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Assessment of Resource Inputs into Electrical and Electronic Trades in Technical Colleges

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Abstract. This study was a survey research designed to determine the availability, functionality and utilization of human, material and physical resource inputs into the implementation of electrical and electronic trades programme in Ogun state technical colleges. To accomplish these objectives, five research questions were formulated. The entire population of heads of department of electrical and electronic trades, principals and students in six technical colleges in Ogun state, Nigeria were used for the study, because of the relatively small size. A three (3)-section instrument which was face-validated by experts was used for data collection. The data collected from the study was analysed using frequency count, percentages, mean, and standard deviation. The study found that teachers of electrical and electronic trades in Ogun state technical colleges are inadequate, and that student-teacher ratio does not conform to the National Board for Technical Education (NBTE) stipulated standard for technical courses. The study also found that material and physical resources are inadequate. Furthermore, ¾ of the available resource input into electrical and electronic trades are not functional while only 13% of the available resource inputs are being utilized for the skill acquisition of students. It was therefore recommended that, administrators of technical colleges should strengthen the linkage between technical colleges and industries, to enable access to industrial attachment for both teachers and students. Efforts should also be made by the government through improved funding, to ensure the provision of the minimum required human, material, and physical resources for effective implementation of the electrical and electronic trades programme. Technical college administrators were also advised to devise a system of predictive, preventive, and corrective maintenance in order to ensure that the school's resources are kept in good condition, among others.

1. Introduction

Technical college is an integral part of Nigeria's education system. It contributes towards the development of physical and economic competencies of the individual (Sanni, 2002). In technical colleges, learners are trained to acquire relevant knowledge and skills in different occupations for gainful employment. According to Federal Ministry of Education (2004), a technical college is a section of Technical and Vocational Education (TVE) designed to produce craftsmen and master craftsmen in various skill areas.

Electrical and electronics trades are among the skilled areas studied in Technical colleges. The goal of the programme is to produce craftsmen, technicians and other skilled personnel who will be enterprising and self-reliant with skills in basic electricity, cable jointing, domestic and industrial installation, as well as winding of electrical machines, among others. The trade comprises of Electrical Installation and Maintenance Work, plus Radio, Television and Electronic Work (NBTE, 2001).

According to Ede (2001), some of the basic factors that could help in achieving meaningful technical education in electrical and electronics trades include the provision of necessary resources inputs. An input, according to Hornby (2004), is that which is placed into projects or programmes in order to make it succeed. Inputs are resources such as people, raw materials, information or finance that are fed into a system to obtain a desired output. Adesina and Anyahoka (2004) stated that an input is the resource that facilitates the effective implementation of a given curriculum.

Resources may mean different things to different persons. According to Adeogun (1999), educational resources refer to the facilities that can be used to achieve educational goals and objectives. He grouped them into physical, human and material resources. According to him, human resources are teachers and administrative staff; physical resources are buildings, workshops, laboratories, libraries; while material resources are tools, equipment and consumables. Similarly, Ekundayo (2009) defined educational resources as the totality of everything which the education system need for its smooth running, and that include human, physical and material resources. In the context of this study, resources for electrical/electronic trades are the individuals, facilities and equipment utilized to impart to the learner knowledge, skills and attitudes in electrical/electronic trades. This study grouped electrical and electronic trades' resources into human, physical and material resources.

Orebanjo (1999) recorded that teachers as human resources in the education system, help learners in various aspects of skill aacquisition. Fabunmi (1997) also noted that educational resources in schools are the major variables that determine the rate of educational success; hence their availability and quality will determine the quality of output. Olaitan, Igbo, Nwachukwu, Onyemachi and Ekong (1999) also added that the effective implementation of vocational and technical education curriculum depends on the quality of teachers and their ability to effectively manipulate, and operate available tools and equipment, for the training of the students. This implies that without adequate material, physical and human resources input, the objectives of electrical and electronic trades programme cannot be achieved.

Therefore, to achieve effective electrical and electronic trades programme, technical colleges where the craftsmen are trained need to be well equipped with quality human, physical, and material resources. According to World Bank report on Africa (2004), many teachers recruited into teaching profession in schools do not meet the quality required for effective teaching. The Teachers Registration Council of Nigeria (2017), also indicated that about 50 percent of the teachers in the Nigerian school system are found unqualified. Teachers of electrical and electronic trades are not an exemption in this scenario. The achievement of quality in teaching demands that the input to teaching and learning should be available, adequate and functional and properly utilized.

The body that is charged with the responsibility of regulating and maintaining standards in Technical Colleges specified the minimum requirements for the training and production of quality electrical and electronics trades graduates. This includes general admission requirements into the colleges, necessary resources such as classroom, laboratories, books in the library, equipment like signal generator, signal tracer, oscilloscope, frequency counter, portable drilling machine, and personnel. Therefore, qualified and committed teachers, as well as adequate, functional, and well utilized tools and equipment, are required for proper skill acquisition in electrical and electronic trade programme. Considering the dearth of skills and increase in unemployment among electrical and electronic trade graduates, there is a possibility that available resources in the colleges may not be functional or well utilized for skill acquisition of learners. Therefore the assessment of educational resource inputs into the programme deserves serious attention.

Inadequate, non-functional or underutilized resources will result to inability of electrical and electronic trade graduates to truly learn what matters within the specified school years. This can result into graduate unemployment, and

even generate vices such as armed robbery, internet scam and drug pushing by graduates. In the light of the above, the major purpose of this study was to assess the resource inputs into the implementation of electrical and electronic trade programme in Ogun state technical colleges.

2. Research Questions

The following research questions guided the study:

- How adequate is the available human resource input into electrical and electronic trades programme in Ogun state technical colleges?
- How adequate is the available material resource input into electrical and electronic trades programme in Ogun state technical colleges?
- How adequate is the available physical resource input into electrical and electronic trades programme in Ogun state technical colleges?
- Are the available electrical and electronic trades resources functional?
- To what extent are the available resources utilized in Ogun state technical colleges?

3. Methodology

The study adopted a descriptive survey research design. The population for this study consists of Electrical and Electronics Trades heads of department, principals and students in government-owned technical colleges in Ogun state, Nigeria. They are: Government Technical College Ajegunle; Government Technical College Aiyetoro; Government Technical College Idi-Aba, Abeokuta; Government Technical College Igbesa; Government Technical College Ijebu-Ode; Government Technical College ljebu-Igbo; and Government Technical College Ilara-Remo. The entire population was used for the study. This population was accessible and manageable due to the relatively small size. All the heads of department of electrical/electronic trades, principals and students in the technical colleges were purposively selected for the study.

Three sets of instrument were used for data collection for this study. They are:

(a) Checklist for electrical and electronic trades heads of department in technical colleges
(b) Resource input into electrical and electronic trades questionnaire for principals in technical colleges
(c) Resource input into electrical and electronic trades questionnaire for students in technical colleges

Part A was adapted from the National Board for Technical Education (NBTE) document of minimum required laboratory/workshop, equipment, instruments and tools for electrical and electronic trades. Additional columns were included in the minimum requirements in order to determine the functionality of the available tools and equipment.

Part B contains items that are based on the NBTE minimum requirements for physical and human resources, while items in Part C were designed to investigate the level of utilization of the available tools and equipment.

Items in the instrument were generated from the National Board for Technical Education (NBTE) document of minimum requirements for electrical and electronic trades programme. It was however subjected to face validation by three experts.
The researcher relied on the data supplied by the principals, heads of department, and students concerning the availability, functionality, and utilization of resource inputs into electrical and electronic trades in Ogun state technical colleges. The data collected from the study was analysed using frequency count, percentages, mean and standard deviation. In taking decision on the availability of the inputs, any input that was available and more than required (AMR) was considered very adequate, those available as required (AAR) was considered adequate. Also, those that were available but lower than required (ALR) was considered inadequate, while the last group with zero (0) frequency was be termed Not Available at-all (NAA).

The real limit of the mean values of items was used to take decisions on the level of utilization of the available tools and equipment. The statistical real limit of the mean values is as follows: **Very Highly Utilized (VHU)** = 4.50 - 5.00, **Highly Utilized (HU)** = 3.50 - 4.49, **Utilized (U)** = 2.50 - 3.49, **Moderately Utilized (MU) =** 1.50 - 2.49, **Not Utilized (NU)** = 0.50 - 1.49

4. Results

Research Question 1: How adequate is the available human resource input into electrical and electronic trades programme in Ogun state technical colleges?

Table 1: Human Resource Input into Electrical and Electronic Trades Programme in Ogun State Technical Colleges

S/N	Technical Colleges	No. of Teachers	Minimum Qualification of Teachers	Remark	Teacher-Student Ratio	Remark	Decision
1	College A	1	BSc (Ind. Tech)	Qualified	1:82	ALR	Inadequate
2	College B	3	BSc (Elect)	Qualified	1:63	ALR	Inadequate
3	College C	2	PGDE (Ind. Tech)	Qualified	1:114	ALR	Inadequate
4	College D	1	BSc (Basic Elect)	Qualified	1:84	ALR	Inadequate
5	College E	2	PGDE (Ind. Tech)	Qualified	1:59	ALR	Inadequate
6	College F	2	PGDE (Ind. Tech)	Qualified	1:37	ALR	Inadequate

***ALR: Available, but lower than required**

Table 1 shows that teachers in the six technical colleges used for this study possess the requisite qualifications for teaching electrical and electronic trades. However, it can be seen from the table that student-teacher ratio ranges from 1:37 to 1:114 in the technical colleges. This negates the National Board for Technical Education (NBTE) stipulated standard of 1:25 for technical courses. As such, the teachers are available, but lower in quantity than required in the technical colleges. Human resource input into electrical and electronic trades programme in Ogun state technical colleges is therefore inadequate.

Research Questions 2: How adequate is the available material resource input into electrical and electronic trades programme in Ogun state technical colleges?

Table 2: Material Resource Input into Electrical Installation and Maintenance Work in Ogun State Technical Colleges

S/N	Description	QR	QR for 6 Colleges	Quantity Available in each College						Quantity available for the 6 Colleges	Remarks
				A	B	C	D	E	F		
1	Workbench	40	240	5	4	10	5	5	5	34	Inadequate
2	Crowbar	20	120	-	6	-	-	-	-	6	Inadequate
3	Conduit bender	20	120	3	1	1	1	2	1	9	Inadequate
4	Stock and dies	10	60	-	-	-	-	-	-	-	Not Available
5	Conduit vice	20	120	-	-	-	-	-	-	-	Not Available
6	Clamp	40	240	-	-	-	-	-	-	-	Not Available
7	Winding machine	20	120	-	-	-	-	-	-	-	Not Available
8	Battery charger	20	120	2	1	1	1	1	1	7	Inadequate
9	Grease gun	10	60	-	3	-	-	-	-	3	Inadequate
10	Wiring board	40	240	6	68	10	5	6	7	102	Inadequate
11	Oil can	5	30	-	8	2	-	-	-	10	Inadequate
12	Ladder	5	30	3	1	2	1	1	1	9	Inadequate
13	Scaffold	1	6	-	-	-	-	-	-	-	Not Available
14	Blow lamp	5	30	1	4	1	2	1	1	10	Inadequate
15	Goggle	40	240		5	3	-	-	-	8	Inadequate
16	Soldering iron	30	180	4	6	10	7	20	10	57	Inadequate
17	Welding, brazing M/C	5	30	-	-	-	-	-	-	-	Not Available
18	Hand gloves	40	240	-	-	-	-	-	-	-	Not Available

19	First aid box	2	12	-	-	-	-	-	-	-	Not Available
20	Heater	4	24	-	1	-	1		1	3	Inadequate
21	Helmet	20	120	-	-	-	-	-	-	-	Not Available
22	Safety belt	20	120	1	-	-	1	-	-	2	Inadequate
23	Overall	30	180	-	-	-	-	-	-	-	Not Available
24	Measuring tape	24	144	-	2	-	1	1	1	5	Inadequate
25	Ac ammeter	10	60	-	6	1	-	2	-	9	Inadequate
26	Dc ammeter	10	60	-	10	2	-	2	-	14	Inadequate
27	Ac voltmeter	10	60	-	-	2	-	2	-	4	Inadequate
28	Dc voltmeter	10	60	-	-	2	-	2	-	4	Inadequate
29	Digital multimeter	50	300	-	50	5	-	5	10	70	Inadequate
30	Analog multimeter	20	120	1	39	10	5	7	15	77	Inadequate
31	1ø meter	10	60	2	2	2	2	2	2	12	Inadequate
32	3ømeter	10	60	1	-	1	-	-	-	2	Inadequate
33	Neon tester	20	120	-	15	10	4	1	1	31	Inadequate
34	Voltage tester	20	120	-	4	2				6	Inadequate
35	Steel rule	25	150	-	12	4	3	2	2	23	Inadequate
36	Oscilloscope	2	12	-	-	-	-	-	-	-	Not Available
37	Signal generator	2	12	-	-	-	-	-	-	-	Not Available
38	Micrometer	20	120	-	-	-	-	-	-	-	Not Available
39	Screw driver set	40	240	-	32	10	10	10	10	72	Inadequate
40	Allen keys	40	240	-	-	-	-	-	-	-	Not Available
41	Strippers	50	300	-	1	2	1	1	-	5	Inadequate
42	Hammers	50	300	5	60	10	8	10	10	103	Inadequate
43	Pliers	40	240	-	43	5	7	10	10	75	Inadequate
44	Cutters	40	240	-	47	4	5	5	7	68	Inadequate
45	Hacksaws	40	240	1	50	1	1	1	1	55	Inadequate
46	Mallets	10	60	-	7	5	3	1	2	18	Inadequate
47	Spanners	40	240	8	-	5	7	5	5	30	Inadequate
48	Files	40	240	-	11	3	-	4	-	18	Inadequate
49	Drill (manual)	3	18	-	-	-	-		-	-	Not Available
50	Drill (electric)	3	18	-	1	1	-	-1	-	1	Inadequate
51	Knives	50	300	-	-	-	-	-	-	-	Not Available
52	Pipe wrenches	20	120	-	-	-	-	-	-	-	Not Available
53	Centre punch	20	120	-	13	-	5	-	5	23	Inadequate
54	Ringing tools	40	240	-	-	-	-	-	-	-	Not Available
55	Crimping tools	40	240	-	2	-	-	-	-	2	Inadequate
56	Rheostats	35	210	-	-	-	-	-	-	-	Not Available
57	Inductors	30	180	-	-	-	-	-	-	-	Not Available
58	Transformers	50	300	-	5	-	1	1	-	7	Inadequate
59	DC motor	20	120	-	1	-	-	-	1	2	Inadequate
60	Dc generator	20	120	-	1	-	-	-	1	2	Inadequate
61	1øAc motor	20	120	1	-	-	-	-	1	2	Inadequate
62	1øAc generator	20	120	1	-	-	-	-	1	2	Inadequate
63	Starters	20	120	-	1		-	-	1	2	Inadequate
64	Relays	25	150	-	-	-	-	2	-	2	Inadequate
65	Ceramic insulator	20	120	-	-	-	-	-	-	-	Not Available
66	Crocodile clips	50 p	300	-	2	4	5	5	5	21	Inadequate
67	Ceiling roses	60	360	-	-	-	-	-	-	-	Not Available
68	Armature	20	120	-	-	-	-	-	-	-	Not Available
69	Conduit pipes (PVC)	50	300	2	2	-	-	-	-	4	Inadequate
70	Conduit pipes (steel)	50	300	-	-	-	-	-	-	-	Not Available
71	Circuit breakers	40	240	-	-	-	-	-	-	-	Not Available

*** QR** = Quantity Required, **Percentage Inadequate** =65%, **Percentage Not Available** =35%

Table 2 shows the material resource input into Electrical Installation and Maintenance Work in Ogun state technical colleges. It can be seen that none of the material resource input into Electrical Installation and Maintenance Work is provided in adequate quantity. Rather, 46 of the required materials, which represents 65% are inadequate while the remaining 25 (i.e. 35%) are not even available at all.

Table 3: Material Resource Input into Radio, Television and Electronic Work in Ogun State Technical Colleges

S/N	Description	Quantity Required	Number Available	Remark
1	Multimeter (analog)	20	6	Inadequate
2	Transistor tester	10	4	Inadequate
3	Component checkers	10	-	Not Available
4	Multimeter (digital)	50	1	Inadequate
5	Volt-ohm-milliameter (VOM)	10	8	Inadequate
6	High Input Impedance voltmeter (VTUN or TVM)	5	-	Not Available
9	Magnifying lens	10	-	Not Available
10	Small plastic container	10	2	Inadequate
11	Oscilloscope with 6mhz bandwidth	5	1	Inadequate
12	Flashlight	30	-	Not Available
13	Sandpaper	40	-	Not Available
14	Steel bowl	40	-	Not Available
15	Small bench vice	10	4	Inadequate
16	Portable drilling machine	2	-	Not Available
17	AV equipment	1	-	Not Available
19	Overhead Projector	10	-	Not Available
20	VCR and it monitor	5	-	Not Available
21	Illustration colour chart	40	-	Not Available
22	Screw driver sets	40	10	Inadequate
23	Nut drivers (Hex)	20	-	Not Available
24	Soldering iron	30	8	Inadequate
25	Wire stripper	50	-	Not Available
26	Regular and miniature needle Pliers	40	-	Not Available
27	Diagonal cutters	40	-	Not Available
28	Screws (set)	12	-	Not Available
29	Drill	3	-	Not Available
30	Fixed resistor(assorted)	50	60	Adequate
31	Variable resistor(assorted)	50	60	Adequate
32	Fixed capacitor	50	60	Adequate
33	Variable capacitor	50	60	Adequate
34	Air core inductor	50	1	Inadequate
35	Magnetic core inductor	50	1	Inadequate
36	Transformer(LF)	50	6	Inadequate
37	Transformer (HF)	50	-	Not Available
38	60/40 solder	20	-	Not Available
39	Pen light	30	-	Not Available
40	Steel-wire brush	15	-	Not Available
41	Pocket knife	50	-	Not Available
42	Electrical tapes	24	-	Not Available
43	Crimping tools	40	-	Not Available
44	Heat sinks	30	6	Inadequate
45	Files	40	2	Inadequate
46	Variable power supply	50	2	Inadequate
47	Desoldering device	30	-	Not Available
48	Alignment tools	15	-	Not Available
49	Soldering gun	50	-	Not Available

Adequate:8%, Inadequate: 31%, Not Available: 61%

Table 3 shows the material resource input into Radio, Television and Electronic Work in Ogun state technical colleges. It can be seen from the table that 30 material resource input, which represent 61% of the total material required, are not available at all. 15 material resource input, which represent 31% of the total material required, are available but inadequate, while 4 material resource input, which represent only 8% of the total material required are adequate in quantity.

Research Questions 3: How adequate is the available physical resource input into electrical and electronic trades programme in Ogun state technical colleges?

Table 4a: Physical Resource Input into Electrical and Electronic Trades Programme in Ogun State Technical Colleges

S/N	Resources	Sitting capacity required	Sitting capacity available in the colleges						Remark
			A	B	C	D	E	F	
1	Library	1/3rd of student population	-	24	40	-	-	-	Inadequate
2	Chemistry laboratory	30-35 students	-	38	40	25	-	-	Inadequate
3	Physics laboratory	30-35 students	-	35	15	30	-	-	Inadequate
4	Metal workshop	30-35 students	-	30	-	-	-	-	Inadequate
5	Electrical installation workshop	30-35 students	20	20	80	50	20	20	Inadequate

Table 4b: Furnitures and offices

S/N	Item	Number Available						Remark
		A	B	C	D	E	F	
1	Teachers' tables	2	3	3	2	2	2	Adequate
2	Teachers' chairs	2	3	3	2	2	2	Adequate
3	Students' lockers	40	30	50	35	50	30	Inadequate
4	Students' chairs	40	60	50	35	50	40	Inadequate
5	Teachers' offices	1	2	3	1	2	1	Adequate

Table 4a and 4b reveals the adequacy of physical resource input into electrical and electronic trade programme in Ogun state technical colleges. From table 4, it can be seen that recommended physical resources like library, Physics laboratory, chemistry laboratory, metal workshop, and electrical installation workshop provided for the implementation of the programme are inadequate. Furthermore, table 4b which shows the adequacy of teacher and student furnitures, teachers' offices revealed that teachers offices are available and complemented with the required furniture, but that is not true in the case of students. Finding revealed that students' chairs and lockers are grossly inadequate.

Research Questions 4: Are the available electrical and electronic trades resources functional?

Table 5a: Functionality of Resource Input into Electrical and Electronic Trades Programme in Ogun State Technical Colleges (Electrical Installation and Maintenance Work)

S/N	Description	QR for 1 College	QR for 6 Colleges	Quantity available for 6 Colleges	Quantity in good condition	Quantity in bad condition
1	Workbench	40	240	34	12	22
2	Crowbar	20	120	6	2	4
3	Conduit bender	20	120	9	9	-
4	Battery charger	20	120	7	6	1
5	Grease gun	10	60	3	0	3
6	Wiring board	40	240	102	100	2
7	Oil can	5	30	10	10	-
8	Ladder	5	30	9	7	2
9	Blow lamp	5	30	10	7	3
10	Goggle	40	240	8	8	-
11	Soldering iron	30	180	57	30	27
12	Heater	4	24	3	1	2
13	Safety belt	20	120	2	2	-
14	Measuring tape	24	144	5	5	-
15	Ac ammeter	10	60	9	4	5
16	Dc ammeter	10	60	14	10	4
17	Ac voltmeter	10	60	4	2	2
18	Dc voltmeter	10	60	4	2	2
19	Digital multimeter	50	300	70	45	25
20	Analog multimeter	20	120	77	20	57
21	1ø meter	10	60	12	10	2
22	3ø meter	10	60	2	2	-

23	Neon tester	20	120	31	31	-
24	Voltage tester	20	120	6	5	1
25	Steel rule	25	150	23	22	1
26	Screw drivers	40	240	72	56	12
27	Strippers	50	300	5	3	2
28	Hammers	50	300	103	89	14
29	Pliers	40	240	75	60	15
30	Cutters	40	240	68	52	16
31	Hacksaws	40	240	55	50	5
32	Mallets	10	60	18	11	7
33	Spanners	40	240	30	28	2
34	Files	40	240	18	12	6
35	Drill (electric)	3	18	1	0	1
36	Centre punch	20	120	23	23	-
37	Crimping tools	40	240	2	1	1
38	Transformers	50	300	7	5	2
39	DC motor	20	120	2	2	-
40	Dc generator	20	120	2	1	1
41	Ac motor ((1ø)	20	120	2	2	-
42	Ac gen (1ø)	20	120	2	1	1
43	Starters	20	120	2	1	1
44	Relays	25	150	2	1	1
45	Crocodile clips	50p	300	21	21	-
46	PVC Conduit	50	300	4	2	2

24% fully functional, 76% partially functional

Table 5b: Functionality of Resource Input into Electrical and Electronic Trades Programme in Ogun State Technical Colleges (Radio, Television and Electronic Work)

S/N	Description	QR	Quantity Available	Quantity in good condition	Quantity in bad condition
1	Multimeter (analog)	20	6	0	6
2	Transistor tester	10	4	0	4
3	Multimeter (digital)	50	1	0	1
4	Volt-ohm-milliameter (VOM)	10	8	0	8
5	Small plastic container	10	2	2	-
6	Oscilloscope with 6mhz bandwidth	5	1	1	-
7	Small bench vice	10	4	0	4
8	Screw driver sets	40	10	0	10
9	Soldering iron	30	8	0	8
10	Fixed resistor(assorted)	50	60	60	-
11	Variable resistor(assorted)	50	60	60	-
12	Fixed capacitor	50	60	60	-
13	Variable capacitor	50	60	60	-
14	Air core inductor	50	1	0	1
15	Magnetic core inductor	50	1	1	-
16	Transformer(LF)	50	6	0	6
17	Heat sinks	30	6	6	-
18	Files	40	2	1	1
19	Variable power supply	50	2	1	1

42% fully functional, 58% partially functional

Table 5a and b reveals the functionality of resources input into electrical and electronic trade in Ogun state technical colleges. Firstly, it can be seen that only 11, which represents 24% of the available resource input into electrical installation and installation work are fully functional. Not all the remaining 35 available electrical installation and maintenance work resources are functional as seen in the table. Furthermore, it can also be seen from the radio, television, and electronic work resources table that only 42% of the available resources are fully functional. The remaining 58% are partially functional.

Research Question 5: To what extent are the available resources utilized in Ogun state technical colleges?

Table 6a: Utilization of resource input into electrical and electronic trades programme in Ogun state technical colleges (Electrical Installation and Maintenance Work|)

S/N	Description	$\bar{X}$	S.D	Remark
1	Workbench	2.95	1.00	Utilized
2	Crowbar	2.20	0.52	Not Utilized
3	Conduit bending machine	2.30	0.66	Not Utilized
4	Battery charger	2.35	0.49	Not Utilized
5	Grease gun	2.25	0.44	Not Utilized
6	Wiring board	3.15	0.93	Utilized
7	Oil can	2.20	0.62	Not Utilized
8	Ladder	2.30	0.92	Not Utilized
9	Blow lamp	2.35	1.04	Not Utilized
10	Goggle	2.45	1.15	Not Utilized
11	Soldering iron	3.35	1.31	Utilized
12	Heater	2.15	0.99	Not Utilized
13	Safety belt	2.50	1.40	Not Utilized
14	Measuring tape	2.35	0.93	Not Utilized
15	Ac ammeter	2.20	0.70	Not Utilized
16	Dc ammeter	1.95	0.39	Not Utilized
17	Ac voltmeter	2.20	0.41	Not Utilized
18	Dc voltmeter	2.25	0.64	Not Utilized
19	Digital multimeter	2.30	0.80	Not Utilized
20	Analog multimeter	2.15	0.49	Not Utilized
21	Energy meter (single phase)	2.25	0.44	Not Utilized
22	Energy meter (three phase)	2.25	0.85	Not Utilized
23	Neon tester	2.25	0.64	Not Utilized
24	Voltage tester	2.05	0.22	Not Utilized
25	Steel rule	1.95	0.39	Not Utilized
26	Screw driver set	2.10	0.31	Not Utilized
27	Strippers	2.10	0.55	Not Utilized
28	Hammers	3.35	1.42	Utilized
29	Pliers	3.80	1.44	Utilized
30	Cutters	2.00	0.46	Not Utilized
31	Hacksaws	2.30	0.80	Not Utilized
32	Mallets	2.10	0.72	Not Utilized
33	Spanners	2.15	0.49	Not Utilized
34	Files	2.15	0.37	Not Utilized
35	Drill (electric)	1.95	0.60	Not Utilized
36	Centre punch	2.25	0.79	Not Utilized
37	Crimping tools	2.20	0.52	Not Utilized
38	Transformers	2.15	0.49	Not Utilized
39	DC motor	2.10	0.55	Not Utilized
40	Dc generator	2.15	0.49	Not Utilized
41	Ac motor (single phase)	2.25	0.85	Not Utilized
42	Ac generator (single phase)	2.25	0.72	Not Utilized
43	Starters (various types)	2.25	0.72	Not Utilized
44	Relays	2.25	0.55	Not Utilized
45	Crocodile clips	4.05	1.32	Utilized
46	Conduit pipes (PV)	2.15	0.49	Not Utilized

13% Utilization

Table 6b: Utilization of resource input into electrical and electronic trades programme in Ogun state technical colleges (Radio, Television and Electronic Work)

S/N	Description	$\bar{X}$	S.D	Remark
1	Multimeter (analog)	2.20	0.70	Not Utilized
2	Transistor tester	2.00	0.32	Not Utilized
3	Multimeter (digital)	2.10	0.31	Not Utilized

4	Volt-ohm-milliameter (VOM)	2.10	0.72	Not Utilized
5	Small plastic container	2.35	0.88	Not Utilized
6	Oscilloscope with 6mhz bandwidth	2.35	0.75	Not Utilized
7	Small bench vice	2.20	0.52	Not Utilized
8	Screw driver sets	2.20	0.52	Not Utilized
9	Soldering iron	2.20	0.52	Not Utilized
10	Fixed resistor(assorted)	2.30	0.92	Not Utilized
11	Variable resistor(assorted)	2.15	0.49	Not Utilized
12	Fixed capacitor	2.35	0.93	Not Utilized
13	Variable capacitor	2.20	0.52	Not Utilized
14	Air core inductor	2.10	0.72	Not Utilized
15	Magnetic core inductor	2.05	0.22	Not Utilized
16	Transformer(LF)	2.20	0.52	Not Utilized
17	Heat sinks	2.20	0.62	Not Utilized
18	Files	2.20	0.52	Not Utilized
19	Variable power supply	2.25	0.85	Not Utilized

0% Utilization

Table 6a and b reveals the utilization of resource input into electrical and electronic trade in Ogun state technical colleges. It can be seen that only 6, which represents 13% of the available resource input into electrical installation and maintenance work, are being utilized for skill acquisition of the students, the remaining 87% are not utilized. Furthermore, it can be seen that none of the radio, television, and electronic work resources provided is utilized for teaching and learning in the technical college.

5. Findings of the Study

- The number of teachers for electrical and electronic trades programme in Ogun state technical colleges is lower than required, in other words, inadequate.
- Teachers in the technical colleges used for this study possess the requisite qualifications for teaching electrical and electronic trades.
- Student-teacher ratio is far above the National Board for Technical Education (NBTE) standard. The stipulated standard is 1:25 for technical courses. The range on ground however is 1:37 to 1:114.
- 65% of the required materials for electrical installation and maintenance work are inadequate. 35% of the required materials are not available at all.
- 61% of the materials required for radio television and electronic work are not available in the technical colleges, 31% of the materials required is available but inadequate, while only 8% of the materials required is available and adequate.
- Physical resources like library, Physics laboratory, chemistry laboratory, metal workshop, and electrical installation workshop provided for the implementation of the programme are inadequate.
- Sufficient teachers' offices are available, and complemented with adequate furniture.
- Students' chairs and lockers are grossly inadequate.
- Only 24% of the available resource input into electrical installation and maintenance work are fully functional.
- Only 42% of the available resource input into radio, television, and electronic work are fully functional.
- Only 13% of the available resource input into electrical installation and maintenance work are utilized for skill acquisition of the students.
- None of the 19 resources provided for radio, television, and electronic work are utilized for teaching and learning in the technical colleges.

6. Discussion of Findings

The findings in this study reveal that availability of teachers for electrical and electronic trades programme in Ogun state technical colleges is

lower than required. However, the available teachers possess the requisite qualifications for teaching electrical and electronic trades. Student-teacher ratio also negates the National Board for Technical Education (NBTE) stipulated standard of 1:25 for technical courses.

This finding is contrary to World Bank report on Africa (2004) which reported that teachers recruited into teaching position in schools do not meet the quality required for effective teaching; Esa (2005) report that some 32% of academic staff did not possess relevant skills to serve as teacher in technical colleges; and the report of Teachers Registration Council of Nigeria (TRCN) that 50% of the teachers in Nigerian school system are found unqualified, the findings in this study indicate that teachers in technical colleges in Ogun state are qualified. The only problem is that of numerical adequacy which is in agreement with the findings of Uwatt (2004) that inadequate qualified personnel is a major problem in in technical colleges in Nigeria.

The study also found that 65% of the required materials for electrical installation and maintenance work are inadequate while the remaining 35% are not even available at all. In the same vein, 61% of the materials required for radio television and electronic work are not available in the technical colleges. 31% of the materials required are available but inadequate while only 8% of the materials required are available and adequate. This is in line with the study by Oke (2003) on the Appraisal of Introductory Technology Curriculum in Lagos State. After taking the stocks of equipment available for Introductory Technology (now Basic Technology), he found, among other things, that the effective implementation of the programme is greatly hindered by inadequacy of equipment, tools, training materials and poor workshop environment. Also the study by Fagbemi (1997) indicates gross inadequacy of infrastructures and equipment in technical education.

Findings also reveal that recommended physical resources like library, physics laboratory, chemistry laboratory, metal workshop, and electrical installation workshop provided for the implementation of the programme are inadequate. Only, teachers' offices and furniture are adequately inputed. Students chairs and lockers are grossly inadequate. The findings are similar to that of Fagbemi (2007) that, in Yobe state secondary schools, there is gross inadequacy of infrastructures and facilities.

The finding in this study also reveals that only 24% of the available resource input into electrical installation and maintenance work are fully functional. In the same vein, only 42% of the available resource input into radio, television, and electronic work are fully functional. This is in consonance with the finding of Uwakaego (2012) who researched on the means of improving the efficiency of human and material resources for teaching agricultural education in colleges of education in south-east Nigeria. She found that most of the available material resources were less functional, while others were not functional. Similarly, Adetona (2010), in a study that x- rays the availability, awareness and utilization of resources in public libraries in Delta state, revealed that books that dominate the library collection are out-dated.

Furthermore, one finding in this study shows that only 13% of the available resource input into electrical installation and maintenance work are being utilized for skill acquisition of the students while none of the 19 resources provided for radio, television, and electronic work are utilized for teaching and learning in the colleges. This agrees with Oloyede's (2008) finding in a comparative study on the influence of resource availability and utilization on academic performance of students of private and public secondary schools in Ibadan metropolis, that most available resources in the schools were unutilized.

Inadequacy of both human, material, and physical resources, as well as non-functionality and non-utilization of those available can be associated with the dearth of practical skills among graduates of electrical and electronic trades. The aim of electrical and electronic trades programme at producing craftsmen, technicians and other skilled personnel who will be enterprising and self-reliant with skills in domestic and industrial installation, as well as

operate, maintain and repair electrical and electronic equipment, among others, have suffered setback due to the avoidable trend of resource non-availability, inadequacy, non-functionality, and non-utilization as the case may be.

7. Conclusion

Based on the findings of the study, resource inputs into electrical and electronic trades are inadequate. Most of the available resources are non-functional, while the functional ones are underutilized. Inadequacy of resources may lead to cuts in the volume of training expected to be provided in technical colleges. These cuts are a hindrance to a pursuit of the objectives of providing training and subsequent job placement of technical college graduates. Considering the nature of Technical Vocational Education and Training (TVET) as a form of education, it is logical to conclude that TVET system will be effective if resources are adequately supplied to match the student intake. Teachers are highly motivated to teach practical skills when there is a regular supply of instructional materials, thus ensuring active participation of trainees.

The shortage of basic resources in the technical colleges is probably due to non-commitment of politicians to education. Many state governments in the country would rather spend the amount of money it will cost to build nine universities to build new government house. A practical example is that of the Akwa-Ibom state government house, in South/South zone of Nigeria (under Godswill Akpabio's regime) that gulped billions of naira. States that are not building government houses embark on bogus projects like roads, event centres, for the selfish purpose of campaigning for elections, while schools continue to suffer. Some state governments even find it difficult to pay staff salaries, let alone providing funds to equip school libraries, workshops, and laboratories with needed resources.

Dilapidated structures, abandoned projects, empty libraries, workshops, and laboratories that characterize schools suggest that the government only pays lip service to the development of the education sector.

8. Recommendations

Based on the findings of this study, the subsequent discussion, and their implications, the following recommendations are made:

- Efforts should be made by the government to ensure the provision of the minimum required human, material, and physical resources for effective implementation of the electrical and electronic trades programme.
- The administration of technical colleges should strengthen the linkage between the colleges and industries. This will enable the colleges to access opportunities for industrial attachment for both teachers and students.
- Technical college administrators should devise a system of predictive, preventive, and corrective maintenance of existing resources to ensure that they are in good condition.
- Technical college administrators should organize retraining programmes to build the capacity of their teachers, for effective implementation of the programme.

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