

Adequacy, Functionality and Utilization of Electrical Installation Equipment in Technical Colleges in Delta State

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Abstract

The present study investigated the adequacy, functionality and utilisation of electrical installation equipment in Technical Colleges located in Delta State. The study was directed by three research questions and three hypotheses. The study employed a survey research design. Both the National Board for Technical Education (NBTE) checklist of Electrical Installation Workshop Practise and a self-developed questionnaire were used as instruments for data collection. The questionnaire had a reliability coefficient of 0.73. The researcher gathered data from teachers at technical colleges. The gathered data were analysed using frequency count, mean and t-test. The study's results indicated that the NBTE facilities necessary for Electrical Installation workshop practice in technical colleges in Delta State were inadequate. Additionally, the workshop practice equipment was found to be moderately functional and utilised. Furthermore, there was no statistically significant difference in the mean response of teachers from rural and urban technical colleges in Delta State regarding the adequacy, functionality, and utilisation of machine and hand tools. The study's findings led to the recommendation that school administrators should prioritise the implementation of Electrical Installation workshop practices. Additionally, it is recommended that teachers and instructors in technical colleges of Delta State make effective use of the available resources to enhance skill acquisition. It is imperative for school administrators to ensure that Electrical Installation workshop practice teachers utilise the appropriate facilities for skill acquisition in Technical Colleges of Delta State. Stakeholders should provide the necessary

facilities, including machinery and hand tools, for the acquisition of skills in electrical installation workshop practice in Delta State Technical Colleges.

Keywords: *Adequacy, Functionality, Utilization, Electrical Installation Equipment, Technical Colleges*

Introduction

This study focuses on the adequacy, functionality, and utilisation of workshop equipment in technical colleges in Delta State. It examines the extent to which workshop equipment is provided and made ready for use. Availability refers to the utilisation of procured and accessible equipment, functional tools, component parts, apparatus, and appliances to enhance the academic achievement of students by making the workshop materials more accessible, engaging, and rewarding. Physical facilities play a crucial role in facilitating students' learning, as the absence of such resources poses significant challenges in organising practical work. Daluba (2012) emphasised the need of ensuring the availability and adequacy of equipment, materials, and tools (workshop facilities) in order for technical and vocational education to effectively accomplish its objectives. Therefore, facilities are essential for any significant technical vocational education (TVE) initiatives.

A technical college is a structured educational institution that offers specialised instruction with the objective of equipping individuals with the necessary skills and knowledge to secure jobs within society. The primary objective of technical education, as a programme provided by technical institutions, is to equip individuals with the necessary skills to effectively participate in and contribute to societal progress (Federal Republic of Nigeria, 2014). In order to attain this objective, it is imperative for an individual to undergo a structured educational programme at a technical college that offers specialised programmes in various technical trades such as welding, electrical installation works, building, radio and television, mechanical, maintenance work, mechanical craft practice, decoration, fashion, agricultural (soil, animal and crops), plumbing, sculptures, carpentry and painting, among others. Technical training institutions, such as technical colleges, typically enrol students who demonstrate a willingness to follow programmes that are focused on technical skill development. The duration of the technical college course for pre-vocational training is three years, as mandated by the National Policy on Education (NPE) (FRN, 2014). This programme is taught in three years, namely year I, II, and III. The training provided to students during the initial and subsequent three years of the programme, which will equip them with the necessary skills for self-employment, can only be accomplished in an atmosphere that offers sufficient and operational equipment for practical work.

The NBTE (2003) states that the curriculum for the electrical installation and maintenance works programme provides a detailed list of essential facilities and equipment needed for the successful implementation of the course. The aforementioned inventory of facilities and equipment necessitates consideration since students' test failures can be attributed mostly to insufficient adequacy and a dearth of pertinent educational resources, hence rendering them ineffective and unemployed. According to Abubakar (2000), employers expressed dissatisfaction with the

graduates' lack of preparedness due to their inability to meet the employers' employment standards. Hence, given the correlation between facilities in Technical and Vocational Education (TVE) and students' academic performance, the objective of this study was to gather empirical evidence by investigating the adequacy, functionality and utilisation of electrical equipment in both urban and rural technical colleges located in Delta State, Nigeria.

Workshop practice is a subject that is included in the curriculum of technical colleges during the first, second and third years, as mandated by NPE (FRN, 2014). The scope of these activities encompasses electrical installation, maintenance, cable joining, battery charging, video satellites (CCTV), closed circuit television, and the wired operation of electrical machinery. The success of technical colleges in achieving their objectives in workshop practice programmes and enhancing students' academic performance relies on several factors. These aspects encompass the accessibility, efficacy, and utilisation of equipment, together with the availability of materials and a sufficient number of technical education teachers. Furthermore, the correct use and utilisation of technical equipment, tools, and materials during workshop practice are of utmost importance.

The use of appropriate equipment, tools, and their respective functions by teachers during workshop practice enhances practical work and promotes student achievement. The efficacy of instructional facilities and equipment in the workshop is contingent upon the teacher's utilisation of them. It is important to note that teachers alone are unable to attain the requisite skills and values. Thus, it is crucial to have highly skilled teachers who possess desirable and in-demand abilities, together with the expertise to effectively transmit skills and theories to others. The proper implementation of the recently introduced curriculum in technical colleges by the NBTE is dependent on this. Ezeji (1998) discovered several key contributions to students' learning outcomes, including teachers' utterances, actions, leadership styles, topic expertise, and teaching skills. Gaining the requisite proficiency to proficiently utilise the equipment in workshop activities and during teachers' training will empower educators to properly impart knowledge in their curriculum implementation.

In the context of operations, instruction, and learning exercises, hand tools refer to instruments or gadgets that are designed to be easily handled. Numerous tools are frequently employed in the field of electrical and installation studies to facilitate the acquisition of knowledge during both practical and theoretical courses. These tools serve the dual purpose of demonstration and evaluation, enabling the assessment of skill acquisition levels. These advances are only feasible in situations where manual tools are sufficient, so enhancing the learning process and enabling learners to engage in a heightened level of creativity.

Students at urban and rural technical institutes engage in workshop practice, which includes diverse units such as automobile, mechanical, wood, building, electrical, and electronic. These lessons are specifically created for technical professors and other trained technical workers to showcase their expertise in a professional manner. Additionally, they provide learners with the opportunity to familiarise themselves with the functionality, adequacy, and equipment of these units, while also acquiring the necessary educational facilities in technical colleges encompass the tangible resources that support the process of instruction and knowledge acquisition inside these institutions. According to Ibrahim (2014), the significance of educational facilities and equipment

was emphasised. According to the source, educational facilities and equipment refer to the tangible and intangible resources that contribute in the facilitation of the teaching and learning processes within an educational environment. According to Kpanep (2011), the provision of high-quality technical and vocational educational facilities ensures that students acquire practical knowledge, skills, and expertise in their chosen sector. This, in turn, leads to the advancement of technological education.

According to Castaldi (2013), educational facilities and equipment encompass a range of resources such as workshops, labs, studio equipment, machineries, tools, consumable materials, and instructional materials. These resources play a crucial role in facilitating the attainment of instructional effectiveness by proficient teachers. The facilities available to students in teaching colleges encompass a range of materials and resources that serve to enhance the educational process within a school system. Educational equipment constitutes the fundamental input for the implementation of any instructional course. The origins of instructional activities are contingent upon the presence and accessibility of essential educational resources. It is widely acknowledged that the effective instruction of the practical aspects of a technical subject by a technology instructor is contingent upon the availability of functional tools, machines, or equipment. The presence and efficient utilisation of educational resources and equipment training or instruction inside technical colleges play a crucial role in facilitating the acquisition of skills, so enabling individuals to become productive and make meaningful contributions to national development. According to Lbrahiin (2014), the academic performance of students has a direct impact on the quality of education they receive. This quality is influenced by the presence of adequate physical facilities and the overall learning environment. According to Ifeakor and Okoli (2010), the primary aim of technical vocational education training is to cultivate practical abilities in learners. The acquisition of pertinent abilities in the domains of construction, design, and repair may alone be attained within a proficient operational workshop that is equipped with appropriate machinery and facilities for utilisation.

According to McCarthy et al. (2012), a significant obstacle in the curriculum of technical institutions is the insufficient availability of training facilities for teaching technical courses. In certain technical colleges, the presence of workshop facilities is scarce, and the availability of workshop materials is much more limited. Adewumi (2013) provided evidence for this assertion by stating that throughout his research, he conducted visits to several technical institutions and saw that a significant number of them lacked workshops. In cases where workshops were present, they were found to be non-operational, with certain workshops lacking the necessary equipment for effective teaching and learning. It is worth noting that while certain individuals assert the presence of structures, there is a lack of technical and efficient instructional equipment that should be employed to effectively cultivate the necessary technological skills for optimal development.

In 1985, the Federal Ministry of Education, Science and Technology made the decision to improve the academic performance and success of technical students in various institutions. This was achieved by providing schools with standardised equipment and functional facilities to facilitate a conducive workshop environment. According to Adewumi (2013), the equipment, facilities, and workshop resources available in schools, including building equipment, functional tools, and school materials, are insufficient for successful utilisation. Okoro additionally stated

that, apart from insufficient equipment and functional instruments in the workshop, the lack of skill continues to be a persistent issue in the tertiary institution. According to Alegbemi (2010), the persistent issue of inadequate physical facilities and workshop practice in technology education will persist as long as the government neglects to address this matter and fully acknowledge the importance of technology education for national development. According to Alegbemi (2010), in order to successfully prepare students to thrive in the era of science and technology and keep up with the latest technological advancements, it is necessary for the government and education stakeholders to change their approach towards providing schools and students with functional and accessible workshops, as well as equipment and utilities.

Statement of the Problem

The main goal of technical education is to provide individuals with the essential skills needed to lead a fruitful life and make significant contributions to the advancement of society. These objectives may alone be attained within an environment that is conducive to learning, wherein training equipment that is both functional and reliable, as well as effective, is made available. Based on empirical observations, it has been found that a significant number of Technical Colleges in Nigeria, with a particular focus on Delta State, face challenges in providing sufficient tools and equipment to their students. This insufficiency hinders the acquisition of enhanced skills, primarily due to the absence of functional modern equipment. Consequently, students tend to exhibit subpar performance in their academic pursuits, particularly when seeking employment opportunities within organisations upon graduation.

The high incidence of inadequate electrical installation skills among graduates of technical schools, coupled with high unemployment rates and underperformance among those who are hired, raises concerns about the sufficiency, functionality, and successful utilisation of electrical installation workshop practice in technical colleges. With these identified lapses on the increase, the researcher deemed it necessary to investigate the adequacy, functionality and utilization of workshop practice equipment and tools in technical colleges in Delta State.

Purpose of the Study

The primary purpose of this study was to evaluate the adequacy, functionality and utilisation of facilities for hands-on electrical installation work in technical colleges in Delta State. The specific purpose of this study was to:

- assess the adequacy of electrical tool and equipment used in technical colleges;
- evaluate the functionality of electrical tools and equipment used in technical colleges;
- evaluate the extent to which electrical installation equipment is utilized in technical colleges.

Research Questions

The study was guided by the following research questions:

1. How adequate are the electrical installation hand tools and equipment in technical colleges?
2. How effective are the functional electrical installation hand tools and equipment for technical colleges?
3. How are the electrical installation hand tools and equipment utilized in urban and rural technical colleges?

Hypotheses

The following hypotheses were examined with a significance level of 0.05:

1. There is no significant difference between the mean responses of electrical installation teachers in urban and rural Technical Colleges with adequate hand tools and equipment.
2. There is no significant difference between the mean responses of electrical installation teachers in urban and rural technical colleges on the level of functionality of hand tools and equipment.
3. There is no significant difference between the mean responses of electrical installation teachers in urban and rural technical colleges on the level of utilization of hand tools and equipment.

Methods

The study employed a survey research design, which was deemed suitable due to the absence of variable manipulation in the study. In the 2017/2018 academic year, the study population consisted of 37 electrical installation teachers, with 15 teachers from rural areas and 22 teachers from urban areas. Additionally, there were 124 students from six technical colleges in Delta State. No sampling was done in this study, rather all the 37 electrical installation teachers (Comprising of 15 teachers from rural and 22 Prom urban) and 124 students from the six (6) government technical colleges in Delta State in 2017/2018 academic session served as the sample of the study. Questionnaire was used as instrument for data, The questionnaire comprises of three (3) sections; Section A deals with the level of Adequacy of the electrical installation hand tools and equipment in technical colleges, Section B deals with the level of functionality of electrical installation hand tools and equipment in technical colleges, and Section C deals with the electrical installation hand tools and equipment utilized in technical colleges, while the check list has 128 items, the questionnaire is of (4) four point rating scale with a corresponding weight of 4, 3, 2 and 1.

The questionnaire validation process engaged professionals from the Department of Technical Education at Delta State University, Abraka. The specialists thoroughly analysed the checklist and questionnaire to assess the appropriateness of the instrument. Essential adjustments were made in accordance with the suggestions and recommendations provided. Moreover, the checklist has previously been standardised by the NBTE, since it serves as the highest authority responsible for the execution of the workshop practice equipment curriculum. The instrument was administered to 10 electrical installation teachers from government technical college Igueben in Edo State. After administering the questionnaire, the collected data were used to determine the reliability of the questionnaire. The Cronbach Alpha technique was employed to calculate the reliability coefficient using SPSS Statistical Software Version 20, resulting in a value of 0.73. The data collection process involved administering a questionnaire and checklist to teachers from the six government technical colleges in Delta State. The surveys were offered to the teachers by the researcher, while the checklist was provided to the Head teachers in order to obtain the necessary information. All administered questionnaires were promptly collected, resulting in a return rate of 100 percent. This study employed the mean and standard deviation to analyse the data in order to address the research questions. Additionally, a t-test was utilised to assess the hypotheses. When the mean response value for any item in the questionnaire exceeded 2.50, it was considered

adequate, functional and utilized, whereas items with scores below 2.50 were considered inadequate, non-functional, and not utilized.

Results

Research Question One: How adequate are the electrical installation hand tools and equipment in Technical Colleges?

Table 1: Mean response of Electrical Installation Teachers on Adequacy of Hand Tools and Equipment in urban and Rural Technical Colleges

Category	Technical Colleges	No. of Teachers	Mean Responses of Teachers								N	Grand Mean	SD	Remark
Urban	Sapele Technical College, Sapele	8	1.00	1.00	1.00	1.00	0.02	2.00	0.00	1.00	22	1.63	0.88	Inadequate
	Agbor Technical College, Agbor.	7	2.13	2.12	2.54	2.00	1.85	2.52	2.22					
	Oflagbe Technical College, Oflagbe..	7	1.10	1.21	1.85	2.22	2.41	2.45	2.75					
Rural	Issele-Uku Technical College, Issele-Uku	6	1.00	1.00	1.00	1.00	0.00	1.00			15	1.53	0.77	Inadequate
	Utagba-Ogbe Technical college, Kwale	5	2.13	0.00	2.57	2.56	1.85	=						
	Otor-Ogor Technical College, Otor-Ogor	4	2.57	2.13	0.00	0.00	=	=						

Table 1 shows the urban technical colleges, Sapele technical college had the mean responses of 1.00, 1.00, 1.00, 1.00, 0.02, 2.00, 0.00, and 1.00 while Agbor technical college reflected the mean responses of 2.13, 2.12, 2.54, 2.00, 1.85, 2.52 and 2.22. In addition, Oflagbe technical college had the mean responses of teachers as 1.10, 1.21, 1.85, 2.22, 2.41, 2.45 and 2.75. The Urban Technical Colleges had the grand mean responses of 1.63 with standard deviation of 0.88 which indicated not adequate hand tools and equipment base on the bench mark of 2.50 Under Rural Technical Colleges, Issele-Uku had the mean responses of 1.00, 1.00, 1.00, 1.00, 0.00 and 1.00 while Utagba Ogbe Technical College also reflected the main response of 2.13, 0.00, 2.57, 2.56 and 1.85 additionally, Otor-Ogor technical college had the mean responses of 2.57, 2.13, 0.00 and 0.00. The rural technical colleges had the grand mean response of 1.53 with standard deviation of 0.77 which indicated inadequate hand tools and equipment base on the bench mark of 2.50

Research Question Two: How effective are the functional electrical installation hand tools and equipment in technical colleges?

Table 2: Mean response of Electrical Installation Teachers on Functionality of Hand Tools and Equipment in urban and Rural Technical Colleges

Category	Technical Colleges	No. of Teachers	Mean Responses of Teachers								N	Grand Mean	SD	Remark
Urban	Sapele Technical College, Sapele	8	0.68	0.68	0.68	0.68	0.00	1.36	0.00	0.68	22	1.55	1.00	Not Functional
	Agbor Technical College, Agbor.	7	2.05	1.00	2.05	0.00	2.75	2.75	2.4					
	Ofagbe Technical College, Ofagbe.	7	2.75	2.5	2.05	1.00	1.25	2.4	2.15					
Rural	Issele-Uku Technical College, Issele-Uku	6	1.00	1.00	1.00	1.00	0.00	2.00			15	1.36	0.95286	Not Functional
	Utagbe-ogbe Technical college, Kwale	5	0.00	1.00	2.13	1.35	2.57							
	Otao-ogor Technical College, Otor-ogor	4	2.13	0.00	0.00	0.00								

Table 2 shows the urban technical colleges, Sapele technical college, had the mean response of teachers as 0.68, 0.68, 0.68, 0.68, 0.00, 1.36, 0.00 and 0.68 while Agbor technical college reflected the means response of 2.05, 1.00, 2.05, 0.00, 2.75, 2.75 and 2.4. In addition Ofagbe technical college, had the means response of teachers as 2.75, 2.5, 2.05, 1.00, 1.25, 2.4 and 2.15. The Urban Technical Colleges had the grand mean response of 1.55 with standard deviation of 1.00 which indicated not functional hand tools and equipment base on the bench mark of 2.50. Under Rural Technical Colleges, Issele-Uku had the mean response of teachers as 1.00, 1.00, 1.00, 1.00, 0.00 and 2.00 while Utagba-Ogbe Technical College also reflected the main response of 0.00, 1.00, 2.13, 1.35 and 2.57. Additionally, Otor-Ogor technical college had the main response of 2.13, 0.00, 0.00 and 0.00. The rural technical college had the grand mean response of 1.36 with standard deviation of 0.953 which indicated not functional hand tools and equipment base on the bench mark of 2.50.

Research Question Three: How are the electrical installation hand tools and equipment utilized in urban and rural technical colleges?

Table 3: Mean response of Electrical Installation Teachers on Utilization of Hand Tools and Equipment in urban and Rural Technical Colleges

Category	Technical Colleges	No. of Teachers	Mean Responses of Teachers								N	Grand Mean	SD	Remark
Urban	Sapele Technical College, Sapele	8	0.68	0.68	0.68	0.68	0.00	1.36	0.00	0.68	22	1.60	0.88	Not Utilized
	Agbor Technical College, Agbor.	7	2.05	0.00	2.05	2.05	2.75	2.75	2.4					
	Ofagbe Technical College, Ofagbe.	7	2.75	2.5	2.05	0.00	0.00	2.4	2.15					
Rural	Issele-Uku Technical College, Issele-Uku	6	1.00	1.00	1.00	1.00	0.00	2.00			15	1.57	0.83	Not Utilized
	Utagbe-ogbe Technical college, Kwale	5	0.00	1.00	2.13	0.00	2.57							
	Otao-ogor Technical College, Otor-ogor	4	2.56	1.85	2.57	2.13								

Table 3 presents an overview of the urban technical colleges. The grand mean response of teachers at Sapele Technical College was 0.68, 0.68, 0.68, 0.68, 0.00, 1.36, 0.00, and 0.68. On the other hand, Agbor Technical College had a grand mean response of 2.05, 0.00, 2.05, 2.05, 2.75, 2.75, and 2.4. Furthermore, the Ofagbe Technical College exhibited mean responses from teachers, with values of 2.75, 2.5, 2.05, 0.00, 0.00, 2.4, and 2.15. The Urban Technical Colleges had the grand mean response of 1.60 with standard deviation of 0.88 which indicated not Utilized hand tools and equipment base on the bench mark of 2.50. Under Rural Technical Colleges, Issele-Uku had the mean response of 1.00, 1.00, 1.00, 1.00, 0.00 and 2.00 while Utagba-Ogbe Technical College also reflected the main response of 0.00, 1.00, 2.13, 0.00 and 2.57 additionally, Otor-Ogor technical college had the main response of 2.56, 1.85, 2.57 and 2.13. The rural technical college had the grand mean response of 1.57 with standard deviation of 0.83 which indicated not Utilized hand tools and equipment base on the bench mark of 2.50.

Hypothesis 1: There is no significant difference between the mean responses of electrical installation teachers in urban and rural Technical Colleges with adequate hand tools and equipment.

Table 4: Summary of t-test analysis of the adequacy of the electrical installation hand tools in the urban and rural technical colleges in Delta State.

Location	N	Mean	SD	df	t _{cal}	Sig. (2-tailed)
Urban	22	1.6295	0.88266	35	0.829	0.412
Rural	15	1.5329	0.77059			

According to Table 4, the computed t-value (0.829) at a degree of freedom of 35, along with a p-value of 0.412, exceeds the predetermined level of significance of 0.05. Consequently, the hypothesis is deemed valid. This suggests that there is a lack of statistically significant difference in the mean response provided by teachers from rural and urban technical schools about the adequacy of electrical installation hand tools and equipment at technical institutions.

Hypothesis 2: There is no significant difference between the mean responses of electrical installation teachers in urban and rural technical colleges on the level of functionality of hand tools and equipment.

Table 5: Summary of t-test analysis on the functionality of Electrical Installation tools in Technical Colleges

Location	N	Mean	SD	df	t _{cal}	Sig. (2-tailed)
Urban	22	1.5538	1.00396	35	2.110	0.041
Rural	15	1.3605	0.94059			

The data in Table 5 indicates that the t-value (2.110) estimated for a degree of freedom of 35, with a p-value of 0.041, is lower than the predetermined significance level of 0.05. Therefore, the hypothesis is disproven. This indicates that there is a notable disparity in the average ratings of the effectiveness of electrical installation hand tools and equipment among teachers in rural and urban technical colleges.

Hypothesis 3: There is no significant difference between mean responses of electrical installation teachers in urban and rural technical colleges on the level of utilization of hand tools and equipment.

Table 6: Summary of t-test analysis on the utilization of the electrical installation hand tools/equipment's in the urban and rural technical colleges

Location	N	Mean	SD	df	t _{cal}	Sig. (2-tailed)
Urban	22	1.6010	0.88015	35	0.246	0.807
Rural	15	1.5738	0.83179			

Based on the information provided in Table 6, the t-value estimated (0.246) for a degree of freedom of 35, combined with a p-value of 0.807, is higher than the preset significance level of 0.05. Therefore, the hypothesis is considered to be valid. This indicates that there is no statistically significant disparity in the average evaluation of the use of electrical installation hand tools and equipment between instructors in rural and urban technical colleges.

Discussion

The investigation revealed that a considerable fraction of the hand tools discovered in both rural and urban technical colleges were inadequate for the purpose of Electrical Installation workshop practice. The results align with previous research conducted by Ibrahim (2014), which found that in technical colleges in Kaduna State, only 22.5% of electronics laboratory facilities meet the minimum requirement set by NBTE. Similarly, only 9.8% (9 items) of electrical laboratory facilities meet the minimum requirement set by NBTE. Similarly, Umunadi (2009) found that technical colleges in Delta States lacked sufficient access to essential power equipment and materials. In a similar vein, Au (2015) documented that the workshop practice equipment in technical colleges in Kano State was insufficient. In addition, Poripo (2012) found that South-South tertiary institutions lack sufficient instructional facilities for teaching and learning automobile technology. The study also identified a deficiency in training infrastructure, including the absence of necessary instruments and equipment.

The findings of the survey indicated that the state of electrical installation workshop facilities at Delta State Technical institutions was generally satisfactory across all technical institutions, with the exception of Otor-Ogor Technical College, which lacked the necessary equipment. These findings align with previous studies. Bellow and Shuaibu (2013) reported that the workshop facilities needed for instructing electrical installation and repair work in Bauchi State Technical Colleges were not functioning. The study conducted by Poripo (2012) revealed that the instructional facilities used for teaching and studying car technology in higher institutions in the South-South region were not working properly.

The findings also indicated that the electrical installation workshop facilities in technical colleges in Delta State were fairly utilised in all of the technical institutions, with the exception of Otor-Ogor Technical College, which lacked any of the necessary equipment. These findings are consistent with previous research conducted by Umunadi (2009), which demonstrated inadequate utilisation of fundamental electricity equipment and materials. Similarly, Poripo (2012) found that training facilities, including tools and equipment, were either unavailable or neglected. The study's

findings regarding the relationship between equipment/tools and students' academic progress at Delta State technical colleges were inconsistent with the reports of Ulugega (2014) and Nwadiani (2016), who observed significant deficiencies in the availability of equipment/tools in these institutions.

Conclusion

The study's findings led to the conclusion that the hand tools and equipment utilised in the Electrical Installation workshop practice at Delta State Technical Colleges were deemed inadequate. Additionally, it was observed that certain hand tools and equipment were found to be non-functional. Additionally, the research findings indicate that the appropriate hand tools and equipment were not employed for the purpose of conducting Electrical Installation workshops in technical institutes located in Delta State. Therefore, it was concluded that the hand tools and equipment utilised in the laboratory practice for electrical installation were inadequate and under-utilised.

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