FACILITIES/EQUIPMENT FOR THE PRACTICAL SKILL TRAINING OF ELECTRONIC WORKS TRADE STUDENTS IN TECHNICAL COLLEGES OF NIGER-STATE AND FEDERAL CAPITAL TERRITORY, ABUJA

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Abstract

The study assessed the practical skill training offered to students of technical colleges in Federal Capital Territory, Abuja using descriptive research of the survey type.. The population for the study consisted of 30 college administrators (23 principals and vice principals and 7 HODs) and 32 Electrical/Electronics teachers. Two research questions were raised and answered while one hypothesis was formulated and tested. A 36 item structured questionnaire was developed from the literature reviewed for the study and utilized in collecting data. The structured questionnaire was face-validated by 3 experts in Electrical/Electronic trades and measurement and evaluation. The Cronbach alpha method was used to test the internal consistency of the questionnaire items and a co-efficient of 0.84 was obtained. The descriptive statistics of mean and standard deviation were used to answer the research questions while t-test statistic was used to test the hypothesis. Findings from the study revealed that most of the facilities/equipment that are needed for practical training of technical college students are not available and those available are inadequate and not effectively put into use by the teachers and students. It was therefore recommended that adequate facilities and equipment should be supplied to the electronics section of the technical colleges. The teachers and experts in the field should recommend the required facilities and equipment to be used in schools. Lastly, for effective use of the facilities/equipment, the college authority should ensure that every teacher is able to operate and or use every tools and equipment available.

Introduction

Electronic work trade is one of the Engineering trades offered in Nigerian Technical Colleges and designed to meet the need of craftsmen that will repair, and service appliances such as cassette players, radio, television and other electronic appliances. It is very important that the technical colleges equip their students with the needed skills that will enable them meet the need of the society in repair and services of electronic goods. The students may also wish to use the opportunity to further their education in technical education (National

Board for Technical Education (NBTE), 2001).

The programme for Electronic works trade in Nigeria technical colleges is designed to produce competent craftsmen in various Electronic works trade. According to National Board for Technical Education (NBTE 2001), a graduate of Electronic works trade is expected to completely diagnose and repair any fault on Radio, Television and Communication system to manufacturers' specifications. These graduates may proceed to tertiary institutions for further studies in Technical Education. A National curriculum is adopted in all the technical colleges accredited by NBTE. The programmes in technical colleges are offered at levels leading to the award of National Technical Certificate (NTC) and Advanced National Technical Certificate (ANTC) for craftsmen and master craftsmen respectively (Federal Government of Nigeria, 2000). The Federal Republic of Nigeria (FRN, 2004) pointed out that the main feature of the curricular activities for technical colleges shall be structured in foundation and trade modules, the curriculum for each trade shall consists of general education, theory and related courses, workshop practice industrial training components and small business management and entrepreneurial training. The curriculum for Electronics works trade in technical colleges covers the major area of Electronic skills which include soldering, fault detection and rectification; others are electronic devices and circuits, radio and audio frequency amplifiers, radio system and television repairs and maintenance. Anadi (1989) as cited in Akinduro (2007) pointed out that it is essential that technical colleges in the light of essence of their establishment should equip the students with skills related to their field of study for employment. Olaitan and Aguisiobo (1981) argued that any skill-oriented discipline where acquisition of skills and knowledge are needed requires an intensive exposure of students to practical work. Therefore, the teaching and learning in Electronic works trade should sufficiently furnish the students with necessary work skills and competences that can lead to skill development and acquisition.

Okorie, (2000) defined skill as expertness in practical ability, dexterity and tact. He stressed further that, to possess a skill is to demonstrate the habit of acing, thinking and behaving in a specific activity in such a way that the process becomes natural to the individual through repetition and practice. As a principle, vocational education will be effective in proportion as it trains the individual directly and specifically in the thinking habits and manipulative habits required in the occupation itself (Okoro, 1993).

Practical skill training is an aspect of a technical college programme that can be defined as an act of doing, making manipulating and practicing the theoretical knowledge gained with the uses of materials, tools and equipment. As craftsmen and technicians pass through technical college programmers it is expected that such programme will equip them to function well in the society. The NBTE (1987) explains that the ultimate goal of the programme offered in the technical college is to enable trainees perform all the skills and show a good knowledge of the theoretical concepts of the trade as specified in training modules before they are certified.

However, Chirs (1998) as cited in Aknduro (2007) noted that most of these skills are not being acquired by technical colleges graduated. He argued that students in technical colleges have often not been given the skills they actually needed. As a result of this, many students are graduating from technical colleges without acquiring the necessary skills. Such graduates find it

difficult to become self-reliant in the face of unemployment in the country.

Electronic works trade is one of the nerve centre of the economics of Nigeria because almost all government, industrial and commercial establishments and private individuals require the service of Electricians or Craftsmen. The word electronics has become a part of our day-to-day lives. Nowadays, it is hard to imagine life without the use of these electronic goods, which include items of regular use like televisions, radios, Global System of mobile communication (G.S.M) Video Compact Disk (V.C.D) computers and many others. It becomes necessary that Electronic craft men and technicians be equipped with the required skills for quality services. Anadi (1989) cited in Akinduro (2007) stated that graduates will contribute effectively to the achievement of self-reliance goal in proportion as they are adequately equipped with the required skill. Every year technical colleges produce graduates who seem not to perform creditably in their education or take employment especially in Electrical and Electronic trades. This has serious economic and social implications on the nation. Since skills acquisition depend on the skill training given to the students, it is then imperative to assess the facilities/equipment used for the practical skills training of students in Electronic works trade. The study is therefore aimed at assessing the facilities/equipment for practical skills training of Electronic works trade student in the technical colleges of Niger state and Federal Capital Territory (FCT), Abuja.

Statement of the Problem

There have been numerous complaints about the competency and the qualities of graduates produced in technical colleges in Nigeria today. According to Tundunwada (1981), most graduates are not properly prepared for work, especially for industries and commerce. Dikko (1998)

also observed that there is growing concern among industrialist that graduates from technical institutions do not possess adequate work skill necessary for employment in industries.

Presently, there is a general concern over the apparent perceived falling standards of education and production of unskilled technical graduates who cannot cope with the world of work especially in Niger State and FCT. The outcry of individuals and groups over the poor quality of technical graduates being produced including those that studied Electronic works trade suggest that there is a problem in the process of training the students. Olaitan (1996) pointed out that many technical college students when they graduate are found in the street without job because their training is inadequate for societal needs. This study is therefore designed to assess the facilities/equipment for practical skill training of technical college students in Electronic works trade in Niger State and FCT.

Purpose of the Study

The purpose of this study is to assess the availability and adequacy of training equipment/facilities in Electronic work trade section in the colleges. The study also investigated the extent of usage of equipment/facilities for teaching practical skill.

Research Questions

The following research questions will be answered by the study:

1. How available and adequate are the training equipment/facilities in Electronic works trade section in technical colleges?

2. To what extent are the equipment/facilities put to effective use for training the students?

Hypothesis

In line with the research questions the under listed hypothesis was formulated.

H_0 There is no significant difference in the mean opinion of technical college administrators and teachers on availability and adequacy of the training equipment/facilities.

Methodology
Research Design

The study adopted a survey research design in carrying out the investigation.

Population

The population for the study consisted of 30 technical college administrators (principals, vice principals and HODs) and 32 Electrical/Electronic teachers in all the technical colleges that offered Electronic works trade in Niger State and FCT

Research instrument

The major instrument used for the study was a set of questionnaires containing a total of thirty eight (38) items statements which were administered on the Electrical/Electronic teachers and college administrators, using the four likert scale of strongly agree, agree, disagree and strongly disagree.

Validity of the instrument

The research instrument was validated through consultation with experts in Electronic works trade and also measurement and evaluation. The
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corrections suggested by the exports led to a modification of some items in the questionnaire.

Reliability of the instrument

The reliability of the instrument was determined using the test-re-test method. The reliability coefficient of 0.84 was obtained using Kuder Richardson Formula (KR-1) this value suggests that the instruments were reliable.

Data Analysis

Data collected were analyzed using the Arithmetic mean (x). The decision point was put at 2.5. This therefore, implies that a mean rating of less that 2.5 is "not available or not adequate or not effectively used" while a mean rating more than 2.5 is "available or adequate or effectively used". The hypothesis formulated was tested at .05 level of significance using t-test statistical tool.

Results

The results of the data analyses are presented below in accordance with the research questions and hypothesis.

Research Question 1

How available and adequate are the training equipment/facilities in electronic works trade section in technical colleges.

Table 1: Mean response of college administrators and teachers on availability and adequacy of training equipment/facilities in technical colleges

S/N	Electronic equipment/ facilities	Availability						Adequacy					
		X_1 Administrators (Principals,vice principals &HODs)N=30	SD_1	Teacher N =32 X_{12}	SD_2	X_1 Ground mean	Remark	X_1 Administrators (Principals,vice principal&HODs)N=30	SD_1	Teacher N = 32 X_{12}	SD_2	X_1 Ground mean	Remark
1	Standard workshop with sufficient work	2.35	1.12	1.90	0.89	2.13	N.A	2.33	0.64	2.25	0.78	2.29	N.A
2	Storage facilities	3.01	0.99	2.25	0.93	2.13	N.A	2.33	0.88	2.35	0.87	2.24	N.A
3	Illumination wires	3.12	0.69	3.31	1.01	3.22	A	2.95	0.99	2.95	0.85	2.95	A
4	Hammer	3.01	1.06	2.75	0.66	2.88	A	2.80	0.66	2.80	0.64	2.80	A
5	Sets of screw driver	2.87	0,81	2.90	0.68	2.89	A	1.97	0.88	2.10	0.96	2.04	N.A
6	Pair of pliers	2.46	1.16	2.05	0.89	2.25	A	2.37	0.75	2.25	0.66	2.31	N.A
7	Soldering irons	2.97	0.90	2.85	0.67	2.91	A	2.25	0.65	1.70	0.88	1.98	N.A
8	Soldering lead	3.12	0.83	2.96	0.55	3.04	A	1.68	0.61	1.72	0.67	1.70	N.A
9	Vero boards	2.35	0.87	2.45	0.87	2.40	N.A	1.88	0.86	2.06	0.83	1.97	N.A
10	Printed circuits	2.20	0.77	1.90	1.03	2.05	N.A	1.80	0.97	1.84	0.87	1.82	N.A
11	Oscilloscope	2.31	0.65	2.10	1.01	2.21	N.A	1.75	1.07	2.01	0.80	1.88	N.A
12	Power supply units	1,75	0.71	1.85	0.92	1.80	N.A	1.90	0.75	1.90	1.03	1.90	N.A
13	Electronic components	2.70	0.87	2.61	1.03	2.66	A	1.95	0.72	2.25	0.89	2.10	N.A
14	Electric wires	3.12	1.00	2.90	1.02	3.01	A	1.76	0.78	1.78	0.63	1.77	N.A
15	Electronic accessories	2.31	1.06	1.78	0.78	2.05	N.A	2.45	0.68	2.22	0.80	2.34	N.A
16	Drilling machines	2.27	0.76	2.12	0.88	2.20	N.A	2.16	1.02	2.16	0.64	2.16	N.A
17	Multi-meters	2.77	0.68	3.20	0.67	2.99	A	1.60	0.94	1.72	1.03	1.66	N.A
18	Flux	1.60	0.71	2.35	0.65	1.78	N.A	2.40	0.89	1.98	1.00	2.19	N.A
19	Measuring instruments	2.12	0.88	1.95	0.79	2.04	N.A	2.45	0.98	2.44	0.66	2.45	N.A
	Grand mean $\overline{X}$	2.48	0.88	2.44	0.84	2.46	N.A	2.15	0.84	2.13	0.82	2.14	N.A

Key

$\overline{X}_1$= Mean of the Administrators $\overline{X}_2$= Mean of the Teachers SD_1 = Standard Deviation of the Administrators
SD_2 = Standard Deviation of the Teachers

The data presented in Table 1 revealed that great number of equipment/facilities for the training of electronic works trade students were not available and inadequate. Items that were not available and inadequate were standard workshop storage facilities, vero boards, printed circuits, oscilloscope power supply units, electronic accessories, drilling

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machines, flux and other measuring instruments. This is indicated by the overall means of each items in both availability and adequacy, were less than 2.50. Illumination wires and hammers were available and adequate as shown by their means which is above 2.50. The items that were available but not adequate were sets of screw-drivers, pair of pliers, soldering iron, soldering lead, electronic components, electric wires and

multimeter as indicated by their overall means which is greater than 2.50 for availability and less than 2.50 for adequacy respectively. The table also showed that the standard deviation (SD) of the items ranged from 0.66 to 1.07. This indicated that the respondents were not very far from the mean and one another in their responses.

Research Question 2

To what extent are the facilities put to effective use for training the students?

Table 2: Mean response of college administrators and teachers on the extent to which the facilities are put to effective use to train the students

	Items	Respondents (Administrators & Teachers) $\overline{X}$	SD	Remarks
20	Standard workshop with sufficient work stations.	2.31	0.76	N.E.U
21	Storage faculties	2.34	0.54	N.E.U
22	Hammers	2.75	0.55	E.U
23	Illumination wires	2.78	0.89	E.U.
24	Set of screwdrivers	3.14	0.90	E.U.
25	Pairs of pliers.	2.68	0.75	E.U.
26	Soldering irons	3.01	0.67	E.U
27	Soldering lead	3.12	1.02	E.U
28	Vero boards	1.89	1.82	N.E.U
29	Printed circuits	1.86	0.86	N.E.U
30	Oscilloscope	1.96	0.41	N.E.U
31	Power supply units	2.27	1.41	N.E.U
32	Electronic components	2.01	0.91	N.E.U
33	Electric wires	1.96	0.95	N.E.U
34	Electronic accessories	2.23	0.70	N.E.U
35	Drilling machines	1.87	1.01	N.E.U
36	Multi meters	2.54	0.50	E.U
37	Flux	1.98	0.87	N.E.U
38	Measuring instruments	2.00	0.96	N.E.U
	Ground mean $\overline{X}$	2.41	0.75	N.E.U

Key
N.E.U = Not Effectively Used $\overline{X}$ = Mean
SD   = Standard Deviation   E.U.= Effectively Used.

The data in Table 2 shows that most of the available equipment/facilities in electronic work trades were not put to effective use in training the students. These are standard workshop, storage facilities, Vero boards, printed circuits, oscilloscope, power supply units, electronic components, electric wires, electronic accessories, drilling machines, other measuring instrument, and flux. This

is evident by the overall means of each of the items being below 2.50. Equipment/facilities that were put to effective use were hammers, illumination wires, set of screwdrivers, pairs of pliers, soldering iron, soldering lead and multimeter, as shown by their overall means, which is above 2.50.The table also showed that the standard deviation (SD) of the items

ranged from 0.66 to 1.07. This indicated that the respondents were not very far from the *Hypothesis*

mean and one another in their responses.

Table 3: t-test analysis of the mean responses of college administrators and teachers on the availability and adequacy of training facilities

Table 3a Availability

Group	N	$\overline{X}$	SD	Df	t-cal	t-crit	P < 0.05
Administrators	30	2.48	0.88	60	1.83	2.00	Not significant
Teachers	32	2.44	0.84				

Table 3b Adequacy

Group	N	$\overline{X}$	SD	Df	t-cal	t-crit	P < 0.05
Administrators	30	2.15	0.84	60	0.95	2.00	Not significant
Teachers	32	2.13	0.82				

Key
N = Numbers of Respondents
$\overline{X}$ = *Mean*
SD = Standard Deviation
Df = Degree of freedom

Table 3a & 3b show that t-calculated value for availability and adequacy of equipment/facilities are 1.83 and 0.95 respectively at t-table value of 2.00 at 0.05 level of significance. Therefore, the null hypothesis of no significant is not rejected. The t-test analysis in table 3a & b indicates that there is no significant difference between the mean responses of college administrators (Principals, vice principals and HODs) and teachers on availability and adequacy of the training equipment/facilities for practical skills development of Electronic works trade students in Technical Colleges.

Discussion

The findings of this study have revealed that there was unavailability and inadequacy of training equipments/facilities in electronic works trade of the technical colleges. The findings show that out of nineteen items listed, only two were available and adequately supplied, six were available but not adequate, while twelve items listed were not available and therefore, not adequate. This situation is not consistent with Ressier (1986) who stressed the need for adequacy of facilities in vocational training. According to him, adequate training facilities enable the learners to actively participate in the learning process and that it has the effect of reducing abstractions to the concrete thereby making learning more understandable and meaningful to the learners. Also, this situation is not consistent with Ezeji (2004) who emphasized that industrial arts education requires a laboratory/workshop setting with adequate training facilities as a unique learning situation in which the learner may experiment, test, construct, assemble, repair, design, create, imagine and study. He stressed that active laboratory/workshop experiences are essential to the study of industrial Arts education.

The equipment/facilities were not put to effective use in training the students. As revealed by the findings only hammers, sets of screwdrivers, and pliers were effectively used to train the students while the rest of the facilities were not put to effective used. This is not in agreement with Nwachuku (2001) who stated that the use of facilities depend to a large extent on the instructors commitment to his professional responsibility and more importantly his resourceful and ingenuity. For any technical education programme to be taught, He stressed that the use of tools and equipment are very necessary, to make the lesson meaningful and interesting to the students.

The t-test for hypothesis revealed that there is no significant difference between the mean opinion of college administrators and electrical/electronic teachers on the availability and adequacy of equipment/facilities in technical colleges. The non-significant difference between the mean responses of the two groups of respondents could be attributed to the fact that equipment/facilities were not supplied to the college and many were grounded without replacement. Some of the equipment are obsolete and abandoned as a result of poor maintenance. This situation is not in consonant with Olaitan, Nwachuku, Igbo, and Ekong (1999) who suggested that work experience can only be achieved where the training jobs are carried on in the same way with the same operations, the same tolls and the same machines as in occupation itself. The situation as revealed by the analyses did not also agree with Kavanaugh (1982) who stressed the need to expose students to all necessary tools and equipments required in the trades. This according to him is to avoid the students finding the tools and equipments strange when required to work with them in industries after graduation.

Conclusion and Recommendation

The economic development of any country is directly related to the quality of its available human resources. Human resources productivity can only be enhanced through skill acquisition. In Nigeria, skills acquisition is hoped to be achieved through vocational education which has as one of its major objectives to impact skills that will make the recipient self-reliant. For this objective to be achieved, the government and stakeholders must provide technical colleges with necessary and adequate tools and equipment/facilities for teachers and students to use. The teachers and experts in the field should recommend the required facilities. For effective use of the facilities, the college administrators should ensure that every teacher is able to operate and or use every tools and equipment available to enhance teaching. The college administrators must ensure that the available resources and equipment are effectively put into use for training the students.

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