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ASSESSMENT OF INFORMATION AND COMMUNICATION TECHNOLOGY FACILITIES FOR THE IMPLEMENTATION OF ELECTRICAL INSTALLATION AND MAINTENANCE WORKS IN GOVERNMENT TECHNICAL COLLEGES IN RIVERS STATE

[1]Gashion, K. S. and [2]Puyate, S. T.
[1&2]Department of Vocational and Technology Education, Rivers State University

Corresponding author: katumuowajilo.gashion1@ust.edu.ng

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Abstract

The study assessed the availability and functionality of information and communication technology facilities for the implementation of electrical installation and maintenance works in government technical colleges in Rivers State. Two research questions were answered with corresponding null hypotheses that were formulated and tested at 0.05 level of significance. The study employs the descriptive research survey design and was carried out in Rivers State. The population of the study consist of all the 13 teachers and 156 students of electrical installation and maintenance works trade. Due to small population size, the study employed a census population and hence, there was no sample and sampling technique. The instrument for data collection was a self-structured questionnaire tagged "Assessment of ICT Facilities for the Implementation of Electrical Installation and Maintenance Works Questionnaire (AICTFIEIMWQ)" which was structured on a 4-point rating scale. The instrument was face and content validated by two experts in technical education and a reliability coefficient of 0.86 was established through Pearson Product Moment Correlation (PPMC). Mean and Standard Deviation were used to answered research questions while hypotheses were tested with z-test. The study found that ICT facilities available are functional for the implementation of electrical installation and maintenance works in government technical colleges in Rivers State were at low extent. Based on the findings of the study, it was recommended among others that all the technical colleges in Rivers State should be properly equipped with facilities through provision by donor agencies such as government, Parent Teachers Association (PTA), UNDP, UNESCO, UNICEF, philanthropist, etc. These will enhance teaching of electrical installation and maintenance works. Preventive maintenance culture should be effective and adopted by electrical installation and maintenance works teachers as this will prolong the life span of the facilities and functional.

Keywords: Information and Communication Technology, Facilities, Electrical Installation and Maintenance, Technical Education, Technical College.

Introduction

All over the world, education is regarded as the bedrock of meaningful development in any society. Education is seen as an aspect of socialization which involves the acquisition of knowledge and learning of skills capable of shaping beliefs and moral values. According to Castle (as cited in Adiele, Leigha & Abraham, 2018), education is all that happens to us from the day we are born to the day we die. Education, therefore, could be seen as the process by which every society attempts to preserve and upgrade the accumulated knowledge, skills and attitudes in its cultural setting and heritage in order to foster continuously the well-being of mankind and guarantee its survival against the unpredictable (Owo, 2020). Education today has been expanded due to innovations in technologies especially in the areas of instructional materials and instructional delivery. These technologies are enhanced through the use of Information and Communication Technology (ICT). Information and Communication Technology (ICT) has become a cornerstone of modern education, transforming teaching and learning processes across the globe. In the context of technical college, particularly in fields like electrical installation and maintenance, ICT plays a critical role in enhancing the quality and efficiency of education. The availability and functionality of ICT in education not only facilitates the acquisition of technical skills but also prepares students for the demands of a technology-driven workforce (UNESCO, 2015).

Information and Communication Technology (ICT), includes all forms of technologies such as internet, computers, websites, telephones, mobiles, wireless devices, networks, hardware, software and telecommunication equipment (Latu & Koh, 2021) while Ofodu (2020) refer to ICT as electronic or computerized devices, assisted by human and interactive materials that can be used for a wide range of teaching and learning as well as for personal use. Beckinsale and Ram (2019)

defines Information and Communication Technologies as “any technology that we use to facilitate processing, gathering, distribution and use of information.

Information and Communication Technology implementation in technical college enhances learning by providing interactive and practical experiences, enabling simulations, and offering access to a wealth of resources and information. This is particularly important in technical disciplines such as electrical installation and maintenance works, where hands-on practice and up-to-date knowledge of technology are crucial (Anderson & Grönlund, 2009). The availability and quality of ICT facilities in technical colleges significantly impact the effectiveness of education in technical fields. ICT facilities include hardware such as computers, projectors, and interactive whiteboards; software for simulations and design; and internet connectivity for accessing online resources and collaboration tools. Availability and functionality for the implementation of these facilities can lead to improved student engagement, better understanding of complex concepts, and enhanced practical skills in Electrical Installation and maintenance Works in technical college (Pelgrum & Law, 2003).

Electrical Installation and Maintenance Works (EIMWs)is one of the courses offered in Technical College. It is an electrical course that runs from Technical College level even to tertiary institutions like polytechnics, universities, monotechnics, Colleges of Education (Technical) and so on. Electrical Installation and Maintenance Works Programme is one of the technical college programmes which, according to the curriculum of the programme (National Board for Technical Education, NBTE, 2003) aims to train personnel as craftsmen and technicians to be productive and qualified for paid employment and own up a business as entrepreneur at the end of their training, or further their studies in Polytechnics, Colleges

of Education (Technical) and Universities. According to National Board for Technical Education (NBTE, 2003), the curriculum of EIMWs programme covers a period of three years whose course contents and programme enables the trainee (students) to be able to use different kinds of tools, machines and equipment to carry out specialized works upon graduation. The following are its specific objectives:

a. Carry out different experiments involving resistors, capacitors and inductors (Series/parallel connection).
b. Carry out both domestic and industrial installation service.
c. Mount and Install electrical machines.
d. Fix and join electrical cables.
e. To carry out installation and connection batteries for charging systems.
f. Use tools to dismantle, recoil and recouple an electrical machine (generator or motor) and
g. Carry out tests on installations and machines using appropriate tools.

The implementation of EIMWs can only be realizable if ICT facilities are available and functional. This is so because students will be exposed to the use of hands making the instructional process to be real than been abstract. According to Puyate (2004), effective teaching would not be possible without adequate arrangements for the availability and functionality of required instructional facilities. This means that the availability functionality of ICT facilities for training in any technical college enhances the vital process of the skills to be acquired. Availability of appropriate facilities enhances student learning by allowing them to be involved in demonstrations, and practice which will help them to continue to build their skills.

Inadequate facilities for implementation of technical trades such as electrical installation and maintenance works have been observed as

a barrier in instructional processes especially in Technical Colleges where teaching is more practically demonstrated than theory while others lamented on the gross inadequacy, unavailability, non-utilization and non-functional state of the facilities (Hassan & Babawuro, 2023). Facility availability is the act of making provision for all required materials needed for teaching and learning of EIMWs course in technical colleges. This is why Yaduma and Moses (2020) stressed that for Technical Colleges to achieve its objectives in electrical installation and maintenance works, ICT facilities must be provided, made available, and functional.

Technical Colleges in Nigeria are established with the aim of producing craftsmen in different crafts and trades at different levels of master craftsmen at the advance crafts level (Federal Ministry of Education, 2013). Students trained in technical colleges are expected to acquire the required practical skills, knowledge and attitude (Nwineh & Opigo, 2025). However, the main aim of technical college training is to produce an effective, efficient and able craftsmen and women with relevant skills that will be able to promote and developed an industrially area of maintenance, goods production and general services (Abdulkadir, 2011). Also, the goal of technical college education is developing saleable skills in youths in order to make them useful to themselves, society and also become labour assets in the industries (Boyi, 2018). The courses offered at the Technical Colleges leads to the award of National Technical Certificate (NTC) and Advance National Technical Certificate (ANTC). The curriculum programmes of Technical Colleges according to Federal Republic of Nigeria (2013) are grouped into related trades. These include; the computer trades, electrical/electronic trades, building trades, wood trades, and mechanical trades. Also, Technical Colleges are institutions that provide secondary level education in Technical Education (Amenger,

2023). Technical College was introduced and design with a curriculum that are capable of training and producing graduates that possess marketable and saleable skills, knowledge and attitude in their areas of specialization and interest that will enable them qualified for effective paid employment and also to actually function well in their place of works (Amenger, 2023). In Technical Colleges, technical teachers are meant to train the students on different skill-based areas which include woodwork, metalwork, building and electrical/electronic trades among others (Adeyemi & Uko-Aviomoh, 2014).

Statement of the Problem

Despite the recognized importance of ICT in education and the efforts of the Nigerian government to promote its integration, many technical colleges in Rivers State face significant challenges in implementing ICT effectively. Preliminary observations and reports suggest that these colleges may lack adequate ICT facilities, including essential hardware (computers, projectors, interactive whiteboards), software (educational programs, simulations), and reliable internet connectivity. Additionally, there are concerns about the adequacy of training for teachers to effectively utilize these technologies in their teaching practices. These deficiencies can hinder the quality of education provided, limiting students' ability to engage with modern learning methods and technologies that are essential for mastering electrical installation and maintenance works. Without sufficient ICT resources, students may struggle to acquire the practical skills and theoretical knowledge needed to perform effectively in the workforce. This situation not only affects the students' future employability but also impacts the broader objective of developing a skilled technical workforce to support the regional economy. The poor state of ICT facilities in terms of availability and functionality negatively impacted the implementation process of teaching and

learning. The adverse effect is that craftsmen and technician that are not properly trained are produced (Oluteju, 2017). Hence, it becomes imperative to examine the assessment of ICT facilities for the implementation of electrical installation and maintenance works in government technical colleges in Rivers State.

Purpose of the study

The purpose of the study is to examine the assessment of ICT facilities for the implementation of electrical installation and maintenance works in government technical colleges in Rivers State. Specifically, the study seeks to;

1. Determine the availability of ICT facilities for the implementation of electrical installation and maintenance works in government technical colleges in Rivers State.
2. Determine the functionality of ICT facilities for the implementation of electrical installation and maintenance works in government technical colleges in Rivers State.

Research Questions

The following questions were answered to guide the study.

1. To what extent are ICT facilities available for the implementation of electrical installation and maintenance works in government technical colleges in Rivers State?
2. To what extent are ICT facilities functional for the implementation of electrical installation and maintenance works in government technical colleges in Rivers State?

Hypotheses

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

1. There is no significant difference in mean response of teachers and students on the extent to which ICT facilities are available for the implementation of electrical installation and maintenance works in government technical colleges in Rivers State.

2. There is no significant difference in mean response of teachers and students on the extent to which ICT facilities are functional for the implementation of electrical installation and maintenance works in government technical colleges in Rivers State.

Methodology

The study employed the descriptive research survey design and was carried out 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 population of the study was all the teachers and students of electrical installation and maintenance works trade. As at the time of the study, Government Technical Colleges in Rivers State has 13 teachers and 156 students of electrical installation and maintenance works trade (Office of the Principals, 2024). Due to small population size, there was no sampling and no sample technique. Hence, it was a census study. The instrument for data collection was a self-structure questionnaire tagged "Assessment of ICT Facilities for the Implementation of Electrical Installation and Maintenance Works Questionnaire (AICTFIEIMWQ)" which was designed in a modified 4-point rating scale of Extent with numerical values of 4 – Very High Extent (VHE), 3 – High Extent (HE), 2 – Low Extent (LE), and 1 – Very Low Extent (VLE). The instrument was validated and tested for reliability. A reliability coefficient of 0.86 was established through Pearson Product Moment Correlation (PPMC). Data obtained were analyse using Mean with Standard Deviation to answered research questions while hypotheses were tested with z-test. For decision on the research questions, item having a mean score of 2.50 and above was taken as "High Extent (HE)" while item having mean score less than 2.50 was considered as "Low Extent (LE)". The decision on the hypotheses was that if the calculated value of z (zcal) is less than the critical value of z(zcrit), the

hypothesis was accepted but if the calculated value of z (zcal) is greater than or equal to the critical value of z (zcrit), the hypothesis was rejected.

Results

Research Question 1: To what extent are ICT facilities available for the implementation of electrical installation and maintenance works in government technical colleges in Rivers State?

Table 1: Mean Responses on Extent ICT Facilities are Available

S/N	ICT Facilities Available for Implementation Include	Teachers			Students		
		Mean	S.D.	RMK	Mean	S.D.	RMK
1	Smart interactive or electric board	1.01	0.73	LE	1.07	0.76	LE
2	Multimedia projectors/power point	1.45	0.81	LE	1.32	1.01	LE
3	Web based learning	1.03	1.11	LE	1.21	0.66	LE
4	Computer room	2.34	0.69	LE	2.21	0.74	LE
5	Offline computers	2.11	0.71	LE	1.43	1.01	LE
6	Digital library	1.01	0.68	LE	1.03	0.96	LE
7	E-mail facilities	2.11	1.01	LE	1.94	0.71	LE
8	Online/internet computer	1.33	0.66	LE	1.64	0.58	LE
9	Laptops/modem/flash drives	1.08	0.74	LE	1.33	0.6	LE
10	Electronic device for multiple marking	1.01	0.58	LE	1.84	0.84	LE
11	E-lectures	2.16	0.59	LE	2.31	1.01	LE
12	E-workshop	2.01	0.84	LE	1.84	0.84	LE
13	E-drills	1.05	0.61	LE	1.12	1.01	LE
14	E-examination	1.13	0.8	LE	1.31	0.84	LE
15	E-books	1.45	0.93	LE	1.32	0.66	LE
16	E-mail and Fax	1.09	0.74	LE	1.04	0.78	LE
17	E-sound books	1.7	0.57	LE	1.84	0.71	LE
18	E-trackers	1.11	0.62	LE	1.63	0.87	LE
19	Personal Computer, Laptops	2.43	1.1	LE	2.38	1.01	LE
20	E-database	1.98	0.84	LE	1.45	0.58	LE
	Average Mean	1.53	0.77	LE	1.56	0.81	LE

Source: *Researcher's Field Result; 2024*

The result in Table 1 shows the response of teachers and students on extent ICT facilities available for the implementation of electrical installation and maintenance works in government technical colleges in Rivers State. The result as shown in Table 1 revealed that teachers and students show a Low Extent (LE) that all the items 1 – 20 are ICT facilities are

available for the implementation of electrical installation and maintenance works in government technical colleges in Rivers State.

Research Question 2: To what extent are ICT facilities functional for the implementation of electrical installation and maintenance works in government technical colleges in Rivers State?

Table 2: Mean Responses on Extent ICT Facilities are Functional for the Implementation of Electrical Installation and Maintenance Works in Government Technical Colleges in Rivers State

S/N	ICT Facilities Available for Implementation Include	Teachers			Students		
		$\overline{X}_1$	SD1	RMK	$\overline{X}_2$	SD2	RMK
21	Smart interactive or electric board	1.53	0.73	LE	1.02	0.76	LE
22	Multimedia projectors/power point	1.90	0.81	LE	1.21	1.01	LE
23	Web based learning	1.21	1.11	LE	1.05	0.66	LE
24	Computer room	1.45	0.69	LE	1.31	0.74	LE
25	Offline computers	1.43	0.71	LE	1.03	1.01	LE
26	Digital library	1.03	0.68	LE	1.05	0.96	LE
27	E-mail facilities	1.08	1.01	LE	1.22	0.71	LE
28	Online/internet computer	1.19	0.66	LE	1.19	0.58	LE
29	Laptops/modem/flash drives	1.21	0.74	LE	1.04	0.60	LE
30	Electronic device for multiple marking	1.03	0.58	LE	1.02	0.84	LE
31	E-lectures	1.22	0.59	LE	1.06	1.01	LE
32	E-workshop	1.04	0.84	LE	1.30	0.84	LE
33	E-drills	1.02	0.61	LE	1.26	1.01	LE
34	E-examination	1.17	0.80	LE	1.12	0.84	LE
35	E-books	1.11	0.93	LE	1.43	0.66	LE
36	E-mail and Fax	1.43	0.74	LE	2.01	0.78	LE
37	E-sound books	1.09	0.57	LE	1.06	0.71	LE
38	E-trackers	1.01	0.62	LE	1.05	0.87	LE
39	Personal Computer, Laptops	1.43	1.10	LE	1.33	1.01	LE
40	E-database	1.02	0.84	LE	1.10	0.58	LE
	Average Mean/SD	**1.23**	**0.77**	**LE**	**1.19**	**0.81**	**LE**

Source: *Researcher's Field Result; 2024*

The result in Table 2 shows the response of teachers and students on extent ICT facilities functional for the implementation of electrical installation and maintenance works in government technical colleges in Rivers State. The result as shown in Table 2 revealed that

teachers and students show a Low Extent (LE) that all the items 21 – 40 are extent which ICT facilities are functional for the implementation of electrical installation and maintenance works in government technical colleges in Rivers State.

Hypothesis 1: There is no significant difference in mean response of teachers and students on the extent to which ICT facilities are available for the implementation of electrical installation and maintenance works in government technical colleges in Rivers State.

Table 3: z-Test Analysis on Extent ICT Facilities are Available

Groups	X	SD	N	df	α	Zcal	zcrit	RMK
Teachers	1.53	0.77	13					
				167	0.05	-0.13	1.960	Accepted
Students	1.56	0.86	156					

Researcher's Field Result; 2024

Since the calculated value of z (-0.13) is less than the critical value of z (1.960) at 0.05 level of significance, the null hypothesis that there is no significant difference in mean response of teachers and students on the extent to which ICT facilities are available for the implementation of electrical installation and maintenance works in government technical colleges in Rivers State was accepted.

Hypothesis 2: There is no significant difference in mean response of teachers and students on the extent to which ICT facilities are functional for the implementation of electrical installation and maintenance works in government technical colleges in Rivers State.

Table 4: z-Test Analysis on Extent ICT Facilities are Functional

Groups	X	SD	N	df	A	Zcal	Zcrit	RMK
Teachers	1.23	0.77	13	167	0.05	0.18	1.960	Accepted
Students	1.19	0.81	156					

Researcher's Field Result, 2024

Since the calculated value of z (0.18) is less than the critical value of z (1.960) at 0.05 level of significance, the null hypothesis that there is no significant difference in mean response of teachers and students on the extent to which ICT facilities are functional for the implementation of electrical installation and maintenance works in government technical colleges in Rivers State was accepted.

Discussion of Findings

Result from Table 1 revealed the extent to which ICT facilities are available for the implementation of electrical installation and maintenance works in government technical colleges in Rivers State. The study found that ICT facilities available for implementation of electrical installation and maintenance works in government technical colleges in Rivers State are at low extent and include smart interactive or electric board, Multimedia projectors/power point, Web based learning, Computer room, Offline computers, electronic device for multiple marking, Digital library, E-mail and Fax, Personal Computer, Laptops and E-drills among others. The finding of this study is in line with Jegede and Owolabi (2013) confirmed in their study that e-Learning materials such as computers, radio sets, Skype, printers, scanners, video recorders, teleconferencing, and books on e-learning are available but were not adequate for the implementation of educational programmes.

Result from Table 2 revealed the extent to which ICT facilities are functional for the implementation of electrical installation and maintenance works in government technical

colleges in Rivers State. The study found that ICT facilities are functional for implementation of electrical installation and maintenance works in government technical colleges in Rivers State are at low extent and include smart interactive or electric board, Multimedia projectors/power point, Web based learning, Computer room, Offline computers, electronic device for multiple marking, Digital library, E-mail and Fax, Personal Computer, Laptops and E-drills among others. The finding of this study is in line with Nwagbo and Ugwuanyi cited in Agboeze, Ugwoke and Onu (2019) as aver that ICT facilities that are available in Nigeria schools are grossly inadequate and not functional which affects the implementation of ICT progarmmes and learning in schools.

Conclusion

The study examines the assessment of ICT facilities for the implementation of electrical installation and maintenance works in government technical colleges in Rivers State. The study however, concluded that ICT facilities available and functional for the implementation of electrical installation and maintenance works in government technical colleges in Rivers State include web-based learning, offline computers, digital library, laptops/modem/flash drives, smart interactive or electric board, multimedia projectors/power point, online/internet computer among others.

Recommendations

Based on the findings of the study, the following recommendations were made.

1. All the technical colleges in Rivers State should be properly equipped with facilities through provision (availability) by donor agencies such as government, Parent Teachers Association (PTA), UNDP, UNESCO, UNICEF, philanthropist, etc. These will enhance teaching of electrical installation and maintenance works.
2. Preventive maintenance culture should be effective and adopted by electrical

installation and maintenance works teachers as this will prolong the life span of the facilities and functional.

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