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Assessment of the Training Facilities for the Implementation of Mechanical Technology Programme in Technical Colleges in Northern Nigeria

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Abstract:

This study aims to carry out an assessment of the Training Facilities for the Implementation of Mechanical Technology Programme in Technical Colleges in Northern Nigeria. The specific objectives were to determine the availability, adequacy and functionality of the facilities in the workshop. A descriptive research design was adopted to reach out to a population of 144 respondents in 24 NBTE-accredited technical colleges in the study area. An NBTE checklist of workshop facilities consisting of 51 items in seven sub-themes was used as an instrument for data collection. The instrument was administered by the researchers and the trained assistants. The data was analyzed using the mean statistic. Results show that the majority of the workshop facilities were available, most of the workshop facilities were inadequate and the majority of the workshop facilities were functioning. It was recommended, among others, that Federal and State Governments should add to their annual budget 5% for the purchase of new and modern workshop facilities. The emphasis in the present dispensation is on the teaching of digital workshop skills to students. It is very vital that digital facilities be supplied adequately to the schools for instruction. Government should involve Non-Governmental Organizations, the Industry and other stakeholders in hosting meetings for workshop skills curriculum development, supply of facilities and drawing future road maps for skills training.

Keywords: Assessment, training facilities, mechanical technology

1. Introduction

The implementation of any technical college programme requires the adequate provision of training facilities. If the training facilities are in short supply would, no doubt, hamper the effective implementation of the said programme of the technical college. Successfully implementing a mechanical technology programme requires tools and simple and complex facilities (Jadas, 2015). By facilities here, it means those necessary things that are required by both the trainers and trainees to run the training programme successfully without any hitch. On the other hand, training would mean imparting and acquiring knowledge and skills by a trainee within a given period of time. In other words, training has to do with the acquisition of skills within a specified time frame (Bature & Umar, 2019).

In order to ascertain the availability, adequacy and functionality of training facilities of the mechanical technology programme of technical colleges, assessment cannot be overemphasized. By assessment here, it means to have knowledge of the quality of facilities available and adequate by the standard required for the purpose of training per class. It is one thing to have the training facilities available and it is quite another thing to ascertain that the adequate facilities function properly (Bature, 2012). By adequacy here, we mean whether the facilities are enough to meet the training needs of the trainees. That is, if the trainees will get access to these training facilities when the need arises without any hitch. By functionality, it means that the facilities are working and usable by both trainers and trainees.

The accessibility to training facilities is paramount to both the trainers and the trainees. The training of mechanical technology students cannot be effective without the requisite available training facilities. This would go a long way to motivate the trainers to have an interest to impart the right skills to the learners. The learners, on the other hand, would acquire the necessary skills expected of them before they graduate (Edmond, Amade & Wandobed, 2016).

The available training facilities must be functional and up-to-date. It has to meet the training needs of the trainees. So far, the advancement in science and technology that keeps emerging triggers the need for training facilities to be functional and up-to-date. Thus training institutions must be provided with functional and up-to-date facilities that would

serve the yearnings of both stakeholders. If the training facilities are obsolete, skills acquired by trainees would be outdated. Hence, the objective of training the students would not be achieved, thereby making them become old-fashion graduates. Thus this will lead to having wastage of both human and material resources.

In Northern Nigeria, the researchers have observed that while the population of students is increasing every year, the majority of the technical colleges are in short supply of training facilities. Even the ones that are available are obsolete non-functional and sub-standard. Efforts should be made by the government to ensure that technical colleges are supplied with adequate functional training facilities. This will enhance the training of the trainees with the right skills, knowledge, attitudes and competencies, thereby preparing them for employable skills or for further education (FGN, 2014).

The need for assessing the training facilities of technical college programmes cannot be overstressed. Assessment will unfold the quality and quantity of the training facilities available and functionality to meet the training needs of the trainers at a given moment of training. Hence, this study needs to assess the training facilities of the mechanical technology programme implementation in Technical Colleges in Northern Nigeria.

1.1. Statement of the Problem/Justification

Undoubtedly, college training facilities have to be assessed to ascertain their availability, adequacy and functionality in meeting any training needs. Thus, it would not be out of place to embark on the assessment of the training facilities of mechanical technology programme implementation in technical colleges in Northern Nigeria. The works of literature searched by the researchers have shown that technical colleges are not training the graduates with the right skills required by the industries. Furthermore, there is a paucity of studies to ascertain the availability, adequacy and functionality of training facilities in technical schools in Northern Nigeria. More so, the absence of generated data to the attestation to the present predicament would further degenerate misinformation as regards the authenticity of the training facilities that could be utilized at this moment for training the trainees.

The lack of data would no doubt hamper ascertainment of the training facilities available, adequate and functional in meeting the training needs of any given college training programme. Hence, the concern of this present study is to assess the training facilities that are available, adequate and functional for the implementation of mechanical technology programme of Technical Colleges in Northern Nigeria.

1.2. Objective of the Study

This study aims to assess the availability, adequacy and functionality of training facilities for the implementation of mechanical technology programme in technical colleges of Northern Nigeria.

1.3. Research Questions

The research question that guided the study is thus:

- What are the training facilities available for the implementation of mechanical technology programme in technical colleges in Northern Nigeria?
- How adequate are the training facilities for the implementation of mechanical technology programme in technical colleges in Northern Nigeria?
- How functional are the training facilities for the implementation of mechanical technology programme in technical colleges in Northern Nigeria?

2. Review of Related Literature

This section covers the conceptual and theoretical framework to set a premise for this study. Others include a review of similar studies on the assessment of available training facilities for the implementation of trade courses in technical colleges. This is to assist in identifying areas of focus, challenges and benefits to the stakeholders in Northern Nigeria and beyond. The findings of these previous studies can be compared and come out with emerging potential recommendations for practitioners and policymakers as the result may unfold.

3. Conceptual and Theoretical Framework

Experts have defined institutional training facilities as those things that are required for a specific training programme to implement in a school system (Bature & Abubakar, 2019). Some of these training facilities may include the following: instructional materials, equipment, machines, tools, building, gadgets and means of communication and transportation of both human and material resources, among others (Edmond, Amadu & Wondobed, 2016). Training, on the other hand, is the act of imparting skills to a trainee for a period of a given session of the learning-teaching process. Here the trainee is expected to exhibit certain learning behaviours which will show that he/she has adequately and uniquely been educated and taught at the end of a trained programme of the training given to a trainee on a particular subject matter. It is expected that he/she should be able to demonstrate the skills acquired without any hitch if given the appropriate environment and tools required in the workplace now or in the future (Jadas, 2015). This is exactly what training does to a learner in a given learning-teaching process. The trainer donates the skills, while the trainee absorbs the skill and puts it into constant practice using appropriate tools and instruments for effective input and output achievement.

In order to ascertain the availability and adequacy of training facilities for the moment and future needs, there is a need to continue to assess the programme frequently as the need to do so arises (Bature & Abubakar, 2019). This has to do with the judgment about the quality and authentication of the facilities of the training programme at hand as to whether it meets the desirable standards at any given period of the teaching-learning process *visa-viz* the challenges of the moment and future, of course. This is a fact whether one accepts it or not. It is a basic truth.

4. Methodology

4.1. Study Area

The area under study comprised all the 24 Technical Colleges in 13 states with full accreditation in Mechanical Technology programme from National Board for Technical Education (NBTE) in Northern Nigeria. The state include: Adamawa, Bauchi, Benue, Gombe, Jigawa, Kaduna, Kano, Katsina, Nasarawa, Plateau, Sokoto, Yobe and Zamfara (NBTE, 2021)

The researchers have already familiarized themselves with the study area. However, a preliminary study was undertaken to ascertain the number of Technical teachers, students and Heads of department. The study revealed that there are 144 technical teachers. The total population stands at 144 respondents. All the population will be used as respondents, and therefore, no sampling.

4.2. Research Design

This study will use a descriptive survey research design. A survey will be used to obtain data from the students and teachers of mechanical technology from each of the technical colleges in Kaduna state. A survey will be conducted to seek the opinions of the respondents. A checklist would be provided based on NBTE's standard, and respondents would be required to respond appropriately to what they observed.

A checklist will be provided to collect information from respondents, students and teachers. The training facilities of mechanical technology are subdivided into seven themes such as:

- Machines /equipment
- Hand tools
- Holding tools
- Welding/fabrication facilities
- Forging facilities
- Design facilities

4.3. Method of Data Collection

The instrument for the study will be a checklist administered by the researchers and six trained research assistants to the respondents to observe and put a checkmark on the appropriate column to indicate their observation on the indices itemized on the checklist.

4.4. Method of Data Analysis

The analysis of data will involve the use of frequency tables and mean statistics. The decision on any item was based on the mid-point of the four-point rating scale. Thus, any item with a mean of 2,5 and above was accepted and any item with a mean below 2.5 was rejected.

5. Result

The data analysis were presented in tables according to the research questions that guided this study. The presentation is based on the 13 states that data were collected to show the availability, adequacy and functionality of the 51 workshop equipment.

S/N	Machines/Equipment	\bar{X}_1	\bar{X}_2	\bar{X}_3	\bar{X}_4	\bar{X}_5	\bar{X}_6	\bar{X}_7	\bar{X}_8	\bar{X}_9	\bar{X}_{10}	\bar{X}_{11}	\bar{X}_{12}	\bar{X}_{13}	Grand Mean	Remark
		1	Shaping Machine	2.8	2.5	2.7	3	2.7	3.2	3.8	2.9	2.9	3.7	2.4	2.5	3.1
2	Milling Machine	2.9	2.5	2.5	3.3	2.9	3.1	3.2	2.7	2.9	3.9	2.6	2.9	3.2	3	Available
3	Bench Drilling Machine	3.3	3.5	2.9	3.1	2.9	3.7	3.5	3.1	3	3.8	2.9	2.6	3.4	3	Available
4	Pillar Drilling Machine	2.5	2.3	2.4	3.6	2.5	2.6	3.8	2.4	3.1	3.2	2.6	2.8	2.6	2.8	Available
5	Radial Drilling Machine	2.1	2.2	2.5	3.1	2.3	2.9	2.6	2.7	2.5	3	2.8	2.7	3	2.6	Available
6	Hand Drilling Machine	3.9	3.2	3.8	3	3.5	3.7	3.8	3.3	3.3	3.8	3	3.1	3.4	3.4	Available
7	Lathe Machine	3	3.3	3.4	3.4	3.8	3.3	3.2	3.8	3.7	3.9	3	3.5	3.3	3.4	Available
8	Universal Grinding Machine	3.3	3.4	3.2	3.1	2.9	3.1	3.7	3.6	3.1	3.9	3.8	2.9	3.6	3.4	Available
9	Surface Grinding Machine	2.4	3.2	2.2	3.2	3.5	2.9	2.7	3.7	3.4	4	2.9	3.1	3.1	3.1	Available
10	Bench Grinding Machine	4	3.9	3.7	3.6	3.5	4.1	3.5	3.7	3.4	3.9	3.6	3.1	3.6	3.7	Available
11	Filing Machine	2.9	3.2	3.2	3.1	2.9	4	3.2	3.9	3.2	3.8	2.9	3.5	3.1	3.3	Available
12	Power Cutting Machine	1.9	2.2	2.6	3.3	3.2	2.6	3.1	3.5	3	4.1	3.2	3.1	3.5	3	Available
13	Guillotine Machine	1.5	2.2	2.1	2.6	2.5	3.7	3.4	3.1	2.5	3.7	2.6	2.2	3.2	4.1	Available
14	Welding machine (AC)	3.5	3.6	3.3	3.7	3.1	3.8	3.5	3.2	3.3	3.8	3.5	3.5	3.2	3.5	Available
15	Welding machine (DC)	3.2	3.1	3.3	3.3	3.5	3.7	3.2	3.6	3.3	3.3	3.5	3.1	3.1	3.3	Available
16	Forging Machine	2.9	3.2	2.7	3.2	3.1	3.2	2.9	2.7	2.5	3.2	3.3	3.1	3.1	3.3	Available

												Overall Mean			3.2	Available
HAND TOOLS																
17	Flat files	3.3	3.5	3.6	3.2	3.6	3.6	3.2	3.2	3.4	3.8	3.6	3.6	3.8	3.5	Available
18	Half round files	3.7	3.9	4	4.2	3.5	3.8	3.6	3.3	3.6	4.2	3.5	3.9	3.5	3.7	Available
19	Round files	4.1	3.7	3.9	3.3	3.7	3.8	3.6	3.8	3.8	4	3.7	4	3.9	3.7	Available
20	Sledge hammer	3.1	3.2	3.3	3.1	3.5	4.1	4	3.2	3.8	3.9	3.2	3.2	3.6	3.5	Available
21	Ball pane hammer	2.6	2.8	3.2	3.2	3.1	3.5	2.9	3.2	3.1	3.8	3.3	3.1	3.2	3.2	Available
22	Mallet	2.9	3.2	3.3	3.4	3.2	3.1	3.4	2.9	3.5	3.8	3.2	3.5	3.1	3.3	Available
23	Hacksaw	4.2	4.3	3.9	3.5	4	4.1	3.8	3.9	4.1	4.2	3.7	3.8	3.6	3.9	Available
24	Chisel	3.1	3.6	3.5	3.7	3.1	3.2	3.8	3.7	3.5	3.9	3.6	3.7	3.6	3.5	Available
25	Set of spanners	2.9	3.1	3.2	3.2	3.2	2.9	2.9	2.9	3.3	3.9	3.6	3.7	3.9	3.3	Available
26	Scrapers	2.5	2.6	2.3	2.6	2.7	3.1	3.4	2.5	2.9	3.5	2.9	3.5	3.1	2.9	Available
												Overall Mean			3.5	Available
WORKHOLDING DEVICE																
27	Bench Vice	3.4	4	3.9	3.6	4	4.2	3.8	3.6	3.4	4.3	3.8	3.7	3.7	3.8	Available
28	Tool Makers Clamp	3.1	3.3	3.1	3.2	2.9	2.8	3	3.3	3.4	3.8	3.6	3.9	3.6	3.3	Available
29	Pliers	3.4	3.2	3.5	3.3	3.2	3.1	3.7	3.1	3.3	3.9	3.1	3.4	3.1	3.3	Available
30	Tongs	2.9	2.4	2.7	3.1	3.2	2.9	2.8	3.1	2.9	3.8	2.7	3.4	3.1	3	Available
MARKING TOOLS																
												Overall Mean			3.6	Available
31	Scriber	3.3	3.5	3.6	3.2	3.6	3.6	3.2	3.2	3.4	3.8	3.6	3.6	3.8	3.5	Available
32	Center punch	3.7	3.9	4	4.2	3.5	3.8	3.6	3.3	3.6	4.2	3.5	3.9	3.5	3.7	Available
33	Steel rule	4.1	3.7	3.9	3.3	3.7	3.8	3.6	3.8	3.8	4	3.7	4	3.9	3.8	Available
34	Try square	3.1	3.2	3.3	3.1	3.5	4.1	4	3.2	3.8	3.9	3.2	3.2	3.6	3.5	Available
35	Surface gauge	2.6	2.8	3.2	3.2	3.1	3.5	2.9	3.2	3.1	3.8	3.3	3.1	3.2	3.2	Available
36	Surface plate	2.9	3.2	3.3	3.4	3.2	3.1	3.4	2.9	3.5	3.8	3.2	3.5	3.1	3.3	Available
37	v-block	2.1	2.3	2.5	2.6	3.1	2.4	2.5	3.1	3.2	2.6	2.4	2.9	3	2.7	Available
38	Micrometer screw gauge	2.5	2.6	2.7	3.2	2.9	3.2	2.8	2.9	3.4	3.5	3.1	2.9	2.9	3	Available
39	Vanier Caliper	2.5	2.5	2.8	3	2.3	2.6	2.4	3.1	3.6	3.4	2.3	2.6	2.9	2.8	Available
40	Dial Indicators	1.9	2.4	2.1	1.8	2.2	2.3	2.5	1.5	1.9	2.7	2.3	2.7	2.6	2.1	Not Available
41	Dividers	3.5	3.4	3.8	3.2	3.1	3.9	3.8	3	3.2	3.9	2.7	3.1	3.5	3.4	Available
42	Odd leg Caliper	2.7	2.9	3	3.5	3.1	2.9	2.6	2.9	3.2	3.8	2.9	3.6	3.1	3.1	Available
43	External Caliper	3.1	2.9	3.1	2.6	3.8	3.0	2.9	3.4	3.3	3.6	3.1	2.9	3.6	3.2	Available
44	Internal Caliper	2.6	2.9	2.8	3	3.2	3.5	2.8	2.6	3	3.9	3.1	2.9	2.8	3	Available
45	Angle Plate	1.7	2.3	2.4	2.8	2.9	1.9	2.4	2.7	3.2	2.1	2.9	2.1	2	2.4	Not Available
												Overall Mean			3.1	Available
WELDING/FABRICATION																
46	Set of Snips	3.1	3.5	3	3.9	3.2	3	3.1	3.6	3.4	3.2	2.9	3.5	3.2	3.2	Available
47	Set of gas welding Cylinders	3.9	3.7	3	3.9	3.4	3.7	3.9	3.9	3.2	4.1	3.8	3.5	3.8	3.7	Available
												Overall Mean			3.5	Available
FORGING FACILITIES																
48	Melting furnace	1.5	1.5	2.2	2.1	2.5	2.1	1.9	1.8	2.5	3	1.9	2	2.3	2.1	Not Available
49	Set of molds	2	2.1	2.4	2.4	1.9	2.5	2.1	1.9	2.3	3	2.1	2.2	2	2.2	Not Available
50	Set of molding tools	2.3	2.3	2.1	2.4	1.9	2.2	2.3	2	2.1	3.1	2.5	2.2	2.4	2.4	Not Available
51	Patterns	2.4	2.5	2.1	2.8	2.1	2	2	2.1	2.3	3	2.4	2.3	2.5	2.3	Not Available
												Overall Mean			2.3	Not Available

Table 1: Mean Availability of the Workshop Equipment in Adamawa (\bar{X}_1), Bauchi (\bar{X}_2), Benue (\bar{X}_3), Gombe (\bar{X}_4), Jigawa (\bar{X}_5), Kaduna (\bar{X}_6), Kano (\bar{X}_7), Katsina (\bar{X}_8), Nasarawa (\bar{X}_9), Plateau (\bar{X}_{10}), Sokoto (\bar{X}_{11}), Yobe (\bar{X}_{12}) and Zamfara (\bar{X}_{13})

The data analysis in table 1 above shows that the majority of the workshop equipment was available except items 40 and 45 of marking tools. However, the overall mean of 3.1 revealed that all the marking tools are available.

Furthermore, all the forging facilities (items 48, 49, 50 and 51) were not available. The overall mean of 2.3 confirmed that the forging facilities were not available.

S/N	Machines/Equipment	\bar{X}_1	\bar{X}_2	\bar{X}_3	\bar{X}_4	\bar{X}_5	\bar{X}_6	\bar{X}_7	\bar{X}_8	\bar{X}_9	\bar{X}_{10}	\bar{X}_{11}	\bar{X}_{12}	\bar{X}_{13}	Grand Mean	Remark	
1	Shaping Machine	2.8	2.5	2.2	2.6	2.3	2.2	2.2	2.4	2.5	2.3	2.4	2.5	2.1	2.4	Inadequate	
2	Milling Machine	2.1	2.1	2.5	2.1	2.1	2	1.9	1.6	2.4	2.1	2.4	2.3	1.9	2.1	Inadequate	
3	Bench Drilling Machine	2.3	2.3	2.1	2.2	2.3	2.1	2.4	2.2	2.3	2.5	2.5	2.1	1.9	2.2	Inadequate	
4	Pillar Drilling Machine	1.2	2.3	2.4	2.1	1.9	1.7	2.2	2.4	2.1	2.1	2.3	2.1	2	2.1	Inadequate	
5	Radial Drilling Machine	2.1	2.2	2.1	1.9	2.3	2.1	2.2	2.7	2.4	2.1	2.1	1.6	1.9	2.1	Inadequate	
6	Hand Drilling Machine	2.1	2.1	2	2.4	2.5	2.1	1.9	2.3	2.1	2	2.4	2.3	2.1	2.2	Inadequate	
7	Lathe Machine	2.1	1.9	1.7	1.4	2	2.2	2.3	2.1	1.9	2.3	2.4	2.2	2.1	1.9	Inadequate	
8	Universal Grinding Machine	2.4	2.1	2.4	2	2.9	2.6	2.3	2.5	2.1	1.9	2	2.3	2.4	2.3	Inadequate	
9	Surface Grinding Machine	2.3	2.1	2.2	2.2	2	2.1	2.2	2.5	2.3	2.3	2.4	2.1	2.1	2.2	Inadequate	
10	Bench Grinding Machine	2.5	2.3	2.1	2.3	2.5	2.5	2.6	2.1	2	2.1	2.3	2.4	1.9	2.3	Inadequate	
11	Filing Machine	2.5	2.1	2.9	1.9	2	2.3	2.2	2.4	1.8	1.9	2.4	2.2	2.1	2.2	Inadequate	
12	Power Cutting Machine	1.3	2.3	2.1	2.1	2.4	2.1	2	2.5	2.4	2.8	2.3	2.2	2.2	2.2	Inadequate	
13	Guillotine Machine	1.3	2.3	1.9	2.1	2.3	2.7	2.3	2.1	2.4	2.1	2.4	2.2	2.2	2.2	Inadequate	
14	Welding machine (AC)	1.5	1.8	2.1	2	2.8	2.1	2.2	2.2	2.2	1.9	2.5	2.3	1.9	2.1	Inadequate	
15	Welding machine (DC)	1.8	2	1.9	2.2	1.4	1.9	2.1	2.1	2.1	2.2	2.3	2.8	2.3	2.1	Inadequate	
16	Forging Machine	1.9	2.3	2.1	2	2.1	2.4	2.5	2.1	2.1	2.2	2.2	2.3	2.3	2.2	Inadequate	
															Overall Mean	2.2	Inadequate
	HAND TOOLS																
17	Flat files	1.9	2.1	2.5	2.4	2.5	2.1	2.5	2.3	1.9	2.2	2.2	2.3	2.4	2.3	Inadequate	
18	Half round files	2.5	2.3	2.2	2.5	2.5	2.2	2.1	2.3	2.1	2	2.3	2.4	2.5	2.3	Inadequate	
19	Round files	2	2.1	1.9	2.1	2.5	2.1	2	2.4	2.1	2.2	2.4	2.5	1.9	2.2	Inadequate	
20	Sledge hammer	2	2.3	2.3	2.5	2.1	2.2	1.9	2.1	3.2	2.8	2.3	2.5	1.9	2.3	Inadequate	
21	Ball pane hammer	2.1	2.2	2.1	2.1	2.4	2.1	2.1	2.3	2.1	2.1	2.2	1.9	1.4	2.1	Inadequate	
22	Mallet	2.9	2.3	2.1	1.9	1.5	2.4	2.3	2.5	2.1	2	2.3	2.1	2.9	2.3	Inadequate	
23	Hacksaw	2.3	2.5	2.1	1.5	2	2.3	2.1	1.7	1.2	2.4	2.4	2.1	2	2	Inadequate	
24	Chisel	2.4	2.1	2	1.9	2.3	1.5	2	2.1	2.5	2.4	2.1	2.1	2.3	2.1	Inadequate	
25	Set of spanners	2	2.5	2.1	2.2	2.1	2	2.4	2.4	2.5	2.5	2.1	1.9	1.6	2.2	Inadequate	
26	Scrapers	2	1.9	2.5	2.2	2.1	2.5	2.6	2.1	1.7	1.7	2.1	2	2.4	2.1	Inadequate	
															Overall Mean	2.2	Inadequate
	WORK HOLDING DEVICE																
27	Bench Vice	2.4	2.4	2.1	1.8	1.7	1.4	2	2.5	2.4	2.3	1.9	2.3	1.7	2.1	Inadequate	
28	Tool Makers Clamp	1.3	1.7	1.5	1.5	1.8	2	2.1	1.6	2.4	2.1	2	1.6	1.9	1.8	Inadequate	
29	Pliers	1.9	2	2.1	2.1	2.1	3.1	2.1	1.6	1.9	1.8	2	2.3	2.1	2.1	Inadequate	
30	Tongs	1.5	2.1	1.8	1.5	2.3	1.8	2	2.1	1.7	2	2.1	1.6	2	1.9	Inadequate	
															Overall Mean	1.9	Inadequate
	MARKING TOOL																
31	Scriber	1.3	1.7	2.1	2.5	1.3	1.8	2.3	2.1	2.4	2	1.8	1.6	2.2	1.9	Inadequate	
32	Center punch	2.2	1.8	2.2	2.4	2.1	2	1.6	1.5	2.1	2.1	2.3	1.9	2	2	Inadequate	
33	Steel rule	1.9	2.6	2.5	2.5	2.6	1.9	2	2.7	1.9	2.1	2.5	2.7	1.6	2.3	Inadequate	
34	Try square	2.1	2.1	2	1.8	1.9	2.5	2.6	2.1	2.5	1.8	2	2.6	2.1	2.2	Inadequate	
35	Surface gauge	1.8	2	2.3	2.4	2.3	2.4	2.5	1.9	2.1	2.5	2.1	2	1.5	2.1	Inadequate	
36	Surface plate	2.2	2.1	2	1.7	1.8	2	2	2.4	2.5	2.3	1.9	2.8	2.2	2.1	Inadequate	
37	v-block	2	2.3	2.1	2.2	2.1	1.9	2.1	1.8	2.1	2.2	2.2	2.1	2	2.1	Inadequate	
38	Prometer screw gauge	2.1	2.2	2.1	2.1	1.9	2.3	2.4	2.1	2	2.4	2.5	2.1	2.2	2.2	Inadequate	
39	Vanier Caliper	1.9	2.1	1.5	1.6	2.1	2	2	2.7	2.4	2.4	1.8	2.3	1.9	2.1	Inadequate	
40	Dial Indicators	1.6	2.1	2.1	1.4	1.4	2.1	2.1	1.3	1.8	2.1	2.3	2.3	2.1	1.9	Inadequate	
41	Dividers	2.1	2.4	2.2	1.9	2.2	2.2	2.1	2.2	2.1	1.8	2.5	2.8	2.9	2.3	Inadequate	
42	Odd leg Caliper	2.3	2.4	2.3	2.2	2.1	2.5	2.6	2.1	2.1	2	2	1.9	2.2	2.2	Inadequate	
43	External Caliper	1.9	2.1	2.3	2.3	2.5	2.4	1.3	2.4	1.6	2.4	1.7	2	2.3	2.1	Inadequate	
44	Internal Caliper	2	2.1	1.9	2.2	2.4	2.3	1.8	1.7	2	2.4	2.1	2.5	1.8	2.1	Inadequate	
45	Angle Plate	1.2	1.6	1.7	2	2.5	1.5	2.3	2.1	2.5	1.9	2.1	1.8	1.9	1.9	Inadequate	
															Overall Mean	2.1	Inadequate
	WELDING/FABRICATION																
46	Tool of Soldering	1.9	2.2	2.1	1.8	1.7	2	2	2.1	2	1.6	1.5	1.9	2	1.9	Inadequate	
47	Welding	1.9	1.5	2.4	2.1	1.7	2.1	2.4	1.6	1.9	2	2.1	2.2	2.4	2.2	Inadequate	
															Overall Mean	2.1	Inadequate
	FORGING FACILITIES																
48	Forging furnace	1.3	1.5	1.3	1.7	1.8	1.9	1.9	1.6	1.9	1.8	1.5	2.1	2	1.7	Inadequate	
49	Tool of mold	1.8	1.6	1.7	1.8	1.4	1.9	2	1.8	1.7	2	2.1	1.9	1.8	1.8	Inadequate	
50	Mold	1.7	1.8	1.9	2	1.7	1.8	2.1	1.9	2.1	1.9	2.1	1.8	1.7	1.8	Inadequate	
51	Pattern	1.4	1.9	1.5	2	1.7	1.8	1.6	2	2.1	1.9	2.1	2.1	2	1.9	Inadequate	
															Overall Mean	1.8	Inadequate

Table 2: Mean Adequacy of the Workshop Equipment in Adamawa (\bar{X}_1), Bauchi (\bar{X}_2), Benue (\bar{X}_3), Gombe (\bar{X}_4), Jigawa (\bar{X}_5), Kaduna (\bar{X}_6), Kano (\bar{X}_7), Katsina (\bar{X}_8), Kebbi (\bar{X}_8), Nasarawa (\bar{X}_9), Plateau (\bar{X}_{10}), Sokoto (\bar{X}_{11}), Yobe (\bar{X}_{12}) and Zamfara (\bar{X}_{13})

The results in table 2 above show that the respondents in all 13 states indicated that all the workshop equipment from item 1 – 51 were inadequately available. The overall mean of all the sub-sections was below the cut-off mean point of 2.5, confirming the inadequacy of the workshop equipment.

S/N	Machines/Equipment	\bar{X} 1	\bar{X} 2	\bar{X} 3	\bar{X} 4	\bar{X} 5	\bar{X} 6	\bar{X} 7	\bar{X} 8	\bar{X} 9	\bar{X} 10	\bar{X} 11	\bar{X} 12	\bar{X} 13	Grand Mean	Remark
1	Shaping Machine	2.9	2.4	2.6	3	3.4	3.1	3.6	3	2.8	2.9	2.8	2.8	3	2.9	Functional
2	Milling Machine	2.5	2.7	2.5	3.0	2.7	3	3.1	2.5	2.7	3.2	2.5	2.5	2.8	2.7	Functional
3	Bench Drilling Machine	2.9	2.8	2.7	2.9	2.7	2.5	2.4	2.6	2.8	2.8	2.5	2.6	2.7	2.7	Functional
4	Pillar Drilling Machine	2.6	2.4	2.5	2.8	2.6	2.6	2.5	2.3	3	2.8	2.5	2.5	2.6	2.6	Functional
5	Radial Drilling Machine	2.5	2.5	2.5	2.9	2.4	2.6	2.5	2.8	2.7	3	2.6	2.6	2.9	2.6	Functional
6	Hand Drilling Machine	2.9	3	2.7	2.7	2.9	2.5	2.5	2.5	2.7	2.5	2.5	2.6	2.7	2.7	Functional
7	Lathe Machine	2.8	2.5	2.6	2.8	2.7	2.9	2.7	3	2.9	2.5	2.7	3	2.8	2.8	Functional
8	Universal Grinding Machine	2.9	2.5	2.5	2.8	2.6	2.5	2.8	2.7	2.8	2.6	2.5	2.5	2.7	2.6	Functional
9	Surface Grinding Machine	2.3	2.9	2.5	3	2.8	2.5	2.5	2.9	2.5	2.9	2.7	2.6	2.5	2.7	Functional
10	Bench Grinding Machine	3	2.9	2.9	2.8	2.5	2.7	2.9	3	2.9	2.9	2.6	2.5	2.6	2.8	Functional
11	Filing Machine	2.5	2.6	2.5	2.4	2.5	2.8	2.9	2.5	2.5	2.6	2.5	2.6	2.7	2.6	Functional
12	Power Cutting Machine	2	1.9	2.5	2.9	2.8	2.5	2.6	2.5	3.7	2.9	3	2.8	2.7	2.7	Functional
13	Guillotine Machine	1.7	1.7	1.9	2.1	2	2.5	2.6	2.4	2.2	2.1	1.9	2	2.5	2.1	Not Functional
14	Welding machine (AC)	2.5	2.7	2.6	2.6	2.9	2.6	2.5	2.9	2.6	2.8	2.7	3	2.7	2.7	Functional
15	Welding machine (DC)	2.5	2.8	2.5	2.7	2.7	2.5	2.5	2.6	3	2.8	2.5	2.8	2.6	2.7	Functional
16	Forging Machine	2.6	2.6	2.8	2.9	3	2.5	2.5	2.5	2.4	2.8	2.5	2.5	2.7	2.6	Functional
Overall Mean															2.7	Functional
HAND TOOLS																
17	Flat files	2.7	3.1	3	2.9	3	2.9	3.1	3.2	2.9	3.1	2.9	2.5	3	2.9	Functional
18	Half round files	3	2.9	3	3.1	2.7	2.9	2.5	2.6	3.1	3.3	2.8	2.8	3.1	2.9	Functional
19	Round files	2.8	2.5	2.7	2.8	2.8	3.1	2.5	2.5	3	3.1	2.5	2.8	2.8	2.8	Functional
20	Sledge hammer	2.9	2.8	2.5	3.1	3	2.9	3	2.8	2.6	2.9	2.5	2.5	2.7	2.8	Functional
21	Ball pane hammer	2.5	2.6	2.8	3	2.5	2.8	2.5	2.6	3	2.9	2.6	2.8	2.5	2.7	Functional
22	Mallet	2.5	2.6	2.4	3	2.8	2.6	2.8	2.6	3	3.1	3	2.5	2.5	2.7	Functional
23	Hacksaw	3.1	3.2	2.9	3	3.2	2.7	2.9	3.1	3.3	3	2.6	2.8	2.7	3	Functional
24	Chisel	2.7	2.5	2.5	2.9	2.7	3	2.7	2.8	2.5	2.6	2.5	2.9	2.5	2.7	Functional
25	Set of spanners	2.5	3	2.9	2.5	2.8	2.5	2.7	2.5	2.7	2.5	2.5	2.8	2.9	2.7	Functional
26	Scrapers	2.5	2.4	2.5	2.8	2.5	2.7	2.6	2.8	2.5	2.9	2.5	2.7	2.7	2.6	Functional
Overall Mean															2.8	Functional
WORK HOLDING DEVICE																
27	Bench Vice	3	3.1	3.4	2.8	2.9	3	3.1	2.7	3.2	2.9	3.2	2.5	2.9	3	Functional
28	Tool Makers Clamp	2.5	2.5	2.4	2.5	2.7	2.6	2.7	2.5	2.8	2.5	3	2.9	2.7	2.6	Functional
29	Pliers	2.7	2.7	2.6	3	2.8	2.5	3.1	2.5	2.8	2.5	2.7	2.9	2.5	2.7	Functional
30	Tongs	2.5	2.4	2.7	2.7	2.8	3	2.5	2.6	2.8	3	2.5	2.7	2.6	2.7	Functional
Overall mean															2.8	Functional
MARKING TOOLS																
31	Scriber	2.7	2.5	2.5	2.6	2.5	2.6	2.7	2.5	2.6	2.6	2.5	2.8	2.5	2.6	Functional
32	Center punch	3	2.5	2.5	2.6	2.6	2.6	2.9	3	2.5	3.1	2.7	2.6	2.6	2.7	Functional
33	Steel rule	3.1	2.9	2.7	2.6	2.9	2.8	2.5	2.6	2.8	2.8	2.8	2.9	3	2.8	Functional
34	Try square	2.5	2.7	2.5	2.6	2.9	3	2.7	2.8	2.6	2.6	2.6	2.5	2.5	2.7	Functional
35	Surface gauge	2.6	2.5	2.6	3	2.8	2.4	2.8	2.9	2.5	2.6	2.5	3	2.9	2.7	Functional
36	Surface plate	2.5	2.6	2.7	2.5	2.6	2.8	2.5	2.5	2.8	2.5	2.8	2.6	2.4	2.6	Functional
37	v-block	2.1	2.3	2.5	2.5	2.6	2.4	2.5	2.5	2.7	2.6	2.4	2.9	2.6	2.5	Functional
38	Micrometer screw gauge	2.4	2.5	2.5	2.7	2.5	2.9	2.8	2.5	2.7	2.8	2.5	2.9	2.5	2.6	Functional
39	Vanier Caliper	2.5	2.6	2.6	2.8	2.4	2.5	2.5	2.8	2.7	2.8	2.5	2.6	2.6	2.6	Functional
40	Dial Indicators	2.4	2.5	2.2	2.3	2.4	2.5	2.5	2.6	2.3	2.7	2.5	2.7	2.5	2.5	Functional
41	Dividers	2.8	2.9	3	2.5	2.5	2.7	2.8	2.8	2.7	2.5	2.5	2.6	2.5	2.7	Functional
42	Odd leg Caliper	2.5	2.5	2.7	2.8	2.5	2.4	2.7	2.9	2.5	2.5	2.6	2.5	2.6	2.6	Functional
43	External Caliper	2.8	2.5	2.4	2.6	2.7	2.7	2.5	2.6	2.6	2.8	2.5	2.9	2.7	2.6	Functional
44	Internal Caliper	2.7	2.5	2.5	2.8	2.7	2.5	2.8	2.6	2.5	2.9	2.5	2.6	2.5	2.6	Functional
45	Angle Plate	2.4	2.3	2.5	2.5	2.7	2.1	2.5	2.4	2.6	2.4	2.7	2.6	2.8	2.5	Functional
Overall Mean															2.6	Functional
WELDING/FABRICATION																
46	Set of Snips	2.7	2.8	2.9	2.5	2.5	2.6	2.7	2.8	2.6	2.5	2.9	2.7	2.9	2.7	Functional
Overall Mean															2.8	Functional
FORGING FACILITIES																
48	Melting furnace	2.1	2.4	2.5	2.3	2.4	2.5	2.4	2	2.1	2.4	2	2.2	2.3	2.3	Not Functional
49	Set of molds	2	2.1	2.4	2.4	2	2.5	2.1	2.4	2.1	2.4	2.5	2.2	2	2.2	Not Functional
50	Set of molding tools	2.4	2.1	2.1	2.2	2	2.4	2.2	2.1	2.2	2.5	2	2.5	2.2	2.2	Not Functional
51	Patterns	2.3	2.3	2.2	2.4	2.1	2.2	2.1	2.2	2.3	2.4	2.4	2.3	2.3	2.6	Not Functional
Overall mean															2.3	Not Functional

Table 3: Mean Functionality of the Workshop Equipment in Adamawa (\bar{X} 1), Bauchi (\bar{X} 2), Benue (\bar{X} 3), Gombe (\bar{X} 4), Jigawa (\bar{X} 5), Kaduna (\bar{X} 6), Kano (\bar{X} 7), Katsina (\bar{X} 8), Kebbi (\bar{X} 8), Nasarawa (\bar{X} 9), Plateau (\bar{X} 10), Sokoto (\bar{X} 11), Yobe (\bar{X} 12) and Zamfara (\bar{X} 13)

The data analysis in table 3 shows that the majority of the workshop equipment available were functional except item 13 (Glulotine Machine), which was not functioning. However, the overall mean of 2.7 indicates that the majority of the machines are functioning. All the forging facilities items 46 - 51 were not functioning. The overall mean of 2.3 confirmed that the forging department was not functioning.

6. Discussion of Findings

The seven sub-themes investigated (see table 1) show that the majority of the workshop facilities in each of the sub-themes were available, except that of forging operations that were not available. The availability of training facilities is a must if skills will be adequately acquired. The bone of contention is whether the available equipment was enough to cater to the teaming of the population arising yearly. According to Edmond, Amade & Wandobed (2016), the accessibility to training facilities is paramount to both the trainers and the trainees. The training of mechanical technology students cannot be effective without the requisite available training facilities. This would go a long way to motivate the trainers to have an interest to impact the right skills to the learners. The learners, on the other hand, would acquire the necessary skills expected of them before they graduate.

Table 2 shows that all the workshop equipment in the seven sub-themes was inadequately supplied. That is to say, though the facilities were available, they were inadequate to meet up for the population under training. This is to buttress the fact that the quality of skills that would be acquired by the trainees may not meet up with the requirement of industries where the graduates are expected to work. It is one thing to have the training facilities available and it is quite another thing to ascertain that the adequate facilities function properly (Bature, 2012). This is in line with Jadas (2015), who ascertained that the trainer donates the skills while the trainee absorbs the skills and puts them into constant practice using appropriate tools and instruments for effective input and output achievement.

Table 3 determined whether the training facilities were functioning. It is very clear that most of the facilities were functioning except for welding/fabrication and forging. This is also in line with Bature (2012), who reiterates that it is one thing to have the training facilities available and it is quite another thing to ascertain that adequate training facilities function properly (Bature, 2012). The skills that are lacking are that of forging because the facilities were neither available nor functioning. A personal experience during data collection shows that many of the facilities were very old but well-maintained.

7. Conclusion

The acquisition of skills for any field of human endeavour has to be with the provision of up-to-date facilities adequate to meet up with the population and keeping these facilities functional and well maintained at all times. This study has revealed the state of the workshop facilities for mechanical trade option Technical Colleges in Northern Nigeria. Though most of the facilities were available, they were not adequate. Most of these facilities were functioning, but in some areas, they were neither available nor functioning. If adequate skills must be acquired by trainees, the Government must be proactive in the provision of workshop facilities and equipment.

8. Recommendations

- Federal and State Governments should add to their annual budget 5% for the purchase of new and modern workshop facilities.
- The emphasis in the present dispensation is on the teaching of digital workshop skills to students. It is very vital that digital facilities be supplied adequately to the schools for instruction.
- Trainers must be engaged in three months of compulsory industrial training to acquire new workshop skills in modern facilities.
- Admission into technical colleges is to be done based on the available facilities in the training workshops.
- There should be an urgent supply of adequate welding/fabrication and forging facilities by the Government.
- Government should involve Non-Governmental Organizations, the Industry and other stakeholders in hosting meetings for workshop skills curriculum development, supply of facilities and drawing future road maps for skills training.

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