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AVAILABILITY OF CELL PHONE REPAIR FACILITIES FOR CELL PHONE REPAIRERS IN NORTH EAST GEO - POLITICAL ZONE, NIGERIA

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ABSTRACT: *The study was conducted to assess the availability of cell phone repair facilities for cell phone repairers in North East Geo - Political Zone of Nigeria for effective job performance. Specifically, the study determined: the ability of cell phone repairers to use cell phone repair facilities correctly and the availability of cell phone repair facilities for cell phone repairers. Two research questions and two hypotheses guided the study. Opinion survey research design was adopted to carry out the study. The population of the study was four hundred and thirty three (433) cell phone repairers. A 42-item structured questionnaire was validated by two specialists. The instrument was tried out on 45 registered cell phone repairers randomly selected from three Local Government Areas of three Senatorial Districts in Plateau State. The reliability coefficient was 0.88. Mean and standard deviation were computed which were used to answer the two research questions formulated to guide the study. The two hypotheses were tested using one way Analysis of Variance (ANOVA) at 0.05 level of significance using SPSS version 17.0 software. Four findings were revealed based on the research questions and hypotheses, among which are: the extent at which cell phone repairers were able to use repair facilities correctly was moderate, that the level of availability of repair facilities was low. Recommendations based on the findings were made that cell phone repairers need training to improve on their use of cell phone repair facilities and the need to procure more repair facilities for effective job performance.*

KEYWORDS: Cell Phone, Repair Facilities, Cell Phone Repairers

INTRODUCTION

The inability of government to provide enough jobs for its citizenry has led to a high proportion of graduate and non graduate unemployment in the country (Nkechi, Ikechukwu and Okechukwu, 2012). In order to earn a living, people learn one trade or the other. One of the trades engaged in is cell phone repairs. The training is acquired through apprenticeship training under the supervision of the craft master. The performance of these repairers has not been without hitch with the type of repair facilities that are used and the ability to use them correctly.

Cell phones repair facilities are repair tools and test equipment used in diagnosing and effecting repairs on faulty cell phones. A cell phone repairer may be intelligent, skilled, and experienced well above peers, but without tools, the cell phone repairer is extremely limited. However, when selecting tools and equipment for repairing cell phones, it is important to select the best and appropriate tools (Goldwasser, 2013).

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Basic reliable easy-to-use test equipment is more important than sophisticated instrumentation laden with features that will not be needed. Among test equipment for cell phone repairs is inductor capacitance resistor meter (LCR), signal injector, Digital Multimeter, Analogue Multimeter Frequency Analyzer, IC Tester, Printed Circuit Board Tester, Screen Tester and Laser Station.

According to Ibezim, Ohanu, and Shodeinde (2014), the faults developed by mobile phones can be remedied using the right tools, equipment and materials with the help of competent cell phone repairer. Such tools used for mobile phone repairs include; precision screw drivers, testers, rework station, soldering lead among others. CS-Tele (2006) stated that the tools for mobile phone repairs include: ball grid array (bga) kit, bga boards, blow brush, bga ic adhesive removing liquid, soldering iron paste, wick, tweezers, pliers, iron head , power supply, lens, knife, multimeter, screw driver set, screw driver with lens and tweezers among others. Some of these tools can be used for assembling and disassembling of cell phones. Assembling cell phone involves putting the cell phone parts together for the purpose of making it functional.

The functionality of electronic products is not eternal and without breakdown. These circuits can breakdown through one or more of their components, hence the need for maintenance and repairs of these products when there is breakdown (Omofonmwan and Chukwuedo, 2013). Repair of cell phone in North East Geo Political Zone of Nigeria has been encountering challenges in getting the cell phone repair done properly when faulty. This has led to "buy, use and dump "syndrome which does not augur well for the economy of a country. Poor repair could be as a result of non availability of repair facilities or inability to use the facilities correctly. This study therefore assessed the level at which repair facilities are available and the extent of use by cell phone repairers.

The study is underpinned on the Theory of Constraints. The theory of constraints was propounded by Goldratt Eliyahu M. Goldratt and Jeff Coxin in 1984, (Goldratt and Cox, 2004). The theory says that every system, no matter how well it performs, has at least one constraint that limits its performance. The core concept of the Theory of Constraints is that every process has a single constraint and that total process throughout can only be improved when the constraint is improved. The theory of constraints is a methodology for identifying the most important limiting factor (i.e. constraint) that stands in the way of achieving a goal and then systematically improving that constraint until it is no longer the limiting factor. These needs could be inadequate knowledge of identifying appropriate cell phone parts which are very vital in the repair of this equipment. Unavailability of repair facilities for effective repair of cell phone is restrictions that prevent an organization or individual from maximizing its performance and reaching its goals. When all these constraints are met, there will be improvement on job performance of cell phone repairers.

The purpose of this study was to assess the availability and correct use of cell phone repair facilities for cell phone repairers for effective job performance in North East Geo - Political Zone, Nigeria. Specifically, the study determined the:

1. ability of cell phone repairers to use cell phone repair facilities correctly.
2. availability of cell phone repair facilities for cell phone repairers.

The following research questions were formulated to guide the study.

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1. To what extent are cell phone repairers are able to use cell phone repair facilities correctly?

2. What is the level of availability of cell phone repair facilities?

Two null hypotheses were tested at 0.05 level of significance as follows:

Ho_1: There is no significant difference in the mean ratings of cell phone repairers with differing levels of education on their perceived ability to use varieties of cell phone repair facilities correctly.

Ho_2 There is no significant difference in the mean ratings of cell phone repairers with differing levels of education on the availability of cell phone repair facilities for cell phone repairers.

This study is significant to the cell phone repairers, the government and the society at large. The findings will be of benefit to the cell phone repairers in their vocation taking into cognizance the unemployment situation in the country. The study identified the areas of weakness/constraints of cell phone repairers in correct use of cell phone repair facilities and the availability of cell phone repair facilities. When the identified constraints are improved upon, it will enhance the quality of their job and ultimately increase their financial strength.

The study is also significant to the entire society in that cell phone users will have their cell phones repaired when damaged or needs servicing. The situation of "buy, use, damage and dump" syndrome of cell phones by users due to poor repairs will be drastically reduced. Also the study is significant to the Government because the needs of cell phone repairers identified will help the Government in making adequate planning and policies on its self reliance drive. This will reduce over dependent of graduates and non graduates on government for job opportunities.

METHODOLOGY

This study employed descriptive survey design. This is suitable because it sought the opinion of the representative of the entire population with specific emphasis on cell phone repairers in North East Geo political Zone of Nigeria in order to describe the outcomes for generalization. The sample size of the study was 433 drawn from a population of 548 cell phone repairers. Stratified random sampling technique was used to select one local government from each of the three senatorial districts in all the six states that constitute North East Geo political Zone of Nigeria. A questionnaire validated by three experts was used for data collection. The reliability of the instrument was determined using Cronbach alpha method and the alpha value obtained was 0.88.

The instrument was administered and retrieved by the researcher for the analysis. Mean and standard deviation were computed for each of the items in the questionnaire which were used to answer the two research questions formulated to guide the study. The two hypotheses were tested using one way Analysis of Variance (ANOVA) at 0.05 level of significance using SPSS version 17.0 software. The decision for answering the research questions were based on real limit of numbers. Any item with the mean values from 3.50 and above was rated high

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extent, while any item with the mean values of 2.50 – 3.49 and less than 2.50 was rated moderate extent and low extent respectively.

Results/Findings

The results of the data analysed in this study are presented in Tables 1, 2, 3 and 4.

Research Question 1: To what extent are cell phone repairers able to use cell phone repair facilities correctly?

Table 1. Mean Ratings and Standard Deviations of Responses of Cell Phone Repairers on Correct Use of Repair Facilities for Effective Job Performance

S/N	Repair Facilities	Levels of use of Repair Facilities		Remark
		$\bar{x}$	δ	
1.	Set of screwdrivers	3.37	0.48	M
2.	Soldering iron	3.47	1.37	M
3.	Lead sucker	3.11	1.45	M
4.	Pliers diagonal	3.26	1.19	M
5.	Cleaning Brush	3.96	0.69	H
6.	Culminated Magnifying Lens	3.39	1.30	M
7.	Tweezers	2.55	0.76	M
8.	Soldering SMD Rework Station	3.09	0.29	M
9.	IC Extractor	1.47	0.50	L
10.	Computer (Desk or Laptop) Software	2.31	0.72	L
11.	Ability to use ohmmeter to measure resistance of resistors in cell phone	3.21	1.16	M
12.	Ability to use continuity tester to test for continuity on flex	3.61	1.06	H
13.	Ability to use continuity tester to test for continuity on mains supply cord	3.98	1.27	H
14.	Ability to use voltmeter to measure voltages across components in cell phone	2.60	1.43	M
15.	Ability to use transistor tester to test transistors	1.08	0.27	L
16.	Ability to use ohmmeter to test diode	3.35	0.84	M
17.	Ability to use screen tester to test faulty screen	1.25	0.43	L
18.	Ability to use printed circuit board tester	1.33	0.71	L
19.	Ability to use IC tester to test integrated circuit	1.77	1.02	L
	Grand Mean $(\bar{X}_G)$	2.75	0.89	

Key: $\bar{x}$ = Mean rating of cell phone repairers; δ = Standard Deviation; H = High; M = Moderate; L = Low.

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From Table 1, it can be seen that cell phone repairers rated 3 items (5, 12 and 13) high with mean ratings above 3.50. Items (1, 2, 3, 4, 6, 7, 8, 11, 14, and 16) were rated above 2.50 which is moderate while items (9, 10, 15, 17, 18, and 19) were rated below 2.50 which is low. The mean response of the respondents ranged from 1.08 to 3.98 while standard deviations ranged from 0.27 to 1.45. On the whole, the grand mean ($\bar{X}_G$) of this research question is 2.75 while the standard deviation is 0.89.

This implies that the extent at which cell phone repairers is able to use repair facilities correctly for cell phone repair is moderate.

Research Question 2: What is the level of availability of cell phone repair facilities for cell phone repairers?

The results of Table 2 show the level of availability of cell phone repair facilities for cell phone in North East Geo political Zone.

Table 2. Mean Ratings and Standard Deviation of Responses of Cell Phone Repairers on Availability of Cell Phone Repair Facilities for Effective Job Performance

S/N	Repair Facilities	Level of availability		Remark
		$\bar{x}$	δ	
1.	Set of screwdrivers	3.15	1.29	M
2.	Soldering iron	3.23	1.09	M
3.	Lead Sucker	3.13	1.22	M
4.	Long nose pliers	3.47	1.37	M
5.	Pliers diagonal	2.35	0.84	L
6.	Cleaning Brush	3.47	1.37	M
7.	Culminated Magnifying Lens	2.42	1.39	L
8.	Tweezers	1.97	0.35	L
9.	Circuit board holder	1.49	1.29	L
10.	White light	2.32	1.19	L
11.	DC Digital Power Supply	3.52	1.34	H
12.	Soldering SMD Rework Station	2.61	1.37	M
13.	Ultrasonic Cleaner	1.26	0.65	L
14.	IC Extractor	1.38	0.98	L
15.	Computer (Desk or Laptop) Software	2.37	0.48	L
16.	Dongle Machine	1.16	1.09	L
17.	Digital Multimeter	4.53	0.68	H
18.	Analogue Multimeter	3.15	1.29	M
19.	Frequency Analyzer	1.16	0.07	L
20.	IC Tester	1.17	1.10	L
21.	Printed Circuit Board Tester	1.30	0.71	L
22.	Screen Tester	1.41	0.83	L
23.	Laser Station	1.35	0.98	L
	Grand Mean ($\bar{X}_G$)	2.32	1.00	

Key: $\bar{x}$ = Mean rating of cell phone repairers; δ = Standard Deviation; H = High; M = Moderate; L = Low.

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From Table 2, the result presented indicates the response of cell phone repairers on the level of availability of repair facilities for cell phone repairers in North East Geo political Zone. Out of the 23 items, cell phone repairers rated items 11 and 17 above 3.50 which is high, while seven (7) items (1, 2, 3, 4, 6, 12 and 18) were rated above 2.50 which is moderate. Also items (5, 7, 8, 9, 10, 13, 14, 15, 16, 19, 20, 21, 22 and 23) were rated below 2.50 which is low. The mean ratings ranged from 1.16 to 4.53 while standard deviation ranged from 0.07 to 1.39. On the whole, the grand mean $(\bar{X}_G)$ of this research question is 2.32 while the standard deviation is 1.00. This implies that the level of availability of repair facilities for cell phone repairers is low.

Hypothesis 1: There is no significant difference in the mean ratings of cell phone repairers with differing levels of education on their perceived ability to use variety of cell phone repair facilities correctly.

In order to test this hypothesis, one way Analysis of Variance (ANOVA) was applied. The mean ratings of cell phone repairers with differing levels of education (BSc/HND, ND/NCE, SSCE and OTHERS) was analyzed using analysis of variance. The result of the analysis is shown in Table 3.

Table 3. One way Analysis of Variance (ANOVA) of Mean Responses of Cell Phone Repairers with BSc/HND, ND/NCE, SSCE and OTHERS on their Perceived Ability to Use Variety of Cell Phone Repair Facilities Correctly

Source of Variation	SS	df	MS	F	P-value	F crit	Remarks
Between Groups	3.99	3	1.33	1.56	0.21	2.73	Accepted
Within Groups	61.42	72	0.85				
Total	65.41	75					

Table 3 presents the ANOVA result for hypothesis 3. From the ANOVA table, the F-calculated was 1.56 and the F- critical was 2.73. It therefore means that the F-calculated was less than the F-critical. This signifies that the null hypothesis was upheld. This means that there is no significant difference in the mean ratings of BSc/HND, ND/NCE, SSCE and OTHERS on their perceived ability to use variety of cell phone repair facilities correctly in North East Geo political Zone.

Hypothesis 2: There is no significant difference in the mean ratings of cell phone repairers with differing levels of education on the availability of cell phone repair facilities for cell phone repairers.

In order to test this hypothesis, one way Analysis of Variance (ANOVA) was applied. The mean ratings of cell phone repairers with differing levels of education (BSc/HND, ND/NCE, SSCE and OTHERS) was analyzed using analysis of variance. The result of the analysis is shown in Table 4.

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Table 4. One way Analysis of Variance (ANOVA) of Mean Responses of Cell Phone Repairers with BSc/HND, ND/NCE, SSCE and OTHERS on the Availability of Cell Phone Repair Facilities for Cell Phone Repairers in Northeastern Nigeria

Source of Variation	SS	df	MS	F	P-value	F crit	Remarks
Between Groups	2.29	3	0.76				
				0.48	0.70	2.71	Accepted
Within Groups	139.59	88	1.59				
Total	141.88	91					

Table 4 presents the ANOVA result for hypothesis 2. From the ANOVA table, the F-calculated was 0.48 and the F- critical was 2.71. It therefore means that the F-calculated was less than the F-critical. This signifies that the null hypothesis was upheld. This indicates that there is no significant difference in the mean ratings of BSc/HND, ND/NCE, SSCE and OTHERS on the availability of cell phone repair facilities for cell phone repairers in North East Geo-Political zone.

DISCUSSION

The findings of research question one reveals the extent to which cell phone repairers in the North East Geo Political Zone were able to use cell phone repair facilities correctly: set of screwdrivers, soldering iron, lead sucker, long nose pliers, pliers diagonal, cleaning brush, culminated magnifying lens, tweezers, white light, soldering rework station and ultrasonic cleaner was rated as high. The only repair facilities that could not be used correctly by cell phone repairers are IC Extractor, Computer (Desk or Laptop) Software, transistor tester to test transistors and screen tester to test faulty screen. This shows that they are knowledgeable in the correct use of cell phone repair facilities. It also shows that the repairers were exposed to variety of repair facilities during the course of their apprenticeship training while the repair facilities they could not use may be due to non-availability or inadequate knowledge of the facilities by the master craftsman. This is contrary to the finding of Harding (2009) that a well grounded understanding of electronics and diagnostic skills helps repairers to use and interpret readings from multimeters, oscilloscopes and computerized diagnostic equipment.

The findings of research question two indicated that the level of availability of repair facilities for cell phone repairers in North East Geo-Political zone of Nigeria is generally low. This finding agrees with the findings of Ogbuanya, Ogundola and Ogunmilade (2010) which found that tools and equipment were not enough for teaching and learning of motor mechanic works at technical colleges in south western Nigeria. This result is also in consonance with the findings of Omofonmwan and Chukwuedo (2013) which show that tools and equipment are in short supply at various training centres. Majority of cell phone repairers are made to do with what they have and could not afford to purchase all the necessary repair facilities. The cell phone repairers mostly have digital and analogue multimeters while other repair facilities like diagonal pliers, Culminated Magnifying Lens, Tweezers, Circuit board holder, White

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light, were not available. The finding is also in agreement with Osuala (2004) who found that the major problem facing vocational and technical education includes inadequate quantities of equipment, machines, tools and instructional materials. Availability of tools and equipment can be achieved when there is fund for purchase of adequate tools and equipment by cell phone repairers. Inadequate tools could be attributed to the quality of training received which did not expose them to the use of modern facilities during apprenticeship training.

The findings of hypothesis one revealed that there is no significant difference in the mean ratings of cell phone repairers with differing levels of education i.e. BSC/HND, OND/NCE, SSCE and OTHERS (i.e. those with primary school leaving certificate and secondary school drop-out) on their perceived ability to use variety of cell phone repair facilities correctly. This might not be unconnected to how knowledgeable the trainer is. The adage that you cannot give what you do not have has really come to play. The apprentice could only be taught based on the knowledge of their master.

The findings of hypothesis two revealed that there is no significant difference in the mean ratings of cell phone repairers with differing levels of education on the availability of cell phone repair facilities for cell phone repairers. The study show that the level of availability of repair facilities for cell phone repairers in North East Geo Political Zone is generally low. This finding agrees with the findings of Ogbuanya, Ogundola and Ogunmilade (2010) which found that tools and equipment were not enough for teaching and learning of motor mechanic works at technical colleges in south western Nigeria. This result is also in consonance with the findings of Omofonmwan and Chukwuedo (2013) which show that tools and equipment are in short supply at various training centres. This implies that majority of cell phone repairers make do with what they have and could not afford to purchase all the necessary repair facilities. The cell phone repairers mostly have digital and analogue multimeters while other repair facilities like diagonal pliers, Culminated Magnifying Lens, Tweezers, Circuit board holder, White light, were not available. This is also corroborated by Osuala (2004) who found that the major problem facing vocational and technical education includes inadequate quantities of equipment, machines, tools and instructional materials. Availability of tools and equipment can be achieved when there is fund for purchase of adequate tools and equipment by cell phone repairers. This can be attributed to the level of training received which did not expose them to the use of modern facilities.

Implications of the Study

This study has far reaching implication for the cell phone repairers, the society and the government. The cell phone repair facilities that could not be used by cell phone repairers and those not available will be identified and if improve upon will enhance the quality of their job and ultimately increase their financial strength. The society who happens to be the user of cell phones will be sure of getting their set repaired when faulty instead of procuring new one. This will help in saving their meager resources and channel it to other profitable ventures. The study will enable the Government to be aware of the needs of cell phone repairers and make necessary planning and policies that will enhance their skills. The rate of unemployment will be reduced because many unemployed graduates will opt to be self reliance.

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CONCLUSION

From the findings of this study, it can be concluded that the extent to which cell phone repairers in North East Geo Political Zone of Nigeria could use cell phone repair facilities correctly is moderate while the level of availability of repair facilities is low. There is no significant difference in the ability of cell phone repairers with differing educational levels to use variety of cell phone repair facilities correctly. Likewise there is no significant difference in the availability of cell phone repair facilities with differing levels of education.

Future Research

Further research could be carried out on consumer perception of cell phone repairers as well as Needs assessment of cell phone repairers for effective job performance in North West Geo political Zone of Nigeria.

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