



Assessment of Instructional Resources Available for Teaching and Learning of Electrical/Electronic Programmes in Technical Colleges in Rivers State

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ABSTRACT

This study assessed instructional resources available for teaching and learning of electrical/electronic programmes in technical colleges in Rivers State. A descriptive survey design was used. The study comprised a population of 161 respondents. No sample was made due to the small size of the population. Three research questions and three hypotheses guided the study. The instrument used for data collection was a structured questionnaire which was validated by experts. Mean was used to answer the research questions while z-test was used to test the hypotheses. The study found that human resources such as qualified teachers, workshop instructors and attendants for teaching and learning of electrical/electronic trades in technical colleges in Rivers State were available. The study also found that material resources for teaching and learning of electrical/electronic trade in technical colleges in Rivers State available but not very adequate. The study also found that most of the infrastructural facilities for teaching and learning of electrical/electronic trade in technical colleges in Rivers State are not available and those available were obsolete. Based on the findings, it was recommended among others that human resources such as qualified electrical teachers/instructors, technicians, and workshop attendants should be employed in technical colleges in Rivers State for effective implementation of electrical/electronic curriculum, infrastructural facilities such as classroom blocks, workshops, staff offices, toilets, adequate water and power supply should be provided in Rivers State technical colleges.

Keywords: Instructional, Resources, Teaching, Learning, Electrical/Electronic

INTRODUCTION

It is widely accepted that no social, economic, political, and educational sector can achieve expected outcomes without the necessary resources. Hence, students' academic performance cannot be achieved in Electrical/Electronic programmes in Technical Colleges in Rivers State without the utilization of instructional resources to expose students to some form of stimulation. Vocational and technology education programmes are aimed at imparting individual learners with practical skills, basic scientific knowledge, attitude and competence that enable them to work very effectively in industrial and self-reliance ventures. This can however be achieved through a systematic and well-organized training facilities. Training facilities in schools must be comparable to those in industries (Maaji, 2013). Electrical/Electronic trade subjects principally include (1) electrical installation and maintenance work (2) Radio, television and electronics work. Some diverse practical contents deal with appliances repairs both in domestic and industrial premises where electrical and electronics systems operate. Details of electrical and electronics trades' subjects taught in Nigerian technical colleges include: domestic and industrial installation, cable jointing and repairs, battery charging and repairs, winding of electrical machines, basic electricity, electrical electronic drawing and

calculations, radio communications and services, television services and repairs, electronic devices and circuits (FGN, 2004; NBTE, 2012).

Instructional resources in the teaching of electrical electronic are anything that consist teachers' effectiveness in promoting teaching and learning. Students learn faster and easier when given the chance to learn through more instructional resources than one. The use of instructional material provides the teachers with interesting and compelling flat form for conveying information since they motivate learners to learn more. Resources could be described as anything that can be used for production or creation, which yields an output. It includes things in the learning environment that are used to enhance the achievement of learning objectives such as facilities, materials, finance, human being, among others. Operationally, a resource refers to human beings, instructional materials, and instructional methods which provide information for teachers and students on instructional basis in teaching Electrical/Electronic programmes in Technical Colleges in Rivers State.

Teaching is an instructional process that involves the acquiring of knowledge through the utilization of resources. It therefore, follows that; such resources may be both human and non-human provided they facilitate the acquisition and evaluation of knowledge, skills, attitude morals and values (Esu & Inyang-Abia, 2004). According to Nigeria Board for Technical Education (NBTE, 2012), for Electrical/Electronic trade to achieve its stated objectives, resources for teaching and learning must be available. Oloyede (2003) classified educational resources into human and material resources. In terms of human resources, the most important are the teachers and the students. Human resource indicators include staff strength, number of teachers, teachers' quality, qualification, and experience.

Human resources exist within people and consist of a person's potential abilities as well as current attributes; these resources include energy, knowledge, education, talent, attribute, skills and any other characteristics which require cognitive, affective or psychomotor abilities. Human resources in Electrical/Electronic trades in technical colleges can thus be school administrator (principal), technical teachers, workshop attendant, artisans and other members of staff who are either directly or indirectly involved in improving, molding, creative ability, aptitude, value commitment of students in Electrical/Electronic trades curricular. Human resources in electrical/electronic technology programme are qualified technical education teacher with at least a degree in technical education B.Sc. (Ed) in Technical Education, higher national diploma in electrical/electronic technology (HND) in addition to certificate in education (NCE) (NBTE, 2012). Along this line, it is of importance that qualified electrical/electronic technician/craftsmen possess at least national technical certificate (NTC) in electrical/electronic are needed to inculcate the necessary skills to students.

Udo (1997) stressed the need for adequate manpower in electrical/electronics, if quality students are to be realized in Nigeria. Also the situation is conformity with Amo-Kehinde (2003) who stated that no nation ever rises above the quality of its teachers. An electrical/electronic shop attendant is needed to take care of the workshop. Akinfolarin, Ajayi, and Oloruntegbe (2012) reported that teachers, instructors, technician and other required resources for teaching technical education were available. James and David (2019) *posited that human resources such as teachers, instructors and laboratory attendants were found to be inadequate in most technical colleges for teaching and learning processes in Technical and Vocational Education and Training programmes.* The workshop attendant should possess apprenticeship certificate in electrical/electronic technology and at least a First School Leaving Certificate (FSLC).

Material resources are facilities and materials procured for effective training of the students in practical skills and applied scientific knowledge in Electrical/Electronic trades in technical college. These include tools, equipment, machines, instructional and training materials, consumables, finances, textbook, responsive curriculum and management. Chukwuani (1989) affirmed that the use of material resources for technological education must be in perfect condition for objectives to be actualized. In same vein, Onyemaechi (2004) stated that the increase in electrical/electronic students' knowledge will be the outcome of availability of tool and equipment in performing specific function by lecturers, instructors and students.

Ogbuanya, Nweke and Ugwoke (2017) posited that material resources needed for effective delivery of electrical/electronics technology include workshop, wiring boards, meters, cold chisels, power hand drills, electric soldering iron, universal pipe bending machines, radio receivers, drill bit set, screw drivers (assorted), hydrometers, batteries (assorted), hammers, (assorted), steel rules (assorted),

magnets (assorted), relays, switches (assorted), tubes (assorted), thermostats, conduit pipes, joint junction boxes, socket outlets, plugs (assorted), digital meters, analogue meters, oscilloscopes, function generators, television receivers, inductors (assorted), lead sucker, side cutters, etc. According to Osuala (1999), the use of materials resources in teaching vocational education subjects is vital; thus they attract the attention of the students in the class. Olagboye (2004) stated that material resources consist of instructional resources such as audio and visual aids, graphics, printed materials. These resources according to Wang (1993) effectively facilitates the conveying of intended messages for learners' understanding, retaining, and application of experiences gained to reach overall purpose of electrical/electronic trade.

Infrastructural facilities are the relevant materials utilized by institutions to facilitate teaching and learning in electrical electronic trades. It is the physical framework of facilities through which goods and services are provided to the public (Deepika, 2002). Ezeji (2015) explained that Electrical/Electronic trades requires a workshop setting with adequate teaching facilities as a unique learning situation in which the learner may experiment, test, construct, assemble and disassemble, repair, design, fabricate, create, imagine and study. It was further stressed that adequate workshop experiences are essential for effective training of Electrical/Electronic trades in technical colleges. Infrastructural facilities refer to non-human and non-financial resources. They include the school physical facilities such as the library, laboratories, school plant, workshops, land, building, furniture, equipment, machinery, vehicles, electricity and water supply.

Deepika, (2002) identified playgrounds, furniture, instructional facilities, school physical environment (beautification of the school environment), classroom blocks, electrical/electronic workshops, store, drilling machines (portable), library, staff office, toilet, adequate power supply, bore hole and utilities which include extinguishers, workbench, and first aid box as requirements for effective electrical/electronic technology programme. Chukwuani (1989) stated that for teaching to be a pleasure material resources needed in a laboratory or workshop must be of adequate number. Filibus (2001) asserted that tools and other equipment are inadequately provided, hence lead to the production of highly unskilled personnel who are unemployable and unproductive. Supporting this assertion, Osam (2013) stated that vocational and technical school facilities in Rivers State are also inadequate and in poor condition.

Statement of the Problem

There has been extreme fall in the performance level of Electrical/Electronic candidates in National Business and Technical Education Board (NABTEB) examination. In support, NABTEB Registrar/Chief Executive during a meeting of the Federal Ministry of Education, and National Stakeholders Consultative Meeting on improving performance in public examination, reported that the performance of electrical/electronic candidates from Rivers State technical colleges were extremely poor. It was further reported that 27% of the students passes all the registered subjects while 73% had deficiencies in one subject or the other. In addition to high failure rate of electrical/electronic candidates in NABTEB examination, the electrical/electronic graduates of technical colleges remained unemployed when these graduates are suppose to be employers of labour. This according to Down (2012); Mohammed and Ismail (2014); Aring (2012), is because electrical/electronic graduates lack employable, marketable and occupational skills. Based on the above, there is need to assess the availability of instructional resources for teaching and learning of electrical/electronic trade in technical colleges in Rivers State.

Purpose of the Study

The purpose of the study was to assess the availability of instructional resources for teaching and learning of electrical/electronic trade in technical colleges in Rivers State. Specifically, the study seeks to:

1. Determine the availability of human resources for teaching and learning of electrical/electronic trade in technical colleges in Rivers State.
2. Ascertain the availability of material resources necessary for teaching and learning of electrical/electronic trade in technical colleges in Rivers State.
3. Determine the availability of infrastructural facilities for the teaching and learning of electrical/electronic trade in technical colleges in Rivers State.

Research Questions

1. What are the human resources available for teaching and learning of electrical/electronic trade in technical colleges in Rivers State?
2. What are the material resources available for teaching and learning of electrical/electronic trade in technical colleges in Rivers State?
3. What are the infrastructural facilities available for teaching and learning of electrical/electronic trade in technical colleges in Rivers State?

Hypotheses

The following null hypotheses were formulated and tested at 0.05 level of significant.

1. There is no significant difference in the mean response of teachers and students on human resources available for teaching and learning of electrical/electronic trades in technical colleges in Rivers State.
2. There is no significant difference in the mean response of teachers and students on infrastructural facilities available for teaching and learning of electrical/electronic trades in technical colleges in Rivers State.

METHODOLOGY

Rivers State is a state in the southern part of Nigeria which has different levels of tertiary institutions. Hence, this study was conducted in all the four technical colleges in Rivers State which include Government Technical College, Port Harcourt, Government Technical College, Ahoada, Government Technical College, Tombia and Government Technical College, Eleogu. The study utilized a descriptive survey research design to seek the opinion of technical college teachers and students in Rivers State. The target population was 161 electrical/electronic personnel (125 students and 36 staff) (Source: *NBTE Unit; Rivers State Ministry of Education, 2018*). No sampling technique was adopted due to the manageable size of the population. The instrument for data collection was the researchers' structured questionnaire designed in a 4-point rating scale. The reliability of instrument was established from 28 respondents using Pearson Product Moment Correlation (PPMC) coefficients method which yielded a reliability of 0.82. Data was analyzed using mean and standard deviation with a criterion mean value of 2.50 and above.

RESULTS

Research Question 1: *What are the human resources available for teaching and learning of electrical/electronic trade in technical colleges in Rivers State?*

Table 1: Mean Response on Human Resources available for teaching and learning of electrical/electronic trade

S/N	Item Statement	Teachers (n=36)			Students(n=125)		
		\bar{X}	SD	Rmrk	\bar{X}	SD	Rmrk
1	Teachers	2.82	0.62	A	2.87	1.04	A
2	Instructors	2.91	0.80	A	2.79	0.83	A
3	Workshop Technician	2.52	0.58	A	2.62	1.09	A
4	Workshop Attendants	2.57	0.86	A	2.53	0.79	A
	Grand Mean/SD	2.70	0.71	A	2.70	0.94	A

Table 1 shows the human resources available for teaching and learning of electrical/electronic trade in technical colleges in Rivers State. The result revealed that all the items are available with mean value of (2.82 & 2.87), (2.91 & 2.79), (2.52 & 2.62) and (2.57 & 2.53) for teachers, instructors, workshop technician and workshop attendants respectively. The standard deviation values indicated that the respondents were close in their responses.

Research Questions 2: *What are the material resources available for teaching and learning of electrical/electronic trade in technical colleges in Rivers State?*

Table 2: Mean Response on Material Resources available for teaching and learning of electrical/electronic trade

S/N	Item	Teachers (n=36)			Students (n=125)		
		\bar{X}	SD	Remrk	\bar{X}	SD	Remrk
1	Wire Crimpers	2.31	0.54	NA	3.97	0.86	A
2	Voltmeter	2.61	0.75	A	2.76	0.51	A
3	Ammeter	3.50	0.66	A	1.48	0.59	NA
4	Millimeter	2.07	0.56	NA	3.31	0.71	A
5	Screw Drivers	2.48	0.62	NA	3.76	0.66	A
6	Utility Knife	2.22	0.64	NA	2.72	0.58	A
7	Allen wrench Set	3.61	0.71	A	2.59	0.68	A
8	Flash Light	1.37	0.70	NA	1.45	0.62	NA
9	Torpedo Level	2.59	0.69	A	1.48	0.64	NA
10	Pliers of various Types	3.17	0.78	A	3.85	1.04	A
11	Wire Strippers	2.81	0.75	A	2.55	0.57	A
12	Hammer of various sizes	3.04	0.79	A	3.94	0.63	A
13	Tester of various types	3.22	0.62	A	3.79	0.62	A
14	Measuring Tapes	2.52	0.62	A	3.55	0.72	A
15	Fish Tape	2.37	0.74	NA	2.55	1.09	A
16	Adhesive Tapes	3.61	0.67	A	2.28	0.55	NA
17	Junction Boxes	3.80	0.72	A	3.71	0.72	A
18	Connector Clip of various types/sizes	3.53	0.83	A	2.66	0.61	A
19	Twilight Switches	2.18	0.75	NA	1.62	0.61	NA
20	Power Cable Connectors	2.33	0.70	NA	2.49	0.66	NA
21	Hacksaw	3.50	0.75	A	2.52	0.74	A
22	Surgical Tools	3.91	0.62	A	2.55	0.51	A
23	Boring Tools	2.41	0.67	NA	1.59	0.50	NA
24	Soldering Materials	3.59	0.66	A	3.48	0.57	A
25	De-soldering Pump	2.55	0.67	A	1.52	0.57	NA
26	Oscilloscope	3.69	0.75	A	2.34	0.55	NA
27	Signal Generator	2.43	0.68	NA	1.48	0.74	NA
28	Prototyping Tools	3.75	0.92	A	3.45	0.72	A
	Grand Mean/SD	2.89	0.69	A	2.69	0.66	A

Table 2 shows the material resources available for teaching and learning of electrical/electronic trade in technical colleges in Rivers State. The result revealed that these resources were available at different extent base on the response of teachers and students. For teachers' responses, the result shows that item 2, 3, 7, 9, 10, 11, 12, 13, 14, 16, 17, 18, 21, 24, 25, 26 and 28 were considered to be available at mean scores of 2.50, 3.50, 3.61, 2.59, 3.17, 2.81, 3.04, 3.22, 2.52, 3.61, 3.80, 3.53, 3.50, 3.91, 3.59, 2.55, 3.69 and 3.75 respectively. From the students' response, the result shows that item 1, 2, 4, 5, 6, 7, 10, 11, 12, 13, 14, 15, 17, 18, 21, 22, 24, and 28 were considered to be available with mean scores of 3.97, 2.76, 3.31, 3.76, 2.72, 2.59, 3.85, 2.55, 3.94, 3.79, 3.55, 2.55, 3.71, 2.66, 2.52, 2.55, 3.48 and 3.45 respectively. Furthermore, the result revealed that material resources whose means were between 2.49 and 1.48 were not available for teaching and learning of electrical/electronic trade in technical colleges in Rivers State.

Research Question 3: *What are the infrastructural facilities available for teaching and learning of electrical/electronic trade in technical colleges in Rivers State?*

Table 3: Mean Response of Respondents on Availability of Infrastructural Facilities

S/N	Item Statement	Teachers(n=36)			Students(n=125)		
		\bar{X}	SD	Remrk	\bar{X}	SD	Remrk
1	Classroom Blocks	2.18	0.71	A	2.39	0.83	NA
2	Store	3.76	0.66	A	2.90	0.71	A
3	Well equipped Workshop	2.44	1.03	NA	2.02	0.73	NA
4	Library	2.39	1.05	A	1.98	1.02	NA
5	Staffroom	3.12	1.21	A	3.60	0.62	A
6	Toilet	2.89	0.52	A	2.72	0.80	A
7	Borehole	2.05	0.88	NA	2.15	0.58	NA
8	Teachers Guide	1.90	0.63	NA	2.32	1.05	NA
9	Elect/Elect Curriculum	3.76	1.07	A	3.88	1.09	A
10	Work Bench	3.90	1.03	A	3.71	0.94	A
11	First Aid Box	1.22	0.51	NA	1.43	0.77	NA
12	Fire Extinguisher	1.06	0.74	NA	2.00	1.03	NA
Grand Mean/SD		2.60	0.84	A	2.67	0.85	A

Field Survey, 2020

Table 3 shows the infrastructural facilities available for teaching and learning of electrical/electronic trade in technical colleges in Rivers State. The result revealed that classroom blocks (2.18 & 2.39), store (3.76 & 2.90), staffroom (3.12 & 3.60), toilet (2.89 & 2.72), curriculum (3.76 & 3.88) and work bench (3.90 & 3.71) are infrastructural facilities available for teaching and learning of electrical/electronic trade in technical colleges in Rivers State. The result also revealed that well equipped workshop (2.44 & 2.02), library (2.39 & 1.98), borehole (2.05 & 2.15), teachers' guide (1.90 & 2.32), first aid box (1.22 & 1.43) and fire extinguisher (1.06 & 2.00) were not available for the teaching and learning of electrical/electronic trade in technical colleges in Rivers State.

Test of Hypotheses

The following null hypotheses were formulated and tested at 0.05 level of significant.

Hypothesis 1: There is no significant difference in the mean response of teachers and students on human resources available for teaching and learning of electrical/electronic trades in technical colleges in Rivers State.

Table 4: z-Test Analysis on Human Resources available for teaching and learning of electrical/electronic trades

Group	N	\bar{X}	SD	N	df	A	Z-cal	z-crit	Remark
Teachers	36	2.70	0.71	36					
					159	0.05	1.32	1.96	Accepted
Students	125	2.70	0.94	125					

The result in Table 4 shows that the calculated value (z-cal) is 1.32 while the critical value (z-crit) stands at 1.96. Since the calculated value (z-cal) is less than the critical value (z-crit), it therefore means that the null hypothesis of no significant difference in the responses of teachers and students on human resources available for teaching and learning of electrical/electronic trade in technical colleges in Rivers State was accepted.

Hypothesis 2: There is no significant difference in the mean response of teachers and students on infrastructural facilities available for teaching and learning of electrical/electronic trades in technical colleges in Rivers State

Table 5: z-Test Analysis on Infrastructural Facilities available for teaching and learning of electrical/electronic trades

Group	N	\bar{X}	SD	Df	α	z-cal	z-crit	Remark
Teachers	36	2.60	0.84					
				159	0.05	-1.47	1.96	Accepted
Students	125	2.67	0.85					

Table 5 shows that the calculated value (z-cal) of -1.47 was less than the critical value (z-crit) which stood at 1.96. Hence, the null hypothesis of no significant difference in the response of teachers and students on infrastructural facilities available for teaching and learning of electrical/electronic trades in technical colleges in Rivers State was accepted.

DISCUSSION OF FINDINGS

Table 1 revealed that teachers, instructors, workshop attendants and workshop technician were available human resources in the four technical colleges for teaching and learning of electrical/electronic trades in Rivers State. This finding corroborate with *James and David (2019) who posited that human resources such as teachers, instructors and laboratory attendants were found to be inadequate in most technical colleges for teaching and learning processes in Technical and Vocational Education and Training programmes. The finding is also in agreement with Akinfolarin, Ajayi, and Oloruntegbe (2012) who reported that teachers, instructors, technician and other required resources for teaching technical education were available.*

From Table 2, the study revealed that material resources are available for teaching and learning of electrical/electronic trades in technical colleges among others include wire crimpers, voltmeter, millimeter, screw drivers, utility knife, allen wrench set, pliers, hammers and wire strippers among. However, some needed materials resources for effective teaching and learning of electrical technology were either not available or inadequate, thus limiting students' skill development in electrical technology. These findings are in agreement with *Osam (2013) and Okebukola (2005) who asserted that hand tools needed for the teaching and learning of electrical electronics trades are rarely available in the college workshops.*

Table 3 revealed that infrastructural facilities such as classroom blocks, workshop, staff office, toilet, bore hole, and workbench were inadequate in technical colleges in Rivers State. These findings are in agreement with *Filibus (2001) who posited that the inadequacy of tools and other equipment provided in technical colleges lead to the production of unskilled students who are unemployable and unproductive.*

CONCLUSION

Based on the findings, the study hence deduced that human, material and infrastructural resources for the teaching and learning of electrical/electronic trade in Technical Colleges are necessities that should be adequately provided for inculcating the required skills needed for students to become self-reliance after graduation. Therefore, these resources should be made available to a utilization point in Technical Colleges in Rivers State to facilitate positive learning outcome.

RECOMMENDATIONS

Based on the findings the following recommendations were made;

1. Qualified electrical teachers, competent instructors, technicians, and workshop attendants should be employed in Rivers State technical colleges. This will enable and effective delivery of electrical/electronic curriculum.
2. Material resources such as power tools, hand tools and other consumable learning materials should be provided and utilized. This will help facilitate teachers' work thus improving students' interests in electrical electronics technology.
3. Classroom blocks, workshops, staff offices and bore hole should be provided in Rivers State Technical Colleges as this will enable quick development of electrical electronic skills and make students employers of labour.

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