

MAINTENANCE OF TECHNICAL LABORATORIES AND EQUIPMENT FOR OPTIMAL SKILLS ACQUISITION IN OGUN STATE TECHNICAL COLLEGES

¹ADERINTO, Idowu Dare; ²AREO, John Olutimileyin & ³OLADIPUPO, Sunday Joseph

^{1,2,3} Tai Solarin University of Education
Department of Industrial Technical Education

Abstract

This study investigated maintenance of technical laboratories and equipment for optimal skills acquisition in Ogun state technical colleges. Descriptive survey research design was adopted for the study. The population for this study comprised all the eight two (82) technical instructors across all the technical colleges in Ogun State. A structured questionnaire with a reliability coefficient of 0.81 was used for data collection. Data was analyzed with descriptive statistics of mean and standard deviation for answering research questions. Findings revealed that maintenance activities are not regularly carried out in technical laboratory in Ogun state technical colleges with an average mean of 2.35. Also, there are factors affecting maintenance of laboratories and equipment with an average mean of 2.29. Findings further revealed that there are strategies for improving maintenance practices of technical laboratory and equipment in Ogun state technical colleges with an average mean of 3.27. It was therefore concluded and recommended that relevant continuous maintenance training should be organized and practice by the teachers often to keep the technical laboratories and equipment's in good condition for practical activities that will equip the students with relevant skills needed in world of work.

Keyword: Maintenance, Skills Acquisition, Technical Laboratory, Equipment

Introduction

Over the years, Nigeria as a nation has been making an effort to advance and industrialized like other nations of the world, in terms of a robust economy, science, and technology as well as a high standard of living. In countries like the United States of America, China, and Germany among others, there are massive industrialization and employment, advanced science and technology, and high income per capital as well as a reduction in the poverty rate among the populace. In the light of this, Nigeria incorporates technical and vocational education within its National Policy on Education as a means of achieving socioeconomic leadership (FRN, 2004).

Education is considered the most efficient way to bring about complete transformation that would guarantee faster national progress and economic growth. According to Ibiwumi & Oluwaseyi (2018), education remains an invaluable tool for human capital

development that is essential for economic growth and sustenance all over the world. This implies that the development of any nation is tied to the enlightenment of its citizens. Besides, the current demand of industries across different nations has called for the service of skillful personnel rather than mere certificate holder that will not add much value to their organization. Therefore, to improve level of skilled graduate in technical colleges, government, educational stakeholders, and citizens needs to prioritize vocational and technical education.

Vocational and technical education is geared towards imparting adequate right thinking and processing habits that are required for successful employment in the world of work. Vocational and technical education, according to Omobola & Olubunmi (2020), entails the acquisition of skills and competencies that can support people in operating effectively in commercial and industrial jobs. Additionally, by fostering the skills required for commercial, industrial, agricultural, and economic development, vocational and technical education helps to create selfreliant nation. This suggest that vocational and technical education would enable the participants to significantly contribute to society (FRN, 2013). Hence, the role of vocational and technical education in national development cannot be overemphasized.

One of the challenges facing effective teaching and learning of vocational and technical education (VTE) and skill acquisition is the poor state of infrastructural facilities. This includes classrooms, technical laboratories, tools, and equipment among others. Therefore, without these facilities in place an in good condition, there can't be effective skill acquisition. Skill acquisition is the ability to be prepared for a particular task or work and become an expert in it (James 2016). It is incredibly depressing that there is a huge rate of unemployment in various parts of the world especially in Nigeria. This contributes to the rise of misbehaviour in many parts of the world.

According to Umunadi (2011), one of the reasons responsible for the low-skill VTE graduates in Nigeria is inadequate facilities in most educational institutions. This could be due to a lack of proper understanding and knowledge on effective management and usage of laboratory facilities by the workshop personnel, instructors, and students. Besides, the study of Uchendu, Ekanem & Jonah (2013) stated that physical resources in the institutions of learning are not regularly maintained but rather maintained occasionally. Hence, there is a need for functional laboratories, equipment as well as appropriate maintenance practices for effective skill acquisition in technical colleges.

Maintenance is crucial to ensure that a system remains available, and when altered, can be restored to its original state (Ibiwumi & Oluwaseyi 2018). Maintenance is an activity that is done regularly to keep a machine, building, or piece of equipment in good condition (Bakare 2014). Functional inspections, servicing, repairs, and replacements of essential laboratory apparatus are all included in maintenance.

Maintenance actions could take place prior to or following a malfunction on a specific machine. In most technical laboratories, many equipment and tools usually required consistent maintenance for optimal functionality. This includes lathe machine, portable drilling machine, hacksaw and bandsaw, boring machine, clamp, alignment tools, files, hammer, spanners, pliers, oscilloscope among others. Therefore, it's critical to adopt routine maintenance procedures when working in technical laboratories in order to extend the equipment's lifespan and ensure both the learners' and instructors' safety. Also, regular maintenance will always keep the facilities in good condition and enhance skill acquisition of the students to make them self-employed, and employable and contribute immensely to the growth of the society. Therefore, this study is on the maintenance of technical laboratories and equipment for optimal skills acquisition in Ogun State Technical colleges

Statement of the Problem

One of the main purposes of establishing technical colleges is to promote general and practical skill acquisition that would help in developing manpower and national development. This means technical college is a skill-focused learning environment where an individual is trained to be self-reliant. In order to accomplish educational objectives as specified in Nigeria's national policy on education, technical institutions are therefore expected to be highly equipped with suitable infrastructural facilities, including tools, equipment, technical laboratories, and skilled personnel, among others. Aside from this, regular practical activities must be encouraged and promoted for the facilities' well-being in order to provide students with the necessary and sufficient skills to succeed in world of work.

Unfortunately, observation has revealed that most facilities in the workshop are not always well maintained. Uchendu et al. (2013) claim that physical resources in the institutions of learning are not regularly maintained but rather maintained occasionally. This inability to maintain laboratory equipment and tools has contributed to a low level of practical activities in the classroom which has affected students' skill acquisition. In addition, this has rendered a large number of graduates unemployed or self-employed after graduation. Without a doubt if this continue, it will seriously harm Nigeria's educational system, particularly at technical colleges where practical skill acquisition is the focus. To stop or reduce this, this study looks into the maintenance of technical laboratories and equipment for optimal skill acquisition in Ogun State technical colleges.

Purpose of the Research

The main purpose of this research is to investigate the maintenance of technical laboratories and equipment for optimal skills acquisition in Ogun State technical colleges. Specifically, the study aims to examine:

1. Regular maintenance activities carried out in technical laboratory in Ogun State technical colleges.
2. Factors affecting maintenance of laboratories and equipment in Ogun State technical colleges.
3. Strategies for improving maintenance practices of technical laboratory and equipment in Ogun State technical colleges.

Research Question

The following research were raised for this study:

1. what are the regular maintenance activities carried out in technical laboratory in Ogun State Technical Colleges?
2. what are the factors affecting the maintenance of laboratories and equipment in Ogun State technical colleges?
3. what are the strategies for improving maintenance practices of technical laboratories and equipment in Ogun State technical colleges?

Methodology

A descriptive survey research design was adopted for the study. The study was conducted in

Ogun State of Nigeria. The population for this study comprised all the eighty-two (82) technical instructors across the eight (8) technical colleges in Ogun State Nigeria. Hence, there was no need for sampling. A structured questionnaire which comprised 22 items was used as an instrument for data collection. Validity of the instrument was done by experts to ensure that the appropriate vocabulary and sentence structure of the items were suitable for the intended respondents. Cronbach Alpha reliability technique was used to establish the internal consistency of the instrument and a reliability coefficient of 0.81 was obtained. The instrument was administered by the researcher with the support of two research assistants. The filled questionnaire was collected on the spot by the researchers. Data was analyzed using descriptive statistics of mean and standard deviation for answering research questions, with the aid of SPSS software. In answering the research question any item with a mean score of 2.50 and above was accepted and any item that falls below 2.50 was rejected.

Data Presentation, Analysis and Results

Research Question 1

What are the maintenance activities carried out in technical laboratory in Ogun State tertiary institutions?

Table 1: Mean responses on regular maintenance activities carried out in technical laboratory in Ogun State Technical Colleges

S/N	Items	Mean	S. Dev.
1.	Proper arrangement of laboratory equipment	2.57	.57
2.	Appropriate spacing of machines and other equipment	2.30	.89
3.	Easy location of different machines and equipment through		2.4
5	.68 labelling		
4	General servicing of machines and tools		2.43
5.	Daily cleaning of the laboratory	2.11	.64
6	Use of Maintenance records	2.42	.57
7.	Provision of sufficient space	2.35	.68
8.	Ensuring appropriate room temperature always	2.33	.75
9.	<u>Preservation of surfaces and finishes</u>	2.3	.94
Average Mean			2.35

Table 1 presents the result of the mean responses of respondents on the maintenance activities carried out in technical laboratory in Ogun State Technical Colleges. The table revealed with mean of 3.57, 3.20, 3.45, 3.43, and 3.11 that there is proper arrangement of laboratory equipment, appropriate spacing of machines and other equipment, easy location of different machines and equipment through labeling, general servicing of machines and tools, and daily cleaning of the laboratory respectively. Also, the result established with means of 3.42, 3.35, 3.33, and 3.23 that there is the use of maintenance records, provision of sufficient space, ensuring appropriate room temperature always, and preservation of surfaces and finishes respectively. However, with an average mean of 2.35 which is greater than the 2.50 minimum level of agreement in this study, it was established that maintenance activities are not regularly carried out in technical laboratory in Ogun State technical colleges

Research Question 2

What are the factors affecting maintenance of laboratories and equipment in Ogun state tertiary institutions?

Table 2: Mean responses on factors affecting maintenance of laboratories and equipment in Ogun state technical colleges

S/N	Items	Mean	S. Dev.
10	Inadequate funding	2.30	.65
11	Lack of skilled personnel	2.38	.58
12	Improper usage of technical laboratories and equipment	2.13	.74

13	Poor attitude of personnel and trainees to maintenance culture	2.29	.81
14	<u>Poor safety consciousness</u>	2.33	.73
Average Mean		2.29	

Table 2 presents the result of the mean responses of respondents on factors affecting the maintenance of laboratories and equipment in Ogun State Technical Colleges. The table revealed with means of 3.57, 3.20, 3.45, 3.43 and 3.11 that there is inadequate funding, lack of skilled personnel, improper usage of technical laboratories and equipment, poor attitude of personnel and trainees to maintenance culture, and poor safety consciousness respectively. However, with an average mean of 2.29 which is greater than the 2.50 minimum level of agreement in this study, it was established that there are factors affecting the maintenance of laboratories and equipment in Ogun state technical colleges

Research Question 3

What are the strategies for improving maintenance practices of technical laboratory and equipment in Ogun state tertiary institutions?

Table 3: Mean responses on strategies for improving maintenance practices of technical laboratory and equipment in Ogun State Technical colleges

S/N	Items	Mean	S. Dev.
15	Arrangement of tools in the toolbox	3.41	.86
16	Lubrication of joints	3.33	.73
17	Servicing of machines	3.48	.61
18	Necessary equipment repairs	3.25	.68
19	Daily cleaning	3.22	.73
20	Orderly arrangement of laboratory resources	3.28	.68
21	Storing laboratory tools and equipment away from sunlight	3.09	.75
22	<u>Regular waste disposal</u>	3.12	.90
Average Mean		3.27	

Table 3 presents the result of mean responses of respondents on strategies for improving maintenance practices of vocational laboratories and equipment in Ogun State Technical

Colleges. The table revealed with means of 3.41, 3.33, 3.48 and 3.25 that there could be an arrangement of tools in the toolbox, lubrication of joints, servicing of machines and necessary equipment repairs respectively. Also, the result established with means of 3.22, 3.28, 3.09 and 3.12 that there could be daily cleaning, orderly arrangement of

laboratory resources, storing laboratory tools and equipment away from sunlight, and regular waste disposal respectively. However, with an average mean of 3.27 which is greater than the 2.50 minimum level of agreement in this study, it was established that there are strategies for improving maintenance practices of technical laboratories and equipment in Ogun State Technical Colleges.

Discussion of Findings

The study investigated maintenance of technical laboratories and equipment for optimal skill acquisition in Ogun State technical colleges. Based on the findings of the study, maintenance activities are not regularly carried out in technical laboratories in Ogun State Technical Colleges. In support of the findings is the study of Uchendu, Ekanem & Jonah (2013) which stated that physical resources in the institutions of learning are not regularly maintained but rather maintained occasionally. It is therefore important to encourage teachers and students to regularly maintain laboratory facilities to be in good condition to improve practical activities that will equip the students with skills needed in the world of work.

Also, the findings revealed that there are factors affecting the maintenance of laboratories and equipment in Ogun State Technical Colleges. This aligns with the study of Obielumani & Obielumani (2015) who asserted that under-funding problems, strikes, economic recession and inflation, corruption, and poor management of available resources are some of the reasons why the Nigerian institutions is perpetually undergoing crises. It also supports the assertion of Stanley (2011) that inadequacies in maintenance practices are banes of development.

The study further revealed that there are strategies for improving maintenance practices of technical laboratories and equipment in Ogun State Technical Colleges. This corroborates with the study of Ikoya (2012) who reported that the availability, adequacy, and functionality of schools' physical facilities are strongly hinged on efficient management and maintenance of resources.

Conclusion

The study investigated the maintenance of technical laboratories and equipment for optimal skills acquisition in Ogun State technical colleges. It was established that Ogun State Technical Colleges' technical laboratories were not usually used for maintenance tasks. Even if a number of elements influence the upkeep of the laboratories and equipment in those technical institutions, there are still tactics that may be used to enhance technical laboratory maintenance procedures with regard to the equipment that is already accessible. Therefore, it is very important to encourage instructors, students, and other laboratory staff members to regularly maintain laboratory facilities and make sure they are in good shape in order to increase practical activities that will give students the appropriate skills they need to succeed in world of work.

Recommendations

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

1. Relevant maintenance training should be organized for the teachers as well as constant maintenance of equipment and technical laboratories should be observed as at when due.
2. Factors affecting the maintenance of laboratories and equipment in those technical colleges should be appropriately taken care of to minimize machine and equipment damage and downtime.
3. Observed strategies for improving maintenance practices in the technical laboratory regarding available equipment should be strictly employed and adapted for improved performance in the laboratory.

References

- Bakare, J. (2014). Development and validation of cell phone maintenance training modules for national diploma students. *An Unpublished Ph.D Project Submitted to the Department of Vocational Teacher Education, University of Nigeria, Nsukka*
- Federal Republic of Nigeria (FRN, 2004). National Policy on Education. (4th Ed.) Lagos.
- Federal Republic of Nigeria (FRN, 2013). National Policy on Education (6th Ed.). Lagos. NERDC Press.
- Ibiwumi, A. A., & Oluwaseyi, F. O. (2018) Maintenance culture among vocational curriculum materials users in Ogun State tertiary institutions. *Journal of Teaching and Teacher Education* 6(2), 2210-1578
- Ikoya, P. O. (2012). Centralization and decentralization of schools' physical facilities management in Nigeria. Retrieved from <http://www.emerdeinisight.com/0957-8234.htm>
- James, E. O. (2016) Impact of SIWES on electrical technology education students' skill acquisition, *Journal of Natural Sciences Research*. 5(22), 2224-3186 (Online) www.iiste.org
- Obielumani, I. O., & Obielumani, J. O. (2015). An overview of physical facilities input and access to university education in Nigerian universities. *Journal of Educational Studies and Management*, 3(1&2), 355-363.
- Omobola, O., & Olubunmi, F. (2020). *Emerging challenges and trends in technical and vocational education and training in Nigeria*. Proceedings of the 2nd International Conference, The Federal Polytechnic, Ilaro, 10th – 11th Nov.

- Stanley, O. (2011). Addressing poor maintenance culture with facility management. Retrieved from <http://www.punching.com/Artid.aspx?theartic=Art201105302466>
- Uchendu, C. C., Elkanem, E. E., & Jonah, S. T. (2013). Resource maintenance for the provision of educational services in public and private secondary schools in Rivers State, Nigeria. *European Journal of Business and Social Sciences*, 2(1)
- Umunadi, E. K. (2011). *Provision of equipment and facilities in Vocational and technical education for improving carrying capacity of Nigeria's tertiary institution*. Paper presented at the 1st International Technology, Education and Environment Conference