reliability of power with a view to ascertaining the profitability of the institution.
- The Polytechnic should initiate spare parts maintenance contracts with manufacturers, build internal capacities and there should also be periodic proactive internal technical audits.
- There is need to retrain staff of the Estate and Works department on modern technology of repair and maintenance and the use of certified checklists for generating sets.
- There should be strict monitoring, adherence and compliance to manufacturer's maintenance schedule of mini powerhouse/ generating sets should be followed religiously without alteration.
- Auchu Polytechnic should upgrade its maintenance approach by introducing a plant maintenance software module in their maintenance system to make operations more efficient and economical.

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## **Design and Construction of an Automatic Power Changeover Switch**

By

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## **Abstract**

Power failure or outage in general hinders development of public and private sectors in a country as most industrial and commercial processes are dependent on electrical power. This limits the development of industries. Also there are processes that require constant and steady power supply; that is, cannot be interrupted because of their importance. For instance the control tower in an airport, internet banking operation telecommunication base stations and lots more. This paper presents the design and construction of an automatic power changeover switch that switches power supply from public power supply to generator once there is public power supply outage and it does this automatically. The methods employed in designing the automatic change over switch involve the use of electromechanical type relays, contactors, voltage monitoring relays and delay timer relays as main components of the system. The output of the power supply unit which powers the relays was tested by making the relays to change over immediately the power varies with a generator and public supply source. A single electric bulb was used for testing, when the utility supply is ON and the source of the generator OFF the bulb which is the load lights. When the utility supply is OFF and the generator switch ON, the load which is the bulb lights. Thus confirming the normal open and close of the relays.

**Keywords:** Switching, relay, generator, public power supply, contactors

## **1. Introduction**

Power instability in developing countries creates a need for automation of electrical power generation or alternative sources of power to back up the utility supply (Lewis B, 1987). This automation is required as the rate of power outage becomes predominantly high. Most industrial and commercial processes are dependent on power supply and if the processes of change-over are manual; serious time is not only wasted but also creates machine damage from human error during the change-over connections. This development could bring massive losses and adverse effects on the consumers of electricity and the equipment that are operated from the utility power. The instability of electricity supply to most of the developing and underdeveloped parts of the world for industrial, commercial and domestic uses, gives rise to the frequent use of mechanical generators as alternative sources of power supply to meet up with the energy demands (Morton and Spence, 1981). An automatic power changeover system or Automatic Transfer Switch (ATS) is a power transfer switch (electrical switch) that switches a load between two sources. It links the load and mains supply or the alternative supply together without jamming the two power sources together and at the end maintains uninterrupted power to a load (Sidhu et al, 1987).

The introduction of generator as an alternative source of electricity supply also brings forth the challenge of switching smoothly and timely between the mains supply and the alternative sources whenever there is a failure on the mains source. There is also the need to reduce drudgery from switching between the two sources on the human side. Steady electricity plays a major role in economic development of a nation and this form the focal point for developing this research study with interest in human, infrastructural and economic development. In this study, we provided an automatic switching mechanism that smoothly and effectively transfers the consumer loads to a generator in the case of power failure and back to the mains supply. The system automatically detects when power has been restored to the mains supply and returns the loads to this source while turning off the generator set. This mechanism has been tested and calibrated.

## **3. Materials and Methods**

### **3.1 Design consideration**

In developing of this automatic changeover machine, generator with the capacity of 12KVA was considered and its rating determines the ratings of the components and circuit elements to be

used. It does not function with a faulty generating set and the generator must have a manual starter and engine stopper

### 3.2 Constructional features

Fig.1 shows the constructional features of an automatic change over switch system using the following component for operation. Contactor, Relay, Fuse, connecting wire, Indicating lamp, Transformers., Rectifier, Contactor coil, Load wire, Supply wire, Connectors, screw nail, Metal panel, Relay coil and casing.

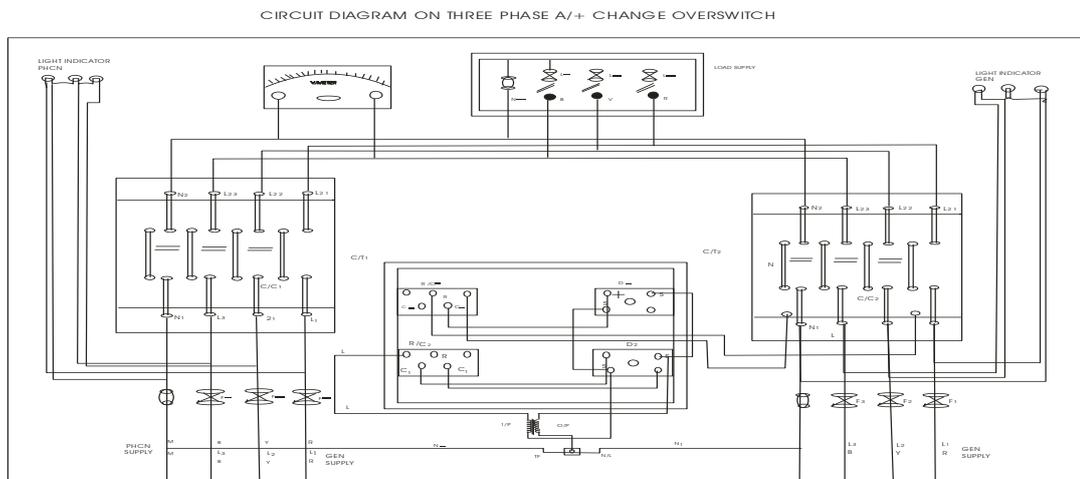


Fig.1: Circuit diagram of automatic change-over circuit

### 3.3 Design calculations

If the change-over is to be applied on a 220V/415V, 12KVA generator operating at 50Hz and a power factor of about 0.8. To determine the rating of contactor to be used as well as cable size. Therefore, active power (P) is computed as follows:

$$P = IV \cos\theta \dots\dots\dots (1)$$

Where;

P = Active powers

S = Apparent power

Line voltage =  $V_L = 415V$

Phase voltage =  $V_{ph} = 240V$

$$S = IV \dots\dots\dots (2)$$

$$\text{Power factor} = \cos\theta \dots\dots\dots (3)$$

$$P = 9.6 \text{KW}$$

Assuming a balanced load is being used;

$$P = 3 I_p V_p \cos\theta \quad \dots\dots\dots (4)$$

$$\text{Therefore, } I_p = 18.3\text{A}$$

The contactor requires minimum current rating of 18.3A as shown in equation (4).

For increased efficiency a tolerance of about +25% is allowed.(Horowitz and Winfield,2002).Thus contactor rating is computed as follows:

$$18.3 + \left(\frac{25 \times 18.3}{100}\right) = 18.3 + 4.6 = 22.9\text{A} \quad \text{or nearest allowable} \quad \dots\dots (5)$$

From the above, 30amp was considered as the nearest allowable current rating of the relay contactor which carry the power aspect of the circuit. i.e. 30 Amp (No) and 30 Amp (Nc). The voltage is 240v while the power factor is approximately 0.8. Therefore, the maximum power wattage the switching system can withstand is computed to be 288 watt for (Normal open-No and Normal close-Nc).

$$P = 288 \text{ watt for Normal open (No) = Normal close(Nc)} \quad \dots\dots\dots (6).$$

From equation (4),  $I_p = 18.3\text{A}$  computed is current per phase. Thus any cable used should be capable of carrying about 1½ times the current (Owen, 1995).

Therefore, required cable should carry a current of at least:

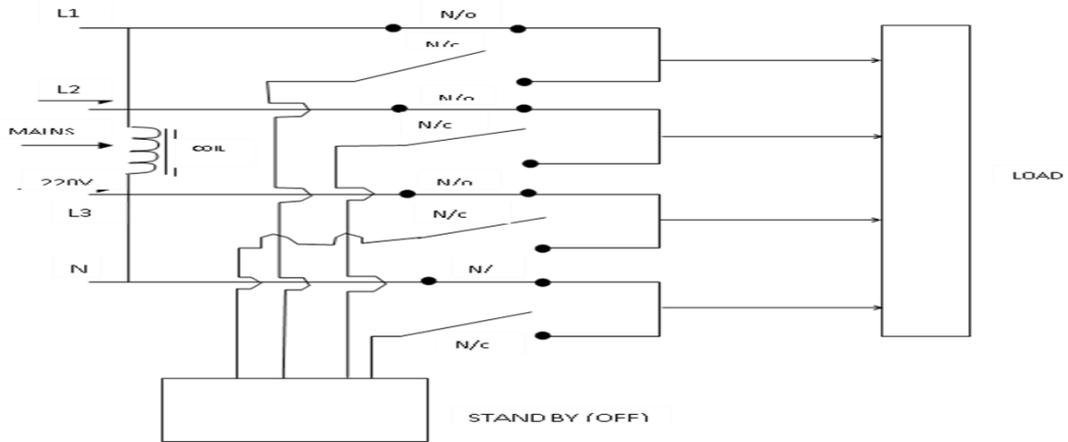
$$\begin{aligned} &18.3 + (50\% \times 18.3) \\ &= 18.3 + 9.15 \\ &= 37.45\text{Amps} \end{aligned}$$

However, if the operating environment is very hot, a larger cable size is required.

#### 4. Results and discussion

The normal open and close of the relay were identified with the aid of a digital meter to avoid wrong connection of the relay contacts. The output of the power supply unit which powers the relays was tested by making the relays to change over immediately the power varies with a generator; the system was tested with public supply sources. A single electric bulb was used for the testing. When the supply of public supply source is ON and the source of the generator OFF the bulb which is the load lights, when the source of public supply sources is

OFF and the generator switch ON the load which is the bulb light. Contactor connection



diagrams are shown in Figs. 4.1-3.

Figure 4.1 Contactor Connections when Supply is from Mains (DISCO)

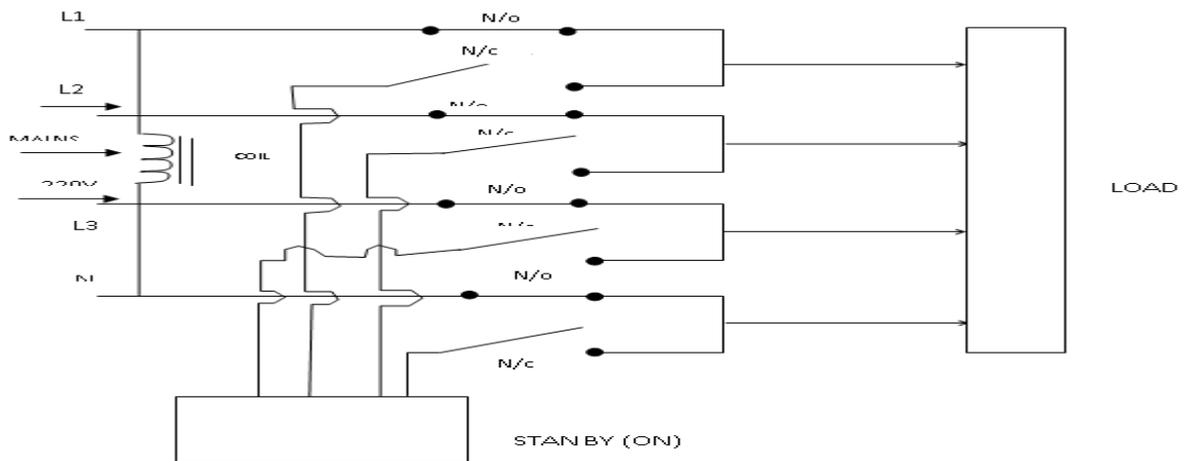


Fig. 4.2: Contactor connections when supply is from StandBy

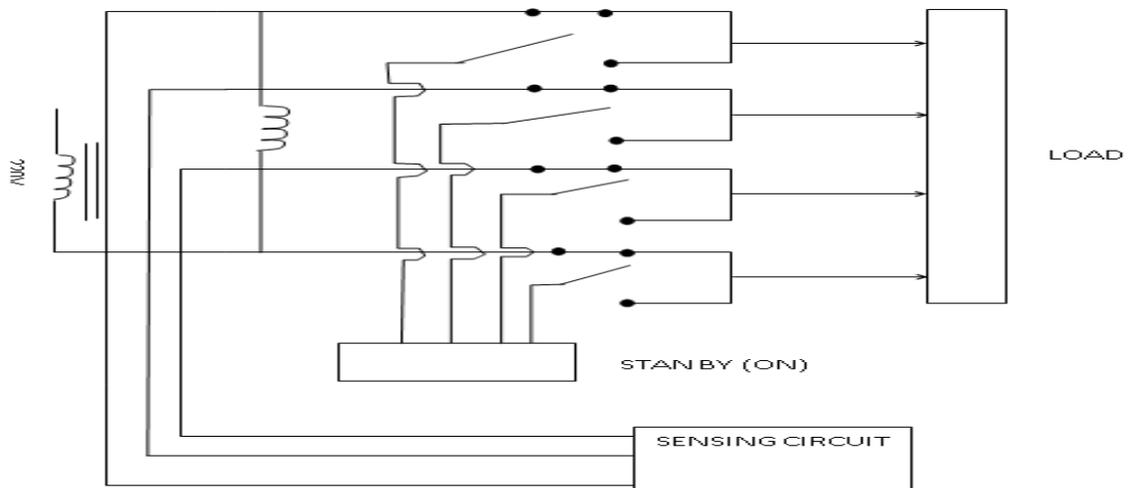


Fig.4.3 Contractor connection when supply is from both sources of supply

Table 1 TEST AND RESULT TABLE

TEST NO	DESCRIPTION OF TEST	RESULT	COMMENT
1.	Mains is applied while the standby is off	Load connected to mains contact sensing circuit not activated	Mains contact energizes while standby de-energized
2.	Main fail and standby is switched on	Load connects to standby contact sensing circuit not activated	Standby contact energizes while mains de-energized
3.	Mains is restored and supply is from both main and standby	Load connects to mains contact sensing circuit activated	Both main and standby energize immediately

## 5. Conclusion

This device can be used to handle large load since the rating of the contactor for this design is 415V/30A. Moreover it forms the basis for the design of a more complicated circuit which is needed for large scale industrial applications. For safety of life and property, the consumers for domestic and small-scale business should adhere strictly to the safety regulations that are associated with this device, for high durability and efficiency.

## 6 Recommendation

From the result of the test carried out on the design, it is deduced that the device can be suitably operated at home and small-scale business, provided all the necessary requirements for its operation are strictly followed. Hence it can, as well serve a multipurpose function. Users should make sure that the fuse rating in their distribution boxes is accurately enough to provide short circuit protection on the system. This is because, there is no special provision for short circuit protection in the contactor and hence it can be easily damaged in the event of short-circuit. It is against this background that I recommend that:

(i), There should be a control circuit in the Generator starter relay to switch on and off the generator when needed.

(ii) Overload of the automatic change over system should be prevented.

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**IMPACT OF TEAMWORK AMONG CONSTRUCTION PROFESSIONALS ON SITE  
PRODUCTIVITY IN ONDO AND EKITI STATES**

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## **Abstract**

*The management of construction projects has been carried out since man first cooperated to erect buildings, it is revealing that historical and contemporary accounts of construction work pay little attention to how people work together and manage their activities. The major reason for poor performance of product delivery in the construction industry is due to the inability of project participants to work collaboratively. The aim of this study was to assess teamwork among construction professionals on site productivity with a view to enhancing the performance of the construction industry. The study adopted a survey research design with the use of a well-structured questionnaire administered on construction professionals. Seventy five (75) questionnaires were administered in each State using random sampling technique, 27 copies were retrieved in Ondo State, while 24 copies were retrieved in Ekiti State, made a total of 51 copies and later analyzed using descriptive statistical tool. The findings indicated that the most important characteristics of teamwork are commitment to work, open and honest communication, having shared goal. The study recommends that the professionals should be working as a team and the use of teamwork should be improved upon in order to increase the productivity of construction professionals.*

*Keywords: Assessment, commitment, construction professionals, productivity, teamwork.*

## **Introduction**

The management of construction projects has been carried out since man first cooperated to erect buildings (Olaniyan, 2000). The process of execution in the building and civil engineering industry requires the application of teamwork (Chan, 1997). This is due to the fact that, professionals working as a team or group will result into higher productivity or greater positive impact more than individual working alone (Moses and Stahelski, 1999). Even though, issues on teamwork has been frequently addressed by the contemporary management researchers in a more structured way, the practice of teamwork has its roots spanned up to the very beginning of human life. For example, the first book of Moses (Genesis 11: 1-4) as put forward by Christian theology when people communed together to build tower of Babel.

According to Cornick and Mather (1999), "when early man started to hunt something that was bigger than any one person could handle, he started to do it with others. The hunting party was a group with a very important common goal to obtain food to survive". Teamwork exists because is not possible for one person to do all the work, a manager has to work through others in every managerial situation. The first line through which professionals act is a group or team and every construction project involves team or group at various points (Moses and Stahelski, 1999). Barry (1992.), observed that we have to acknowledge that large scale modern building requires a team effort, simply to share out the total project into manageable task to keep client and society happy and to maximize the chances of a project success in what is often a fiercely competitive environment. This concept of teamwork is very much appropriate for the construction industry as the construction products are delivered by a collection of professionals. According to Albanese (1994), teamwork approaches in projects has contributed to lower the total project cost by avoiding rework, improving trust, reducing scope definition problems, lowering variation order rates and improving understanding of project objectives. Evbuonwan and Anumba (1998.), opined that part of the reasons for poor performance of product delivery in the construction industry is due to the inability of project participants to work collaboratively. However, simply bringing people together does not necessarily ensure they will function effectively as a team rather team members need to be able to work together in order for the team to successfully achieve its purposes (Mc Ewan *etal*, 2017). Effective teamwork does not occur

automatically. It may be challenged by various issues, such as lack of organization, misunderstandings, poor communications and inadequate participation from team members. Kerzner (2013) opined that inadequate communication is a major drawback to the development of good teams as it induces low motivation levels, drops in team spirit, and it contributes to poorly stated targets and poor project control coordination and flow of work. Therefore, it is crucial for construction project teams to find a solution to help their team members to integrate and work together effectively. However, the purpose of this research has been largely concentrated on the concept of teamwork such as characteristics of teamwork among construction professionals and contributions of teamwork to the productivity or performance of construction professionals.

## **Literature Review**

### **Introduction**

Team is a word and concept well-known to everyone. Each person has his/her own definition of what a team means. Therefore, it is very important to clarify what team means, since it conveys different things to different people. Some people think any group working together can be called a team; some even think it is associated with sports, others perceive team as in its values, such as cooperating and helping each other. Regardless of what people perceive of teams, it exceeds individuals acting alone or in large organizational grouping, especially when performance requires numerous skills, judgments, and experiences. A team can be defined as a small number of people with complementary skills, who are committed to a common purpose, performance goals and approach for which they hold themselves mutually accountable (Katzenbach and Smith, 2003). Teamwork occurs where group of people work toward a common goal in an organized and coordinated way and it requires flexibility of behavior such that if one team member is unable to do a task, any member that is free and capable will take over the task so that the work of the group can progress (Coles, 1999).

According to Robbins and Finley (2000), the concept of team has existed a hundred thousand years ago, throughout history people have worked together and collaborated as big groups on construction projects. Some of the earliest examples known to mankind are megaliths, the construction of the pyramids, the industrial revolution in the 1700s saw changes in organizational structures and business models, which leads toward the beginning of scientific management. Languedoc canal 1681s and the English railways of 1846s were built by a large number of people (John, 2005). Nevertheless, even

the fairly disparate tasks which can be performed by different professionals working in isolation need to be coordinated and teamwork is essential for integrating specialist work into the scheme of things. A team is no longer a group of people working in the same area, using the same equipment, dealing with the same clients within the same location. Nowadays, a team is comprised of people from different organisations, located around the globe with a high degree of interdependence geared toward the accomplishment of mutual goals (Mc Ewan and Beauchamp, 2014). According to Bell (2004), teams are prevalent in organisations and stipulate imperative contributions to organizational productivity. The concept of teamwork has currently become a concern for management in all types of industries including construction.

### **Characteristics of an effective teamwork**

Teamwork is defined by Scarnati (2001) "as a cooperative process that allows ordinary people to achieve extra ordinary results". Harris and Harris (1996) also explain that a team has a common goal or purpose where team members can develop effective, mutual relationships to achieve common team goals. Teamwork relies upon individuals working together in a cooperative environment to achieve common team goals through sharing knowledge and skills. Research has provided a number of attributes required for successful teamwork. Many of these characteristics have been consistently identified in the literature. The summary of literature on the successful characteristics needed for effective teamwork as follows; team members share responsibility, authority and resources to achieve a mission. Action through cooperation is practiced both within the team and in seeking support (Barkley and Saylor, 1994). To be productive, team members interact face to face, perceive strong positive interdependence (Johnson and Johnson 1991).

To achieve project success, each team needs to possess focus, recognition, structure, empowerment, and good communications (Peters 1988; Katzenbach and Smith 2003; Forsberg, Mooz and Cotterman, 2005 and Sundstrom, De Meuse, and Futrell, 1990). Team members must be flexible enough to adapt to cooperative working environments where goals are achieved through collaboration and social interdependence rather than individualised, competitive goals (Luca and Tarricone, 2001). Parker (2008.), lists twelve characteristics of effective teams such as clear purpose, informality, participation, listening, civilized disagreement, consensus decision, open communication and trust, clear roles and work assignments, shared leadership, external relations, style diversity and

self-assessment. There is strong team commitment to succeed (Critchley and Casey, 1986). Gido and Clements (2011.), opined that the characteristics of effective teams include high degree of cooperation, trust, open, timely effective communication and ethical behavior. These characteristics are essential factors for project success.

### **The Contributions of teamwork to the productivity of construction professionals**

There is no iota of doubt that teamwork has a greater impact on organizational productivity. There is no standard basis of calculation scale on which productivity may be measured in different situations, rather it is a general heading used to cover the widely varied forms of measurement in different industries and by different types of people. A lot of benefits have been identified by different researchers such as improved communication, increased common commitment to goals, provides the natural vehicles for workers to share ideas and to implement improvements, increased the creativity among the construction professionals, expanded job skills and knowledge of the construction professionals, higher level of productivity of construction professionals, conflict resolution, motivated members, interdependence, reduced communication problems, collective strength, effective ways of resolving group process problems, high quality decision making, synergy, better decisions and motivation and improved working relationships (Nicholas, 1996; Adams, 1996; Greenberg and Baron, 2000)

### **Professionals in the building construction industry**

The construction industry is a project based industry. Each project needs different people in accordance with their professionalism, knowledge, experience and requires them to work and coordinated with others from different companies. The construction industry has always dealt with the relationship between team, task, individual and leadership (Adair, 1986). Construction professionals include Architects, Builders, Civil/ Structural Engineers and Quantity Surveyors, Service Engineers, Town Planners, Estate Surveyors and Land Surveyors. They are professional bodies that regulate the activities of these professionals. Construction professionals are valuable resources that may contribute in several different ways to construction companies activities, provided that such companies give them an appropriate chance (Morgan, 1997). In general, an Architect is involved in the planning, designing and oversight of a building's construction. He translates the user's needs into

the builder's requirement and thus must thoroughly understand the building and operational codes under which the design must conform (Mbeche, 2000).

The Architect designs the building and prepares specifications. The core practice of a builder is building production management and it encompasses services relating to buildability and maintainability. Quantity Surveyor prepares a bill of quantities, Engineer designs the structural, electrical and mechanical aspect of drawings and Builder supervises the construction works. During construction, the Client may opt to have the same team involved in the design and supervision stage or engage another team to supervise the work. In supervision stage, periodic inspection and meetings are held where the general progress is noted, amendments made and problems resolved. Minutes and progress report are taken then submitted to the Client for information and decision making (Mbeche, 2000). Once the project is completed the consultants are discharged and final payment made.

### **Research method**

Survey design was adopted for this research. Data was obtained with the use of well structured questionnaire from the selected professionals: Quantity Surveyors, Architects, Engineers and Builders in Ondo and Ekiti States, Nigeria. The questionnaires were administered directly by the researcher with the assistant of professional colleagues in the capital cities of these states. The study population was obtained using a list of selected professionals that registered with their professional bodies. Though the list obtained appeared to be fuzzy in terms of details and therefore random sampling of the described population was used for the study because every member stands an equal chance of being selected and it minimizes bias. However a total population of two hundred and forty five(245) was obtained from the list, out of which 150 was chosen using Yamane (1967) formula to determine the sample size. The questionnaire was drawn on a 5-points Likert scale and it was chosen for ease and uniformity of response and the questionnaire comprised only closed-ended questions. Questions were asked on the background information of the respondents, characteristics of teamwork and contributions of teamwork to the productivity of professionals. Seventy five (75) questionnaires were administered in each State,62 were returned and only fifty-one (51) were considered suitable for analysis which represented a healthy return rate of thirty-four percent (34%). This rate is considered sufficient for the research, as posited by Moses and Kalton (1999) that result of a survey could be

considered as biased and of little significance if the return rate was lower than 20-30%. The background information of respondents was analysed by means of frequency distribution and percentage. The mean score was used to rank the characteristics of teamwork and contributions of teamwork to the productivity of construction professionals.

The formula for mean score is =  $\frac{\sum (FX)}{N}$

N

Where X is the rating used per column

F is the sample size for each rating and

N is the total sample size.

Since a Likert of 5-point scale was employed for the collection of data, the formula can thus be written as

$$\text{Mean Score} = \frac{5F_5 + 4F_4 + 3F_3 + 2F_2 + F_1}{N}$$

The basis of determination of characteristics of teamwork of using mean item score was on this premise:

- 1.00 < MIS ≤ 1.99: Not Important
- 2.00 < MIS ≤ 2.99: Low Important
- 3.00 < MIS ≤ 3.99: Moderate Important
- 4.00 < MIS ≤ 4.89: High Important
- 4.90 < MIS ≤ 5.00: Extremely High Important

### Data analysis and presentation

**Table1: Summary of Background Information of Respondents**

Category	Classification	Frequency	Percent
Type of Organization	Public client	13	25.5
	Consultant	18	35.3
	Contractor	20	39.2
	<b>Total</b>	<b>51</b>	<b>100.0</b>
Profession of Respondent	Quantity surveyor	15	29.4
	Architect	10	19.6
	Builder	14	27.5
	Engineer	11	21.6
	Others specify	1	2.0
	<b>Total</b>	<b>51</b>	<b>100.0</b>
Professional Body of Affiliation	NIA	9	17.7
	NIQS	14	27.4
	NIOB	13	25.5
	NSE/COREN	10	19.6
	Others	5	9.8
	<b>Total</b>	<b>51</b>	<b>100.0</b>
Professional	Graduate/Probationer	14	27.5

Membership Type	Corporate	35	68.6
	Fellow	2	3.9
<b>Total</b>		<b>51</b>	<b>100.0</b>
		<b>Frequency</b>	<b>Percent</b>
Highest Academic Qualification of Respondent	HND	20	39.2
	B.sc/B.Tech	16	31.4
	PGD	5	9.8
	M.sc/M.Tech/M.Eng	9	17.6
	PhD	1	2.0
	<b>Total</b>	<b>51</b>	<b>100.0</b>
Nature of Projects Executed	Civil Engineering Projects	30	58.8
	Building Projects	14	27.5
	Heavy Engineering Projects	4	7.8
	Others	3	5.9
	<b>Total</b>	<b>51</b>	<b>100.0</b>
Year of working Experience	1-5 years	9	17.7
	6-10 years	18	35.3
	11-15 years	12	23.5
	16-20 years	10	19.6
	Over 20 years	2	3.9
	<b>Total</b>	<b>51</b>	<b>100.0</b>
	<b>Mean Year</b>	<b>11</b>	

Table 1 shows that 39.2% (20) of the respondents are Contractors, 35.3% (18) are Consultants, 25.5% (13) are Public Clients. From table1, it can be seen that majority of the respondents are Quantity Surveyors with 29.4%, followed by Builders with 27.5% and Engineers with 21.6%. Table1 reflects that all the respondents are affiliated to relevant professional bodies in their respective professions, out of which 68.6% of them have attained corporate membership grade while 27.5% of the respondents are graduate/probationer members of their respective professional bodies.

Analysis in Table1 reveals that about 39.2% (20), 31.4 (16) and 17.6% (9) of the respondents have HND, B.Sc/M.Tech and M.Sc/M.tech degrees respectively. About 9.8% (5) have PGD while 2.0% have PhD. This implies that the respondents are knowledgeable and suitably qualified to provide required information for the study. As for the years of working experience possessed by the respondents, it can be seen that 17.7% falls within 1-5, 58.8% of the respondents are within 6-15 years of experience, while 19.6% falls within 16-20. On the average, the respondents have 11 years of working experience and the information supplied by this category of professionals is considered adequate and can be relied upon.

**Table 2: Characteristics of Teamwork**

<b>Characteristics</b>	<b>Mean</b>	<b>Ranking</b>
Sharing commitment to work	4.49	1
Open and honest communication	4.33	2
Having shared goal	4.31	3
Sharing sense of responsibility	4.29	4
Climate of respect and trust	4.25	5
Value placed on team and self- evaluation	4.22	6
They are energetic, lively and active	4.20	7
People are confident	4.08	8
Taking pride in the team	4.08	8
Give each other feed-back	4.08	8
Inspiring vision	4.02	11
Flexibility of contribution	4.00	12
Decisions are made by consensus	3.20	13
Sense of inclusiveness and support coalition of colleagues	3.92	14
Teams must be provided clear expectations and adequate resources to accomplish its goals	3.92	14
Roles based on expertise and skill	3.88	16
Talent and experience to contribute to the success of the team's objectives	3.84	17
They are relaxed and friendly not tense and hostile	3.80	18
Appreciation of others	3.76	18
Being independent	3.71	20
Structures for interaction, conflict resolution and innovation	3.65	21
Feelings are expressed freely	3.65	21
Listen to one another and do not interrupt	3.63	23
Joint understanding of group norms, value, roles and expectation	3.59	24
Informal/formal/shared leadership	3.47	25
They are enterprising and use their initiative proactive not reactive	3.41	26
They are must receive external support and encouragement	3.22	27
People smile genuinely and naturally	3.04	28
Status less of a variable in interaction	2.96	29

Table 2 reveals that sharing commitment to work ranked as the most important characteristics of teamwork, followed by open and honest communication, having shared goal, sharing sense of responsibility while teamwork must receive external support and encouragement and status less of a variable in interaction are the least important characteristics of teamwork.

**Table 3: Contributions of Teamwork to the Productivity of Construction Professionals**

<b>Contributions</b>	<b>Mean</b>	<b>Ranking</b>
Higher level of productivity of construction professionals	4.71	1
Increased professionals motivation	4.33	2
Increased common commitment to goals	4.08	3
Increased the flexibility of construction professionals	4.04	4
Improved communication among construction professionals	4.02	5
Increased the creativity among construction professionals	3.92	6

Increased professionals satisfaction	3.90	7
Expanded job skills and knowledge of the construction professionals	3.80	8
Provides natural vehicles for professionals to share ideas and to implement improvements	3.67	9

From Table 3, all of the respondents viewed that higher levels of productivity, increased workers motivation and increased common commitment to goals are the highest contributions to the productivity of construction professionals, down the ladder are expanded job skills and knowledge of the construction professionals and provides the natural vehicles for professionals to share ideas and to implement improvements

### **Discussion of findings**

From table 2, it can be deduced that the highest number of the respondents expressed sharing commitment to work as the most important characteristics of teamwork, the percentage composition of sharing commitment to work was in conformity with the view of Albanese (1994.), that the reward of teamwork is the satisfaction of commitment to work, open and honest communication, having shared goals, being independent, sharing sense of responsibility, climate of respect and trust, value placed on team and self -evaluation, being energetic, lively and active, flexibility of contribution that is team likes to work within guidelines and principles, rather than rigid rules thus maintaining the important quality of being adaptable. This result was re-affirms the statement made by Ahadzie, Proverbs, and Olomolaiye (2000.), that achieving commitment to project goals among professionals is key to project success. In order to establish the highest contribution of teamwork to the productivity of construction professionals, Table 3 reveals that higher level of productivity, increased professionals motivation and increased commitment to goals are the highest contributions. Warren(1994.), opines that teams have the potential to create positive synergy, the team produces more and generates more creativity and energy as a group than the individual members could produce working alone thus increased level of productivity. This was corroborated by Arditi and Krishna (2000) who reported that the level of productivity often determines the profitability, performance and success of each and every organization.

### **Conclusions and recommendations**

The goal behind this research was to evaluate teamwork among construction professionals on site productivity with a view to enhancing the performance of the construction of the construction industry. It concluded that characteristics of teamwork are one of the vital tools for proper co-

existence of team members, and the use of teamwork has a great impact on the productivity of construction professionals. Trust, open and honest communication, having shared goals is also part of the characteristics of teamwork when the professionals are to achieve their aim and objectives. The study has implications for practice. Since teamwork is essential to project success, organizations should provide individuals with training in team-building and team dynamics. There is need to build and maintain effective team to maximize the specialist skills of construction professionals in meeting client needs. Conclusively, the use of teamwork should be improved more in order to increase the productivity of construction professionals and further similar studies are recommended to be conducted in other states.

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**INFORMAL EMPLOYMENT GENERATION AND POVERTY  
REDUCTION IN EDO STATE: THE ROLE OF 'OKADA' RIDING  
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## **Abstract**

*This study investigated the role of 'Okada' riding as an aspect of the informal sector in employment generation and poverty reduction in Edo State with the aim of determining the extent to which it contributes to poverty reduction and the degree of its sustainability in terms of economic and safety. Primary data was employed in the study. A survey of 600 randomly selected 'Okada' riders in three local government areas of the state was sampled. Descriptive and quantitative statistical techniques, such as frequency percentage analysis, mean response, t-test, correlation, ANOVA and regression were used in the analysis. Ordinary least square (OLS) was used to estimate the relationship among education, employment, experience, training, degree of risk associated with Okada riding and poverty reduction in Edo state. The research items were found reliable based on Cronbach Alpha value of 86.2%, justifying the empirical validity of the research model. The study revealed that the independent variables-education and employment- were statistically significant to poverty reduction. However, experience, training and degree of risk were not statistically significant. The results indicated that there was relatively high correlation among employment tendency of Okada riding, level of education of Okada riders and contribution to poverty reduction in Edo State by 82.3% and 75.8% respectively. However, Training moderately correlates with poverty reduction by 50.3% while very weak positive correlation exists between experience and degree of risk in Okada riding and poverty reduction by 34.6% and 33.2% respectively. The study concluded that 'Okada' riding is accident-prone and poses risk, but economically sustainable and reduces poverty among the operators in Edo State. Implication of the findings suggested the need for training, certification and promotion of safety of the riders so as to improve their safety.*

**Key Words: Employment generation, Poverty reduction, 'Okada' riding, Safety, Risk**

## **1. Introduction**

The Nigerian economy has been facing serious macroeconomic problems like high inflationary rate, balance of payments deficit, epileptic growth and development in the area of infrastructures that triggered the endemic unemployment and poverty that is now posing great challenges to the living standard of the citizens. Unemployment and poverty are two basic problems plaguing many developing nations of the world (ILO, 2007). High rate of unemployment especially among the youths in developing nations like Nigeria is as prevalent as the rate of underemployment which is the major factor responsible for low standard of living. Poverty is, therefore, widespread, both in cities and urban areas of Nigeria and other developing nations of the world (Amaghionyeodiwe, 2009). For instance, Nigeria was known to have been ranked as one of the middle-income oil producing countries in the late 1970s, but her ranking plummeted to that of one of the lowest-income countries in the early 1990s. Thus, in the early 2000's, Ukwu (2002.), had to describe Nigeria as one of the poorest of the poor among the nations of the world, confronted not just with pockets of poverty, disadvantaged or marginalized areas, groups and individuals but with a situation in which much of the population exists at standards of living below those required for full development and enjoyment of individuals and societal well-being.

In her effort to create jobs for the unemployed and promote economic growth, and hence reduce poverty, the Government of Nigeria has, over the years, put in place a number of economic reform programmes which seem to have very minimal impacts on employment creation, poverty reduction and growth of the national economy (Abiola and Oladeji, 1998; Akinbobola and Saibu, 2004; Amaghionyeodiwe, 2009).

Generally, the impact of unemployment and poverty is more felt at the micro level as it subjects the majority of the Nigerian households to thinking of involvement in any trade that could enable them to satisfy their basic needs of food, shelter, education and clothing. This thinking is basically necessitated by the colossal failure of the formal sector to provide employment and enabling environment that promotes employment generation and reduction of poverty and thus contribute to the growth and development of the economy. To extricate themselves from the dilemma of unemployment and poverty, majority of the people, both in urban and rural settings, who constitute both graduate, skilled, semi skilled and unskilled labour, are taking solace in the informal sector,

especially the use of commercial motorcycle, popularly known as *Okada*, *One Chance*, *Achaba* or *Going or Express* as the easiest means of employment generation so as to reduce the level of poverty in their midst.

Today, hundreds of people are riding *okada* or involved in commercial bike riding for means of survival or to sustain their livelihood. Due to severe poverty that people are struggling with and coupled with high rate of unemployment in the country, many young ones, particularly poor, illiterate, semi-literate and unemployed and retrenched workers and school drop-outs are involved in the *Okada* riding business. More so, the low business sale experienced by young individuals from their previous business activities and enterprises has made many of them to switch to *Okada* commercial transport in recent years. Moreover, the informal transport system of using motorcycle (*Okada*) stemmed from the inadequacy of the formal system of using the appropriate buses and cars that are designed for such purpose. Besides, the high rate of unemployment in most countries, especially the third world countries, had led many to device the unconventional '*Okada*' as a means of transportation to enhance their income generation to meet their basic needs.

Based on literature and empirical evidences available, not much study has been done on employment generation as well as the poverty reduction and the risk implications of *Okada* riding business as an aspect of the informal sector in Nigeria, especially in Edo State. Nevertheless, Ogunrinola, (2010) attempted to fill this gap. However, his study is limited in coverage and at the same time urban-focused. Therefore, this current study is carried out to investigate the role of *Okada* riding in employment generation, poverty reduction and the degree of risk associated with *Okada* riding across rural-urban divide in Edo State. Specifically, this study sought to examine the socio-economic characteristics of *Okada* riders, determine the degree of sustainability of *Okada* riding as a source of employment generation, determine the extent to which *Okada* riding contributes to poverty reduction and investigate the degree of risk associated with *Okada* riding in Edo State

## **2.1 Empirical Literature**

There is no gain-saying that *Okada* riding, as an aspect of the informal sector, has been severally researched on, still, the room for further study would always exist as the previous studies would have created other loopholes that demand further study.

In Nigeria, studies on motorcycle taxi dwell more on the issue of safety, permanency, decency, impact on the environment rather than that of employment generation and poverty reduction. The earlier study was by Akinlade and Brieger (2003). The study relied on the hospital records of 31 motorcycle taxis accidents, as well as a survey of 480 motorcycle taxi drivers in South Western Nigeria.

Farinmade (2012), worked on the challenges of improving informal sector activities conditions in Lagos Island, Nigeria. The survey was carried out using stratified random sampling to ensure a fair representation of the population on each selected streets. The study reveals that there is a relationship between employment in the informal sector and formal sector unemployment, illiteracy, environmental degradation and the rampant violation of planning regulations. The study further recommended the formulation of policies and programmes that will enhance the effectiveness of both the informal sector and planning administration, provision of infrastructure such as markets and designated open spaces to enhance and promote the activities of the sector. In a similar development, Al-Hasan, Momoh and Eborieme (2014), studied "Urban poverty and informal motorcycle transport services in a Nigerian intermediate settlement": a synthesis of operative motives and satisfaction using primary data. SPSS software version 17.0 was used to analyze data. The study observed that motorcycle operation negatively impacts on the environment, health, social and human capital development.

On the issue at hand, few studies have actually been done in Nigeria. For instance, Atoloye (2007.) (as cited in Ogunrinola, 2010), carried out the study titled "The informal sector and employment generation in Nigeria and documented that the sector, like hydra-headed animal, is difficult to describe, but it is indispensable all the same. Its presence is felt everywhere and, as a result, its existence defies any level of economic development, although there is evidence that it is more pervasive in developing economies because of its resilience in addressing the employment needs of the unskilled poor and mass underemployed. Similarly, Arosanyin, Olowosulu and Oyeyemi (2011.), conducted research on "Employment Generation and Earnings in the informal Transport Sector in Nigeria" using logistic models and Mincerian equation for the analysis of the study; it was documented that the informal sector is a source of employment for 21.7 % of jobless people and

72.3 percent of those who shift job. The study pointed out that employment and earnings can be improved upon in the informal sector if the government regulates its operation.

Yakubu (2012.), coming from a new angle, conducted a study on the determinants of earnings among commercial motorcycle operators in Kwara State, Nigeria. He used a modified Mincerian equation as a tool for data analysis. The study showed that the significant variables like age of *okada* riders, location and license-holding positively determined earnings while variable such as average fare charged per trip negatively determined earnings. The study further indicated that *okada* riders earn a minimum of N500.00 and a maximum N2,800per day. This finding, in terms of earnings, corroborated the finding of Arosanyin, Olowosolu and Oyeyemi (2011.) ,that 86% of the participants earn above the minimum wage level.

Nevertheless, Ogunrinola (2010.), did a study titled "Informal Self-Employment and Poverty Alleviation: Empirical Evidence from motorcycle taxi riders in Nigeria". He used two major cities in the south west of Nigeria (Lagos and Abeokuta). The study concluded that in the informal sector, *Okada* riding is a high employer of young school leavers; the study analysis showed that 86% of the participants earn above the minimum wage level. The study further confirmed that some graduates of tertiary institutions are involved in informal sector employment due to lack of desired formal sector employment. However, this study is limited in coverage as it is urban focused.

## **2.2 Theoretical framework**

The theoretical foundation for this study is the Human Capital Theory (HCT) where Becker (1962) and Mincer (1974) view education and training as the major source of human capital accumulation that, in turn, has direct and positive effect on individual's life time earnings. The human capital theory serves as the theoretical framework for analyzing incomes. Resources such as education, training and experience can increase a worker's productivity and earnings (Becker 1962; Mincer 1974). Becker (1960) further contends that physical capital and labour market experience plays the strongest role in the income generating process for self-employed. A widely used adapted model based on the HCT is that Mincerian earnings function is flexible, depending on peculiarities of the study environment. Literature on human capital development and its impact on employment and earnings of the individual within the economy is vast but the majority of these are targeted at the formal education and trainings. In the informal sector, the unemployed, especially the young school

leavers from rural or surrounding semi-urban areas, who failed to obtain the desired formal sector employment, do settle down either to pick up employment in the low-paid informal sector jobs, self-employment in odd jobs like street trading or apprenticeship with master craftsmen in the sector. Those who take to apprenticeship or other menial jobs in the informal sector are those who cannot afford to continue in the formal educational ladder and/or cannot obtain paid job in the formal sector of the economy.

Human capital is the term economists often use for education, health, and other human capacities that can raise productivity when increased. Increase in the level of education is capable of raising human capacity of income generation in the society. Human capital is described further by Mincer (1974.), to mean productive investments embodied in human persons. These include skills, abilities, ideas, resulting from expenditure on education and on-the-job training. In this connection, to operate in the informal sector, some forms of skills, abilities, ideas and training are needed in order to enhance productivity that will, in turn, guarantee employment and earnings. This is reflected in some informal sector activities like tire repair business, motor/motorcycle mechanic, and hairdressing where one needs to undergo apprenticeship training to become self-employed. However, commercial motorcycle business requires skills, ideas, and abilities to operate in order to generate employment and income.

### 3. 1 Model specification

This study adopted a model for poverty reduction based on the modification of previous model of employment generation and employment supply models of Ogunrinola, 2010.

PR= f(Employment, experience, educational qualification of the rider, the level of training of the rider in *Okada* riding and degree of risk exposure). This is mathematically expressed as:

$$PR = f(Emp, Exp, Edu, Trn, Rsk) \dots\dots\dots(1)$$

Equation (1) states the model functional form which shows that poverty reduction is a function of employment, experience, educational qualification of the *Okada* Rider, training of the rider and degree of risk associated with 'Okada' riding in the study area. The model is specified as:

$$PR = \beta_0 + \beta_1 Emp + \beta_2 Exp + \beta_3 Edu + \beta_4 Trn + \beta_5 Rsk \dots\dots\dots(2)$$

The econometric equation to be estimated is stated thus:

$$PR = \beta_0 + \beta_1 Emp + \beta_2 Exp + \beta_3 Edu + \beta_4 Trn + \beta_5 Rsk + u \dots\dots\dots(3)$$

Where:

Where  $\beta_0$  is a constant while  $\beta_1, \beta_2, \beta_3, \beta_4$  and  $\beta_5$  are parameters to be estimated to determine the influence and magnitude of change in the independents variables as it affects the dependent variable (Poverty Reduction). While,  $u$  is the error term

### 3.3 Research data and methodology

The data for this study were strictly primary. The data were generated using structured questionnaire to source for vital information on *Okada* riding business from the riders in three selected local government in Edo State. A total of six hundred (600) questionnaires were administered to the three randomly selected local government areas in Edo State. Of the six hundred administered questionnaires, a total of five hundred and sixty eight (568) questionnaires, accounting for 94.67% were retrieved of which ten (10), accounting for 1.76% were found unusable for multiple ticking and severe mutilations of answers. To be precise, five hundred and fifty eight (558) questionnaires, which accounts for 93%, were found usable and, therefore, used. The methods employed in this study were descriptive and quantitative statistical methods. The quantitative approach involved the use of econometric technique of which one sample t-test, correlation, ANOVA and regression analysis were employed for the estimation of the selected variables.

### 4. Discussion of results

Generally, the respondents (*Okada* riders) in the study area are all males. This implies that the operation of *Okada* riding business is gender biased or gender sensitive! This confirmed the finding of other works like Ogunrinola (2010.), Al-hasan, Momoh and Eborieme (2014.), etc. This is reflective in the general trend of road transport business. The age distribution showed that a vast majority of the operators, who sustain the business, exist within the cohort of 20-39 years (82.44%). This corroborates NBS CWIQ (2006.), survey which indicated that 72.7% of the country's active population is self-employed. Distribution of the respondents by level of education showed that 2.69%

of them have no formal education what-so-ever. 20.60% have primary education while 14.16% have junior secondary education. It further showed that most of the operators (32.43%) are holders of senior secondary certificates while 22.94% and 7.18% possess National Diploma/National Certificate on education and HND/B.Sc certificates respectively. The inference, here, is that the educational background of an operator would likely determine his involvement in 'Okada' riding business.

On occupational distribution of the respondents, the study revealed that 42.11% are artisans who have learnt one form of trade or the other while 20.79% are students who are probably in the business to assist themselves in school. This showed that many of the riders have acquired some technical skills prior to their engagement in the *Okada* riding business while some of them are either students of higher institutions of learning (who are engaged in *Okada* riding to perhaps raise some money for schooling) or graduates of tertiary institutions who had to get involved in *Okada* riding due to lack of desired formal sector employment. This category of riders (graduates) is considered under-employed because they are employed in low productive job and grossly underutilized labour force in the state and Nigeria in general because the job status is far below their education and training, even though *Okada* riding is seen to be risky but moderately sustainable in terms of economic derivable of the riders. This finding confirmed the submission of Olaore (2011.), that 'Okada' riding has attracted increased number of people who have been previously engaged in one or more other occupations. In the vein, Arosantin et al (2011.), submitted that 72.3% of those who switched to motorcycling were artisans, while 27.7% were either unemployed youths, retirees or retrenched. The fact showed that more artisans are switching to commercial motorcycling business which may have negative impact on socio-economic and technological development in Nigeria.

The personal attributes of the respondents indicated that 72.94% of the operators are not trained for the business while 27.06% claimed to have undergone training. However, the respondents' psychology and their side comments during the field work revealed that those who claimed to have been trained were actually economical with the truth. The truth that was deduced was that they did not actually receive any formal training. The position was affirmed by the 72.94% respondents who reported that they were not formally trained as *Okada* riders. The study also revealed that most of the operators (44.44%) are in the business to create employment for themselves as well as reduce their level of poverty while 9.14% are in the business to augment their

incomes. On experience of the operators in *Okada* riding, the study indicated that 92.47% of the respondents have experience in *Okada* riding while 7.53% reported that they do not have experience on the job.

The study also revealed that '*Okada*' riding is a source of employment for many youths across the rural-urban settlements in Edo State and this shows the importance of the informal sector transport system in the labour absorption process in the rural-urban areas of Edo State. 72.58% agreed that the business is a source of employment generation while 27.42% agreed otherwise. To further substantiate this, 68.46% reported that they feel employed as *Okada* riders. The study, therefore, confirms other studies in this respect (Debora. 2007; Khothina, 2007; Ogunrinola, 2010). However, the study showed that most of the operators (85.30%) indicated willingness to quit the business should there be job opportunities in the formal sector. This is suggestive that '*Okada*' riding provides temporary employment. This confirmed the earlier submission of Todaro (1969) that the informal sector (of which *Okada* riding is an aspect) provides temporary employment as means of survival while waiting on the queue for formal sector jobs. However, studies like Amin's (1981) and Ogunrinola's (1991.), did not support this view. Never-the-less, most of the respondents agreed that *Okada* riding is a source of employment generation and it is moderately economically sustainable, but risky business in Edo State. A vast majority of the respondents agreed that the income from the business meets their family basic needs and it is seen as a source of employment generation hence they feel employed.

Furthermore, the study revealed that 41.22% of the operators earn between N2,100 and N2,500 daily while 11.83% earn above N2,500 daily. The earnings analysis further showed that 40.86% of the respondents make a net earnings of between N12,100 and N15,000 while 11.68% earn over N15,000 weekly, and this is far above the national minimum wage. This affirms the earlier submissions of Ogunrinola (2010.) and Yakubu (2012.), that the majority of riders are earning above the minimum wage from the business, and that, probably, has made the sector to be attractive to many educated youths (even up to tertiary level) who would have ordinarily remained openly unemployed. Furthermore, the study revealed that the income from '*Okada*' riding meet the basic needs of the operators and those of their families.

Results from the empirical analyses suggest that there is high positive correlation between respondents on *Okada* riding as a source of employment generation and its contribution to poverty reduction at 82.3%. Level of education of *Okada* riders and poverty reduction is correlated at 75.8%. Moderate positive correlation exists between training and poverty reduction by 50.3%. However, the finding indicates that very weak positive correlation exists between experience and degree of risk associated with *Okada* riding and its contribution to poverty reduction by 33.2% and 34.6% respectively. In addition, there is significant correlation among the variables. Employment generation status of *Okada* rider and level of education impacted positively on poverty reduction by 62.6% and 13.0% but experience, training, and degree of risk indicated negative impact on poverty reduction. There is overall statistical significance among the independent and dependent variables at 1% and 5% respectively. The model is fitted at 72.25 and also can explain the variation in poverty reduction by 72% of the independent variables.

Finally, the a-priori expectation of the model for the study was specified as:  $\beta_1 > 0$ ,  $\beta_2 > 0$ ,  $\beta_3 > 0$ ,  $\beta_4 > 0$  and  $\beta_5 < 0$  in line with human capital theory of Becker (1962) and Mincer (1974.), who viewed education and training as the major source of human capital accumulation, which, in turn, has direct and positive effect on individuals' life time income and Anderson's experience/learning curve, which states that as an individual's experience on an activity increases, cost of production reduces and output increases. Therefore, it was expected that the independent variables in the model (employment, the level of education, experience and training of the rider), except the degree of risk associated with *Okada* riding, will have positive relationship with poverty reduction among riders in the study area. As expected, the empirical findings revealed that gainful employment and level of education of *Okada* riders impacted positively on poverty reduction but experience and training of rider did not influence or impact significantly on poverty reduction of the rider. This is attributable to the fact that the business of *Okada* riding does not require formal training and much of experience before venturing into it. Expectedly, the degree of risk associated with *Okada* riding has a negative relationship with poverty reduction.

## 5. Summary of findings, conclusion and recommendations

### Summary of findings

This study brings to light several important findings: Firstly, the study revealed that '*Okada*' riding is a source of employment and income for many youths across the rural-urban settlements in Edo State and this shows the importance of the informal sector transport system in the labour absorption process in the rural-urban areas of Edo State. To further substantiate this, 68.46% of the respondents reported that they feel employed as *Okada* riders. The study, therefore, confirms other studies in this respect (Debora. 2007; Khothina, 2007; Ogunrinola, 2010). However, the study showed that most of the operators (85.30%) indicated willingness to quit the business should there be job opportunities in the formal sector. This is suggestive that *Okada* riding provides temporary employment.

Secondly, earnings analysis revealed that 41.22% of the operators earn between N2, 100 and N2, 500 daily while 11.83% earn above N2, 500 daily. It further showed that 40.86% of the respondents make a net earnings of between N12, 100 and N15, 000 while 11.68% earn over N15, 000 weekly. This affirms the earlier submission of Ogunrinola (2010) and Yakubu (2012.), that the majority of riders are earning above the minimum wage from the business, and that, probably, has made the sector to be attractive to many educated youths (even up to tertiary level) who would have ordinarily remained openly unemployed. Furthermore, the study revealed that the income from *Okada* riding meet the basic needs of the operators and those of their families.

Finally, results from the empirical analyses suggest that there is high positive correlation between respondents on *Okada* riding as a source of employment generation and its contribution to poverty reduction at 82.3%. Level of education of *Okada* riders and poverty reduction is correlated at 75.8%. However, very weak positive correlation exists between the experience in *Okada* riding and poverty reduction by 34.6%. In addition, there is significant correlation among the variables. Employment generation status of *Okada* rider and level of education impacted positively on poverty reduction by 62.6%. However, experience, training and degree of risk associated with *Okada* riding impacted negatively on poverty reduction by 13.2%, 50.3% and 33.2% respectively. There is overall statistical significance among the independent and dependent variables at 1% and 5% respectively.

The model is fitted at 85 and also can explain the variation in poverty reduction by 72% of the independent variables.

### **Conclusion**

Results from the study revealed that the *Okada* riding business is predominantly male business and most of the operators are youths, less educated and poor. It further revealed that the operation provides employment for many youths who would have remained unemployed in Edo State. However, the employment provided by *Okada* riding seems to be temporary, as a vast majority of the respondents indicated interest to quit the business of *Okada* riding if they found job opportunities in the formal sector. This implies that they (riders) do not actively seek this informal sector job but are in the job to keep body and soul going.

Conclusively, this study submits that the parameters-level of education and employment of Okada riders- have positive relationship with poverty reduction while experience of the rider has negative and relatively poor effect on poverty reduction and the variables are jointly significant. Training and degree of risk associated with Okada riding have negative influence on poverty reduction and the variables are not significant. Furthermore, the business of *Okada* riding poses much of risks and it is associated with health and other hazards. This is capable of affecting the life expectancy of the active labour population of the state.

### **Recommendations**

The study observed that the nature of job provided by *Okada* riding has been shown to be temporary and risky, given the willingness of the respondents to quit if given job opportunities in the formal sector and the rate of accidents associated with the operation. Therefore, the operation should be recognized as to include the mode into the national transport policy. This calls for the need for effective regulation of the operation and monitoring for safety, through safety education and enlightenment campaign, and improvement in the enforcement of all safety measures by the relevant authorities. These are important to reduce the frequent and already high accident and fatality rate arising from *Okada* operation. Since majority of the respondents can speak and understand English Language (literate), the communication of safety education is expected to be relatively easy. Moreso, there is need for a more rigorous enforcement of training and licensing requirements for riders to ensure that only those that are trained, qualified and licensed are certified as commercial *Okada*

riders. Furthermore, government should formulate policies that would enable this informal operation to play complementary role within an integrated modal transport system, but with regulations to streamline its operation by the Federal Road Safety Corps (FRSC). Road design and construction should accommodate motorcycle routes to reduce traffic congestion/accident in the cities and townships in Nigeria, as the business has been seen as unavoidable.

On the part of individual 'Okada' riders, they should endeavour to drive with care so that the rate of accident associated with the business is drastically reduced. They should also try to use personal protective equipment for their safety. Majorly, they should avoid taking hard drug, smoking and answering phone calls while riding. Furthermore, they should reduce their daily expenses on undesirable consumption, this will relatively increase their net amount of money made per day.

In order to address loss of potential human capital, as observed among 'Okada' riders, government should intervene by formulating policies and enacting laws geared towards providing free-for-all, compulsory and quality education, specifically targeting the age cohort that mainly engage in the vocation. Where any of such laws does exist, it should be vigorously enforced.

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**Appendixes**  
**One Sample T-Test Analysis**

<b>Variables</b>	<b>N</b>	<b>Mean</b>	<b>Std. Deviation</b>	<b>T</b>	<b>Df</b>	<b>Sig.</b>
How old are you?	558	1.71	0.851	47.41	557	0.000
Your sex?	558	1.00	.000 <sup>a</sup>	62.67	557	0.000
What is your marital status?	558	1.80	0.68	44.28	557	0.000
If married, how many children do you have?	379	1.90	0.83	68.57	378	0.000
What is your level of education?	558	3.74	1.29	53.60	557	0.000
What is your major occupation?	558	2.98	1.31	67.01	557	0.000
What is your most important reason for going to <i>Okada</i> riding?	558	2.47	0.87	91.87	557	0.000
Were you formally trained as an <i>Okada</i> rider?	558	1.73	0.45	63.46	557	0.000
How long have you been operating <i>Okada</i> ?	558	2.93	1.09	96.19	557	0.000
Can you say that you have experience in <i>Okada</i> riding?	558	1.08	0.26	80.65	557	0.000
How many hours do you operate <i>Okada</i> in a day?	558	3.25	0.95	77.13	557	0.000
How many days do you work in a month?	513	2.72	0.80	72.92	512	0.000
Do you own a motorcycle?	558	1.18	0.38	40.89	557	0.000
If yes, how many do you have for this business?	469	1.49	0.79	32.52	468	0.000
If no, how do you get one to ride?	89	1.65	0.48	77.64	88	0.000
How much do you make per day?	558	3.46	1.05	78.37	557	0.000
After taking out the daily running cost of this <i>Okada</i> , how much, on the average, do you make daily?	558	3.41	1.03	78.52	557	0.000
What is your estimated net weekly income from <i>Okada</i> riding?	558	3.41	1.02	70.62	557	0.000
Does the income from <i>Okada</i> riding meet your family basic needs?	558	1.20	0.40	67.41	557	0.000
Do you see <i>Okada</i> riding as a source of employment generation?	558	1.27	0.45	66.81	557	0.000
Do you feel employed as an <i>Okada</i> rider?	558	1.32	0.47	76.45	557	0.000
Would you quit <i>Okada</i> riding if you have employment opportunity in the formal sector?	558	1.15	0.35	66.89	557	0.000
Do you agree that <i>Okada</i> riding is economically sustainable?	558	1.36	0.48	97.40	557	0.000
If yes, to what extent is <i>Okada</i> riding business economically sustainable?	355	2.73	0.53	123.52	354	0.000
Is the operation of <i>Okada</i> riding safe?	558	1.85	0.35	37.04	557	0.000
If yes, evaluate the degree of safety of <i>Okada</i> riding	82	2.57	0.63	78.30	81	0.000
Are you satisfied operating <i>Okada</i> as a source of employment opportunity in the informal sector?	558	1.61	0.49	67.55	557	0.000
Do you agree that <i>Okada</i> riding business contribute to poverty reduction?	558	1.405	0.49	67.41	557	0.000

\*Sig. value <0.01 and 0.05 indicates that the variable is statistically significant (difference) in response at 1% and 5% level.

**Source:** SPSS version 20.0 One Sample T-test Result Extraction

#### 4.7.2: Correlation Analysis

		Poverty reduction	Experience	Education	Employment	Training	Degree of risk
Pearson Correlation	Poverty reduction	1.000	.346	.758	.823	.503	.332
	Experience	.346	1.000	.491	.420	.174	.961
	Education	.758	.491	1.000	.761	.804	.482
	Employment	.823	.420	.761	1.000	.413	.404
	Training	.503	.174	.804	.413	1.000	.167
	Degree of risk	.332	.961	.482	.404	.167	1.000
Sig. (1-tailed)	Poverty reduction	.	.000	.000	.000	.000	.000
	Experience	.000	.	.000	.000	.000	.000
	Education	.000	.000	.	.000	.000	.000
	Employment	.000	.000	.000	.	.000	.000
	Training	.000	.000	.000	.000	.	.000
	Degree of risk	.000	.000	.000	.000	.000	.
N	Poverty reduction	558	558	558	558	558	558
	Experience	558	558	558	558	558	558
	Education	558	558	558	558	558	558
	Employment	558	558	558	558	558	558
	Training	558	558	558	558	558	558
	Degree of risk	558	558	558	558	558	558

\*Sig. value <0.01 and 0.05 indicates that the variable is statistically significant at 1% and 5% level.

Source: SPSS version 20.0 One Sample T-test Result Extraction

#### Coefficients<sup>a</sup>

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	.276	.080		3.452	.001
	Experience	-.056	.152	-.030	-.371	.711
	Education	.144	.028	.377	5.161	.000
	Employment	.612	.044	.580	14.056	.000
	Training	-.029	.055	-.026	-.531	.596
	Degree of risk	-.096	.157	-.050	-.610	.542

a. Dependent Variable: poverty reduction

#### Model Summary and Model Fit

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics		
					R Square Change	F Change	df1
1	.850 <sup>a</sup>	.722	.720	.26020	.722	286.803	5

a. Predictors: (Constant), Predictors: (Constant), Degree of risk, Training, Employment, Education, Experience in Okada riding

**ANOVA<sup>a</sup>**

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	97.092	5	19.418	286.803	.000 <sup>b</sup>
	Residual	37.374	552	.068		
	Total	134.466	557			

a. Dependent Variable: Poverty reduction

b. b. Predictors: (Constant), Degree of risk, Training, Employment, Education, Experience

**Conversational Competence of International Students in a Study-Abroad Context**

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## **Abstract**

**A relatively under-researched language-user-group is the L2 international students on a temporary stay abroad, who already possess a measure of the L2 (English) competence but are handicapped in their lingua franca context by such linguistic factors as phonological and lexical variations between their home variety and the dialect in the place of study. Foreign students in this situation suffer communication challenges which severely affect their social and academic interactions, hence the need to understand their linguistic survival strategies. This study seeks to investigate the conversational competence of international students in a study-abroad context based on a questionnaire survey of international post graduate students at Universiti Putra Malaysia (UPM), Malaysia. A three-part instrument was used to collect data from a sampled group of 70 students and was meant to elicit respondents' English language proficiency level and their experiences with using English abroad with emphasis on their conversational skill experience with co-international students. The results indicated that dialectal differences and irregular use of English account for the conversational difficulties of international students and suggest that most international students would benefit from remedial grammar classes based on the contextually relevant English variety or dominant colloquial dialect.**

**Key words: international student; L2; conversational competence; ELF; mutual Intelligibility**

## 1. Introduction

Far more work in Second Language Acquisition (SLA) research has been done in such areas as L2 learner error, L2 social identity construction and crisis, language use difficulty, etc but comparably little has been researched on the L2 speaker in transit, in temporary abode as non-native speaker (NNS) in NNS domain (e.g. an Italian interacting orally with a Russian in English in Nigeria). Such relatively under researched group are the L2 international students on a temporary stay, who already possess a measure of the L2 competence but are faced with phonological and lexical variations between their variety and the one in the place of study. From the research testimonies of Jenkins (2007), Foster & Tavakoli (2009), and Virkkula & Nikula (2010), there have been relatively fewer studies on English as a lingua franca (ELF) and they have tended to focus more on foreign language users' identity problems in situations where the target language is used as a native language, concerned primarily with migrant workers (Norton, 2000; Block, 2006) and fewer studies still on students' actual experiences in the situation of their study abroad (Jackson, 2008; Kinginger and Belz, 2005; Pellegrino, 1998; and Polanji, 1995).

The variety of English international students know and can use is most often than not different from the prevailing variety in the new place of study (especially for informal discourse) and this has serious implications for their studies, for they must necessarily interact with the locals, the school staff, and co-students in pursuit of their studies, social and personal needs ( Thornbury & Slade, 2006). As observed by Celce-Murcia & Olshtain (2000:164):

Foreign students, upon first arriving in another country, need to communicate on a survival level like the new immigrant, on the one hand, and like a university student, on the other ....While taking care of all their daily routines, foreign students have to register at the university; speak to clerks, advisors, professors, and classmates; and function efficiently in an academic environment.

They soon encounter linguistic barriers which significantly impair their efforts to access information. Their attempt at mutual intelligibility is complicated by the phonological variations, new words and phrases, different speech mannerism, and new cultural pragmatics

requiring different language knowledge and discourse processing. (Foster & Tavakoli, 2009; Flipsen, 2006). Fundamentally, to what extent is the average international student proficient in English, for he must necessarily be, if he has to read textbooks and other reference materials written in English, use the internet sources, follow lectures and tutorials, be involved in co-operative and peer learning, do presentations, attend to assigned academic writing tasks, process error feedbacks, etc as part of the study process? Therefore, we must ask the following questions because they are pertinent to the research concern of this study:

1. To what extent is the NNS international student conversant with the syntactic rules of English and his ability to apply them in both written and oral discourse?
2. Can the average NNS international student give examples of new sentence structures or lexical items peculiar to the native speaker (NS) usage as these examples? :

*"Yap!"*

*"What's up!"*

*"No, I thought it was crummy!"*

*"Wanna meet for lunch tomorrow?"*

*"I dunno what classes to take."*

Such colloquial expressions common in conversational repertoire as exemplified above often take NNS international students aback, striking them as rather inappropriate or slangy. The questions above become even more relevant in the light of such common complaints revealed in the 'Additional comment/observation portion' of the questionnaire by the subjects of study at UPM :

*"I don't understand when they (other NNS international students including the locals) speak. It's frustrating because I can't converse with them."*

*"I can't talk with them because I keep repeating myself and I don't understand a word of what they say. This embarrasses me because I know they must think I can't use English."*

Considering this background, we have to reiterate again that discourse or conversational skill is often a very strong barrier most difficult for L2 learners and speakers of any language because "the speaker must produce all of the units of that language

reasonably accurately, with sufficient amplitude and with appropriate prosodic variation”(Flipsen, 2006:303). It follows that the L2 English speakers need to learn how to bring about a conversation and how to respond to an initiating utterance; they need to understand that “utterances have both a literal and an intended or functional meaning”; they need to understand gender roles; they need to be able to tell pragmatic or intended meaning; in short, they need to be competent in discourse rules and the regular features of discourses (Holmes,1995; Tannen,1996).

Research studies in this area examine such emergent challenges as adjusting to and imbibing a new way of life, a new linguistic behaviour, and social habits often occasioning social identity crisis in the L2 learner or speaker. As Wandel (2002:73) suggests in handling L2 communication situations, we must ask if the L2 speaker possesses “communicative and pragmatic tools to ‘negotiate meaning’, to develop interactive and meta-linguistic skills, to be able to tolerate and endure ambiguity”. Souto-Manning’s (2007), socio-psychological study of immigrants in the United States focused on their strategies for resolving and tackling ‘conflicting linguistic traditions and coping with new identities’. Virkkula and Nikula (2010), investigated identity construction in contexts where English is not the mother tongue but is used as a shared language (*lingua franca*) by people from different countries focusing on “the sense that is made of learning experience”. In a related study, Spielman and Radnofsky (2001), concur with the common finding that communicative incompetence as a result of failed L2 acquisition can be frustrating and telling on an L2 learner’s self-esteem. Jiang et al.(2009), on L2 acculturation, concluded that social and affective factors are linked to language, as key variables in aiding L2 acquisition.

This study, in effect, sought to investigate the conversational competence of international students in a study-abroad context using international post graduate students at Universiti Putra Malaysia (UPM) as a case study. Therefore, the objectives of this study were to investigate :

1. the English language background of international students at UPM to ascertain their proficiency level in English;

2. the ability of international students at UPM to make meaningful conversations with the UPM staff and co-students given their suspected little knowledge of colloquial English, differences in accent, and socio-cultural pragmatics; and
3. international students' difficulty with conversations with UPM staff and co-students' impact on their learning at UPM.

The research focus of this study was the following questions :

1. What is the general English proficiency level of international PG students at UPM?
2. Are international PG students at UPM able to make meaningful conversations with UPM staff (teaching and administrative), co-students, and the locals?
3. Do the difficulties international PG students have with making conversations with UPM staff and co-students impact negatively on their learning at UPM?

## **2. Methodology**

The research design is a simple one-shot questionnaire survey employing a purposive non-probability sampling design.

### **2.1 Participants**

The target population comprised international students (estimated to be over 1,000) on post graduate programmes at UPM that had spent more than two semesters on their programme of study. From this population a sample of 70 respondents excluding native speakers of English (NS), was drawn. The sampled group could be said to be generally representative of the population of study because they shared basically the same characteristics with the generality of other international students : similar educational background (for they had all studied English as a subject and the majority's experience of using English had been mainly related to their education), and socio-academic status. In this purposive sampling of respondents, discipline of study, nationality, age, gender, or religion were not considered and all 70 participants use English as their second language.

### **2.2 Instruments of data collection**

The study data came from one source : a structured questionnaire in five parts. The instrument was developed by the researcher based on reviewed relevant literature for the

study and previous questionnaires designed for similar studies (Flipsen, 2006; Laguardia & Goldman, 2007). To ensure validity and reliability of the questionnaire instrument, the researcher piloted the instrument on eight PG students (three local and five Nigerians) outside the sampled population of the study to assess the suitability, relevance, clarity, and diction of the language of the questionnaire items.

Part One of the questionnaire was on the respondents' biodata and it consisted of six question-items which sought to investigate their language use in their home country, English language skills and grade, academic qualification, and academic programme of study at UPM. The respondents were asked either to mark [x] in the brackets provided or to give answers where there was no bracket. Part Two was on (English) language use patterns of the respondents and it consisted of eight Likert-Scale questions dealing with pronunciation, speaking, and reading problems. Part Three, also eight Likert-Scale questions, dealt with problems in social communication: their interaction (social and academic) problems as it relates to the respondents' knowledge and practice of the socio-cultural norms in the setting of study. Part Four concerned problems in English language learning and acquisition and contained eight Likert-Scale questions focusing on the respondents' linguistic preparedness for academic and social discourses. The items here sought to investigate the level of their proficiency in English, colloquial variety, and their conversational competence. Part Five was a blank section which requested respondents' additional comment or observation (if any) on the issues in the questionnaire.

The respondents answered the items in the questionnaire (except for Part One) on a 5-point-scale of agreement (Strongly Disagree – Disagree – Undecided – Agree –Strongly Agree). Apart from the information revealed in the questionnaire, the respondents were not given any other information and they understood that their participation in the study was voluntary and that their response was strictly for academic purpose. The questionnaire was administered to the respondents individually by the researcher, explaining the purpose and the need for honest response. The questionnaire aimed to elicit basically the respondents' experiences with using English abroad with emphasis on their conversational skill experience with co-international students.

### **2.3 Data analysis**

Data analysis was done at two levels : descriptive analysis and tabulation of summarized data and presentation; each concluded with a brief discussion of the significant results or observations as suggested in the analysis. Participants' answers to each question were calculated in terms of average, frequency distribution, and percentage distribution. To aid analysis of the data and interpretation of results, points 1 and 2, and points 4 and 5 of the 5-point Likert-Scale were combined during the data analysis procedure. While accepting that some valuable data in the extreme on 3-point responses might be lost considering slight shades of differences in perception, this would not significantly affect the results and basic conclusions of this study. Besides, being an exploratory study and given the small sample size (70), the results/findings cannot be precise. Analysis was divided by tabular method to facilitate the summarization and communication of the data. Simple tabulation was used to count the number of responses to a question before putting them in frequency distributions. Figures counted were converted to percentages. This was done manually.

### **3. Results**

In accordance with the order of the research questions of the study, this section presents the results of the survey. Responses to the questionnaire are reported in terms of frequencies and percentages.

#### **3.1 General English proficiency level of international students at UPM**

The first research question of the study asked about the general English proficiency level of international students : their linguistic preparedness for academic and social discourses. The data collected provided three specific items of information related to their background ability in English (including the colloquial dialects) and their conversational competence.

The responses to the questionnaire items (see Table 1) indicated that 53(75.7%) 'Agree'/ 'Strongly Agree' that they find English pronunciations difficult; 52(74.3%) said they have average English skills and know more of bookish English; 45(64.3%) 'Strongly Agree'/ 'Agree'

that they are deficient in colloquial dialects of English; and 45(64.3%) out of the 70 respondents said they started using English regularly only when they entered UPM. Though the data suggested obvious need for more English grammar lessons, yet 55(78.6%) of the respondents said they were never helped with their English, and 46(65.7%) said they would not need to learn correct grammar in an English class. These responses can only be traced to personal pride or ego in not wanting to admit their weaknesses in grammar.

**Table 1 : General English proficiency level of international students at UPM**

How do you agree with the following statements?		Strongly Disagree/Disagree		Undecided		Agree/Strongly Agree	
		Freq.	%	Freq.	%	Freq.	%
22	I am sometimes helped with my English when in class, when I go shopping, in conversations, etc.	55	78.6	1	1.4	14	20
23	I started using English regularly when I entered this university.	15	21.4	10	14.3	45	64.3
25	I find English pronunciations difficult.	5	7.1	12	17.1	53	75.7
26	I would like to learn correct grammar in an English class.	46	65.7	10	14.3	14	20
27	My level of proficiency in English is average.	10	14.3	8	11.4	52	74.3
28	I find English grammar difficult and confusing.	35	50	21	30	14	20
29	I know more of bookish or educated English than the colloquial variety.	10	14.3	8	11.4	52	74.3
30	I am not conversant with colloquial English.	5	7.1	20	28.6	45	64.3

### 3.2 Ability to make meaningful conversations in English

Research question Two sought to investigate the ability of international students to make meaningful conversations in English. Table 2 presents the frequencies and percentages related to questions regarding international students' interaction (social and academic) problems as it relates to their knowledge and practice of the socio-cultural norms in Malaysia. As inferred from the data in Table 1, responses to this portion of the questionnaire support the feeling that international students' source of communication difficulty may not only be the lack of the knowledge of the pragmatics or socio-cultural linguistic behaviour in Malaysia, but obvious poor knowledge of English grammar rules : more than half of the respondents (30/42%; and 8/11.4% 'Undecided') 'Strongly Agree/' 'Agree' with the statements that they are not conversant with some English structures and expressions;

27(38.6%) and 12(17.1%) 'Undecided', agreed that with improved English skills they could more readily develop relationship with other students; and 48(68.6%) admitted to having problem communicating with other international students.

The data clearly pointed to pronunciation and speech-speed (55/78.6%) as the biggest problems of international students and this often led to embarrassment due to failure to communicate as admitted by 51(72.9%) of the 70 respondents. Also the majority, (40/57.1%) said 'Strongly Disagree'/ 'Disagree' to the statements suggesting they are able to respond fluently in English to questions without code-switching or getting stuck; and that they conversed with UPM staff, co-students, and the locals as often as they chose.

**Table 2: Ability to make meaningful conversations in English**

How do you agree with the following statements?		Strongly Disagree /Disagree		Undecided		Agree/Strongly Agree	
		Freq.	%	Freq	%	Freq.	%
7	There are some English structures and expressions I am not conversant with.	32	45.7	8	11.4	30	42.9
8	If I improve my English skills, I can more readily develop relationship with other students.	31	44.3	12	17.1	27	38.6
10	I have no problem with communicating with international students.	48	68.6	3	4.3	19	27.1
13	My language difficulties affect my willingness to communicate.	34	48.6	15	21.4	21	30
17	I converse with UPM staff, co-students, and the locals as often as I choose.	40	57.1	17	24.3	13	18.6
19	I am often embarrassed by my lack of communication.	17	24.3	2	2.9	51	72.9
20	My main areas of difficulties in conversations with UPM students, staff, and the locals are pronunciations and speech-speed.	13	18.6	2	2.9	55	78.6
21	I am able to respond fluently in English to questions without code-switching or getting stuck.	40	57.1	6	8.6	24	34.3

### 3.3 Impact of conversational difficulties on their socio-academic interactions

Research question Three inquired about the impact on international students' learning, their conversational difficulties in English. Table 3 illustrates the frequencies and percentages of answers by the respondents to the questions regarding pronunciation, accent, speaking, and reading problems in English. It indicates that for almost all the questions, a majority of the respondents surveyed, 'Strongly Agree'/ 'Agree' that they (67/95.7%) noticed the

influence of their mother tongue in their pronunciation; that they (61/87.1%) related more with students from their country because they readily understood their English; that they (43/61.4%) did not wish to learn the local language (Bahasa Melayu) to help their social and academic interactions; that they (69/98.6%) thought UPM staff, students, and the locals on the one hand and they on the other, had problems with each other's accent; that they (37/52.9%) would rather not use English; and same number (37/52.9%) said coping with their study was a little difficult as a result of their inadequate English skills. The two statements that the majority of the respondents disagreed with were questions 12 and 14: 32(45.7%) of them did not agree that their pattern of (English) language use had positive impact on their learning and social interactions; while on their considered assessment of the locals' (excluding lecturers) English proficiency level, 43(61.4%) disagreed that it was average. However, it was observed that 41.4% and 32.9% answered 'Strongly Agree'/'Agree' respectively to the statements (12 and 14).

**Table 3: Impact of conversational difficulties on their socio-academic interactions**

How do you agree with the following statements?		Strongly Disagree/Disagree		Undecided		Agree/Strongly Agree	
		Freq.	%	Freq.	%	Freq.	%
9	I notice my mother tongue influence in my pronunciations.	-	-	3	4.3	67	95.7
11	I relate more with students from my country because I readily understand their English.	9	12.9	-	-	61	87.1
12	I think my pattern of (English) language use has positive impact on my learning and social interactions.	32	45.7	9	12.9	29	41.4
14	I assess the locals, (excluding lecturers) English proficiency level to be average.	43	61.4	4	5.7	23	32.9
15	I wish to learn Bahasa Melayu to help my social and academic interactions.	43	61.4	6	8.6	21	30
16	I think UPM staff, students, and the locals on the one hand and I on the other have problems with each other's accent.	1	1.4	-	-	69	98.6
18	I would rather not use English.	29	41.4	4	5.7	37	52.9
24	Coping with my study is a little difficult as a result of my inadequate English skills.	30	42.9	3	4.3	37	52.9

#### **4. Discussion and conclusion**

Research question One was on the general English proficiency level of international students to enable the researcher determine their ability to handle conversational discourses in English. Given that grammatical competence is a 'sine qua non' for effective performance in a language, the research question sought to investigate the extent to which international students have acquired the English language skills of reading, writing, speaking, and listening which necessarily enable and facilitate discussions in the English medium. The relevant data to this question revealed that the average international student has a relative knowledge of these skills as it pertains to the standard English variety by which they can do independent studies through reading and writing. The data equally revealed that most international students have a below-average knowledge of the various colloquial dialects of English which is usually the dominant variety employed for informal conversations. Thus it can be deduced from the data to research question one that the international student while capable of independent learning through reading of text materials and use of the electronic media (internet), is not able to derive much academic help from interactive or conversational resources.

Research question Two inquired into the international students' ability to make meaningful conversation in English. The data for this question indicated that a good number of international students admit to being inadequate in English grammar and that they would benefit from grammar classes. This indication re-echoes a similar finding in Virkkula and Nikula (2010: 263) :

Although the participants have a pragmatic view of English as a language for communication in general, their own positions tend towards that of incompetent users of English who need to learn specific items of the language.

It would appear too that international students tend to restrict their use of English to mainly formal, lingua franca, and academic contexts. This sparse and irregular use of English affects their effective command of English as this attitude violates the widely acknowledged dictum that 'we learn a language by speaking it'. In addition, the data analysis significantly pinpoints pronunciation and speech-speed as the biggest problems of international students.

Research question Two data clearly attest to the claim that dialectal differences of English, to a great extent, contribute to the conversational difficulties of international students (Fromkin & Rodman, 1974; Flipsen, 2006).

The impact of their conversational difficulties on learning interactions at UPM formed the basis for research question Three. The collated data suggested that differences in accent, grammar difficulties, and language use pattern severely restrict the conversational engagements between students from different regions, hence, the common practice of relating more with fellow country students. We can conclude, therefore, that linguistic constraints account for the far little conversational discourses with other students from different regional varieties of English.

Of equal importance, at this point, is the need to consider the extent to which the international student is willing to be acculturated, to defer to the contextually relevant dialect of English (in this case). Are they resisting or willing to accept "the socially recognizable ways of being" (Virkkula & Nikula, 2010) in the target culture? In concern for the same tendency, Swales (1990:77) made a relevant observation in his discussion of 'English in academic and research settings' about L2 speakers' discourse competence and their readiness to imbibe the L2 socio-rhetorical discourse format :

Thus, even if the students recognized that in the US they could be more to the point and more direct than in their various home academic cultures, this did not mean to say that they were either comfortable about or competent in doing things the American way.

As observed by Virkkula and Nikula (2010:255), "There are fewer studies of students' actual experiences in the context of their stay abroad". There is the need to focus more on the generally acknowledged L2 interaction deficiencies of international students (as this study also attests) to know the possibilities and constraints in L2 contexts or in lingua franca situations. The reviewed literature indicates, and this study confirms, that it requires both grammatical and communicative competence to be discourse competent, when 'discourse' is seen as "a way of representing ideas and knowledge" (Virkkula & Nikula, 2010: 253). Now, crucial issues to ponder! Since it is suspected that adult L2 acquisition of native-like accent

is near impossible (Brown, 2008:62; Neufeld, 2001), how does the international student L2 English speaker, who, though having an appreciable grammar of English, cope with a totally new English dialect (different accent, intonation, and stress patterns – a linguistic colouring from the local languages) as is the case in the study setting? What communication or discourse strategies are available to the international student and what motivational factors are there to make him identify closely with the culture and people to ease his communication difficulties (Laguardia & Goldman, 2007:112; Brown, 2008)? These questions demand much more research in ELF contexts. But obviously, time is needed for the international student to learn and adjust to the new accent, the prevailing English variety, and the socio-cultural pragmatics. Until then, he will have to bear the “feelings of anger and frustration” (Kinging & Belz, 2005), the “feelings of annoyance, and doubt about getting along” (Virkkula & Nikula, 2010:265), the social dilemma, and the silence to which he is often driven by his failure to communicate or to comprehend a piece of communication.



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**Effect of Fermentation on the Proximate Composition, Functional Property and Organoleptic Quality of Cassava flour in Bread Production**

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**Abstract**

*The use composite flour for commercial bread making purpose and consumption of composite cassava bread has not been given much attention in Nigeria. This study was carried out to explore the impact of fermentation of cassava on its functional properties and organoleptic quality of cassava bread. Cassava was fermented for 72 hrs using Saccharomyces cerevisiae to make fermented cassava flour (FCF). The unfermented cassava flour (UFCF) was made into flour after drying, the proximate composition of both flours were examined. The percentage moisture content of both flour samples did not show much difference, though was higher in UFCF (13.20) than FCF (12.00). The percentage ash content, however, was higher for UFCF (2.68), than FCF (0.68). The crude fibre UFCF (5.00) was higher than that of FCF (3.67). The percentage carbohydrate showed slight decrease in the fermented flour, 73.07 as against 74.19 in UFCF. The functional properties of the fermented and unfermented cassava compared with wheat flour (WF) showed the emulsion activity of the flours ranged from 42.98-47.57 with FCF having the highest. The loose bulk density (LBD) of the flours range from 0.34-0.48 with WF having the highest of 0.48 followed by FCF (0.34), and UFCF (0.30). The highest overall acceptability was obtained with wheat flour bread having a mean score of 8.1. Statistical analysis of the sensory evaluation however indicated there is no significant difference in the organoleptic quality of the bread made from wheat flour and composite flour of WF: FCF.*

**Keywords: Fermentation, Proximate composition, Organoleptic Quality.**

## **Introduction**

Cassava is a tropical, herbaceous, perennial plant that can grow up to 3 – 5 m in height. The leaves are deeply indented, palmate with 3 - 7 lobes that are attached to a slender stem by long petioles. The small, greenish-yellow flowers form panicles, which turn into seed capsules that explode upon ripening to distribute their load. The roots form large starchy tubers, somewhat similar to sweet potato, with a dark brown, fibrous covering and white flesh. Cassava an easily adaptable plant, growing well in humid tropical conditions, but can also withstand draughts. It does well in poor soil where little else will grow. It requires little care and protects itself against predators by means of poisonous latex, which flows particularly profusely in the leaves. It is ideally adapted to tropical growing conditions (Agunbiade and Sanni, 2001).

Cassava flour is popular in Nigeria and in most parts of West Africa. It is rich in fibre and protein. It also has vitamin B6, C, and K, magnesium, copper, niacin, which has a nice smooth texture and mild taste. Cassava flour has application as a thickener for sauces (garri, soup) and is also used in baking. Starch extracted from cassava root, tapioca, also works as a great alternative to wheat (Agunbiade and Sanni, 2001).

Wheat has been the most important staple grain for thousands of years. It is suited for bread making and other baked products, due to its high gluten content. Gluten gives wheat flour it's elasticity and strength, making it suitable for baking. However, wheat flour has negative effect for people who are sensitive to gluten. It causes the immune system to mount an attack on it. Celiac disease is the most severe form of gluten sensitivity. In this condition the body's immune system treats gluten as a foreign body attacking it but also attacking an enzyme in the cells of the digestive tract; transglutaminase. It is hence classified as an autoimmune disease. Studies have shown that the rate of celiac disease is on the increase (Kris, 2013). The objective of this study is to explore ways of enhancing the quality of cassava flour as a possible alternative.

## **Materials and method**

### **Collection of samples**

Freshly harvested cassava root tubers (*Mannihot esculenta Crantz*) used for this study were purchased from a local farmer in Egono, Etsako West Local Government Area of Edo State, Nigeria. They were identified in the Department of Agricultural Technology, Auchi Polytechnic, Auchi. The wheat flour was purchased from the local market in the same Local Government Area.

### ***Processing of Cassava Flour***

The cassava roots were washed with tap water, peeled and washed again in distilled water before grating with a motorized cassava grater. The grated cassava was packed in clean cheesecloth and pressed using a manual screw press (Eriksson, Koch, Tortoe, Akonor, and Oduro-Yeboah, 2014). The resulting mash was then shared into two equal parts, one to be processed as unfermented cassava flour (UFCF) and the other as fermented cassava flour (FCF).

### ***Unfermented Cassava Flour (UFCF)***

The pressed cassava mash was separated using a cassava grater and sundried for 48 hr. The dried cassava grits were milled into flour using a disc-attrition mill. The resulting flour was sieved using a 250 $\mu$ m sieve to obtain a uniform particle size. The cassava flour was then packed in dry clean plastic bucket with a lid (labeled UFCF), and stored (Eriksson, *et al*, 2014).

### ***Fermented Cassava Flour (FCF)***

The second part of the cassava mash was placed in a 20 L dry clean plastic bucket with lid. Boiling water was added to solubilize the starch granules (Eriksson, *et al*, 2014). It was allowed to stand until the temperature of the slurry became lukewarm. Yeast cells (*Saccharomyces cerevisiae*) were then added, 0.3 g/L of fermentation substrate. The slurry was stirred to allow proper spread of the yeast (Azoulay, Jouanneau, Bertrand, Raphael, Janssens and Lebeault, 1980). The bucket was then sealed with the lid and the set up allowed to ferment for 72 hr. The mash was then pressed with the manual screw press, and the resulting mash was separated using a cassava grater and sun dried for 48 hr. The dried cassava grits were milled into flour using a disc-attrition mill, and the emerging flour sieved and stored in a dry clean plastic bucket with lid and labeled as FCF.

### **Proximate analysis**

Moisture content was determined according to the method reported by Chow, Rumsey, and Woldroup, (1980). The sample UFCF (5g) was weighed in a crucible of known weight and placed in an oven and allowed to dry at 105°C for 3 hr. The crucible and sample were then allowed to cool in a desiccator after which they were weighed. The percentage moisture content was determined using the equation below:

$$\% \text{ moisture} = \frac{(B-A)-(C-A)}{B-A} \times 100$$

Where: A = weight of crucible, B = weight of crucible + wet sample C = weight of crucible + dry sample. The same procedure was repeated for FCF.

Ash Content was determined by the method reported by ....( ). Dry UFCF sample (3g) was weighed in a crucible of known weight and placed in a furnace and heated at 550°C for 6 hr. After which they were allowed to cool in a desiccators and weighed. Percentage ash content was calculated using the equation below:

$$\% \text{ Ash} = \frac{A-B}{C} \times 100$$

Where: A = weight of crucible with sample, B = weight of crucible with ash, C = weight of sample.

The same procedure was repeated for FCF sample.

Crude Fibre content was determined by the method reported by Chow, *et al* (1980). Defatted sample of UFCF (3g) was put in a round bottom flask. 200 ml of (1.25 % v/v) sulfuric acid (H<sub>2</sub>SO<sub>4</sub>) was added and refluxed for 30min. The entire residue was transferred to a filter paper lined in a Buchner funnel and rinsed with boiling water. The residue was then transferred into a round bottom flask using 1.25% NaOH. 200 ml of 1.25 % H<sub>2</sub>SO<sub>4</sub> was again added and the mixture was refluxed for 30 min. The residue was then transferred to a filter paper of known weight and washed with 1 % HCL, followed by a wash with boiling water, and petroleum ether. The residue was then transferred into a crucible of known weight and dried at 105°C for 3 hr, after which it was incinerated at 500°C in a furnace for 3 hr, cooled and weighed. The procedure was repeated for FCF.

Crude Nitrogen was determined by the method reported by Chow, *et al* (1980). UFCF sample (1g) was put into a kjeldahl flask. A mixture of catalyst; K<sub>2</sub>SO<sub>4</sub> and Cu<sub>2</sub>SO<sub>4</sub> (2g) was added to the samples in the flask. Conc. H<sub>2</sub>SO<sub>4</sub> (20ml ) was then added to the content of the flask and heated until the

mixture became clear. The digested sample in the flask was diluted with 50 ml distilled water and transferred to a distillation flask. 50 ml of 40% NaOH was then added with glass beads. The distillation unit was immediately connected and the mixture heated. The released ammonia (NH<sub>3</sub>) was trapped in 4 % boric acid (15 ml) and indicator in a conical flask. The solution in the conical flask (boric acid and ammonia) was titrated with standard Hydrochloric acid, to determine the amount of NH<sub>3</sub> trapped in the solution. Blank was prepared following same procedure without adding the samples.....Crude protein was calculated by multiplying with the conversion factor 5.70 for flour. The same procedure was repeated for FCF sample.

$$\% \text{ crude nitrogen} = \frac{\text{Burette reading} \times N \text{ Hcl}}{\text{weight of sample}}$$

Crude Lipid was determined (Chow, *et al* (1980)). The sample UFCF sample (5g) was put into an extraction thimble and placed in the extraction unit of a Soxhlet apparatus. Petroleum ether (300 ml) was added into a previously weighed (clean and dry) extraction flask. The extraction unit was fixed unto the flask and the flask was brought to boil, with heat adjusted to obtain 10 refluxes per hour. The procedure was carried out for 3 hr. The petroleum ether was then distilled and the flask cooled and weighed. The same procedure was repeated for FCF sample.

$$\% \text{ Crude Lipid} = \frac{B-A}{C} \times 100$$

Where: A = weight of extraction flask, B = weight of flask with fat, C = weight of sample

Available carbohydrate was calculated by difference of the addition of percentage crude protein, lipid, ash, fiber and moisture (Madubuike, Onyema, Odinma and Sokwaibe, 2014,).

### **Physiochemical properties**

**Bulk Density** was determined by the method reported by Errikson *et al* (2014). Each sample (10g) was put into a 25 ml measuring cylinder and the volume recorded as 'loose volume' (LV). The bottom of the cylinder was then tapped gently and repeatedly until a constant volume was reached, and the volume recorded as 'packed volume' (PV). The bulk density was then calculated with the expression bellow:

$$\text{Loose bulk density (LBD)} = \frac{m}{LV} \quad \text{where } m = \text{weight of sample}$$

$$\text{Packed bulk density (PBD)} = \frac{m}{PV}$$

**Water absorption capacity** was determined by standard procedures as reported by Errikson *et al* (2014). Each sample (1g) was weighed and put in a 15 ml centrifuge tube. Distilled water (9 ml) was then added and mix thoroughly for 1 min. The mixture was allowed to stand for 30 min after which the samples were centrifuged at 5,000 rpm for 30 min. The volume of the free water (supernatant) was recorded.

Volume of absorbed water = 9- volume of free water (unabsorbed water). This was expressed as volume per gram of sample and recorded as water absorption capacity.

**Emulsion activity** was determined Errikson *et al*, (2014). Each sample (0.4g) was put in a 15ml centrifuge tube. Distilled water (5 ml) was then added, and the mixture mixed vigorously in a warring blender for 5 min. Soy oil (5 ml) was then added and the mixture again mixed vigorously for 5 min. The mixture was transferred into a centrifuge tube and centrifuged at 1600rpm for 5 min. The volume of the oil which separated from the sample after centrifuge was recorded. Emulsion activity was calculated as:

$$\text{Emulsion activity (EA)} = \frac{\text{Height of oil}}{\text{Total height of mixture}} \times 100$$

### **Bread Making**

The bread was produced according to the method described by Edema, Sanni, and Sanni,. (2005). The flours obtained were blended with wheat flour at 100:0, and 70:30, levels of substitution for bread production. WF, UFMEF and FMEF at100:0 and 0:100 levels were used as control. The bread recipe consisted of 300 g of each blend, 18.6 g sugar, 5.1 g salt, 11.7 g margarine, 9.9 g yeast, 0.06 g ascorbic acid and 160 ml of warm water. More water was added to the cassava flour product to reach desired consistency. The dry ingredients were thoroughly mixed and the fat was then rubbed in. The ascorbic acid was dissolved in some of the warm water and added to the flour. The yeast was then dissolved in some of the water and added to the flour. The mixture was kneaded into smooth pliable elastic-like dough, covered and allowed to ferment (30 min). It was then knocked back and cut into size and transferred to a lightly greased pan and allowed to proof (15 min), baked at 200°C for 20 min (Amandikwa, Iwe, Uzomah, and Olawuni 2015).

### ***Sensory Evaluation of Bread***

Bread loaves were allowed to cool and cut into slices of uniform thickness and transferred onto clean plates coded with random single-digit codes. A sensory panel consisting of 10 semi-trained graduate students of Hospitality Management Department, Auchi Polytechnic, familiar with sensory attributes of local bread was employed to evaluate the products. A 9-point Hedonic scale was used to rate the breads for aroma, texture, appearance, taste, and overall acceptability. A score of 1 represented "dislike extremely" and a score of 9 represented "like extremely" (Eriksson, Koch, Tortoe, Akonor, and Oduro-Yeboah, 2014). A bread sample was evaluated at a time with water and cream crackers given to each panelist to refresh palate.

### ***Statistical analysis***

Kruskal Wallis non-parametric analysis of variance was performed to calculate mean Ranks and significant levels for aroma, texture, appearance, taste and overall acceptability. Student's 't' test was performed to compare the mean values of the proximate composition of the fermented and unfermented cassava flours. Significances were determined at  $P < 0.05$ .

### **Result**

Table 1 shows the proximate analysis composition data of the fermented and unfermented cassava flours. The percentage moisture content of both flour samples did not show much difference; but the value was higher in UFCF (13.20) than FCF (12.00). The percentage ash content was higher for UFCF (2.62), with FCF having 0.68.

Table 1: *Proximate analysis composition of the unfermented and fermented cassava flour*

Flour	Moisture(%)	Ash(%)	Protein(%)	Lipid(%)	Fibre(%)	Carbohydrate(%)
UFCF	13.20	2.62	3.79	1.20	5.00	74.19
FCF	12.00	0.68	6.98	3.60	3.67	73.07

The crude protein in FCF was higher by about 84.6% over that of UFCF. The fermentation process increased the percentage lipids in FCF by about 200%, The percentage crude fibre of UFCF (5.00)

was, however higher than that of FCF (3.67). There was a slight decrease in percentage carbohydrate in the fermented flour, (FCF) 73.07% as against 74.19% of UFCF.

Table 2 shows the functional properties of the fermented and unfermented cassava and wheat flour. The Emulsion Activity (EA) of the flours ranged from 42.98 -47.57, with UFCF having 42.98, WF, 47.06 and FMEF having the highest EA of 47.47.

Table 2: *Functional properties of the fermented and unfermented cassava flour*

Flour	EA(%)	LBD(g/cm <sup>3</sup> )	PBD(g/cm <sup>3</sup> )	WAC(/g)
UFMEF	42.98	0.30	0.41	1.00
FMEF	47.57	0.34	0.43	1.67
WF	47.06	0.48	0.66	1.52

\*EA-emulsion activity, \*LBD-loosed bulk density, \*PBD-packed bulk density, \*WAC-water absorption capacity

Loose Bulk density (LBD) of the flours ranged from 0.30-0.48 with WF having the highest (0.48), followed by FCF (0.34) and UFCF (0.30). The Packed Bulk density ranged from 0.41-0.66, with WF having the highest PBD (0.66), followed by FCF (0.43) and UFCF (0.66). The Water Absorption Capacity (WAC) of the samples ranged from 1.00 – 1.67, with FCF having the highest (1.67), followed by WF (1.52) and UFCF (1.00).

Table 3: Sensory evaluation of bread prepared using different wheat-cassava flour mix

Bread Sample	Aroma	Texture	Appearance	Taste	General Acceptability
WF	8.0	8.2	8.4	8.0	8.1
FMEF	2.3	3.1	3.0	2.1	1.8
UFMEF	3.2	3.7	3.2	2.9	2.7
WF:UFMEF	6.8	7.4	6.5	7.0	6.7
WF:FMEF	6.6	7.6	7.2	7.4	7.2

The result of the sensory evaluation of bread made from fermented, unfermented cassava flours and wheat flour are presented in table 3. Scores for aroma ranged from 2.3 - 8.0, with WF having the highest mean score of 8.0, followed by wheat-unfermented cassava flour composite bread

(WF:UFMEF) having a mean score of 6.8, WF:FMEF, 6.6, UFMEF, 3.2 and FMEF the least mean score of 2.3. Similarly, WF had the highest mean score of 8.2 for texture, followed by WF:FMEF, 7.7, WF:UFMEF, 7.4 and 3.7, 3.1 UFMEF and FMEF respectively. The mean scores for appearance: 8.4, 7.2, 6.5, 3.2, and 3.0 for WF, WF:FMEF, WF:UFMEF, UFMEF and FMEF respectively. For taste and overall acceptability, WF also had the highest mean score of 8.0 and 8.1 respectively, followed by WF:FMEF having 7.4 and 7.2, WF:UFMEF, 7.0 and 6.7, UFMEF, 2.9 and 2.7, and FMEF, 2.1 and 1.8 respectively.

## **Discussion**

Generally, the fermentation process had significant impact on protein and lipid content of cassava flour. The lipid content recorded about 200% increase, attributable to microbial growth during the fermentation process. It has been reported that organisms can produce microbial fat during fermentation (Joko and Kazuhiko, 2013). The same has been reported for the protein content, which was about 84.6% higher in FCF than UFCF due to fermentation. Microbial strains have been reported to secrete extracellular proteins into cassava starch granules during fermentation, forming single cell protein (Azoulay, Jouanneau, Bertrand, Raphael, Janssens and Lebeault 1980). Brook, Stanton and Wallbridge (1969), also reported increase in protein content through fermentation process. The decrease in carbohydrate is consistent with the fact that the carbohydrate formed a carbon source for the fermenting organisms.

The result of the functional properties of the flour also improved during fermentation. Bulk Density gives an indication of the relative volume of packaging required for the product. Generally, higher bulk density is desirable for greater ease of dispersibility and reduction of paste thickness (Udensi and Eke, 2000). The fermentation process appears to improve the BD tending it towards the character of wheat flour. Low Bulk density are good physical attributes when considering transportation and storability of the products. Water absorption capacity is attributed to growth season, age of crop, and maturity at harvest. It has also been attributed to processing period, storage time (Brook, Stanton and Wallbridge 1969). Fermentation of the cassava flour tend to have impacted tremendously on the WAC of cassava flour, tending it towards the character of wheat flour.

The results of the sensory evaluation of the bread products are similar to those obtained by Eddy, Udofia, and Eyo (2007) who reported that bread baked with 10 and 20% cassava – wheat composite flour were not significantly different in any sensory attributes. Cassava flour is essentially starch and therefore an increase in its content in composite flour assist the occurrence of retrogradation in bread upon cooling and in storage (Defloor, Leijskens, Bokanga and Delcour, 1995). The low score in the overall acceptability of FMEF (1.8) may not be unconnected to the taste which was described by the Panelist as sharp and sour. This is may be due to increase in acid content following the fermentation process. However, its acceptability improved far beyond that of UFMEF in its composite mixture with wheat flour (30%).

### **Conclusion**

This study has further added scientific proof to the fact that fermentation process has significant impact on the protein and lipid content of substrates. This has enhanced the nutrient quality of the cassava flour under study. Though the Organoleptic quality did not improve during the process of fermentation, some of the functional properties improved.

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**GLOBALIZATION AND THE LOGIC OF CAPITALISM IN DANIEL DEFOE'S "ROBISON CRUSOE"**

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**Abstract**

In the course of human existence, the actors pay attention to the safety of their comfort zones. People do not only protect their comfort zones and what they have acquired, depending not on their might alone but on others. Today, the world is no longer as large as it used to be since globalization has brought about emerging trends in the areas of communication, education, trading, etc, such that one can be educated on-line, get information faster and do transactions from the comfort of one's house. Over time, the nature of a true capitalist is that his quest for wealth is insatiable and he uses the worker to achieve his objectives and dumps him as he is due to be alienated from the benefits of his labour. This paper, therefore, explores the themes of globalization and capitalism and shows their relationship in the context of Daniel Defoe's "Robison Crusoe".

## **Introduction**

The quest for survival has been and will remain the hallmark of human existence. Human beings must eat and acquire the basic necessities of life, no matter the circumstances. The urge for satisfaction has, many times, brought about innovation in no small measure. Robinson Crusoe's innovativeness is brought to bear as a result of him being cast on an island. He rescues victims from the evil hands of savages and turns them into servants on the island. The rescue of Friday means more mouths to feed, therefore, there has to be an expansion of his cultivations and getting more games. Crusoe is usually restless when there is nothing to be done. Crauzetin (Saltoglu, 2010) aptly describes the English in these lines: "The Englishman [was] never satisfied with what he obtained; his mind [got] bored when in rest. The desire to increase always his property by continuous speculations destroy[ed] in him the love of tranquility . . ." He has no business in sharing his wealth with anyone even though he has used others to acquire them. This is a clear case of what Karl Marx describes as alienation, a situation, where the worker is completely separated from the benefits of their labour. Xury is sold without compassion, Friday is made a perpetual punitive servant who continues to serve and protect Crusoe.

## **Text Synopsis**

Robinson Crusoe, by Daniel Defoe, is a young and restless individual who defies the advice of his parents especially that of his father and goes on seafaring. He gets involved in series of violent storms yet refuses to go home to the parents as a result of shame. He ventures into sea again; he is cast on a lonely island where he lives for more than 20 years. He comes back and realizes that so much wealth has been made for him.

## **Globalization**

Even though the word globalization is a new entry in most dictionaries, its noun form globe has always been used and the adjective global indicates the whole earth. Globalization, being a noun, stands for a process of globalizing. The implication of this is that there is a process that is being carried out in order for globalization to be realized. Oyeleye (2005), opines that to globalize, therefore, implies lower costs of production, international expansion of companies and appropriate take overs – global trade, global media, global fashion, global pollution, global language, etc. The world today has become a small community or a village such that to achieve or make advances in any

human discipline, be it education, communication or marketing, one does not necessarily have to travel because of modern technologies that have really reduced the world to a small space. Larsson (2001), believes globalization "Is the process of world shrinkage, of distances getting shorter, things moving closer. It pertains to the increasing ease with which somebody on one side of the world can interact, to mutual benefit, with somebody on the other side of the world". Globalization enables the ease of doing things. This cuts across every sphere of life and human endeavours. It is no longer news that information is now at our finger tips, businesses, politics, education, technology etc. This is done across communities, cultures and disciplines. The point here is not to exhaust the concept of globalization but to examine and establish the fact that it has everything to do with the ease of doing business across the world. It does not really matter anymore whether or not an entrepreneur is around to manage their business, it will go on so long there are good people to manage such a business. An example of this is demonstrated in the text of consideration – Robinson Crusoe. Robinson Crusoe has found himself in Brazil and because the world is a global village contemplates thus:

...I resolved, if I could get license to settle there (Brazil), I would turn planter among them, resolving in the meantime to find out some way to get my money which I had left in London remitted to me. To this purpose, getting a kind of a letter of naturalization, I purchased as much land that was uncured as my money would reach, and formed a plan for plantation and settlement, and such a one as might be suitable to the stock which I proposed to myself to receive from England. (Defoe, 2011:38-39).

His desire now is to become a citizen of Brazil and become a farmer as it happens today. One can become a citizen of a place by birth, length of stay and so on. Such a person could participate in politics and any other legitimate business they so desire. Another very important tool of globalization is language acquisition. English language has been and it is still being used to globalize and tie and bind the world together. Fishman (1998) in Oyeleye (2005), describes the linguistic situation of English as "both a consequence of and a contributor to globalization". Friday is rescued crude. Crusoe teaches him English, not to Friday's benefit but his. No capitalist can be magnanimous enough to

teach others what will salvage their situation because they (capitalists) need loopholes to exploit. English language is meant to make Friday do his master's biddings with ease ...having learned him English so well that he could answer me almost any questions...(Defoe, 2011:20). Friday has successfully acquired English for easy manipulation by his master-Crusoe. As a capitalist in search of more wealth, he ventures into sea leaving behind his plantation in Brazil. Upon his return, he realizes that he has become wealthy:

...By the same fleet, my two merchant trustees shipped me 1200 chests of sugar, 800 rolls of tobacco, and the rest of the whole account in gold. I might well say now, indeed, that the latter end of job was better than the beginning. It is impossible to express here the fluttering of my very heart when I looked over these letter, and especially when I found all my wealth about me; for as the Brazil ships come all in fleets, the same ships which brought my letters brought my goods, and the effects were safe in the river before the letters came to my hand. In a word, I turned pale, and grew sick; and had not the old man run and fetched me a cordial, I believe the sudden surprise of joy had overset Nature, and I had died upon the sport. (Defoe, 2011:278).

## **Capitalism**

Capitalism can be said to be an economic system in which the means of production and business ownership are completely left in the hands of private individuals. It must be noted that these individuals determine the prices of goods and services. Scott (2006) believes that:

...Capitalism is an indirect system of governing an economy where in various economic actors are allowed to compete to serve the needs of consumers according to a set of laws and rules, and where the ensuing competition serves to induce the

mobilization of human energy and talent as well as other resources for the benefit of society as well as the economic actors themselves.

From the observation on capitalism by Scott (2006), the capitalist economy is highly competitive in that the more innovative one is, the more relevant one (and his product) will continue to be. Society is usually left at the whims of capitalists as they are to determine the prices of goods and services. We cannot separate capitalism from materialism. The basic interest of a capitalist is to make profit and to make it maximally; this could even be to the detriment of another person. Adam Smith says "Political economy is one that protects its citizens, creates conditions for well-being, including economic growth and provides public services in the context of personal liberty protections of rights, and enforcement of laws of justice". (Smith, 1976) Political economy of capitalism ensures moderation, it is not absolute, that is, the practice of capitalism has human face, since the laws can be activated to deal with a situation in which the citizen has been taken advantage of. This argument by Smith sounds ideal. It will save consumers from heartless and inhuman capitalists. (Saltoglu, 2010) believes that:

By the turn of the 17th century, the overseas discoveries together with the development of new markets, increasing consumption, banking system, and trade enabled the limited British economy to flourish beyond its national boundaries. The young Englishmen, who could not find any promising trade or job opportunities in their native land, followed the voyages of discovery of the Spanish and the Portuguese sailors. Like Crusoe, these young Englishmen were inspired by wealth gained through adventure, and they left their homes with the hopes of finding fortunes.

Robinson Crusoe's flare and desire to acquire wealth is not different from that of a typical capitalist. Sombart (1967) further states that due to the desire for having more, the new individual enjoys the bliss of "possess[ing] . . . the delight of owning much gold, no matter in what form". As observed before, the interest of the capitalist is to make profit and make it even more. Crusoe became a

capitalist before going to be stranded on an Island in which he spends over 20 years of fruitfulness in material acquisition. Necessity becomes the mother of invention for Crusoe. First he realizes that there is no one to contend with on the island but wild beasts and fowls that can be domesticated:

I found also that the island I was in was barren and, as I saw good reason to believe, uninhabited, except by wild beasts, of whom, however, I saw none, yet I saw abundance of fowls, but knew not their kinds, neither when I killed them could I tell what was fit for food, and what not; at my coming back, I shot at a great bird which I saw sitting upon a tree on the side of a great wood. I believe it was the first gun that had been fired there since the creation of the world; I had no sooner fired but from all the parts of the wood there arose an innumerable number of fowls of many sorts, making a confused creaming, and crying every one according to his usual note; but not one of them of any kind that I knew. As for the creature I killed, I took it to be a kind of a hawk, its colour and beak resembling it, but had no talons or claws more than common; its flesh was carrion and fit for nothing. (Defoe 2011:56-57).

The capitalist turns a barren land into a fruitful one. His (the capitalist) desire is always to create wealth with the available resource / resources. Crusoe comes upon an uncultivated/barren land which he turns into his empire by cultivation and taming the already existing animals. The capitalist is more superior as a result of the wealth at their disposal. Saltoglu, (2010) opines that "Having worldly riches turns into the lust for possessing even more fortune, and this insatiable psychology pushes the economy of Crusoe's time. As the capitalist individual is imbued by the capitalist urges, Crusoe's personality is split between the conservative mercantilist culture, and the entrepreneurial passions". Crusoe is not different as he is able to acquire a lot with the power of his gun. No wonder he concludes above that no gun has been fired on the island since its creation. His survival is largely owing to the power of his gun:

The first shot I made among these creature, I killed a she-goat which had a little kid by her which she gave suck to, which grieved me heartily; but when

the old one fell, the kid stood stock still by her till I came and took her up,... took the kid in my arms, and carried it over my pale, in hopes to have bred it up tame, but it would not eat, so I was forced to kill it and eat it myself... (Defoe, 2011:65).

... I made him understand that I would shoot and kill that bird; accordingly I fired and bade him look, and immediately he saw the parrot fall; he stood like one frightened again, notwithstanding all I had said to him; and I found he was the more amazed because he did not see me put anything into the gun; but thought that there must be some wonderful fund of death and destruction in that thing, able to kill man, beast, bird, or anything near or far off; and the astonishment this created in him was such as could not wear off for a long time; and I believe, if I would have let him, he would have worshipped me and my gun. As for the gun itself, he would not so much as touch it for several days after; but would speak to it, and talk to it as if it had answered him, when he was by himself; which, as I afterwards learned of him, was to desire it not to kill him. (Defoe, 2011:208).

On the island, the power of his control lies in his gun. It is with the power of the gun that he saves Friday from the savages. Incidentally, this marks the beginning of his expansion and human companionship. He has said that he has to expand because of the extra mouth he has to feed:

I began now to consider that, having two mouths to feed instead of one, I must provide more ground for my harvest and plant a larger quantity of corn than I used to do; so I marked out a larger piece of land, and began the fence in the same manner as before, in which Friday not only worked very willingly and very hard, but did it very cheerfully; and I told him what it was for, that it was for corn to make more bread, because he was now with me, and that I might have enough for him and myself too. He appeared very sensible at that part, and let me know that he thought I had much more labour upon me on his account that I had for myself; and that he would work the harder for me, if I would tell him what to do. (Defoe, 2011:209).

As a result of the safety he has given to victims of savages and shipwrecks, he becomes a lord onto them on the island which he calls his island, "This put new thoughts into my head; for I presently imagined that these might be the men belonging to the ship that was cast away in sight at my island , as I now call it..." (Defoe 2011:219). He has become the sole owner and possessor of the God-given island because he gets there before the others and the fact that he is able to rescue others and provides them with food. They all see him as God-sent in the time of their affliction. He desires his escape from the island and to do this he needs those he has rescued. Basically, the rescue of the victims is for a selfish reason. Using others to achieve what you want is a typical process that is usually adopted by the capitalist. It is also clear that Crusoe regrets not having a servant when it is very important to him. This is an indication that his servants are like tools that should be discarded when they have served their use. Saltoglu, (2010) observes that "He violates Xury's basic right by selling him, and ignores Friday's fundamental right of freedom, too. Since capitalism creates such an intruding psychology, reification forms the core of his behavior. The system itself, thus, gives way to schizophrenia in people like Crusoe". The case of Xury is important. When it is time to do away with Xury, he does it without conscience or an iota of humanity. The capitalist is about himself and nothing else. Crusoe has no regret for selling Xury. He regrets when he has a need for him:

...I could have been content to have taken this moor with me and have drowned the boy, but there was no venturing to trust him. When he was gone I turned to the boy, whom they called Xury, and I said to him, "Xury, if you will be faithful to me, I'll make you a great man; but if you will not stroke your face to be true to me," that is, swear by Mahomet and his father's beard, "I must throw you into the sea too." The boy smiled in my face, and spoke so innocently, that I could not mistrust him; and swore to be faithful to me and go all over the world with me. (Defoe, 2011:38)

This is an indication that Crusoe eliminates heartlessly whatever serves as an obstacle as he has done to the boy and decides to retain Xury so long as he will be loyal to him. Xury has confessed his loyalty to him and one should think that he will hold and protect Xury to the end. Without having recourse to Xury's pledges, he sells him to enlarge his coasts:

...he offered me also sixty pieces of eight more for my boy Xury, which I was loath to take, not that I was not willing to let the captain have him, but I was very loath to sell the poor boy's liberty who has assisted me so faithfully in procuring my own. However, when I let him know my reason, he owned it to be just and offered me this medium, that he would give the boy an obligation to set him free in ten years if he turned Christian; upon this, and Xury saying he was willing to go to him, I let the captain have him. (Defoe, 2011:37 & 38).

When Crusoe sees the need for Xury, he feels bad for selling him. The regret is no longer for the compassion he has for the boy but the need to use him to work and expand his plantation: "...However, we began to increase, and our land began to come into order; so that the third year we planted some tobacco and made each of us a large piece of ground ready for planting canes in the year to come; but we both wanted help, and now I found, more than before, I had done wrong in parting with my boy Xury". (Defoe, 2011:39). "...Now I wish for my boy Xury, and the long boat with the shoulder...." (Defoe, 2011:125). As observed before, parting with Xury is not painful to Crusoe perhaps because the boy will suffer in the hands of his new master but because he needs him to expand his empire and to assist in leaving the Island a typical life style of a capitalist. The attitude he demonstrates toward those around him is also displayed in his relationship with God. The attitude of needing people when in distress and forgetting about them when things are good. Crusoe does not have any form of spiritual connection with God. He can best be described as a fair weather believer, "This sense makes individuals feel "shamefully, guiltily, abashedly naked before [God's] all-seeing eye"(Amato, 1982). An individual who calls on God only in moments of trouble or victory / escape is not worthy of God's providence but the almighty is merciful,"...I was now landed and safe on shore, and I began to look up and thank God that my life was saved in a case wherein there was some minutes before scarce any room to hope". (Defoe, 2011:50). Crusoe begins to allow God have His way in his life before a critical situation arises not because of conviction but convenience, "...I would act then as God should direct..."(Defoe, 2011:228). When his race is faced with death, he throws away his desire to clothe himself with God:

...I was filled with horror at the very naming of the white bearded man, and, going to the tree, I saw plainly by my glass a white man who lay upon the beach of the sea, with his hands and his feet tied with flags, or things like rushes, and that he was a European and had clothes on...( Defoe, 2011:229-230)

### **Conclusion**

During the Age of Enlightenment, Britain experienced many changes from religious creed to economic system which all contributed to the formation of the capitalist system. Written in the early 18th century, Defoe's novel coincides with the socio-economic shift from mercantilist to capitalist order which is the period of instability in Britain (Saltoglu, 2010). So, one can clearly see this psychology as exhibited by the eponymous character of Daniel Defoe. Crusoe never gets satisfaction, if he does, going back to the island where he suffers hell would not have been of paramount importance to him. The novel captures so many themes but the themes of globalization and capitalism have been examined in this paper.

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**ON ACADEMIC PERFORMANCE OF STUDENTS IN HIGHER INSTITUTION OF LEARNING  
IN NIGERIA: A REVIEW OF OPINIONS**

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## **Abstract**

*The ultimate aim of academic institutions has been to train their students both in character and in learning. One main factor that has frustrated this idea, over the years, is ugly effect of peer-pressure which in most cases cause students to deviate from the right path, especially at the post-primary level of tutelage. This paper therefore, examines the influence of peer-pressure among students in our secondary schools and its effect on their academic performance. It also examines the cause and types of peer-pressure, while suggesting some recommendations that could forestall the social phenomenon. These include the deployment of trained counselors to function in our secondary and even post-secondary institutions.*

## **Introduction**

Educational activities are geared towards ensuring that students achieve mastery of educational objectives. In school, the extent to which these objectives have been achieved is influenced by many factors, of which peer pressure is one. Peers play a large role in the social and emotional development of adolescent (Allen,2005). Their influence begins at an early age and increases through the teenage years. It is natural, healthy and important for students to have and rely on friends as they grow and mature. A peer could be any one you look up to in behaviour or someone who you would think is equal to your age or ability, (Hardcastle, 2002). On the other hand, the term "pressure" implies the process that influences people to do something that they might not otherwise choose to do.

## **Conceptual clarification**

According to Hartney (2011), peer pressure refers to the influences that peers can have on each other. Peer pressure is emotional or mental forces from people belonging to the same social group (such as age, grade or status) to act or behave in a manner similar to themselves (Weinfied, 2010).

Jones (2010), defined peer pressure as the ability of people from the same social rank or age to influence another of same age bracket. Peer pressure is usually associated with teens, although its influence is not confined to teenagers alone.

Mature adults, teens, young adults and children can be seen doing things in order to be accepted by their peers. Peer pressure is commonly associated with episodes of adolescent risk taking (such as delinquency, drug abuse, sexual behaviours).This behaviour commonly occurs in the company of peers. It can also have positive effects when youth are pressured by the peer toward positive behaviour, such as volunteering for charity or excelling in academics (Kellie, 2013).

However, peers can also exert negative influence. They can encourage each other to skip classes, steal, cheat, use drugs or alcohol, or become involved in other risky behaviours. Negative peer pressure may influence in various ways like joining group who drink alcohol, smoke cigarette and Indian hemp among others. It may also lead to the decision to have a boy friend/girl friend; Peer pressure indulges youth into loitering about on the streets, watching films and attending parties during school hours, tapping as alternative to stealing which may eventually graduate into armed robbery (Arief, 2011).

Academic performance refers to how well a student is accomplishing his or her tasks and studies (Scott, 2012). Grades are certainly the most well-known indicator of academic performance. Grades are the students' "score" for their classes and overall tenure. Grades are most often a tallying or average of assignment and test scores and may often be affected by factors such as class attendance and instructor's opinion of the student, as well. Grading systems vary greatly by country and school; common scales include a percentage form 1-100, lettering systems from A-F, and grade point averages (GPA) from 0-4.0 or above.

According to Ward, Stocker and Murray-Ward (2006), academic performance refers to the outcome of education, the extent to which the student, teacher or institution has achieved their educational goals. Academic performance is the ability to study and remember facts and being able to communicate one's knowledge verbally or in written form.

According to Aremu and Soka (2003), academic achievement has been observed in school subjects especially Mathematic and English language among secondary school students. Academic performance of a child could be defined as the learning outcomes of the child. This includes the knowledge, skills and ideas, acquired and obtained through the course of study within and outside the classroom situation (Epunam 1999). It is the outcome of determination, hard work, of student in academic pursuit. Pandney (2008) defined academic achievement as the performance of the pupils in the subjects they study in the school. This determines the pupils' status in the class. This gives children an opportunity to develop their talents, improve their grades and prepare for future academic challenges.

Academic performance refers to a person's performance in a given academic area e.g. reading or language arts, mathematics, science and other areas of human learning. It relates to academic subjects a child studies in school and the skills the child is expected to master in each (Kathryn, 2010).

Academic performance refers to excellence in all academic discipline, in a class as well as extracurricular activities. It includes excellence in sporting behaviour, confidence, communication skills, and others.

Steinberger (2005), posit that academic performance encompasses students' ability and performance; it is multidimensional, intricately related to human growth and cognitive, emotional and

sociol- physical development; it reflects the whole child; it is not related to a single instance, but occurs across time and levels, through a student's life in school and into post secondary years and working life. Academic performance refers to how well a student is accomplishing his tasks and studies.

### **Types of Peer Pressure**

Marcelina Hardy (2017.), came up with these types of peer pressure which are:

1. Direct peer pressure.
2. Indirect peer pressure.

#### **Direct peer pressure**

Direct peer pressure are friends directly asking someone to do something. As one can imagine, this is a powerful form of peer pressure because it is much more difficult to resist. A teen is afraid of ridicule and losing his/her friend(s) if he/she doesn't do what is asked.

#### **Indirect Peer Pressure**

Indirect peer pressure is not as powerful but can still greatly influence the decisions a teen makes. Indirect peer pressure is what one sees and hears other teenagers doing. Since others are wearing something or doing something, he/she would want to [follow suit to fit into the group](#). No one necessarily asks someone to do anything but it is an unspoken pressure that he/she feels.

This type may seem as though it would be easier to resist but it is actually just as difficult because you may feel like it is not as "cool" if you don't do what the others are doing and it may make it more difficult to make friends.

#### **The Causes of Peer Pressure**

Even with exceptional parents and a healthy home life, students are susceptible to peer pressure. As life under parental rule begins to clash more and more, the need to develop a personal identity strengthens. As a result, students join peer groups in an attempt to grow more independent. For them, it becomes easier to relate to friends than to parents, this ability to relate and connect to one another lays the groundwork for peer pressure of all types. Therefore, the following factors are some of the causes of Peer pressure in our environment today peer-pressure-teen (2017). Popular

Television Culture, Poor Relationship Skills, Avoid Ridicule and Shame, School Environment, Poor parenting, Poor Discipline in the House, Bullying Behavior or the Need to Exert Oneself, A desire to 'fit in.'

### **Popular Television Culture**

The popular television culture is a cause of peer pressure in students, because it tells them how important it is to fit in, to behave in a certain way, and to be part of the popular trends. Students who do not follow the popular trends risk losing their membership in their peer groups.

### **Poor Relationship Skills**

Poor relationship skills mean that the students will not be able to make friends easily. Being rejected or overlooked by peer groups will invariably lead to pressure. Such a student will make desperate attempts to fit in (sometimes at great costs). Behavioral scientists argue that students who are able to make friends easily are usually the ones who have high self-esteem, an outgoing personality, and come from a healthy home environment.

### **Avoid Ridicule and Shame**

The need to avoid ridicule and shame from fellow students is so high; during this phase they are very eager to bond with others and make friends. Under such circumstances they want to avoid being ridiculed and shamed at all cost and that is why many students give in to peer-pressure. Standing up to a peer group does not just lead to being ridiculed or shamed, it often leads to isolation, something which every child fears.

### **School Environment**

The school environment either encourages or discourages peer pressure. A school with a disciplined environment, where good behavior, friendship and bonding are encouraged is highly unlikely to have peer groups which exert negative influence on students. In fact, such a positive environment will instead encourage growth of peer groups which have positive influences on other students in the school. (Peer-pressure-teen,2017,,), shown that schools in low income neighborhood usually have peer groups which encourage negative behavior from other fellow students.

### **Poor Parenting**

Poor parenting often results in students who are not confident, are bullies, do not know how to handle peer pressure, or are undisciplined. And all this means that either they will give in to peer

pressure or pressurize other to follow their ways. Parents should always ensure that they have healthy communication with their children, so they can share all their experiences with them. A self-confident child will not seek out groups with negative influence; moreover, he/she will know how to say "no" to their demands

### **Poor Discipline in the House**

Numerous studies have shown that children that live in an undisciplined or relaxed environment are more likely to experience and give in to peer pressure. Since such children do not have clear cut boundaries to adhere to, they will give in to their peer's demands without any hesitation. If a child comes from a home where there are clear set of rules and he/she is absolutely clear about what the parents expect out of him/her you, it is highly unlikely that he/she will do something that is not expected to do.

### **Bullying Behavior or the Need to Exert Oneself**

Bullying behavior is the third most common cause of peer pressure, because bullies like to have things done their ways. Bully behavior is often seen in parties in which teens are bullied into drinking. Many children start drinking because they want to please the leader of the group (most peer groups have a leader). Those who reject the leader or do not follow his/her ways are usually thrown out of the group or not accepted by the group. The mere thought of humiliation that one might face upon being rejected by a peer group pressurizes many children to give in to peer's demands.

### **A desire to fit**

Every student wants to belong to a group and this causes immense pressure for them to conform to the group's ideologies or ways of doing things. For instance students enter high school, it is noticed that they started dressing a particular way, talking in a certain way, or behaving in a certain way. They did this because they want to be accepted by their peers. The fact is that there is nothing wrong in wanting to fit in- it is natural and everyone feels that way. All that is needed to do is to make sure that one does not join a wrong group

Other causes of peer pressure are: Not Knowing How to Deal with Peer Pressure, Low Self Esteem or Confidence, to avoid rejection and gain social acceptance, Hormonal inconsistencies, Personal/social confusion and/or anxiety, a lack of structure at home.

## **Influence of peer pressure On academic performance of students**

Sociologically, peer group is the aggregation of youths of approximately the same age level and status. Bernard (2008), describes a peer group as member of individuals bound together by purpose or abilities. Beckman (1996), views that members of a group perceive themselves to be alike in significant ways. Blake and Davids (1997.), support the view that a peer group come into being because its members have common goals, interests and motivations. Wattenberg (1998) also is of the view that peer group is a potent force which wields great influence, especially in the school setting. Dubey (1997), is also in the view that peer group has come to be recognized as an association of those within the same age group and the concept can apply to both adult and young alike.

In socialization and education, peer group refers to a group of boys and girls or both belonging to the same age group. It has been found that in most cases, group comprises people of the same sex and age group. That is, girls are likely related to girls and vice-versa. Cases like this tend to have a competitive outlook to life and learning. This is because some of these boys can read for hours and is inclined to study; the girls also would want to meet up with them and as such, we find in some classes girls are in the lead. It has also been found that some pupils find it easier to relate more with people who are older than they and this has more natural outlook to life. In such cases, such pupils have knowledge of things in all spheres of life and could easily discuss issues outside the school curriculum. (Brent, 2006).

The peer group of a student determines the academic ability of that student either negatively or positively. A dull student may become study inclined when he finds himself in a group that encourages effective learning.

However, peers can also have a negative influence on their academics. They can encourage each other to: Skip classes, Join internet crime, Dress indecently, join secret cult, Steal and cheat, Abuse drugs and alcohol, Become involve in Smoking cigarette and Indian hemp, Take decision to have a boy friend/girl friend, Indulge youth into loitering about in the streets, Watch films and attend parties during school hours, Tap as alternative to stealing which may eventually graduate into armed robbery

Poor performance of students in higher institution of learning in Nigeria can be attributed to the above mentioned factors. (Arief, 2011).

Bankole and Ogunsaki (2015), investigated the influence of peer group on the academic performance of secondary school students in Ekiti State. The result suggest that peers relationship socialization, *location, motivation and drug use* have a great influence in determining academic performance of students.

Miranda, Margaretha , Van, Tom, Snijders, Creemers and Kuyper (2006), examined The impact of peer relations on academic progress in junior high. The results indicated that students who were accepted by their peers had lower probabilities to retain a grade or to move downward in the track system.

Research has established a significant link between peers and their academic performance. Students who are poorly accepted by their classmates tend to have lower grades( [Wentzel, 2003](#)) ([Zettergren, 2003](#)), lower scores on achievement tests ([Buhs, Ladd, & Herald, 2006](#)), lower graduation rates ([Risi, Gerhardstein, & Kistner, 2003](#)) and a higher risk of dropping out ([Hymel, Comfort, Schonert-Reichl, & McDougall, 1996](#)). Having friends at school appears to support involvement and engagement in school-related activities.

( [Vandell & Hembree, 1994](#))( [Wentzel & Caldwell,1997](#)) and school performance ([Diehl et al., 1998](#); [Ladd et al., 1997](#)). Although these links have been found from childhood through college, it has been suggested relatedness to peers is particularly important and hence potentially problematic during early adolescence ([Goodenow, 1993](#)).

### **How to handle Peer Pressure**

Managing peer pressure is usually not that difficult if you are only surrounded by people whose values, preferences, and behaviors are similar to yours. However, in a school environment, it's very likely that students meet people with a wide variety of attitudes and behaviors. At times, it may feel easy to know where they stand and act accordingly, but at other times, they might feel confused, pressured, or tempted to act against their own judgment. The truth is that fewer students drink or use drugs than people assume. It is similar with sex and "hooking up"—most students have a skewed

idea of what others are doing. Knowing the facts that it can help them to resist pressures based on the idea that "everyone is doing it" and that you must party to fit in.

When faced with overt or indirect pressure to do something you are not sure about, try using the following strategies:

- Give yourself permission to avoid people or situations that don't feel right and leave a situation that becomes uncomfortable. Work on setting boundaries. It is OK for you to do what is best for you.
- Check in with yourself. Ask, "How am I feeling about this?" "Does this seem right to me?" "What are the pros and cons of making this decision?"
- Recognize unhealthy dynamics: It's not OK for others to pressure, force, or trick you into doing things you don't want. Spend time with people who respect your decisions and won't put unfair pressure on you to conform.
- Remember that you can't (and don't have to) please everyone or be liked by everyone. This can be hard to accept, but it helps to try.
- When people or situations that make you feel pressured are not avoidable, try the "delay tactic": Give yourself time to think about your decision instead of giving an immediate answer: "Let me think about that," "Can I get back to you?" or "Check back with me in an hour."
- When you can't avoid or delay a pressure-filled situation, practice saying "No thanks" or just "No!" It is OK to use an excuse if the truth is too challenging
- Take a friend who supports you along if you are going to be in a pressure-filled situation and let them know what your intentions are
- Stand up for others when you see them being pressured. "
- Ask for advice or support from a parent or other trusted family member, a clergy person, a mentor, or a counselor if you need it.

### **Conclusion**

Learning does not occur in isolation but through interaction with certain factors one of which is the peer group. It can therefore be said that the peer group, which a child interact with will definitely affect learning. On the other hand, peer group ensures positives or negative learning of a

student. The extent to which peer group determines the academic ability of students is high. Peers play a large role in the social and emotional development of students. Educational activities are geared towards ensuring that students achieve mastery of educational objectives. In school, the extent to which these objectives have been achieved is determined by the level of peer pressure, as students' success is reflected in their academic performance.

### **Recommendations to the Study**

Based on the finding of this study, the following recommendations are made:

1. Trained counselors should be posted to all the higher institutions of learning in Nigeria so as to help counsel students with negative influences.
2. Parents should have effective supervision and should not allow other environmental factors to distract their children. There is a need for school managements to have greater supervision and regulations on students' activities to enhance effectiveness of their time

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**LEVERAGING ON INDIGENOUS TECHNOLOGY TO PROMOTE ENTREPRENEURIAL SKILLS  
IN NIGERIA**

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## **Abstract**

*Modern nations have recorded a lot of technological and scientific breakthroughs that have promoted the possession of modern skills by their nationals. These achievements have been attained through the innovation and modernization of indigenous technologies and deliberate promotion of entrepreneurial skills. This study therefore focused on how indigenous technologies could be harnessed to promote entrepreneurial skills and development in Nigeria. Globalisation has made it imperative for nations to focus on their competitive advantages rather than their comparative advantages to excel in the global market place. And this can better be facilitated through the encouragement and growth of indigenous technologies based skills using modern technologies through entrepreneurship development. There is currently ongoing efforts to marry indigenous technologies with entrepreneurship in the country by the various entrepreneurship development centers of the various higher institutions of learning in the country. On a similar note, the National Office for Technology Acquisition and Promotion has been involved in indigenous technology development initiatives to promote entrepreneurship in Nigeria through a number of efforts which include: the promotion of research and development of indigenous related technologies, linkage of industry with such innovations from R & D, encouragement of the youths to be involved with technological innovation and skill acquisition and popularisation of Nigeria related technologies abroad, among others. These efforts have become imperatives as the possession of modern skills by the nationals of any country has become a major determinant of its role in globalization, its citizens' welfare level, SMEs growth and the level of development of the country.*

**Keywords:-** Indigenous Technology, Entrepreneurial Skills, National Development.

## **1. Introduction**

Understanding indigenous technology begins with the word indigenous. Indigenous is a term used to describe a people who are the original inhabitants of a particular geographical area or people originating or developing naturally in a particular area or region (Kim & Berry, 1993). Therefore, the technologies employed by the native inhabitants of a region or country, which constitute important part of its cultural heritage are referred to as indigenous technologies. Indigenous people are the custodians of indigenous technology.

The use of indigenous technology to transform some key sectors for wealth creation while developing competent, resourceful and skillful manpower through entrepreneurship cannot be overemphasized. And, one of the major challenges bedeviling Nigeria and other third worlds today is inefficient use of human resources due to low human capacity building. According to Adefemi, Ilesanmi, Charles and Samuel (2015), the existence of African indigenous technologies provide an opportunity to close this identified development gap. To therefore checkmate the problem of low skill acquisition among Nigerians and Africans, indigenous technology should be leverage on to encourage entrepreneurship skills and training among the people. Marrying indigenous technology with entrepreneurship if properly exploited would enhance skill acquisition and maximize value addition in critical sectors, thereby inhibiting challenges relating to policy making, sustainable development and method of development while considering the potentials, limits and needs of the people (Adewole, Olaopa&Siyانبola 2012).According to Esenjor (1992) real development involves the capacity and creative capacity of a people to transform effectively natural resource of the environment into goods and services through the imaginative and practical application of their creative talents and productive labour force.

This paper therefore is in line with the fact that entrepreneurship and technological development are the bedrock of the nation's development. This can better be achieved through the development of technical competencies and entrepreneurial skills among the youths with the application of indigenous technologies abound in the country.

## **2. The Concept Of Technology And Indigenous Technology**

Different meanings at different times have been ascribed to the world technology right from when the word was first, coined by the Greeks in 1615. Technology was said to have played significant roles in the industrial revolution and renaissance in Europe from the 10<sup>th</sup> to the 18<sup>th</sup> century (Bijker, Huges and Pinch, 1987). They argued that it is pointless wasting valuable time trying to reach a consensus definition as the term does not carry a single meaning. However, Foucault (1988) sees technology in four perspectives. These four types of technologies are technology of production, technology of sign systems, technology of power and technology of the self. According to him, the technology of production allows us to produce, transform or manipulate things; technology of sign systems allows us to use symbols, signs or meaning while technology of power determines

individuals behavior. Meanwhile, the technology of the self is an approach to study the ethics of the individuals.

However, the technology of production which is the focus of this paper is referred to as a collection of techniques skills, methods and processes used in the production of goods and services or in the accomplishment of objectives such as scientific investigation (Manabete and Bobboi, 2014).

At the beginning of the 20th century, the public meaning of technology was associated with achievement, progress and purpose (Adams, 1991). The International Technology Education Association (2002), defined technology as the way people modify the natural world to suit their own purposes. It made reference to the diverse collection of processes and knowledge that people use to extend human abilities to satisfy human needs and wants. From the renaissance period into the present era, technology has been seen as a body of knowledge about the useful arts and its contemporary understanding associated with modernity. Menabete and Bobboi (2014), further emphasized on technology as the application of knowledge towards the design and fabrication of devices, tools and appliances to better the condition of living of a people. It refers to art of using knowledge appropriately to create something that alters the condition of living of man. It involves the application of knowledge, skills and resources to meet people's needs and wants. Technology can therefore be accepted as the tool that keeps the socio-economic life of a people going.

Indigenous technology on the other hand is synonymous with indigenous knowledge and technology itself. Indigenous technology is part and parcel of technology being it foreign or local as some foreign technologies are indigenous to their country or state of origin. Indigenous technology is peculiar to a particular people according to Essien (2011). It emanates from the knowledge of the people and concerns the essential things embodied in the knowledge system of the people. Adewale et al (2012) identified the following as the characteristics of indigenous technology.

1. It is centred on local or indigenous peoples and their beliefs and practices.
2. It is generally bound by geography and most often, does not transcend the locality it originates from.
3. The form of acquiring indigenous technology is normally through oral tradition from generation to generation.
4. It is not dated in the sense that the knowledge or practices do not necessarily have to be primordial.
5. It emerges from the implicit order to reflect the art of skillful living.
6. It attracts the learning spirit; it provides a learning ecology that supports the revitalization and transformation of awareness and knowledge.
7. Through meaningful interactions, indigenous technology seeks to engage and evoke significant knowledge and experiences reflective of the indigenous world.
8. Indigenous technology has the obligation to come into existence to be used and to transform within an ethical space that is responsible to life in all its forms.

9. The ability or capacity to make something does not constitute a valid reason for its existence i.e it is coherent with the rural order.

### 3. The Concept Of Entrepreneurship

The concept of innovation and newness as integral parts of revolutionizing the pattern of production form the basis of entrepreneurship. Ely and Hess (1937) opined that entrepreneurship begins with the desire to fill a gap by meeting the demand for a need, exploitation of an invention, unknown technological breakthrough, opening a new source of supply or a new outlet for product by re-organizing a new industry.

The concept of change also connects creativity and innovation which form and constitute some of the basic qualities of entrepreneurship. Therefore the decision to leave a present career and lifestyle for another takes great deal of energy (Urieto, 2011). The perception that starting a new business is desirable, results from an individual who successfully creates a new business. Similarly the encouragement to form a business is also got from teachers who can significantly influence their individual students to choose not only business careers, but also entrepreneurship as one possible career path.

The failure of firms to produce improved economic results normally lead to the reappraisal of corporate strategies by such firms. The new corporate leadership normally sees the new administration as an opportunity to develop a more unfettered management style whereby they would be able to manage the business by implementing entrepreneurial principles at the very core of internal corporate activities.

Meredith et al (1982), identified the following characteristics and traits of entrepreneurship.

S/N	CHARACTERISTICS	TRAITS
1.	Self Confidence	Confidence, Independence, individuality, Optimism
2.	Task Result oriented	Need for achievement, profit oriented, persistency, perseverance, Hard work, determination, energy, initiative
3.	Risk Taker	Risk-taking ability, likes challenges
4.	Leadership	Leadership behavior, gets along with others, responds to suggestion and criticism
5.	Originality	Innovative creative, flexibility
6.	Future oriented	Foresight perceptive

**Source:** Meredith et al (1982) *The practice of Entrepreneurship*

### 4. Indigenous Technology And Entrepreneurship Development In Nigeria.

Indigenous technologies abound in Nigeria include, pot making, aluminum casting, bronze casting, leather tanning, blacksmithing, goldsmithing, animal husbandry, farming, trade medicine practices, fabrication of local tools and equipment, among others. Leveraging in these technologies to promote entrepreneurship in Nigeria would also enhance their modernization. Folan (1988), is of the view that every culture has her own technology for

achieving desired goals. However, knowledge of other existing technologies and the desire for improvement for global acceptance and competitiveness often lead to better choices and therefore better results. Over the years, Nigeria has impacted local skills and made giant strides in the design, fabrication, refining and development of indigenous technologies according to Siyanbola et al (2012). Equipment like cassava harvester, cassava planter, cassava peeler, maize Sheller and among others have been fabricated using indigenous techniques with the active collaboration of the Entrepreneurship Development Centre (EDC). In view of the above, the entrepreneurship development centres of the various higher institutions of learning should leverage on the opportunity provided by Tetfund to promote Research and Development (R & D) focusing on available indigenous technologies and possible ways of modernizing them. Such technologies should not just be taught on theoretical basis but should also be accompanied by practical training. This would ensure that skills are not only equitably transferred, but also ensured that they are improved on. This would go a long way to encourage indigenous entrepreneurship to fast track economic growth and development of the nation (Adefenye, 2011).

#### **Some practical steps taken so far**

The National Office for Technology Acquisition and Promotion (NOTAP) has been involved in indigenous technology development initiatives to promote entrepreneurship in Nigeria. NOTAP has made concerted efforts in the following ways to promote indigenous technology and entrepreneurship in the country.

1. The promotion of the development of locally motivated technologies through the linkage of industry with National innovation system (NIS) in the areas of scientific Research and Development (R & D) and the promotion of international property rights and commercialization of R & D results.
2. The introduction of the Technology Storyboard Initiative (STI) aimed at sensitizing primary and secondary schools pupils on STI through a step-by-step pictorial representation of the production process of a given product from the raw material stage to the final product.
3. In collaboration with the federal and state government owned agencies, NOTAP has institutionalized the intellectual property capacity building programme in secondary schools aimed at developing the innovative skills and intellectual capacity of the youths.
4. Plans are already on the way to establish the largest science and technology park in Africa in Abuja to be known as Africa's Premier Innovation Corridor (APIC). It is expected that APIC when established will among others provide a synergy between young entrepreneurs and other relevant science and technology stake holders including indigenous technology as well as promote the use of R & D for the economic development of Nigeria (NOTAP, 2011).

One of the ways through which indigenous technology can be leveraged to enhance entrepreneurship in Nigeria is the standardization and codification of IT along with the exploration of

transfer of modern technology with a view to marrying such with the local indigenous technology (Vandeleur, 2010). This is in view of the fact that Nigeria and Africa indeed as a whole need to compete favourably with countries from across the globe. The collaboration of indigenous technology and modern technology to promote entrepreneurship in Nigeria will not only enhance skill acquisition in all the sectors of the economy but would as well facilitate the development of the Nigerian economy. According to Manabete&Bobboi (2014), areas to be covered include medical practices, collaborative R & D efforts, fabrication of tools and equipment, agricultural practices, scientific research efforts, among others to promote and further impact skills in the people.

#### **5. New Frontiers And Opportunities For SMES And Entrepreneurship**

There are reasonable arguments in favour of a position to upgrade and advance for new frontiers for indigenous technologies. For instance, the world footwear and leather products sector can easily be fed from our own indigenous technology and thereby presents further opportunities entrepreneurship and SMEs growth in the country. Although many developing countries, Nigeria inclusive, possess strong potentials with respect to raw materials and skills, they have mainly remained suppliers of raw and semi-finished products. This has been attributed to a limited number of African companies and local industries having developed the capacity to produce finished products. This implies that if efforts are geared at solving this problem, Nigeria will expand its scope of entrepreneurship and skill promotion courtesy of exportation of leather and other 1-Tech products. It was suggested that efforts towards achieving this feat will provide partly a solution to the call for the diversification of Nigeria's non-oil sector and consequently increase the country's revenue generating capacity there by reducing unemployment (Siyanbola et al, 2012). In order to fully realized the above, Siyanbola et al (2012), concluded the followings:

- 1) The role of government as the provider of the initial impetus in the deployment of 1K and I-Techs for national innovativeness and development cannot be substituted. It is important to note that government has to demonstrate sufficient commitment and will power for any meaningful achievement to occur by putting in place adequate mechanism in the form of policy and conducive environment to drive the development of these 1T and 1-Techs. In India, for instance, government created strong institutions to harness the power of 1T and 1-Techs while opening up new frontiers for their application.
- 2) I-Tech IT practitioners should be opened to knowledge, particularly as is available in knowledge centres. As was demonstrated in China, achieving a convergence between state-of-the-art in modern scientific and technology & knowledge and the traditional knowledge and practices will go a long way in enhancing the impact of 1T and I-Techs.
- 3) The role of institutions is critical. Strong research, development and brokerage institutions are required to move the 1K and I-Tech sector forward on the learning curve, assist in the codification of knowledge and facilitate product development and standardization. For instance, the role played by the National Innovation Foundation in India is of note in this regard. This is

basically because they support grassroots innovation and move them to the next level by scouting and documentation of the IKs and innovations.

Technology business incubators (TRIs) are important especially for business development. Research had shown that Technology Incubation works in achieving the goals of technology commercialization by facilitating the growth of technology-based entrepreneurial firms and SMEs thereby facilitating the creation of skilled labour force that can provide potential clients with employees who have the critical skills to fill the newly created technology-oriented jobs.

## **6. Conclusion**

The world has turned a global village through globalization. The ability of nations to compete in the global world today depends not on their comparative advantages but rather on their competitive advantages. One of the ways through nations can compete in today's global world is the efficient exploitation of the marriage between indigenous technologies abound in them and entrepreneurship on one hand, and modern technologies on the other hand, to promote SMEs and national development. This marriage could better be facilitated through deliberate effort to modernize IT through massive investment in R & D and the importation of modern technology for a wholistic collaboration and skills building and transfer in Nigeria.

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**A SEARCH FOR NATIONAL IDENTITY: THE NATIONAL LANGUAGE QUESTION**

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## **Abstract**

*The debate on the search for a national identity through a constructed national language has continued to generate interest and controversy among Nigerians. As a multilingual society, there are millions of people in Nigeria who speak different languages as their mother tongues. Due to this problem of different linguistic and cultural background, it has been a difficult task when it comes to choosing a national language among these multifarious indigenous languages. This work takes a cursory look at the issues of dominance and the problems and prospects of choosing a national language among the indigenous languages in Nigeria and why English language may continue to remain our official language.*

**Keywords:** Language, English language, national language, indigenous language and mother tongue.

## **Introduction**

Language, an organized system of sounds and symbols used for communication by people of a particular community, has remained an indispensable means in our daily interaction. It is a means through which human beings express their thoughts, emotions and feelings. Language is so vital to any society that, its importance cannot be neglected or underestimated. As an indispensable phenomenon, language plays an exaltive role in the life of man. Due to its uniqueness, attention has repeatedly been drawn to it over the years, and as a result, many scholars have come up with some appreciable definitions of the subject.

The Oxford Advanced Learners Dictionary defines language as "the system of communication in speech and writing that is used by people of a particular country". The Longman's Dictionary of Contemporary English sees language as "a system of communication".

The Oxford Advanced Learners Dictionary defines languages as "the system of communication in speech and writing that is used by people of a particular country". Chalker and Weiner (1998) write that language is "the method of human communication consisting of words either spoken or written". Soanes and Steven (2006), see language as "the method of human communication either spoken or written, consisting of the use of words in a structured and conventional way or any method of expression or communication".

Several complex thoughts or ideas can be expressed indefinitely through language to react appropriately in an indefinite range of new situations. This assumption focuses attention on the communicative functions of language. These words or ideas can be organized systematically in an indefinite pattern to produce meaningful sentences.

The major ingredient of language is human vocal sound system. These words can only become meaningful when they are related to a particular speech community. Since these words have meanings attached to them, language is therefore, viewed as consisting of form and meaning. Also, these words can be arranged to collocate along with the existing convention to form meaningful utterances. This means that words are not put together randomly but they are combined in a way to be meaningful, both to the speaker or writer and the hearer or reader.

Language is systematic, a thing shared by members of a speech community. It is obvious then that before a speaker can claim membership of a community, such a person must demonstrate a knowledge of the custom and language of that society. As a social being, man needs language to enable him relate effectively with his fellow beings.

## **The National Language Question**

The need for a national language has continued to generate interest unabated among Nigerians for quite some considerable number of years now. Again and again, there is no denying the obvious fact that the issue of choosing a common medium of expression in the midst of over 400 languages as noted by Ayo Bamgbose, is a very serious or difficult task.

Those who advocate for a national language in a multilingual society such as ours are of the belief that choosing a national language in the midst of the various ethnic groups in Nigeria will

bridge the linguistic barriers among the various states. Even as laudable as this suggestion is, we cannot pretend to over-look some of the major problems that would be created. Also, while some people are of the opinion that Nigeria should be satisfied with the choice of English language which has been introduced by the colonial administrators, others are of the view that the choice of indigenous language(s) would not only foster unity and oneness among the various ethnic groups but will usher in cooperation, mutual understanding and new developments and as such, it should be embraced by all.

Having seen some views or opinions of some advocates for an indigenous language in Nigeria, it becomes imperative to consider at this moment what a national language is all about. National language, which is the thrust of this discourse, can be seen as the language which the government has authorized as the language of a number of ethnic groups in a given political area. A national language may also represent the national identity of a country or be referred to as a first or second language which has become the standard language or lingua franca in a country through historical development or government proclamation. Upholding this view, Akindele and Adegbite (1999) are of the opinion that:

*A national language is the language which has the authority of the government conferred on it as the language of a number of ethnic groups in a given geo-socio-political area. Such a language must as a matter of necessity cut across the entire strata of the society in its use and application.*

The need for a national language in Nigeria has long been a topical issue. The idea to choose a national language was borne due to the diverse nature of Nigerian languages. Moreover, the need to upgrade and develop our indigenous languages and give them national recognition has been the brain behind the pursuit of a language choice in the country and subsequently, the basic reason for a national language question.

In choosing a national language, a number of thought provoking questions may arise in a bid to consider what should be regarded as a national language in Nigeria. Such parameters and probable questions that have been asked for assessing and establishing a national language are:

- What is the status of the language in education?
- Can the language be used in international and sub-regional contexts?
- Does the language reflect cultural, national and social identities?
- Does it possess standard literature?
- Does the language employ standard orthography?
- Does the language involve linguistic research?
- Is the language used by the mass media?
- What is the status of the language in parliament and political campaigns?
- Is it the language of commerce and business interaction, science and technology?
- What is the role of the language in religious activities?

- Is it the language used in official discussions?
- Is the language a medium of social and inter ethnic communication?
- Is it the language that is used to conduct legislative, executive and judicial functions at the three tiers of local, state and federal levels?

Without mincing words, we can conjecture from the above that there are series of questions that need to be answered in choosing a national language. Besides, we seem to be in a dilemma when it comes to choosing a national language because our government has failed in their attempt to come up with an explicit national language policy even when some people have openly canvassed for this in parliament. Many people are also of the opinion that on achieving independence, we should also have been independent even in our language. This has been the basis for the justification of a national language.

Advocacy for the use of indigenous languages as national language has triggered unabated debate because some people share the belief that it will help to preserve our culture and foster national integration. This, again is the opinion of Akindele and Adegbite as they assert that: A national language is deliberately chosen as a symbol of oneness and unity and of achievement of independence, in an erst-while colonial situation and of the state of nationhood.

There is no gain-saying that an indigenous language would have been ideal but it may also create political problems. Besides, it may not be an easy task to lay down the criteria for selecting any indigenous language as a national language because the choice of a major or minor language in Nigeria would further create inter or intra ethnic conflict. However, Bamgbose (1971), identifies two approaches in resolving this conflict, that is, the unilingual and multilingual approaches. The language under the unilingual approach includes: Pidgin English, a combination of three major languages such as "Wazobia" and "Guosa". The multilingual approach suggests the three major languages, that is, Hausa, Igbo and Yoruba as national language while English remains the official language.

Akindele and Adegbite (1999), are of the opinion that if the unilingual approach is to be considered in Nigeria, the Pidgin English cannot be accepted because it is a reduced language and a language of no one. They went further to explain that Pidgin English serves as lingua franca among the semi-literate in the southern part of Nigeria.

Among the major problems that have collectively marred the realization of the national language objective is the choice of one language at the expense of another. This, of course, will generate conflict and tension because no tribe would want its language neglected. Hence, the choice of an indigenous language among the multifarious languages in Nigeria may not create unity or national integration as has earlier been proposed by some people, but rather, it would lead to more problems because the ethnic group whose language has been chosen will be at advantage over others.

More confusion may also arise if we are to speak in favour of those who advocated for a combination of the three major languages – "Wazobia" and "Guosa" Instead of ensuring peace and unity, the tribes involved may be fighting for supremacy and dominance. For instance, the Hausa man

may raise an objection why "Wa", a Yoruba word should come before "Zo" while an Igbo man may also frown at the idea that "Zo" an Hausa word, should come before the "Bia".

Nevertheless, Akindele and Adebite opine that "an amalgam of the major indigenous languages would have a major inadequacy". They posit that such a language lacks the property of creativity and generativity which natural language has. Even now, with the nature of things, where some ethnic tribes feel cheated and marginalized in Nigeria, threats of secession are being murmured on a high magnitude. If adequate precaution is not taken, such threats may developed into real crisis when one language is chosen for a national language at the expense of others.

Akindele and Adebite (1990), concur with this, when they say that: It is argued that because English is neutral to the various ethnic groups in Nigeria, the choice of the language will avert any tension which the choice of an indigenous language might create. This is why the choice of English as a national language has been preferred above any of our indigenous languages. Besides, it is axiomatic without doubt, that many lexical items in English have no equivalence in almost all the indigenous languages in Nigeria. An example worthy of note is that it may appear impossible to find an equivalent for English words like psychology, physiognomy, picaresque, etc in our local dialect. It will also be difficult to transform and translate terms in the sciences. Ogu (1992), in A Historical Survey of English and the Nigerian Situation, buttressed this when he writes that:

*A lot of Nigerian scholars have questioned the view of mother tongue education advocates by pointing out the difficulties it would constitute to transform and translate terms in science subjects like Physics, Chemistry, Biology and Geology to name a few into the mother tongue.*

In view of the above, it is also glaring that some words in our local languages have no English equivalent and most of them are not word-tight. For instance, it appears impossible to have a single word replacement for all the English words in our local languages. Moreover, added to the problem of creativity is the fact that some of our local words may be compounded to get their English equivalent. What may be expressed in a single word in English may become a phrase or clause in some of our local languages. For instance, a word like 'drum' in Etsako may read, "Igo domu" while 'ship' in the same language means "oko eda".

The situation may remain the same even if we are to welcome the idea relating to the amalgamation of the three major languages to create "Wazobia" which means 'come' in the new proposed language. The fusion of the lexical items in the three major languages to create words in the new language may take longer time to develop and also to learn.

Consequently, having seen some of the problems we may likely be confronted with as a result of the choice of an indigenous language as a national language, we are now opportuned to propose that English language be allowed to continue to function not only as our national language, but also as our official language. This essay, will not be complete if we fail to discuss some of the benefits of English in Nigeria. It is very clear that English Language has acquired an enviable status in

Nigeria since it was introduced by the missionaries. Commenting on its importance, Akindele and Adebite explained that:

*Apart from being a medium of social and inter ethnic communication, English is a national language and it is used to conduct legislative, executive and judicial function at the three tiers of local, state and federal government levels.*

English language is said to be without any rival, considering its unique status, functions and roles in the course of nation building and development. Besides, it is the language of national stability. English language has been able to bring together people from different multilingual groups. The political tension created with the choice of one out of the numerous languages in Nigeria has been put to rest with the retention of English language. The fear of dominance and suspicion which the choice of one language over others would have caused is doused.

English language is seen as the language of national and international communication. The language has also facilitated the mutual intelligibility existing among the various ethnic groups in Nigeria. It is the medium through which the individual and the whole nation can develop and participate meaningfully in global or international affairs.

English also plays a vital role in educational process by helping to facilitate academic knowledge. It is the medium of instruction in schools and for the acquisition of technological skills. English language is the bedrock of national and intellectual development.

It is the language of commerce, trade and industry in Nigeria. This is why the nation and her citizens can effectively carry out trading activities with the outside world. Apart from this, it is the language of the mass media which is predominantly used to advertise our goods and services either through the radio, television or newspapers.

English language is the language of Nigerian law courts and diplomacy. The Nigerian constitution is written in English. Without this, the adjudication of justice would have been impossible as English is virtually used in almost all our law courts, both at local and national levels.

## **Conclusion**

We have seen that despite every attempt to stop the dominance of English language in Nigeria, the language has continued to retain its official status, mainly because of the linguistic diversity in Nigeria. Besides, it is seen not only as a tool for national unity but the language of social function at family, community, state, national and international levels. Moreover, because English language is now globalized due to its political, economic, social and scientific development, it will be a difficult task in an attempt to replace the language now and even in the near future with an indigenous language.

From our discussion above, we can submit that the dream of an indigenous language as a national language in Nigeria will remain a mirage because of the multi-faceted nature of the issue at hand. The realization of this dream may also appear to be an exercise in futility as a result of the patronage and prominence that has been given to English language. Besides, no indigenous language has been found to stand out as a possible replacement due to lack of materials and teaching aids.

Again and again, the perturbing question is, how can an Igbo man or any other tribe abandon his language and begin to learn the language of another or a combination of other languages outside his mother tongue? Conclusively, we can posit that choosing the language of a particular ethnic group as a national language and leaving the other, no doubt will raise some dust.

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**REVENUE GENERATION AND PERFORMANCE IN LOCAL GOVERNMENT COUNCIL AREAS IN  
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**Abstract**

*Local governments in Nigeria are faced with many difficulties in generating adequate finance to perform their constitutional responsibilities; such problems are a cog in the wheel to the smooth running of local government administration. The objective of the study is to examine revenue generation and performance in local government council areas in Nigeria. Local governments should strive towards improving internally generated revenue and instill transparency and accountability in their management structure. It was recommended that there should be adequate supply of social and economic services. Efforts of local governments should not only be directed towards revenue yielding activities alone, but also to the provision of social services like good roads, basic health facilities, environmental sanitation, town halls, street light, water supply etc.*

**Key words:** Local Government, Revenue Allocation, Revenue Base; Financial Management.

## **Introduction**

Local governments in Nigeria are potentially very important for social and economic roles that the constitution bestows on them as they generate revenue and encourage civil involvement, as well as creating a visible link between taxes and service delivery. According to Uhunmwangho & Epelle (2008), every local jurisdiction has its unique economic, social and physical characteristics and its historical tradition which are better understood by its people. Thus, the Local Government Areas are created to provide the services which the Federal and State Governments cannot easily undertake due to their remoteness from the local communities. Fosu (2012), outlines the importance of local revenue to Local Governments as follows: Financing administration costs; Financing maintenance costs and thus promoting ownership of projects; Permitting collection of localized and low yielding revenues; Guarantying sustainability of service delivery and autonomy of local governments; Regulating businesses and providing important infrastructure and services such as markets and public conveniences at a charge; Reducing pressure on central governments and reliance on donors.

Revenue generation is an important issue for Local Government Councils. It is through this activity that the Councils source the finance for funding their operations, thus to a large extent, determining the quantity and quality of services provided to the generality of people within their domain. These reasons, coupled with the fact that Local Governments are engines of growth and development, make imperative the need for Local Governments to map out strategies for improved revenue generation, emphasising especially the internal sources which are more flexible, and could be in the total control of the Local Governments.

Local governments in Nigeria are faced with many difficulties in sourcing adequate revenue; such problems are in the cog wheel to the smooth running of the local government system. With the local government reform of 1976, local governments in Nigeria became recognized as the third tier of government, vested with the statutory powers to discharge the duties and responsibilities of government. To achieve this, no doubt, efficient and effective revenue generation and management becomes germane. The revenue issues, particularly the problem of generation, are well documented.

This paper focuses on revenue generation and performance in local government council areas in Nigeria. It discusses the concept of local government, revenue generation, role of local governments, local government revenue generation, sources of local government revenue in Nigeria, problems of revenue generation in local government administration in Nigeria, conclusion and recommendations.

## **Concept of Local government**

The concept of local government, as observed by Dumadu (2008), involves a philosophical commitment to democratic participation in the governing process at the grassroots level. This implies legal and administrative decentralization of authority, power and personnel by a higher level of government to a community with a will of its own, performing specific functions as within the wider national framework. Lawal (2000), also defined local government as that tier of government closest to the people, which is vested with certain powers to exercise control over the affairs of the people in its domain.

The idea of local government is intuitively self-evident and simple. Hence, most writers on local government pay little attention to the issue of its definition. This, however, does not guarantee mutual agreement on a definition of this concept. The absence of mutually agreed definition may not be explained as arising from the vagueness of the idea conveyed by the concept but more significantly because of the series of postulations regarding the reason for the existence and objectives of local government (Akhaine, 2009).

Alluding to the concept of Local Government, therefore, Tonwe (2007), states that with the amount and variety of work to be done country-wide by government, it is impossible for a single authority to undertake directly their performance and the government too does not have the requisite knowledge of all the diverse problems which are local in nature. Therefore, one of the recurrent problems of the tiers of government in Nigeria is the ever-dwindling revenue generation, discernible from budget deficits and paucity of funds for robust economic growth and development.

**Revenue:** Since it is one of the main objectives of this paper to establish a nexus between local government revenue and its level of performance, it is, therefore, incumbent upon us to take the pain in going through the conceptual explorations of Revenue and Performance. Since local government falls within the confines of the public sector, it will be more rewarding at the level of this study to also limit ourselves to what revenue means within the public sector domain. Revenue could be defined as the funds generated by the government to finance its activities. In other words, revenue is the total fund generated by government (Federal, state, local government) to meet their expenditure for a fiscal year. This refers also to the grand total of income received from the source of which expenses are incurred. Revenue could be internal or external revenue (Adejoh & Sule, 2013).

Aborisade (1988), describes revenue as the total income generated from federal, state and local governments. He states further that what makes local government a constitutional matter is the revenue sharing perspectives. Hepworth (1976), describes revenue as an income or funds raised to meet the expenditure. He states further that revenue is a raising resource needed to provide government services. He also states that there are two aspects of finance – Income and Expenditure. In other words, finance encompasses both the sources of fund and its utilization. Specifically, Fayemi (1991), defines revenue as all tools of income to government such as taxes, rates, fees, fines, duties, penalties, rents, dues, proceeds and other receipt of government to which the legislature has the power of appropriation. He further classifies government revenue into two kinds – recurrent revenue and capital revenue.

In Nigeria, it has been largely established that local government depends very heavily on external source of funding especially from the federation account. This must have informed submission by Mbanefo and Bello-Imam (2010), that if the instability in federal government revenue as a result of the changing fortunes of oil price in the international market is not to be allowed to introduce greater instability in the budgetary process of the local governments, then, there is an urgent need for the local governments to explore and exploit their own independent revenue sources.

**Performance:** The term performance has really suffered from the problem of acceptability of suitable criteria for measurement because it is a non observable construct which can be quantified if the nature of performance being measured is clearly defined. Nevertheless, its meaning tends to depend on individual scholar or author's perception of performance. In theory and also in practice, it is almost impossible for us to measure performance, without recourse to efficiency and effectiveness (Mikhelovba, 2011). These two concepts are germane in understanding or measuring performance of any organization or individual. According to Balogun (1972), efficiency can be categorized into three typologies, these are: technical, economic and operational efficiency. However, his position on performance appears to be capitalistic as it attempts to measure performance per input-output ratio.

It is worthy of note to state that local government in a socialist-oriented state and even to a large extent, in a mixed economy state like Nigeria, may be performing without necessarily making profit margin, since the goals of such states, in most cases, are to provide welfare services for their citizens. In such states, effectiveness rather than efficiency comes into play. In most developing worlds, local government can only be assumed to be performing if and only if projects and services delivered meet the local demands of its citizens (Salahu, 2012). In essence, performance at the local government level could be measured in terms of specific developmental projects such as kilometers of rural roads constructed or rehabilitated, number of boreholes and deep well sunk. It could also be expressed in terms of improved quality of life the citizenry enjoy as epitomized in the primary health-care programmes provided, procurement and distribution of fertilizers to farmers at subsidized rate; effective management of primary education as well as quality of public enlightenment programmes provided and enjoyed by the citizens.

### **Revenue Generation**

The term revenue generation in Nigeria local governments is basically derived from tax and non-tax sources. Agya, Ibrahim and Emmanuel (2015), Abubakar (1999), state that revenue is a general term for all monetary receipts accruing from both tax and non-tax sources, as well as fees; grants and contributions constitute the live wire of the local government. Olaoye (2008), views tax as a system of imposing compulsory levy on all income, goods, services and properties of individuals, partnership, trustees, executors and companies by the government.

Tax itself is an amount of money that you must pay to the government according to your income, property, goods; this is what is used to pay for public services and perform other social responsibilities (Olatunji, Olaleye & Adesina, 2001). While non-tax is the revenue accruing to the government other than tax and which is supported by law of the Federation. The history of man has shown that man has to pay tax in one form or the other, that is, either in cash or in kind, initially to his chieftain and later to a form of organized government (Ojo, 2003). Based on the above clarification, no system or rule can be effective, whether foreign or native unless it enjoys some measures of financial independence.

## **Role of Local Governments**

Local governments in Nigeria have enormous responsibilities to perform. These include the mobilization of local resources, promoting social and economic improvement and development as well as national integration. In addition, they are expected to carry out regional policies with respect to agriculture and selected industries, thereby helping to ameliorate unemployment (Obinna, 1988). Ojo (2009), add that local governments at work also revolve round revenue generation, budgeting, development planning, provision of services and community mobilization.

- Collection of rates, radio and television licenses;
- Establishment and maintenance of cemeteries;
- Licensing of bicycles, trucks (other than mechanically propelled trucks), canoes, wheel barrows and carts;
- Construction and maintenance of roads, streets, street lights, drains and other public highways;
- Naming of roads and streets and numbering of houses;
- Provision and maintenance of public conveniences, sewages and refuse disposal;
- Registration of all births, deaths and marriages;
- The provision and maintenance of primary, adult and vocational education;
- The provision and maintenance of health services amongst others;
- Formulation of economic planning and development schemes for the local government area;
- Establishment, maintenance and regulation of slaughter houses, slaughter slabs, markets, motor parks and public conveniences;
- Assessment of privately owned houses or tenements for the purpose of levying such rates as may be prescribes by the Houses of Assembly of a state;
- Control and regulation of:
  - outdoor advertising and hoarding;
  - movement and keeping of pets of all descriptions;
  - shops and kiosks;
  - cooked food sold to the public;
  - laundries;
  - licensing, regulation and control of the sale of liquor;
  - participation in:
  - provision and maintenance of health services;

## **Local Government Revenue Generation**

Tax is a compulsory levy imposed by government on individuals and companies for the various legitimate functions of the state (Olaoye, 2008). Revenue generation in Nigeria local governments is principally derived from tax. Meanwhile Tax is a necessary ingredient for civilization.

Local governments in Nigeria have developed over a number of years. Historically, the development of direct taxation in local government in Nigeria can be traced to the period before the British pre-colonial period. Under this period, community taxes were levied on communities (Rabiu, 2004); recently, the revenue that accrues to local government is derived from two broad sources, viz: external sources and internal sources. There is no gain saying that internally generated revenue has a lot of benefits people enjoy at the local government level.

- Provision of clean water for the people in the local government area
- Construction of good roads for easy movement of transportation
- Provision of a well-equipped health centre in the community to reduce the death rate of the people
- Provision of free education in the community to reduce the level of illiteracy in the society.
- Stability of electricity in the community

### **Sources of Local Government Revenue in Nigeria**

Ola and Tonwe (2005), had noted that the dearth of finance had always been one of the major handicaps that hinder local governments in the performance of their functions in the country. Interestingly, though the 1976 Local Government reform does not only streamline Local Government functions but also clearly state the functions and provisions for ensuring adequate human and financial resources. The revenue that accrues to Local Governments in Nigeria, according to Olaoye (2009), is derived from two broad sources, namely:

a) External sources and

b) Internal sources

**External Sources:** The external sources of Local Government revenue/finance include:

- a. Statutory allocation from federation account in accordance with section 162(3) of the 1999 constitution of the Federal Republic of Nigeria.
- b. Statutory allocation from State Government to the local governments in its area of jurisdiction.
- c. Federal grants –in –aid.
- d. State grants-in –aid
- e. Borrowing from State Government and financial institutions.
- f. Local government share of value added tax (VAT).

**Internal Sources:** Internal sources of government revenue of Local Government includes the following:

- a) Local rates and commission paid to Local Government for assisting in the collection of some taxes or dues on behalf of the state government.
- b) Market rates and levies excluding any market where state finance is involved.
- c) Bicycle, truck, canoe, wheel-barrow and cart fees, other than mechanically propelled truck.
- d) Permits and fines charged by customary courts;

- e) Local Government business investment
- f) Tenement rates, fees from schools established by the local government.
- g) Shops and kiosk rates.
- h) On and off liquor license fees.
- i) Slaughter slab fees.
- j) Marriage, birth and death registration fees and street in the state capital.
- k) Naming of street registration fee, excluding any street in the state.
- l) Right of occupancy fees on lands in the rural areas, excluding those collected by the federal and state governments. Excluding the state capital.
- m) Cattle tax payable by cattle farmer only.
- n) Merriment and road closure levy.
- o) Religion places establishment permit fee.
- p) Signboard and advertisement permit fees.
- q) Vehicle radio license fees (to be imposed by the local government).
- r) Radio and television license fees (other than radio and television transmitter)
- s) Wrong packing charges.
- t) Public convenience sewage and refuse disposal fees.
- u) Customary burial permit fees.
- v) Fees collected from amusement centre established and operated by the local authorities and that of tourist centre and tourist attraction.
- w) Rents, fees on private institutions
- x) Motor Park levies.
- y) Domestic and license fees, etc. (Aibieyi 2011).

### **Problems of Revenue Generation in Local Government Administration in Nigeria**

Many of the problems facing the generation of revenue in the local governments are those that can be corrected to improve their collection. According to Herbert, a dependable tax base for the local authorities is essential. Shortage of trained valuation staff will make taxes on real property difficult to assess for some time to come. The system of graduated tax has been in unjustifiable dispute in recent years. Olaoye (2008) also suggested the possibility of a Native Authorities' Loan Authority (NALA) as an agency to provide capital loans for the local government. However, some of the strategies for improvements are:

**Good infrastructure:** A location with good road net work will provide easy access to the coming and going out of the local government's cars and people. If they get to the local government and see good roads, pipe-borne water, hospitals, schools etc. they may decide to stay (Aderinto, 2005). This will increase the number of people and business that will be paying tax and this will definitely increase the revenue generation because more people will be paying tax. If the government can

provide good infrastructure for the local government, there will be more business and people will see reasons to pay tax.

**Staff motivation:** According to Henry Fayol, there are fourteen principles of management, of which motivation is among the list. Henry Fayol, however, defined motivation as a driving force which stimulates a worker in action. Workers should be encouraged so that they can put in their maximum services and when this is done, there may be increased or solid improvements in revenue collection. Training of workers for knowledge enhancement should be one of such motivational factors (Adebisi, 2005).

**Establishment of projects:** The local government should embark on the establishment of some mini-sized industries, which will provide employment opportunities to the people. There should also be development and improvement in agricultural ventures like crop farming etc. Participation in agriculture will encourage the inhabitants of this local government area to improve their standard of living.

**Revenue management:** There is a general trend of mismanagement and embezzlement in most governmental establishments. The revenue collected is mismanaged by the officials thereby not making the revenue to have any effect on the general populace of the local government. This can be reduced by the centralization of the collection department and rotation of jobs and assignments. If a worker is occupying a particular position for a long time, he tends to master all the ways by which he can de-fraud the department.

**Loyalty of tax payers:** If people can change their attitude of tax evasion, more revenue will be generated. The number of people that pay up their dues (tax) as at when due is very small compared to the number of people that are supposed to pay. If the orientation can change, it will go a long way in increasing the amount of revenue that will be generated in the local government.

## **Conclusion**

It has become obvious that corruption is the major issue in the developmental study of the local government councils in Nigeria. It is therefore believed that local governments could do better in internally generated revenue if council officials honestly and aggressively do their job. But more often, these officials are involved in corrupt practices by short-changing the council either by printing their own personal receipt booklets or misappropriating council funds. The fact that such culprits are not decisively dealt with accordance with extant rules and regulations has encouraged others to toe the same line of corruption, resulting in the ever dwindling internal revenue profile of the council.

Local governments should strive towards improving internally generated revenue and instill transparency and accountability in their management structure. This can be effectively carried out through community participation in their various activities. The need to carry people along in the execution of projects will encourage administrative openness and accountability. Local governments which constitute the areas mostly endowed with natural resources should be allowed to woo foreign investors for the much desired development at the local level. Local government is the most popular in the three-tier structure in the Federal Republic of Nigeria. Any restructuring of this tier of

government must, as a necessity, be done in response to the wishes the generality of the people. The present condemnation of proliferation of local government is highly untenable. Indeed, every autonomous community in Nigeria should constitute a level of governance. This, this researcher believes, will facilitate rapid development of Nigeria and bring about dividends of democracy nearer to the people.

### **Recommendations**

The following recommendations were made in the study:

1. Local government should embark on the establishment of some mini-sized industries that will provide employment opportunities to the people.
2. There should be adequate supply of social and economic services. Efforts of local governments should not only be directed towards revenue yielding activities alone, but also to the provision of social services like good roads, basic health facilities, environmental sanitation, town halls, street light, water supply, etc.
3. There should be incentives to revenue collectors as motivation which will discourage diversion of internally generated revenue. Workers should be encouraged so that they can put in their maximum services.
4. There is an urgent need to revisit the crucial issue of political arrangement that legally imposes serious restrictions on local government revenue mobilization capacity through state control over local government budget.

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**THE IMPACT OF LANGUAGE LABORATORY AND ICT ON THE EFFECTIVE TEACHING AND  
LEARNING OF ENGLISH LANGUAGE**

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## **Abstract**

English Language is not our mother tongue. It is a borrowed language; which accounts for different pronunciations we often hear. This is as a result of interference of different mother tongues with the English most people speak. There is a growing verbal incompetence noticeable, and very glaring among our students, teachers, and among other educated people in the society. So, this study focuses on the impact of the language laboratory and ICT for effective teaching and learning of the English language, since English language has remained a very important tool for socialization and bureaucratic activities in Nigeria. The evolution from language laboratory to ICT in language learning was equally highlighted. Among the major findings of the work is that language laboratory and ICT improve productivity and better performance in communication. At the end recommendations were made to the effect that language laboratories and ICT devices should be made available in all schools to facilitate language learning.

## **Introduction**

Language, according to Carroll (1980), is an acquired learned arbitrary system of vocal/written symbols, through which human beings interact in terms of their cultural experience. In the same direction, language, according to Webster's Encyclopedic Unabridged Dictionary of the English Language, is the body of words and system of use common to a people who are of the same community or nation, the same geographical area or the same cultural tradition.

Language is human speech, either spoken or written. Wherever there is human society, there is language most forms of human activity depend on the co-operation of two or more persons. A common language enables human beings to work together in an infinite variety of ways.

English is one of the major languages out of about 6000 estimated languages spoken in the world. About two hundred or more years ago, English language was simply the language of less than sixteen million people. However, today, English is used by more than four hundred million people and second only to Chinese as regards the number of people using a particular language. English is one of the most influential, significant and growing languages spoken across the universe.

One – sixth of the earth's land surface uses English either as native language or official language (Lingua franca). Of the entire world languages, English is the most widely studied especially in areas where it is not native. We cannot dispute the fact that today, English is used in several countries in the American continent, including the United States of America and Canada, New Zealand, Republic of South Africa, Australia Republic and by most countries in the West African region. English was actually the language of colonization in these countries.

In other countries including Japan and China, English is usually taught as the chief foreign language. Equally, about half of the world's scientific and technical journals as well as newspapers, are printed in English. The spread of English is further enhanced through the establishment of British council and United States Information Service by the British and US governments respectively, with centres and libraries in various countries, including Nigeria. All these factors have, therefore, made it easy for anyone who understands and speaks English, and moves around major cities in the world to communicate effectively with other people.

The English language has remained a very important tool for socialization and bureaucratic activities in Nigeria, since the days of colonization. It was natural that emphasis was laid on spoken English only and either on written English or both of them. However, with the emergence of a new class of people, with time, the civil servants, and their new roles in the colonial administration, the teaching and learning of the language took another form. Today, English is the language for the international community. According to Ezugu (1998), the English language is the most widely spoken language in the world. It is used either as a primary or secondary language in many countries. It is the language of education, administration, law, world trade, international diplomacy as well as a means of enhancing their culture. It is, therefore, worthwhile acquiring mastery of this very important language, for whoever does not, has deprived himself of access to the world's brightest ideas and modern technologies

In Nigeria, English remains the language of pedagogy. Students can hardly make commendable progress in their studies without adequate mastery of English through which most of the courses, in primary, secondary and tertiary institutions are examined. This calls for a system that would be both rudimentary and functional in its approach. This is important, for, according to Umaru (2005), as a student learns a new language, very often he does not know how to express what he wants to say in writing. Since the student uses a foreign language as a medium of communication, he has to start from the scratch to learn the rudiment of the Language. It is natural then that this is the function where the various problems arising from the teaching and learning of the language meet the need to do so properly.

Writing on language teaching, Oluikpe (2005), stated that the basic criteria for assessing students' proficiency in writing and speaking are generally controlled by the basic grammatical categories such as punctuation, tense, number, gender etc. Language teaching in Nigeria has brought out several deficiencies. The major reason for these deficiencies is our English teachers who are not well-trained. Even if they are somewhat trained, their training is not rooted into the work. A situation where a teacher of the language has no mastery of its grammatical categories as we see today does not mean well for the education system.

Also, writing on these problems facing language teaching, Regner et al (2001), posited that many good teachers are adaptive rather than rigid in their approach to teaching children and only

loosely base their instruction on a given method. Language is the official medium of communication of humans; it is one of the things that differentiate man from animals. Signs and symbols have no international understanding and they can be difficult to understand. Picture, painting and sculptures cannot be read by all. This makes language superior to all of them because it is easily understood and generally used.

According to Ozohili (2007), language literally means the "tongue"- a human organ used in speaking. Traditionally, language is defined as a system of arbitrary vocal symbols by which thoughts are communicated from one being to another. Human beings have the ability to learn and to understand and think about things. They have the capacity to gain and use knowledge. They can as well explore situations, collect information, plan and execute plans. Man's high intelligence has also enabled him to evolve a level of linguistic communication by which life can be regulated

Theodore (2001), stated that language learning requires time, patience and practice. It cannot be done solely in school with the large class but requires few minutes of daily practice. Therefore, pupils, students and teachers should be encouraged to practice this language in their leisure time in order to master the language as required.

### **Language Learning Evolution: From the Language Laboratory to the ICT modes.**

Modern Language laboratory was one of the media that made a lot of impact in our educational scene. The language laboratory is an audio or audio-visual installation used as an aid in language learning. Here each student is able to replay one track of play and at the same time record his response on another track. He is then able to rewind the tape to listen to both the master track and the recording to his own response comparing the two recordings.

A language laboratory is a room equipped with audio and visual equipment, such as tape and video recorders for learning a foreign language such as English. Perhaps the first laboratory was at the University of Grenoble in 1908. In the 1950s up till the 1990s, they were tape-based systems using reel-to-reel and later cassette. Current installations are generally media based.

The original language laboratory is now outdated. It allowed a teacher to listen to and manage student audio via a hard-wired analogue tape dock based systems with 'sound booths' in fixed location.

All but the most simple or first generation laboratories allowed the teacher to remotely control the tape transport control of the student booths (record, stop, rewind, etc) from the master desk. This allows for easy distribution of the master programme which is often copied at high speed on to the student's positions for later use by the students at their own pace.

Better tape laboratories housed the tape machine behind a protective plate (leaving only a control panel accessible to the students) or locked the cassette doors. This kept the expensive decks from students' misuse and dust, etc.

#### **Operation**

Once the master program had been transferred on to the students' recorder, the teacher would then hand over control of the decks to the students by pressing the record key in the booth; the student would simultaneously hear the playback of the programme while being able to record his or her voice in the pauses, using the microphone. This is known as an audio active-comparative system.

The significance of the language laboratory has been much felt in the domain of communication. We live in a multilingual and multicultural world, which is being shrunk to the size of a village by the advancement of science and technology. The language laboratory exists to help one to use technology effectively to communicate. It is not merely used for learning a single language, but it can also be used to teach a number of languages efficiently.

To acquire a sensibility for sounds and rhythm of a language, one has to hear the best sample of a spoken language, says Richards (2010). This is precisely the function of the language laboratory. Some highlights of the language laboratory are given below:

- It is a tool designed for teaching any language.
- It helps one to learn pronunciation, accent, stress and all other aspects of the phonetics of a language.
- Effective communicative training programmes for the general public, private and corporate sectors, junior and senior level officers can be given through the language laboratory.

- With content creation, the setting- up of in-house news magazine, corporate publicity and identity, and teaching materials can be generated through the language laboratory.
- General documentation, software documentation and all forms of technical documentation can also be done.
- Experts can utilize the laboratory for creating and editing scientific and technical materials for teaching language.
- The language laboratory enables one to conduct courses for various groups of people like students, faculties, business people, etc.
- Short term and long term coaching classes for international examinations like IELTS, TOEFL and other. Competitive examinations can be organized through the language laboratory.
- Online courses and paperless examinations can be conducted through the language laboratory.

### **Problems Associated With Language Laboratory**

Language laboratories in the 1970s and 1980s received a bad reputation due to breakdowns. Common problems stem from the imitations and relative complexity of the reel-to-reel tape system in use at that time. Design played a part, too, as the simplest language laboratories had no electronic systems in place for the teacher to remotely control the tape decks, relying on the students to operate the decks correctly. Many had no device to stop the tape running off the reel.

The tape recorders in use after the early 1970s in the language laboratory were more complex than those in the home, being capable of multitasking and electronic remote control. As a result, they often had several motors, relays, complex transistorized circuitry and needed a variety of voltages to run. They had lots of rubber parts such as idlers which wear out. Bulks in the control panels were also in continual need of replacement.

Since the student booth tapes were not normally changed from one class to the next but were recorded over each time, these would eventually wear and shed their oxide on the tape heads leading to poor sounding tangling.

The installations were usually maintained under contract service engineering but these either served a country or similar wide area, and would call at five (5) monthly intervals. This meant that if several booths malfunctioned, then for much of that time, the laboratory was out of action.

In the evolution of language learning, it is observed that the use of the language laboratory has gradually given way to ICT (Information Communication Technology) modes of language teaching/learning.

Eaton (2010) posits that the focus in language education in the 21<sup>st</sup> century is no longer on grammar, memorization and learning from rote, but rather using language and cultural knowledge as a means to communicate and connect to others around the globe. ICT has broken all the barriers.

According to Human Resources and Skills Development (Canada, n.d) in the 21<sup>st</sup> century, a comprehensive essential skill set is needed for employment. Some today's tertiary students have a word of resources and information at their finger tips. So they need competences in areas beyond language such as numeracy, thinking skills, computer use and the ability to work well with others. They understand that life-long learning is going to be the norm for them.

The use of technology allows for demonstration of work through portfolios, students-made videos, student blogs, Wikis and podcasts just to mention a few. All these are about using technology to demonstrate students learning in order to show how they themselves reflect upon the impact language learning has had on the them. These they can share with others through ICT.

Technology does not only demonstrate student learning, but also facilitate their learning. Using MALL (Mobile Assisted Language Learning) is quickly gaining ground today as much as CALL (Computer Assisted Language Learning (Chinnery 2006). It is not impossible that at some time in the future, "Apps" or some variation of mobile applications may replace textbooks.

Since the vogue today is that students are harnessing their creativity to express themselves in the computer world, the challenge for the 21<sup>st</sup> century teacher will be to find ways to allow them do it. Eaton (2010) asserts that students are the creators, not simply consumers, of technology and technology produced art and projects.

### **Prospects of Language Laboratory**

In the current digital age, we are all connected regardless of the distance. Advancement in technology has literally brought the world into our living room in the form of TV or internet which allows us to watch events happening in other countries or talk to friends and family living in other

continents via internet. As a result, we are exposed to different languages, cultures and traditions of people all over the world.

As we live in multilingual and multi-cultural world, language laboratory can greatly help students to learn language of their choice, as it will allow students to learn at their own pace. They can record and assess their performance to make sure that they are paying attention to all aspects of phonetics such as pronunciation, accents and stress, etc.

The language laboratory provides access to native speakers via audio-video aids so that they can learn correctly.

Given large number of students pursue higher studies outside their home country; language laboratory would help them in studying the language of the country where they are planning to pursue their higher education, for example, non-native English speaking students are required to give TOEFL/IELTS if they plan to study in North America. While there are several benefits to language resource centre, there should be proper safeguard in place to regulate and monitor the use of technologies employed in the teaching and learning process so that students do not misuse them.

Among others, language laboratory helps as it leads to:

- Pedagogy of learning through technology
- Putting the rules of language learning into practice
- Mastering the language
- Exposition of the strategies of teaching and learning
- Guided modes offer a step by step study course
- The free to roam modes give a student the option of learning by topic or by linguistic skill.
- The dynamic mode takes a student under its wing; and
- Methodology of instruction is followed in the communicative and integrated approach

Perhaps of paramount importance to the prospect of the language laboratory is the inclusion of ICT as an aid to Language Learning. Information Communication Technology in this paper should be seen as a diverse set of technological tools and resources used to communicate, and to create, disseminate, store, and manage information. These devices says Basak and Masoud (2011) include computers, the internet, broadcasting technologies (radio and television) and telephony. Among some of the capabilities of ICT researches have shown are as follows:

- Increase in the quality of learning
- Ease of access to a very high volume of information and knowledge available globally
- Rapid and timely access to information in very little time.
- Indirect creation of learning experiences.
- Create an interest in learning
- Increase learning opportunities etc.

## **Conclusion**

The use of ICT helps learners to have real – life contact with, and exposure to the culture of the peoples, and countries where the language is spoken thus enabling the learner to access and research information worldwide.

Using ICT, particularly email, blogs and video conferencing, facilitates students interaction with native speakers and other communities. Interactive white boards, DVDs, and the use of digital projectors can provide stimulating visual aids as a valuable strategy to support understanding and recall in the new language.

From this study one can conclude that students/teachers find English language a difficult subject to learn and that they lack proficiency in the language.

The highest instructional material available to the learner is the teacher who is equally the model when it comes to pronunciation. And he might not even be a professional in this aspect. Naidoo (2003), suggests that ICT can be used to support teachers who lack adequate skills and content knowledge, thus contributing to improving the quality of learning.

From the forgoing, it is obvious that ICT is beneficial to both the learner and the teacher and if well applied can be a veritable tool in assisting students to acquire language skills whether used independently or in a language laboratory.

### **Recommendation**

With regard to this research, the following recommendations are made:

1. That the government and education planners should provide facilities for training more English language teachers in schools using the language laboratory. Besides, English language teachers should not only have the intellectual knowledge of the subject matter, they must also possess language usage skill to solve the problem of articulation in learning the second language. They should know the methodology for imparting the language.
2. The government and Ministry of Education should make provision for refresher courses for teachers during seminars/workshop periods to bring the language teachers together in order for them to be in tune with modern methodology.
3. There is need for a reconceptualized field that is more learner – centred, more collaborative and more technologically driven.
4. Students should be encouraged and empowered to communicate with others across the globe in real time to enhance their language skills.
5. Again, adequate efforts should be made to ensure a blend of experimentation with the direct method in the teaching of English language. No single method is recommended in isolation.
6. Ministries of Education should provide English language laboratory and other audio visual materials in schools. This will enhance the effectiveness of the teachers, arouse the interest of the students and their performance in oral English examinations and in other aspect of life.
7. National policy on education should lay more emphasis on the use of ICT to commence from the first year a child enters the four walls of a classroom. This will enable the child or pupils to have a good grasp of the language at an early age. The younger the learner, the easier the understanding. So, it is better to catch them young.

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**WHISTLEBLOWING: AN IMPERATIVE IN TACKLING NATIONAL SECURITY ISSUES IN  
NIGERIA**

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## **Abstract**

*Security is one major issue that dominates national discourse in Nigeria today because of the ways it affects the lives and properties of her citizens. Numerous lives and unquantifiable properties of citizens (and non citizens) have been lost to incessant rage of insecurity, manifesting in the forms of kidnapping, armed robbery, ethnic militia, insurgency, rape, civil disobedience and other related security breaches. The efforts of the various security agencies at ensuring the security of lives and properties of citizens cannot be overemphasized. Nevertheless, the citizens on their part have a constitutional duty to provide useful information to help the security agencies in the discharge of their duties. Thus, whistleblowing becomes an imperative. This paper therefore, begins with the conceptual clarification of the terms whistleblowing and national security. It went further to discuss some of the reasons for, and the effects of security challenge in Nigeria and thereafter, discussed the imperatives of whistleblowing in tackling Nigeria's security issues. The paper concludes with some recommendations.*

## **Introduction**

Whistleblowing is the act of exposing any information or activity that is deemed illegal, unethical or not correct within an organization, that is, either private or public (Wikipedia).

The information of alleged wrongdoing can be classified in different ways, they include: violation of company policy, rules, laws, regulations or threat to public interest or national security. This information or allegations can be brought to the surface either internally or externally. Internally, the whistleblower brings his or her accusations to the attention of other people within the organization, such as an immediate boss or supervisor. Externally, the whistleblower can bring such an allegation to the notice of a third party outside the accused person's organization, such as the media, government/law enforcement agencies or those who are concerned.

The constitution of Nigeria (1999) section 24 (d-e) clearly states that the citizens of Nigeria have the duty to provide information or help the law enforcement agencies in the discharge of their duties. The constitution enjoins every citizen to make positive and useful contributions to the advancement, progress and well-being of the community where he or she resides and to render assistance to the appropriate and lawful agencies in the maintenance of law and order. From this, it is obvious that government cannot tackle security problems alone. There is a need for synergy between government and the citizens in which whistle blowing becomes an imperative.

## **Origin of Whistle blowing**

The origin of whistle blowing dates back to the 19<sup>th</sup> century. It was linked with the use of a whistle to alert the public or a crowd about a bad situation, such as the commission of a crime or the breaking of rules during a game. The expression whistleblower attached itself to law enforcement officials in the 19<sup>th</sup> century because they used a whistle to alert the public or fellow police. Sports referees who used a whistle to indicate and illegal or foul play also were called whistleblowers. As from the 1960s, journalists began to use the term for people who revealed wrongdoings.

According to the Nigerian Whistleblower Act (2016), the whistleblower policy was introduced by the federal government to enable patriotic citizens report criminal acts such as mismanagement or misappropriation of public funds and assets, like properties and vehicles, financial malpractice and fraud, collecting/soliciting bribes, corruption, diversion of revenues, unapproved payments, kick backs, over-invoicing etc. It also includes violation of company's law, policy, regulations or threat to life, national security or public interest. Its goal is to broaden the attack on corruption by encouraging the general public to expose corrupt practices. The government will, in turn, reward those whose revelations result to recovery of funds or assets.

## **National security**

National security is a term that has a very wide coverage. It is a term that evolved from simpler definitions which emphasized freedom, military threat and political coercion, to more complex definitions that encompass non-military concerns, such as economic security, food security,

environmental security, cyber security etc. The focus of this research will, however, be on the military dimension of national security.

The Oxford Living Dictionaries define national security as the safety of a nation against threats such as terrorism, war or espionage. Paleri, (2008), explains the military dimension of security as the capacity of a nation to mobilize military forces to guarantee the safety of its borders and to detect or successfully defend it against physical threats including military aggression and attacks by non-state actors, such as terrorism. From these two definitions, it could be concluded that the military dimension to national security is associated with the management of physical threats and with the military capabilities used for doing so.

### **Reasons for security challenge in Nigeria**

So many factors have been blamed for the security challenge in Nigeria, some of which are discussed below:

- 1. Unemployment/Poverty:** The level of unemployment/poverty in Nigeria today has become so alarming and worrisome, particularly among the teeming youths. The failure on the part of government to address this problem has led to in-equitable distribution of wealth among Nigerian citizens. This, in turn, makes them get easily attracted to violent crimes.
- 2. Ethno-Religious conflicts:** These conflicts arise mainly from distrust among various ethnic groups and among major religions in the country. Ubong (2016), identified ethno-religious conflicts as a major source of insecurity in Nigeria. He explains it as a situation in which the relationship between members of one ethnic or religious society is characterized by lack of cordiality, mutual suspicion and fear, and a tendency towards violent confrontation. Frequent and persistent ethnic conflicts and religious clashes between the two dominant religions (Islam and Christianity) present the country with a major security challenge.
- 3. Weak security system:** This results mainly from inadequate equipment for the security arm of government, both in terms of weapons and training. In many cases, security personnel assigned to deal with given security situations, lack the expertise and equipment to handle the situations in a way to prevent them from occurring. Apart from this, some personnel get influenced by ethnic, religious or communal sentiments. Rather than serving the interest of their nation, they are seen to be serving the interest of their people through aiding and abetting criminals from their areas.
- 4. Porous borders:** The porosity of Nigeria's borders has serious security implications for the country. Weapons come easily into Nigeria from other countries. The availability of all kinds of weapons has enabled militant groups and criminal elements to have easy access to arms.
- 5. Illiteracy:** The high level of illiteracy among Nigerians make it easy for most of them to be swayed or brainwashed by different terrorist groups and they end up being used by these groups to perpetuate heinous crimes against innocent Nigerians.

6. **Effects of hard drugs:** Some Nigerians, particularly the youths, are into the habit of taking hard drugs such as cocaine, codine, heroine, tramadol, etc. All these are capable of inducing people to commit crime.
7. **Weak judicial system:** There have been series of allegations against the judicial system of Nigeria as having failed its people by allowing people who have committed all sorts of atrocities to go unpunished simply because the culprits have all it takes to influence the judiciary. The point here is that a situation where the Rule of Law is not fully applied will naturally encourage the perpetration of crime with impunity.

### **Effects of security challenge in Nigeria**

The security situation in Nigeria today has become so worrisome. Media reports, almost on daily basis, show that the nation is under a siege of terror attacks, kidnapping, armed robbery, assassination, cultism, ritual killings, herders attacks on farmers and innocent citizens. As observed by Abidde (2012), security in Nigeria has been tenuous and perilous, at least, since the 1970s. Some writers claim it has become a national emergency because of what some people in different parts of the country have to go through on daily basis. So many lives have been lost, a large number of people displaced from their homes and now have shelter in different Internally Displaced Persons' (IDP) camps. Children and the aged have gone missing or kidnapped by insurgents with no hope of ever seeing them again.

The social, political and economic life of the country has also been seriously affected. The world now sees Nigeria as a very violent nation and this has destroyed the reputation of Nigerians across the world. Today, getting visas into other countries is difficult due to the impression Nigeria is giving to the world.

### **Whistle blowing: An imperative to national security issues in Nigeria**

There is no doubt that a lot of measures have been put in place by government to arrest the security challenges in Nigeria, yet the problem persists, even stronger than ever. There is, therefore, a need for the development of new security policies, thinkings and strategies. The government and the people need to work together to tackle the issue of security in Nigeria so that the country can move forward. This paper, therefore, posits that national security issues can be addressed using the whistleblowing policy. Although this policy was adopted in Nigeria in 2017 by the federal government to help tackle the menace of corruption, its successes in this regard cannot be overemphasized. According to AFRICMIL (Centre for Media and Information Literacy) reports of October, 2017:

'Whistle blowing has added a fresh impetus to the anti-graft war. In less than a year of its inauguration, it has led to the recovery of staggering amounts of looted funds, thus proving to be an effective and reliable mechanism for combating the one singular vice that seems to have permanently arrested the development of Nigeria since independence. As of June 2017, ₦11.6 billion has been recovered...'

This paper submits that, if whistleblowing could achieve such a significant success in the fight against corruption in Nigeria, remarkable successes can also be made if the policy is applied in tackling the country's national security issues.

Moreover, Oyedokun (2017), in his discussion of some of the benefits of "Intelligence Information Sharing", pointed out, among other benefits, that it prevents the activities of those who would do harm through acts of terrorism or other crimes. He argued that crime/terrorism – related, prevention, protection, preparedness, response, etc, require actionable, accurate and timely information about who the enemies are, where and how they operate, how they are supported, the targets, the enemies they intend to attack and the method of attack they intend to use. These items of information can be supplied through whistleblowing.

### **Conclusion/Recommendations**

Whistleblowing as an imperative in tackling national security in Nigeria is also fraught with some problems which may inhibit its success in the country. A whistleblower is expected to provide specific and fact-based information that would assist government and security agencies in arresting any security challenge. It is information that government or the security agencies do not have and could not otherwise obtain from any other publicly available source(s), hence the whistleblowers are usually rewarded. For this reason, there could be a false or misleading information from the whistleblower, which may create more problems than it is expected to solve.

Secondly, there may also be fear on the part of the potential whistleblower that government or the security agencies may use and dump them after supplying the security information, on the excuse that the information so provided is already available to government, or they may even give other excuses. At the end, they may be offered little or nothing as compensation after blowing the whistle.

It is in the light of these problems, that this paper makes the following recommendations:

Firstly, there should be sincerity on the parts of the whistleblower and government. The whistleblower should be sincere enough to give fact-based information to government and the security agencies, not misleading information in a desperate bid to get unmerited reward. Any misleading information from the whistleblowers should attract very stiff sanctions in order to serve as deterrent to other potential whistleblowers who may want to give false information.

Government and the security agencies should also ensure that whistleblowers whose information is found useful are rewarded accordingly.

Furthermore, there should be committed efforts at ensuring the safety and protection of the whistleblowers, to avoid being victimized by criminals whose information has been given to government and the security agencies. Whistleblowing can only make the desired impact in tackling security challenges in Nigeria if whistleblowers enjoy full protection from victimization. This will help remove any fear that may be nursed by a potential whistleblower.

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## MODELING IMPACT OF ICT INTEGRATION ON STATISTICAL LEARNING: STUDY OF AUCHI POLYTECHNIC, AUCHI

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### Abstract

The paper examined effect of ICT integration on academic performance of students in statistical learning outcome in the Nigerian Polytechnic system using Auchi Polytechnic as case study. Primary source was used in the data collection through structured questionnaire. The instrument was administered to 350 students randomly across the four departments in the School of Information and Communication Technology (SICT). Valid sample of 240 questionnaires were used for the analysis based on the statistical techniques of mean response analysis, relative importance index (**RI.I**), and ranking and hypotheses were tested by adoption of correlation and regression techniques. The finding shows that ICT integration impact on statistical learning outcome. High positive correlation existed between ICT integration in statistical learning and academic performance of students in Polytechnic. It was concluded that students' abilities in terms of problem solving and creative thinking is predetermined by ICT integration schemes hence, the study therefore recommended that effort should be made towards improving adoption of ICT and its integration in statistical learning in the Nigerian Polytechnics and other related institutions.

**Keywords:** Learning, outcome, impact, performance

## **Introduction**

Information and Communication Technology is a tool that is fundamental to contemporary learning and teaching in the modern academic environment. The integration of ICT has made learning and teaching interesting and enduring in the present educational development curriculum. M-learning which focuses on the application of media devices to learning has become very popular among the teachers in the secondary and tertiary institution today. The adaptation of ICT and ICT integration in learning and teaching in the Federal Polytechnic is becoming contentious issues that require investigation into the adaptation of ICT integration in the school system.

The impact of ICT on the learning process seems to be more important and requires more than looking only to curricula. Improved student outcomes are observed, with regard to: motivation, enjoying learning; self-esteem; ICT skills; collaborative skills; subject knowledge; information handling skills; meta-cognitive skills, etc (Kulik, 1994; Kirkpatrick and Cuban, 1998). In most higher education institutions, while students and teachers seem to be using the new available technologies more and more intensively, organizational designs are changing slowly. The lack of a strategy regarding such change, as several studies have shown, leads to a weak impact of the use of ICT integration on student performance in Nigeria. As result of this backdrop, this paper examines the level of ICT integration impact on statistical learning outcome (academic performance) in Polytechnic: A Study of Auchu Polytechnic.

## **Statement Of Problem**

The link between ICT facilities and ICT integration in teaching and learning have been very crucial in the educational system today in the developed world and the developing nations particularly Nigeria. The accessibility, availability and utilization of ICT facility by the teachers and the learners in tertiary institutions couple with curriculum development in ICT integration and effects have change the teaching and learning conditions of teachers and learners that the need to examine its impact on statistical learning outcome becomes imperatives in evaluation of students' academic performance in Nigerian Polytechnic using Auchu Polytechnic as case study.

## **Aim And Objective Of The Study**

The objective of this paper is to examine the level of ICT integration impact on statistical learning outcome (academic performance) in Polytechnic: A Study of Auchu Polytechnic. The specific objectives of the study are to:

1. examine ICT integrated related factors stimulating academic performance of students in statistics education?
2. evaluate the effects of ICT integration in students' statistical learning outcome?

3. study ICT integration impact on the statistical learning outcome (academic performance) of students?

### **Research Questions**

In line with the objective of the study, the following research questions are posed for the seminar to provide answers to:

4. What are the ICT integrated related factors that (positively or negatively) stimulate academic performance of students in statistics education?
5. What are the indicators of effects of ICT integration among students learning outcome?
6. Does ICT integration impact on the statistical learning outcome (academic performance) of students?

### **Review of Related Literature**

The direct link between ICT use and students' performance has been the focus of extensive literature during the last two decades. ICT does play a role in students' achievement Coates and Humphreys (2004), surveyed three matched pairs of face- to-face and online principles of statistical courses taught at three different institutions as the measure of learning outcomes. After taking into account selection bias and differences in student characteristics, they report that the average scores are almost 15% higher for the face-to-face format than for the online format. Anstine and Skidmore (2005), surveyed two matched pairs of on-campus and online courses, one in statistics, and the other in managerial economics. They report that after taking into account student characteristics and selection bias, students in the online format of the statistics class exam scored 14.1% less than in the traditional format, whereas, for the managerial economics class, the test scores within both formats were not significantly different. Navarro and Shoemaker (1999), surveyed a matched pair of on-campus and online sections of a class on principles of macroeconomics. The students self-selected the instruction format, with each section having approximately 30 students, and there was no difference in the demographic composition of each section. They used a simple comparison of means of test scores and reported no significant difference in academic performance between the two formats. Terry, Lewer and Macy (2003), cited in Betts, Zau and Rice (2003), surveyed 340 students in a programme offering courses in the three formats of online, on-campus, and hybrid. Using a standard regression model where final exam score is the dependent variable and student characteristics are the independent variables, they report that predicted exam scores for students in the online courses were significantly less than those of students in the on-campus and in the hybrid formats. However, with the comparison of exam scores between students in the hybrid and students in the on- campus classes there was no significant difference. Brown and Liedholm (2002), surveyed students in a matched pair of online and face-to-face principles of economics course taught by the

same teacher. They reported that exam scores, after taking into account differences in student characteristics, were approximately 6% higher for the on-campus format than for the online format. They attribute the relatively better performance in the on-campus classes to the benefit of in-person teacher-student interactions and attribute the relatively poorer performance of the students in the online class to the lack of self-discipline necessary for successful independent learning in the online environment. Goolsbee and Guryan (2002), concluded that there is no evidence for a relationship between increased educational adoption of ICT integration and students' performance. In fact, they find a consistently negative and marginally significant relationship between ICT use and some student achievement measures. Students may use ICT integration to increase their leisure time and have less time to study. Online gaming and increased communications channels do not necessarily mean increased achievement. Many other explanations were presented.

ICT integration seems to be positively correlated to performance while others are not. Fuchs and Woessman (2004), used international data from the Programme for International Student Assessment (PISA). They showed that while the bivariate correlation between the availability of ICT and students' performance is strongly and significantly positive, the correlation becomes small and insignificant when other student environment characteristics are taken into consideration. The analysis of the effects of these methodological and technological innovations on the students' attitude towards the learning process and on students' performance seems to be evolving towards a consensus, according to which an appropriate use of digital technologies in higher education can have significant positive effects both on students' attitude and their achievement. Attwell and Battle (1999), examined the relationship between having a home computer and school performance, for a sample of approximately 64,300 students in the United States. Their findings suggest that students' who have access to a computer at home for educational purposes, have improved scores in reading and maths. Coates and Humphreys (2004), showed that students in on-campus courses usually score better than their online counterparts, but this difference is not significant here. Banerjee, Cole, Duflo and Linden (2004), pointed out: "First, web-based instruction presents information in a non-linear style, allowing students to explore new information via browsing and cross-referencing activities. Second, web-based teaching supports active learning processes emphasized by constructivist theory. Third, web-based education is enhanced understanding through improved visualization and finally, the convenience, it could be used any time, at any place". In this paper, the impact of ICT integration on academic performance of study is key.

## **Research Methods And Material**

Primary data source was used in the data collection based structured questionnaire (find questionnaire at the appendix A). A total of 350 questionnaires containing 16 questions were administered randomly to students in the School of ICT with larger focus on statistics and computer

student. A sample of **240** was purposive taken for analysis. The data were analysis using both descriptive and statistical inference. The descriptive statistics such as mean, relative importance response index and ranking were used. Correlation, ANOVA and Regression were used in testing the research hypothesis. Analysis was performance electronically using statistical software known as Statistical Software for the Social science (SPSS version 20.0).

### Model specification

$$ICTI = \alpha_0 + \alpha_1 SLOC + \varepsilon$$

Where,

*ICTI* = ICT Integration

*SLOC* =Statistical Learning Outcome

$\alpha_0$  = constant

$\alpha_1$  = regression coefficient

$\varepsilon$  = error

Independent variable is ICT integration) and Statistical learning outcome (Academic performance) which the dependent variable.

**Table 1: Summary of Computation Procedures**

Methods of Analysis	Formula	Items	Data type/Scale	Analytical Procedure	Package
Simple Percentage Analysis	Frequency of $\frac{\text{Response} * 100}{\text{total response}}$	Sex, Age, Department, Level, Residence	Nominal, ordinal and interval scale	Electronic method (the use of computer)	Statistical package for the social sciences (SPSS) version 24.0
Mean	Mean response	Items of measure of ICT integration and statistical learning outcome	Nominal, ordinal and interval scale	Electronic method using computer system	Statistical package for the social sciences (SPSS) version 24.0
Relative Importance Index	$RI.I = \frac{\sum W_i X_i}{A * N}$ $W_i$ = is the weighing given to each factor by the respondents (from	All the items of ICT integration and statistical learning outcome	Interval scale	Electronic method using computer system	Microsoft Excel

	1 to 4), $X_i =$ is the total value of each of the response, $A$ is the highest weight (4) and $N$ is the total number of respondents.					
Correlation Analysis	Pearson Product moment method	ICT integration and statistical learning outcome	Interval scale	Electronic method using computer system	Statistical package for the social sciences (SPSS) version 24.0	
Regression Analysis	Multiple Linear Regression	ICT integration and on statistical learning outcome	Interval scale	Electronic method using computer system	Statistical package for the social sciences (SPSS) version 24.0	

Source: Author's computation, 2018

## RESULTS

**Table 2: Descriptive Analysis**

Descriptive Statistics			
	Mean	Std. Deviation	N
Statistical Learning Outcome	2.9500	.09651	8
ICT Integration	2.9375	.13926	8

**Table 3: Correlations Analysis**

		Statistical Learning Outcome	ICT Integration
Pearson Correlation	Statistical Learning Outcome	1.000	.981
	ICT Integration	.981	1.000
Sig. (1-tailed)	Statistical Learning Outcome	.	.000
	ICT Integration	.000	.
N	Statistical Learning Outcome	8	8
	ICT Integration	8	8

**Table 4: Model Summary<sup>b</sup>**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	Change Statistics F Change	df1	df2	Sig. F Change	Durbin-Watson
1	.981 <sup>a</sup>	.963	.956	.02018	.963	154.144	1	6	.000	2.320

a. Predictors: (Constant), ICT Integration

b. Dependent Variable: Statistical Learning Outcome

**Table 5:ANOVA<sup>a</sup>**

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.063	1	.063	154.144	.000 <sup>b</sup>
	Residual	.002	6	.000		
	Total	.065	7			

a. Dependent Variable: Statistical Learning Outcome

b. Predictors: (Constant), ICT Integration

**Table 6:Coefficients<sup>a</sup>**

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.553	.161		3.434	.001
	ICT Integration	.680	.055	.981	12.415	.000

a. Dependent Variable: Statistical Learning Outcome

$$ICTI = 0.553 + 0.680SLOC$$

$$ICT\ Integration = 0.553 + 0.680Statistica\ Learning\ Outcome(Academic\ Performance)$$

## Discussion of Results

Aggregate mean response analysis results in table 2 reveals that respondents in the study agree to ICT integration impacted on statistical learning outcome of students in Auchi Polytechnic and Nigeria at large. The results in table 3 depicted that the ICT integration and Statistical learning outcome were correlated at ( $r = 0.981^{**}$ ;  $p = 0.000 < 0.05$  at 5). This suggests that the independent variable (ICT integration) Measures has very high positive and significant relationship with Statistical learning outcome or academic performance of student in the Polytechnic, hence, H1 is accepted.

In table 4, model summary depicts that the R-square for the model is 0.963 which implies that the dimensions of ICT integration is highly fitted with statistical learning outcome of students by 96.3%. In addition, ICT integration explained about 95.6% of the total variation in with statistical learning outcome of students since the value of the adjusted R-square is 0.956. The Durbin Watson statistics of the model of ICT integration on statistical learning outcome that is academic performance of students is 2.320 which fell within 2.0-4.0. The finding suggested that there is no presence of first order serial autocorrelation.

Table 5 shows that F value is significant ( $F = 154.14$ ,  $p = .0000 < 0.05$  at 5%). This shows that the model for determining statistical learning outcome, that is, academic performance using ICT integration is valid. Thus, based on the findings it can be concluded that there is a strong linear relationship between the predictor-statistical learning outcome (academic performance) and ICT integration.

There is positive relationship among ICT integration (ICT) and statistical learning outcome (SLOC) that is student academic performance. A change or increase in ICT integration in statistical learning will account for 68% increase in student academic performance in the Polytechnics in Nigeria. However, absence of a unit change in ICT integration in statistical learning results in 55.3% increase in academic performance of student (table 6). The finding shows that ICT integration in statistical learning serve as added advantage to student academic performance in the Polytechnic.

## **Conclusion**

The impact of the availability of ICT on student learning will strongly depend on their specific uses. ICT-based instruction could restrict the creativity of the learner. Therefore, positive correlation exists between ICT integration in statistical learning and academic performance of students in the Polytechnic. ICT integration in statistical learning is highly statistically significant to students' academic performance of students in the Polytechnic. The impact of the availability of ICT on student learning will strongly depend on their specific uses. ICT-based instruction could restrict the creativity of the learner. Therefore, positive correlation exists between ICT integration in statistical learning and academic performance of students in the Polytechnic. ICT integration in statistical learning is highly statistically significant to students' academic performance of students in the Polytechnic.

## **Recommendations**

Based on the major findings of the analysis, the study recommended the following:

1. There must be improvement upon the adoption of ICT based instructional material and its integration in the statistical learning in the Nigerian Polytechnics and other related institutions in Nigeria Students' such that abilities in terms of problem solving and creative thinking in predetermined schemes.
2. Effort should be made such that students are taught the relevance ICT skill and technique in statistics and learning since very high correlation exists between ICT integration and academic performance of students in statistics.

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**Appendix**

**QUESTIONNAIRE ON THE IMPACT OF ICT INTEGRATION IN STATISTICAL LEARNING: A STUDY OF AUCHI POLYTECHNIC, AUCHI**

Dear Respondent,

The research instrument title “**THE IMPACT OF ICT INTEGRATION IN STATISTICAL LEARNING: A STUDY OF AUCHI POLYTECHNIC, AUCHI**” is focused on eliciting responses from the ICT students. Your response and sincere participation the survey will be treated with utmost confidentiality to serve the purpose of the research design.

Thanks.

**INSTRUCTION:** tick (x) option as applicable to you.

**SECTION A: Demographic Information of Respondent**

1. Name (Optional)-----
2. Sex: Male ( )Female ( )
3. Age bracket: 18-22years ( ) 23-27years ( ) 28years and above ( )
4. Department: Statistics ( ) OTM ( ) Computer Science ( ) Mass communication ( )
5. Level: ND ( ) HND( )
6. Residence: On campus ( ) Off campus ( )

**SECTION B: ICT Integration Awareness in Auchi Polytechnic**

1. Are you aware of ICT? Yes ( ) No ( )
2. If yes, is ICT integrated in statistical learning? Yes ( ) No ( )
3. Is ICT integration learning applicable to? Class room ( ) Laboratory ( ) Both ( )

**SECTION C: ICT Integration Awareness in Auchi Polytechnic**

S/N	Measures of ICT Integration	SA	A	D	SD
1	Quality of student work and practical examples through visualization of statistical problem				
2	Improves poor handwriting and languages skills through word processing application in statistical reporting				
3	Increased capacities to deal with individual learning styles as students can work at the pace and intensity suitable to their statistical knowledge needs;				
4	Enables collaborative learning with little indication of the isolated learner;				
5	Encourages use of peer coaching and peer reviews using ICT tools				
6	Has impact on resource-based learning and access to real world information on statistics through the Web				
7	Increases information reliability and accuracy adding to authenticity of learning tasks, with realistic and up-to-date information on statistical subjects/topics				
8	Increases student motivation through hands-on activity, visual representations and improved modes of presentation of statistical data				
9	Encourages independent learning and individual preferences for process, layout, style and format of statistics using ICT				
	Changes teacher practices, planning tools and assessment pattern of statistics from students' point of view				

**SECTION D: Evaluation of Student Statistical Learning Outcome (Academic Performance)**

S/N	Measures of Statistical Outcome (Academic Performance)	SA	A	D	SD
1	Gives students more control of independent statistical learning process				
2	Increases opportunities for classes to evolve and for student experiences to shape outcomes in learning statistics				
3	ICT motivated students to commit to learn and to participate in statistical learning activities				

4	Has improved students' quality of work and has given them the confidence to perform enhanced statistical learning tasks				
5	ICT allowed students to learn independently, which has enabled more work to be completed through internet surfing on various subject areas in statistics				
6	ICT enhanced academic achievement due to the reinforcement				
7	ICT enhanced academic achievement due to the practice				
8	ICT enhanced academic achievement due to the constructive theory of learning				
9	ICT integration enhanced academic achievement due to the increasing students' GPA				

**Table 1: Mean Response and Relative Importance Analysis**

S/N	ICT Integration	SA	A	D	SD	N	Total	Mean	RI.I
1	Improves poor handwriting and languages skills through word processing application in statistical reporting	145	23	45	27	240	766	3.19	0.80
2	Encourages independent learning and individual preferences for process, layout, style and format of statistics using ICT	108	65	34	33	240	728	3.03	0.76
3	Increased capacities to deal with individual learning styles as students can work at the pace and intensity suitable to their statistical knowledge needs.	95	89	22	34	240	725	3.02	0.76
4	Quality of student work and practical examples through visualization of statistical problem	97	66	43	34	240	706	2.94	0.74
5	Increases information reliability and accuracy adding to authenticity of learning tasks, with realistic and up-to-date information on statistical subjects/topics	107	44	44	45	240	693	2.89	0.72
6	Encourages use of peer coaching and peer reviews using ICT tools	78	89	32	41	240	684	2.85	0.71
7	Has impact on resource-based learning and access to real world information on statistics through the Web	106	38	45	51	240	679	2.83	0.71
8	Increases student motivation through hands-on activity, visual representations and improved modes of presentation of statistical data	67	87	45	41	240	660	2.75	0.69
9	Enables collaborative learning with little indication of the isolated learner;	89	52	43	56	240	654	2.73	0.68
10	Changes teacher practices, planning tools and assessment pattern of statistics from students' point of view	56	96	48	40	240	648	2.7	0.68
S/N	Statistical Learning Outcome Measures	SA	A	D	SD	N	TOTAL	MEAN	RI.I
1	ICT enhanced academic achievement due to the constructive theory of learning	107	77	35	21	240	750	3.13	0.78
2	Increases opportunities for classes to evolve and for student experiences to shape outcomes in learning statistics	121	34	56	28	239	726	3.04	0.76
3	ICT motivated students to commit to learn and to participate in statistical learning activities	89	89	28	34	240	713	2.97	0.74
4	ICT allowed students to learn independently, which has enabled more work to be completed through internet surfing on various subject areas in statistics	95	76	28	41	240	705	2.94	0.73

5	ICT enhanced academic achievement due to the practice	83	87	38	32	240	701	2.92	0.73
6	Gives students more control of independent statistical learning process	102	56	37	45	240	695	2.9	0.72
7	ICT integration enhanced academic achievement due to the increasing students' GPA	77	91	36	36	240	689	2.87	0.72
8	Has improved students' quality of work and has given them the confidence to perform enhanced statistical learning tasks	100	52	35	53	240	679	2.83	0.71
9	ICT enhanced academic achievement due to the reinforcement	101	38	49	52	240	668	2.78	0.70

Source: Field Survey and Computation, , 20i8.

**Table 2: Mean Response Ranking Analysis**

S/N	ICTI	SLOC
1	3.19	3.13
2	3.03	3.04
3	3.02	2.97
4	2.94	2.94
5	2.89	2.92
6	2.85	2.90
7	2.83	2.87
8	2.75	2.83