

CORE RESOURCE INPUTS REQUIRED BY SECONDARY SCHOOL LEAVERS FOR SETTING UP FUNCTIONAL CELL PHONE MAINTENANCE WORKSHOPS IN LAGOS STATE

BY

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Abstract

The study determined the core resource inputs required by secondary school leavers for setting up functional cell phone maintenance workshops in Lagos State. A descriptive survey design was employed for the study. Three research questions guided the study while three null hypotheses formulated were tested at 0.05 level of significance. The population for the study was 68 subjects which comprised of 35 lecturers of electrical/electronic technology. Purposive sampling technique was used to select 33 literate road side cell phone technicians. Due to the manageable size of the lecturers all of them were involved in the study. A 69-items structured questionnaire was used as instrument for data collection. The instrument was validated by three experts. Cronbach alpha method was used to determine the reliability of the instruments with a coefficient of 0.82. Sixty eight copies of the instrument were administered on the respondents by the researchers and research assistants but sixty five copies of the questionnaire were retrieved and analyzed using mean to answer the research questions while t-test for independent sample was used to test the null hypotheses. The study found out that 16 maintenance skills were required by secondary school leavers for servicing cell phones, 19 maintenance skills were required for repairing cell phones and 34 material resource inputs were required by senior secondary leavers for maintenance of all kinds of cell phones. There was no significant difference in the mean responses of road side cell phone technicians and lecturers of electrical/electronic technology in polytechnics on the core resource inputs required by secondary school leavers for setting up cell phone maintenance workshops. It was recommended that all the identified core maintenance skills should be used to empower senior secondary school leavers for maintenance of all kinds of phones in Lagos State. The study also recommended that core material resource inputs should be made available to senior secondary school leavers in order to set up functional cell phone maintenance workshops.

Keywords: Resource inputs, Maintenance, Workshop, Cell phones

Introduction

Cell phone maintenance is one of the activities that can be carried out in a well equipped workshop. Workshop is a place or location where tools, equipment and machines are kept for the purpose of carrying out manual or maintenance work. Equipment such as multimeters, scraps of Ipads and cell phones are

found in the workshops. Workshops are classified according to the purpose of establishing them. Cell phone maintenance workshop is a place where activities such as repairing and servicing are carried out on all kinds of cell phones. Without a well equipped workshop, maintenance of all kinds of cell phones will be difficult to achieve. A well

equipped cell phone workshop is expected to have various facilities or materials for maintenance of cell phones. Cell phones are portable telephones that use wireless cellular technology to send and receive phone signals. Hahn and Kibora (2008) described cell phones as electronic devices used to make mobile telephone calls across a wide geographic area. Cell phones are found useful in trading, security, transportation, education among others. Tools and materials such as soldering iron, allen keys, soldering paste and soldering lead according to Bakare (2014) are required for maintenance of different types of cell phones. They are parts of resource inputs required for setting up cell phone maintenance workshop.

Resource is any input one uses in the process of creating new goods or services. Resource input encompasses all persons and things capable of passing information, values, experiences and techniques that could be used to engage the learners in the learning process. Okoye (2002) categorised resources into human and material inputs. Resource inputs therefore involve those things that help to facilitate servicing and repairing of different types of cell phones. Awobodu (2000) stated that resource inputs are classified into two as human and material resource inputs.

Human resource inputs as described by Ezenwa and Patrick (2000) are total energies, skills, talents and knowledge of people which are applied to production of goods and rendering of useful services. Olayide and Heady (1982) described human resource inputs as individual that is responsible for decision-making and planning of activities in any programme. Secondary school leavers could be called human resource inputs in most situations. Secondary school leavers are young individuals that have been trained to service and repair or maintain cell phones with relevant material resource inputs while in schools. Material

resource inputs in the view of Ekong (1994), comprise all available and accessible theoretical, practical and skill-oriented instructional materials which facilitate learning. Ezenwa (2010) described material resource inputs as assets in form of material possessions or anything of material value or usefulness that is owned by a person, an enterprise or company. These types of resources include land, capital assets in form of buildings, machines, equipment, tools, skills, competencies among others. Core resource inputs therefore could be in form of materials or humans. Core resource inputs are basic or fundamental skills, competencies, tools, equipment and consumables someone required to set up cell phone maintenance workshop. Core resource inputs required for maintenance of cell phones may include maintenance skills, testers, dusters, charts, equipment and electricity.

Maintenance is a set of steps taken to ensure that an equipment or infrastructure is kept in good operational order until it attain its maximum possible life span. Bakare (2014) stated that preventive and corrective maintenance are the major types of maintenance that can be carried out on mobile phones. Preventive maintenance is carried out to prevent total breakdown of equipment such as cell phones. Santiago (2016) defined corrective maintenance as a set of tasks undertaken to correct the defects or faults that allows equipment or a machine to function well. Bakare (2014) therefore described maintenance of cell phone as the activities carried out to repair, service, flash, upgrade, and configure damaged or malfunctioned cell phones. Maintenance of all kinds of cell phone can only be achieved in a workshop with relevant resources such as materials and skills. Global System for Mobile Communication (GSM) maintenance was introduced into the curriculum of senior secondary school in Nigeria in 2011, so that students could be taught

how to maintain all kinds of cell phones. In the module that contains all the skills needed for maintenance of cell phones to be possible, material resources such as tools, equipment, consumables among others that one required for maintenance of malfunctional cell phones are not specified. This therefore makes it difficult for senior secondary school leavers to set up cell phone workshops because they do not know which tools, equipment or materials to be purchased for cell phone maintenance. Acquisition of skills in servicing and repairing cell phones specified in the GSM maintenance module can only enable one to maintain low end phones. The users of high end phones (smart phones and android phones) run into maintenance problems whenever their cell phones get bad. This worry necessitated the study to determine core resource inputs required by secondary school leavers for setting up cell phone maintenance workshops in Lagos State. Specifically, the study sought to identify:

1. Core maintenance skills required by secondary school leavers for servicing cell phones
2. Core maintenance skills required by secondary school leavers for repairing cell phones
3. Material resource inputs required for maintenance of all kinds of cell phones in the workshop

Research Questions

The following research questions guided the study:

1. What are the core maintenance skills required by secondary school leavers for servicing cell phones?
2. What are the core maintenance skills required by secondary school leavers for repairing cell phones?
4. What are the material resource inputs required for maintenance of all kinds of cell phones in the workshop?

Hypotheses

The following hypotheses were tested at 0.05 level of significance:

H0₁: There is no significant difference in the mean responses of road side cell phone technicians and lecturers of electrical/electronic technology in polytechnics on the core maintenance skills required by secondary school leavers for servicing cell phones

H0₂: There is no significant difference in the mean responses of road side cell phone technicians and lecturers of electrical/electronic technology in polytechnics on the core maintenance skills required by secondary school leavers for repairing cell phones

H0₃: There is no significant difference in the mean responses of road side cell phone technicians and lecturers of electrical/electronic technology in polytechnics on the material resource inputs required for maintenance of all kinds of cell phones in the workshop

Methodology

Design of the Study

The study adopted descriptive research design. Descriptive research design according to Anderson (2009) is a statistical method of collecting data in which people are asked to answer a number of questions usually in the form of a questionnaire. Anderson stated further that reliability of a survey's results depends on whether the sample from which the information has been collected is free from bias and sufficient large. Descriptive research design was appropriate for this study because questionnaire was used to collect data from technicians and lecturers for the purpose of determining the core resource inputs for setting up cell phone maintenance workshops.

Area of the Study

The study was conducted in Lagos State of Nigeria because there was reasonable number of road side technicians and lecturers in the

polytechnics who could be involved in the study as respondents and this therefore made Lagos State a proper place for the conduct of the research.

Population for the Study

The population for the study was 68 which comprised all the 35 lecturers of electrical/electronic technology from three polytechnics namely: Yaba College of Technology, Lagos State Polytechnic Ikorodu and Lagos City Polytechnic and purposive sampling technique was employed to select 33 literate road side cell phone technicians from strategic places in Lagos State such as Computer Village, Alaba International Market and Ladipo Market, Oshodi. The entire lecturers were involved in the study because of their manageable size.

Instrument for Data Collection

A structured questionnaire titled Core Resource Inputs Questionnaire (CRIQ) with five point likert response scales of 5, 4, 3, 2 and 1 representing Strongly Required, Required, Undecided, Not Required, and Strongly Not Required was developed to collect data from the respondents. The questionnaire was divided into Part 1 and 2. Part 1 solicited for information on personal data of the respondents while part 2 with three sections A, B, and C solicited on: core maintenance skills required by senior secondary school leavers for servicing cell phones, core maintenance skills required by senior secondary school leavers for repairing cell phones and material resource inputs for maintenance of all kinds of cell phones respectively.

Validation of the Instrument

The Core Resource Inputs Questionnaire (CRIQ) was subjected to both face and intrinsic validation by three Experts. For face validation, the draft copies of the questionnaire were given to experts to include one from the Department

of Science and Technology Education, University of Lagos, Akoka, one from the Department of Electrical/Electronic Technology, Federal College of Education (Technical) Akoka and one from the Department of Vocational and Technical Education, affiliated programme of the University of Nigeria, Nsukka, Yaba College of Technology Yaba Lagos State.

The intrinsic validity was obtained through the use of the test statistics. The intrinsic validity coefficients obtained for each section of the instrument were as follows: Section A, 0.80; Section B, 0.82; Section C, 0.81. These values indicated a high level at which the items on the questionnaire measure what they should measure.

Reliability of the Instrument

Cronbach Alpha reliability method was used for determining the internal consistency of questionnaire items. Twenty copies of validated structured questionnaire were administered on 10 lecturers of electrical/electronic technology in the polytechnics and 10 road side cell phone technicians all in Ogun State. Their responses were analyzed using Statistical Package for the Social Science (SPSS) 16 versions and overall Cronbach Alpha Coefficient value of 0.82 was obtained.

Method of Data Collection

Copies of the structured questionnaire were administered on the respondents at various locations within Lagos State by the researchers with the help of three research assistants. One week after the administration of the questionnaire, the researcher and research assistants went round to collect the copies of the questionnaire from the respondents and 33 copies of the questionnaire were retrieved back from lecturers while 32 copies were retrieved back from road side cell phone technicians. Out of 68 copies of questionnaire administered

altogether 65 copies were duly collected back from the respondents which represent 95.58 percent return rate.

Method of Data Analysis

Data collected for answering research questions 1, 2 and 3 were analysed using Mean while t-test was used to test null hypotheses one to three at 0.05 level of significance. A cut-off point of 3.50 was used for decision making and any item whose Mean value is 3.50 or above was judged as required, while any item whose Mean value is less than 3.50 was judged as not required.

In taking decision on the hypotheses tested, the hypotheses of no significant difference was accepted where the P-value is greater than 0.05 levels and this indicated that there was no significant difference in the mean ratings of the responses of the groups of respondents on that item. If the P-value is less than 0.05 levels, this indicated that the hypothesis of no significant difference in the mean responses of the groups of respondents was rejected for that item. All

computations were done using the Statistical Package for Social Sciences (SPSS) Version 16.0.

Results

The results for the study were obtained from the research questions answered and hypotheses tested through data collected and analyzed.

Research Question 1

What are the core maintenance skills required by secondary school leavers for servicing cell phones?

Hypothesis one

There is no significant difference in the mean responses of literate road side cell phone technicians and lecturers of electrical/electronic technology in polytechnics on the core maintenance skills required by secondary school leavers for servicing cell phones

The data answering research question one are presented in Table 1

Table 1: Mean Responses and t-test of the Respondents on the Core Maintenance Skills required by Secondary School Leavers for Servicing Cell Phones N = 65

S/N	Item statements	Mean	P-Value	Remark, Ho
1	Clear faults of cell phone with ear piece problem	3.83	0.98	Required, NS
2	Check cell phone with mouthpiece not working	3.65	0.68	Required, NS
3	Carry out minor repair on a cell phone with ringing problem	3.84	0.81	Required, NS
4	Heat the cell phones with vibration problem	3.72	0.35	Required, NS
5	Make minor repair to a cell phone with charging problem	3.82	0.56	Required, NS
6	Heat service dead cell phone	3.71	0.62	Required, NS
7	Dry clean a cell phone with screen problem	4.03	1.01	Required, NS
8	Clean a cell phone with keypad problem	3.97	0.67	Required, NS
9	Clean the ports of a cell phone with SIM card and SIM card port problems	4.15	0.09	Required, NS
10	Service cell phone with network problem	3.93	0.10	Required, NS
11	Adjust cell phone with hand free mode problem	4.01	0.44	Required, NS
12	Set a cell phone hanging when snapping/video recording	3.92	0.89	Required, NS
13	Adjust cell phone restarting when memory card is inserted	3.60	0.81	Required, NS
14	Service cell phone hanging due to overloading of application software	3.83	0.75	Required, NS
15	Make minor repair to a cell phone with charging problem	3.70	0.30	Required, NS
16	Dry clean wet cell phone with appropriate materials	3.63	1.22	Required, NS

Research Question 2

What are the core maintenance skills required by secondary school leavers for repairing cell phones?

Hypothesis two

There is no significant difference in the mean responses of literate road side cell phone

technicians and lecturers of electrical/electronic technology in polytechnics on the core maintenance skills required by secondary school leavers for repairing cell phones. The data answering research question two are presented in Table 2

Table 2: Mean Responses and t-test of Respondents on the Core Maintenance Skills required by Secondary School Leavers for repairing Cell Phones N = 65

S/N	Item statements	Mean	P-Value	Remark, Ho
1	Dismantle the cell phones	3.51	0.09	Required, NS
2	Split out the casing of the cell phone	3.55	0.18	Required, NS
3	Separate the key pad from the mechanism	3.56	0.81	Required, NS
4	Move the slider down	3.74	0.35	Required, NS
5	Lift the connector up to unplug the screen that is attached to the circuit ribbon	3.77	0.61	Required, NS
6	Move the slider up in case of slide phone	3.54	0.62	Required, NS
7	Run fingernail along the edge of the front cover to unclip it	3.80	0.66	Required, NS
8	Remove the front cover of the cell phone	3.77	0.67	Required, NS
9	Identify faulty area or components in a cell phone	3.54	0.19	Required, NS
10	Test the components with appropriate testing instruments	3.79	0.10	Required, NS
11	Remove the component(s) from the mother board using appropriate tools	3.67	0.44	Required, NS
12	Select components of correct specification	3.71	0.89	Required, NS
13	Verify the condition of the components before fixing it back to the mother board	3.69	0.81	Required, NS
14	Repair or change the faulty components if totally bad	3.60	0.75	Required, NS
15	Fixes back the components into mother board correctly	3.56	0.30	Required, NS
16	Applies soldering iron for only 3 seconds if needed	3.58	0.42	Required, NS
17	Applies sufficient flux to point(s) being soldered	3.58	0.11	Required, NS
18	Couple back the phone	3.61	0.14	Required, NS
19	Configure the phone	3.56	0.52	Required, NS

Ho = Null Hypothesis; NS = Not Significant

The data presented in Table 2 reveal that all the 19 items have their mean values ranged from 3.51 to 3.80 which are above the cutoff point of 3.50. This showed that all the 19 items are the core maintenance skills required by secondary school leavers for repairing cell phones. The table also indicated that all the items had their P-values greater than 0.05 at 63 degree of freedom. This indicated that there was no

significant difference in the mean responses of literate road side cell phone technicians and lecturers of electrical/electronic technology in polytechnics on the core maintenance skills required by secondary school leavers for repairing cell phones. Therefore, the null hypothesis of no significant difference was upheld for all the 19 core maintenance skills for cell phone repair

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Research Question 3

What are the material resource inputs required by secondary school leavers for maintenance of cell phones?

Hypothesis three

There is no significant difference in the mean responses of literate road side cell phone technicians and lecturers of electrical/electronic technology in polytechnics on the

material resource inputs required by secondary school leavers for maintenance of cell phones
The data answering research question three are presented in Table 3

Table 3: Mean Responses and t-test of Respondents on the Material Resource Inputs required by Secondary School Leavers for Maintenance of Cell Phones N = 65

S/N	Item Statements	Mean	P-values	Remark, Ho
1	Allen keys	3.81	0.08	Required, NS
2	Infra red rework station for soldering and desoldering of components in the cell phones	3.92	0.18	Required, NS
3	Soldering iron (small-tipped 30-to-50 watt irons)	3.88	0.31	Required, NS
4	Flashing software	3.62	0.35	Required, NS
5	Compatible universal serial bus	4.23	0.56	Required, NS
6	A computer with Windows 2000 or newer with a USB Port, 800Mhz+, 256MB RAM	3.74	0.62	Required, NS
7	Internet facilities in case of down loading software for maintenance of cell phones	3.76	0.61	Required, NS
8	Eyelets and eye letting tools	4.01	0.67	Required, NS
9	Soldering lead for soldering operation	3.74	0.09	Required, NS
10	Soldering paste for soldering	3.90	0.10	Required, NS
11	Long nose pliers	3.92	0.44	Required, NS
12	Cutting pliers for cutting flexible objects	3.61	0.89	Required, NS
13	Hot lead sucker/suction devices for removing melted solder	4.03	0.81	Required, NS
14	Digital power supply	3.71	0.75	Required, NS
15	Fluxes (Non-corrosive liquid flux) to prevent oxidation during soldering	4.20	0.30	Required, NS
16	Multitester for testing and measurement of components electrical quantities	3.83	0.67	Required, NS
17	Solder-resistant paint used in soldering	4.09	0.09	Required, NS
18	Ultrasonic cleaner	3.92	0.10	Required, NS
19	Methylated spirit for washing panel or mother board of cell phones	3.98	0.44	Required, NS
20	Intelligent printed circuit board cleaner for cleaning water damaged mobile phones	4.06	0.89	Required, NS
21	Universal phone lever to open complex cell phones	4.14	0.81	Required, NS
22	Anti-static wrist strap for ESD control	3.71	0.75	Required, NS
23	Antistatic tweezers for installing static sensitive components during mobile phone repair	3.82	0.30	Required, NS
24	Soft, dry cloth for cleaning cell phones	4.29	0.22	Required, NS
25	Pickers for picking small objects in a cell phone	3.64	0.67	Required, NS
26	Screw extractor for grabbing screws	3.81	0.09	Required, NS
27	Universal serial bus cable to provide connectivity between mobile phones and laptop	3.92	0.10	Required, NS
28	Extension boxes for extending power source	3.88	0.45	Required, NS
29	Small brush for cleaning away the solder residues	3.62	0.81	Required, NS
30	Chargers (conventional and universal ones) for charging batteries	4.23	0.23	Required, NS
31	Booster for reactivating dead batteries of cell phones	3.74	0.52	Required, NS
32	Magnifying lens for enlarging tiny objects in a cell phone	3.76	0.31	Required, NS
33	Tweezer	4.01	0.11	Required, NS
34	Magnifying desk lamp	3.74	0.67	Required, NS

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Ho = Null Hypothesis; NS = Not Significant

The data presented in Table 3 reveal that all the 34 items have their mean values ranged from 3.61 to 4.29 which are above the cutoff point of 3.50. This showed that all the 34 items are the material resource inputs required by secondary school leavers for maintenance of cell phones. The table also indicated that all the items had their P-values greater than 0.05 at 63 degree of freedom. This indicated that there was no significant difference in the mean responses of literate road side cell phone technicians and lecturers of electrical/electronic technology in polytechnics on the material resource inputs required by secondary school leavers for maintenance of cell phones. Therefore, the null hypothesis of no significant difference was upheld for all the 34 material resource inputs for maintenance of cell phones.

Discussion of findings

The finding of the study reveals 16 maintenance skills required by senior secondary leavers for servicing cell phones, 19 maintenance skills for repairing cell phones and 34 material resource inputs required by senior secondary leavers for maintenance of all kinds of cell phones. The findings of the study agreed with the findings of Bakare (2014) who determined the ipad maintenance competencies required by electrical/electronic technology students of polytechnics for job creation and security in Lagos State and found out that 11 competencies were required for diagnosing faults in malfunctional ipads, 27 competencies in servicing and repairing faulty ipads and 14 competencies for flashing the faulty ipad technologies.

This finding is in line with the finding of Yakubu (2004) who conducted a study on safety practice skills needed by woodwork students of technical colleges in Kaduna state where he found out that students of woodwork in technical colleges needed sixteen safety practice skills in using hand tools; twenty safety

practice skills in operating portable power tools; thirty safety practice skills in operating machines; ten safety practice skills in handling wood materials and ten safety practice observances in the use of instructional operating guides. The findings of this study agreed with the findings of Olaitan, Osinem, Hontonyon and Akeju (2008) on competencies needed by lecturers in application of micro-computer for teaching in the colleges of education in southwestern Nigeria. The authors found that all the identified 19 competencies covering internet, emailing and power point were needed by lecturers for effective application of computer for teaching in colleges of education. This finding is also in agreement with the study of Akinduro (2006) who carried out a study on electrical installation and maintenance work skills needed by technical college's graduates to enhance their employability in Ondo state. The author found out that the graduates of technical colleges need domestic installation skills, industrial installation skills, cable jointing skills, battery charging skills and winding skills in electrical machine for employment in Ondo State. The findings of the above researchers in their various research activities helped to support the justification of the results of this study on the core resource inputs required by secondary school leavers for setting up cell phone maintenance workshops in Lagos State.

Conclusion

In the module containing all the skills needed for maintenance of cell phones, material resources such as tools, equipment, consumables among others that one requires for maintenance of malfunctional cell phones are not specified. This worry necessitated the study to determine core resource inputs required by secondary school leavers for setting up cell phone maintenance workshops in Lagos State

Recommendations

The following are the recommendations for the implementation of the findings of the study:

1. The identified core maintenance skills should be used to empower senior secondary school leavers for maintenance of all kinds of phones in Lagos State
2. Core material resource inputs should be made available to senior secondary school leavers in order to set up functional cell phone maintenance workshops
3. All the identified core maintenance skills and material resource inputs should be introduced into GSM maintenance module developed for senior secondary schools

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