



## Evaluation of Workshop Facilities for Teaching and Learning of Motor vehicle Mechanics Trade in Technical Colleges of Niger State

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### **Abstract**

*This study was designed to evaluate the workshop facilities for teaching and learning of motor vehicle mechanic trade in technical colleges of Niger State. Three research questions and 2 hypotheses were formulated to guide the study. A descriptive survey research design was employed for the study. The study was carried out in all the Technical Colleges in Niger State. A total of 426 respondents comprising 399 students and 27 teachers were used as population for the study. A structured questionnaire developed by the researcher was used to collect data for the study. The instrument was validated by 3 lecturers. Mean statistics was used to analyze the data for answering research questions, while t-test statistics was employed to test the hypotheses of the study at .05 level of significance. The findings of the study revealed among others that workshop facilities for teaching and learning of motor mechanics trade in technical colleges of Niger State were not available, the available ones were not adequate and that teachers do not apply correct safety measures in the use of workshop facilities for teaching and learning of motor mechanic trade in technical colleges of Niger State. Based on the findings it was recommended that enough funds should be provided by the government for the provision of the workshop facilities, NGO's should also be encouraged to participate in the provision of workshop facilities and teachers should on regular basis organise special safety awareness for the students.*

### **Introduction**

Teaching is a conscious or deliberate effort on the part of a more experienced person to impart theoretical knowledge or practical skills into a less experienced person. Teaching is an interaction between a teacher and a student under the teacher's responsibility in order to bring about the expected change in student's behaviour (Akinote,2005). Learning on the other hand, is a change in behaviour due to experience. It is the process by which behaviour is initiated modified or changed. It is a process by which a student acquire and retain attitudes, knowledge, understanding, skills and capabilities that cannot be attributed to inherited behaviour patterns or physical growth. All these revealed that learning is a process that is used to accomplish set goals by the learner (Oguntonade, 1998). The above explanations revealed that teaching and learning are two activities that are both geared toward the attainment of educational objectives, thus in this context teaching and learning should lead to the attainment of required objectives of motor vehicle mechanic trade.

Motor Vehicle Mechanic trade is one of the Technical Vocational Education programmes which involves the acquisition of scientific knowledge in design, selection of materials, construction, operation and maintenance of motor vehicles. According to National Board for Technical Education (NBTE, 2001) Motor vehicle mechanics trade students are expected to, upon completion of this training, be able to: test, diagnose, service and repair any fault on conventional motor vehicle assemble main units and systems to the manufacturers' specifications. Abdulkadir (2011) explained that the objectives of the practical aspect of Motor Vehicle Mechanics at the technical college include the ability of motor vehicle craft trainees to be able to: test, rebuild and replace injector nozzles, dismantle and reassemble carburettor following appropriate procedure, replace major emission control components, diagnose all problems relating to steering, braking and suspension systems, among others.

For the above objectives to be attained all necessary training facilities that will enhance teaching and learning that will in turn lead to the acquisition of the practical skills aspect of motor vehicle mechanic trade must be put in place. Workshop facilities are those basic hand tools, equipment and structural facilities that will assist the trainee to learn effectively. However, in the words of Temidayo (2005) training facilities are the physical elements of teaching, learning and operating environment which include all properties, media and materials made of machines, tools, materials, workshop, classroom, teaching aids, textbooks and libraries. These training facilities adopted by the teachers in teaching and learning by students of motor vehicle mechanic trade needs to be evaluated to ascertain whether these facilities are available and adequate or not.

Evaluation is the process of identifying the differences between the desired and achieved outcomes of student learning and determining what changes might usefully improve this outcome. However, in the words of Abdul (2012) evaluation in the context of teaching and learning is a process of determining the degree to which student achieve the instructional objectives. Thus Abdul (2012) perceived evaluation as inevitable process in making intelligent decision and in directing student progress towards worthwhile education outcome.

The ultimate objective of vocational and technical education programme which motor vehicle mechanic trade is a subset of is to produce efficient and relevant craftsmen and women that will promote and hasten industrial development in the areas of maintenance, goods production and general services. The acquisition of requisite skills in vocational and technical education is a means of increasing the economic manpower of the individual concerned and that of society as a whole (Abdulkadir, 2011). According to Puyate(2002) the production of these skilled men and women is a function of educational facilities made available during their training at technical college level. Puyate(2002) further stressed the importance of physical facilities in technical colleges as an avenue for the provision and acquisition of technical skills.

Unfortunately, the technical colleges appear not fulfilling the major objectives of their set up as Gana (1989) noted that the available facilities have been grounded and over stretched. Technical colleges are haphazardly managed, they lack the capability to equip students with requisite skills, knowledge and attitude needed for gainful employment (Enemali,1994). Also evidences from literature revealed that most technical teachers find it difficult to organize practical activities for the students. It is probable that the workshop facilities adopted for the teaching and learning of motor vehicle mechanic trade in technical colleges of Niger State may be responsible for these..The problem of this study therefore was to evaluate the workshop facilities for teaching and learning of motor vehicle mechanics trade in technical colleges of Niger State.

### **Purpose of the study**

The purpose of this study is to evaluate workshop facilities for teaching and learning of motor vehicle mechanics trade in technical colleges of Niger State. Specifically the study sought to determine:

1. The availability of workshop facilities for teaching and learning of practical skills in motor vehicle mechanics trade.

2. The adequacy of workshop facilities for teaching and learning of practical skills in motor vehicle mechanics trade.
3. The safety measures adopted by the teachers in the use of workshop facilities for teaching and learning of practical skills in motor vehicle mechanics trade.

### **Research Questions**

The following research questions were formulated to guide the study.

1. What are the workshop facilities available for the teaching and learning of practical skills in motor vehicle mechanic trade?
2. How adequate are the workshop facilities for the teaching and learning of practical skills in motor vehicle mechanic trade?
3. What are the safety measures adopted by the teachers in the use of workshop facilities for teaching and learning of practical skills in motor vehicle mechanic trade?

### **Hypotheses**

The following hypotheses were formulated and tested at the .05 level of significance.

1. There is no significant difference between the mean responses of teachers and students as regards the availability of workshop facilities for teaching and learning of skills in motor vehicle mechanic trade.
2. There is no significant difference between the mean responses of teachers and students as regards the adequacy of workshop facilities for teaching and learning of skills in motor vehicle mechanic trade.

### **Methodology**

A descriptive survey research was adopted for this study. A total of 426 respondents comprising 399 students and 27 teachers from all the technical colleges in Niger State formed the population for this study and the entire population was studied. A structured questionnaire developed by the researcher, named Workshop Facilities Evaluation Questionnaire (WFEQ) and validated by three experts from Industrial and Technology Education Department was used for data collection. The questionnaire items were assigned four points rating scale of: highly available (4), available (3), moderately available (2), and not available (1) for research question one. Very adequate (4), adequate (3), inadequate (2), very inadequate (1) for research question two; While strongly agree (4), agree (3), disagree (2) and strongly disagree (1) for research question three. 426 copies of questionnaire were distributed to teachers and students and 378 copies were duly filled by the respondents and returned representing 88.7%. Mean and Standard Deviation were the statistical tools used to analyze the data for answering research questions; While t-test statistics was used to test the hypotheses at .05 level of significant. A mean score of 2.50 was used as a bench mark for accepting or rejecting items. Therefore, items with a mean score of 2.50 and above were considered agreed; while items with mean score of 2.49 and below were considered disagreed. Also t-critical value necessary for rejection or acceptance of null hypotheses at .05 level of significance was  $\pm 1.96$ ; Thus any calculated value of t below the critical value was considered accepted, while any t calculated equal or more than was considered rejected.



## RESULTS

### Research Question 1

What are the workshop facilities available for the teaching and learning of practical skills in motor vehicle mechanic trade?

**Table 1: Mean responses of teachers and students on the availability of workshop facilities for teaching and learning of practical skills aspect of motor vehicle mechanic trade.**

		N <sub>1</sub> = 27    N <sub>2</sub> = 399			
S/No	FACILITIES	$\bar{X}_1$	$\bar{X}_2$	$\bar{X}_t$	DECISION
1	Electrical test bench	2.04	2.94	2.17	Not available
2	Cylinder boring machine with accessories	2.24	2.05	2.21	Not available
3	Honing machine with accessories	2.09	2.11	2.08	Not available
4	Bottle jack (hydraulic) light vehicle type	2.54	2.85	2.69	Available
5	Bottle jack (hydraulic) heavy vehicle type	1.62	1.98	1.80	Not available
6	Trolley jacks	2.00	2.07	2.05	Not available
7	Dynamometer	2.39	2.29	2.37	Not available
8	Motor scope (engine analyzer)	2.47	2.35	2.41	Not available
9	Tachometer	2.11	2.09	2.08	Not available
10	Hydraulic press	2.04	2.94	2.17	Not available
11	Inspection pits	2.02	2.01	2.15	Not available
12	Armature growler	2.40	2.50	2.45	Not available
13	Dwell tester	2.24	2.05	2.15	Not available
14	Fire extinguishers	2.31	2.29	2.30	Not available
15	Ammeter	2.71	2.00	2.34	Not available
16	Voltmeter	2.10	2.23	2.17	Not available
17	Ohmmeter	2.00	2.40	2.20	Not available
18	Avometer	2.51	2.09	2.30	Not available
18	Auto Electrical System Instructional Chassis	3.00	2.19	2.60	Available
20	Valve spring compressor kit	2.71	2.56	2.64	Available
21	Coil spring compressor	1.40	2.33	1.87	Not available
22	Clutch setscrew gauge	2.07	2.00	1.53	Not available
23	Valve grinders	2.71	2.56	2.64	Available
24	Water buckets	2.88	2.79	2.84	Available
25	Toque Wrench dial type (metric)	1.00	1.34	2.34	Not available
26	Hydraulic nipple forming tool	1.54	2.31	1.93	Not available
27	Flaring tool /for steel turning	1.90	1.88	1.89	Not available
28	Small bore pipe bending tool	1.80	2.56	2.18	Not available
29	Carburettor service kit	1.45	2.34	1.90	Not available
30	Piston ring compressor	2.05	1.98	2.24	Not available
31	Injector repair machine	1.88	1.47	1.53	Not available
32	Injector needle service kit	2.01	2.19	2.10	Not available
33	Hydrometers	1.00	2.70	1.85	Not available
34	Vacuum tester	1.34	2.22	1.78	Not available
35	Pullers (different sizes)	1.22	2.50	1.86	Not available
36	Spark plug tester	1.56	1.01	1.29	Not available
37	Work bench with vices	3.56	4.55	4.06	Available
38	Portable engine hoist	2.01	2.15	2.08	Not available
39	Battery charger	1.01	2.03	1.52	Not available
40	Wire brushes	4.00	3.90	3.95	Available
41	Compressor (3 phase motor driven type)	1.34	2.43	1.89	Not available
42	Wheel balance (rim 13-15)	1.90	1.77	1.84	Not available
43	Air line gauge	1.98	1.78	1.88	Not available
44	Portable tyre inflator	2.40	2.06	2.23	Not available
45	Venire callipers (metric)	2.34	2.11	2.23	Not available
46	Venire height gauge	2.53	2.09	2.31	Not available
47	Vee blocks	3.56	2.66	3.11	Available
48	Surface plates	2.57	2.71	2.64	Available
49	Venire callipers with clock	2.19	2.09	2.14	Not available

Key: N<sub>1</sub> and N<sub>2</sub>=N<sub>0</sub> of Students and Teachers  $\bar{X}_1$  = Mean responses of Students;  
 $\bar{X}_2$  = Mean responses of Teachers  $\bar{X}_t$  = Mean responses of all respondents.

Analysis in Table 1 revealed that the facilities for teaching and learning of motor vehicle mechanic trade are not available in technical colleges in Niger State as the respondents agreed that majority of items are not available.

### Research Question 2

How adequate are the workshop facilities for teaching and learning of practical skills in motor vehicle mechanic trade?

**Table 2: Mean responses of teachers and students on the adequacy of workshop facilities for teaching and learning of practical skills aspect of motor vehicle mechanic trade.  $N_1 = 27$   $N_2 = 399$**

S/No	FACILITIES	$\bar{X}_1$	$\bar{X}_2$	$\bar{X}_t$	DECISION
1	Electrical test bench	2.04	2.94	2.17	Not adequate
2	Cylinder boring machine with accessories	2.24	2.05	2.21	Not adequate
3	Honing machine with accessories	2.09	2.11	2.08	Not adequate
4	Bottle jack (hydraulic) light vehicle type	2.54	2.85	2.69	Adequate
5	Bottle jack (hydraulic) heavy vehicle type	1.62	1.98	1.80	Not adequate
6	Trolley jacks	2.00	2.07	2.05	Not adequate
7	Dynamometer	2.39	2.29	2.37	Not adequate
8	Motor scope (engine analyzer)	2.47	2.35	2.41	Not adequate
9	Tachometer	2.11	2.09	2.08	Not adequate
10	Hydraulic press	2.04	2.94	2.17	Not adequate
11	Inspection pits	2.02	2.01	2.15	Not adequate
12	Armature growler	2.40	2.50	2.45	Not adequate
13	Dwell tester	2.24	2.05	2.15	Not adequate
14	Fire extinguishers	2.31	2.29	2.30	Not adequate
15	Ammeter	2.71	2.00	2.34	Not adequate
16	Voltmeter	2.10	2.23	2.17	Not adequate
17	Ohmmeter	2.00	2.40	2.20	Not adequate
18	Avometer	2.51	2.09	2.30	Not adequate
18	Auto Electrical System Instructional Chassis	3.00	2.19	2.60	Adequate
20	Valve spring compressor kit	2.71	2.56	2.64	Adequate
21	Coil spring compressor	1.40	2.33	1.87	Not adequate
22	Clutch setscrew gauge	2.07	2.00	1.53	Not adequate
23	Valve grinders	2.71	2.56	2.64	Adequate
24	Water buckets	2.88	2.79	2.84	Adequate
25	Toque Wrench dial type (metric)	1.00	1.34	2.34	Not adequate
26	Hydraulic nipple forming tool	1.54	2.31	1.93	Not adequate
27	Flaring tool /for steel turning	1.90	1.88	1.89	Not adequate
28	Small bore pipe bending tool	1.80	2.56	2.18	Not adequate
29	Carburettor service kit	1.45	2.34	1.90	Not adequate
30	Piston ring compressor	2.05	1.98	2.24	Not adequate
31	Injector repair machine	1.88	1.47	1.53	Not adequate
32	Injector needle service kit	2.01	2.19	2.10	Not adequate
33	Hydrometers	1.00	2.70	1.85	Not adequate
34	Vacuum tester	1.34	2.22	1.78	Not adequate
35	Pullers (different sizes)	1.22	2.50	1.86	Not adequate
36	Spark plug tester	1.56	1.01	1.29	Not adequate
37	Work bench with vices	3.56	4.55	4.06	Adequate
38	Portable engine hoist	2.01	2.15	2.08	Not adequate
39	Battery charger	1.01	2.03	1.52	Not adequate
40	Wire brushes	4.00	3.90	3.95	Adequate
41	Compressor (3 phase motor driven type)	1.34	2.43	1.89	Not adequate
42	Wheel balance (rim 13-15)	1.90	1.77	1.84	Not adequate
43	Air line gauge	1.98	1.78	1.88	Not adequate
44	Portable tyre inflator	2.40	2.06	2.23	Not adequate
45	Venire callipers (metric)	2.34	2.11	2.23	Not adequate
46	Venire height gauge	2.53	2.09	2.31	Not adequate
47	Vee blocks	3.56	2.66	3.11	Adequate
48	Surface plates	2.57	2.71	2.64	Adequate
49	Venire callipers with clock	2.19	2.09	2.14	Not adequate

Key:  $N_1$  and  $N_2 = N_0$  of Students and Teachers  $\bar{X}_1$  = Mean responses of Students;  
 $\bar{X}_2$  = Mean responses of Teachers  $\bar{X}_t$  = Mean responses of all respondents.

Analysis in Table 2 revealed that the facilities for teaching and learning of motor vehicle mechanic trade are not adequate in technical colleges in Niger State as the respondents agreed with the majority of items.

### Research Question 3

What are the safety measures adopted by the teachers in the use of workshop facilities for teaching and learning of practical skills in motor vehicle mechanic trade?

**Table 3: Mean responses of teachers and students on the safety measures adopted by the teachers in the use of workshop facilities for teaching and learning of practical skills in motor vehicle mechanic trade.**  $N_1 = 27$     $N_2 = 399$

S/NO	FACILITIES	$\bar{X}_1$	$\bar{X}_2$	$\bar{X}_t$	DECISION
1	The workshop working space is kept clean	4.50	3.08	3.79	Agree
2	Gas cylinders are properly installed and leak proof	2.31	2.05	2.18	Disagree
3	Safety eye shield are provided for practical	2.10	2.45	2.28	Disagree
4	Students are always directed to wear their overall	2.09	2.44	2.27	Disagree
5	Hand tools are always kept clean	1.80	2.00	1.90	Disagree
6	Machines are regularly maintained	1.70	2.45	2.08	Disagree
7	Fire extinguishers are provided	1.61	2.03	1.82	Disagree
8	First aid box are provided	1.34	2.43	1.89	Disagree
9	Adequate ventilation is provided in the workshop	1.90	1.77	1.84	Disagree
10	Floor are kept clean	3.45	3.00	3.23	Agree
11	Bench vices are properly secured to the bench	2.40	2.06	2.23	Disagree
12	Emergency exit are provided and easy to open	2.34	2.11	2.23	Disagree
13	Teachers always outline safety precautions	2.09	2.11	2.10	Disagree

Key:  $N_1$  and  $N_2$  = No of Students and Teachers    $\bar{X}_1$  = Mean responses of Students;  $\bar{X}_2$  = Mean responses of Teachers    $\bar{X}_t$  = Mean responses of all respondents.

Analysis in Table 3 revealed that the teachers do not adopt safety measures in the use of workshop facilities for teaching and learning of motor vehicle mechanic trade in technical colleges in Niger State as the respondents agreed with the majority of items.

### Hypotheses Testing

**Table 4 t-test analysis of students and teachers on the availability of workshop facilities for teaching and learning of practical skills in motor vehicle mechanic trade. (P < .05).**

Respondents	Standard Deviation	t - Cal	t - Critical	Decision
Students	15.04	0.07	1.96	Not Significant
Teachers	7.14			

Table 4 revealed that t calculated does not exceed the t- critical value; this implied that there is no significant difference in the mean responses of teachers and students as regards the availability of workshop facilities for teaching and learning of skills in motor vehicle mechanic trade.

**Table 5: t-test analysis of students and teachers on the adequacy of workshop facilities for teaching and learning of practical skills in motor vehicle mechanic trade. (P < .05).**

Respondents	Standard Deviation	t - Cal	t - Critical	Decision
Students	19.02	0.09	1.96	Not Significant
Teachers	6.15			

Table 5 revealed that calculated t does not exceed the t- critical value; this signified that there is no significant difference in the mean responses of teachers and students as regards the adequacy of workshop facilities for teaching and learning of skills in motor vehicle mechanic trade.

### Findings/Discussion

The findings as contained in the table 1 revealed that the workshop facilities for the teaching and learning of practical skills in motor vehicle mechanic trade are not available in all the technical colleges in Niger State as required by the National Board for Technical Education (NBTE). This is in-line with views of Abdulsalam (2010) who lamented that there is lack of training facilities such as hand tools and portable machines in technical colleges. Also justifying the consequences of these assertion Uzoagulu (1992) noted that when the equipment are not available vocational training programme will suffer and will lead to production of highly unskilled personnel who are not productive and unemployable. The workshop facilities and equipment are very important to any educational programme and when they are not available the programme suffers (Okoro,1991).

The findings as contained in table 2 revealed that most technical colleges in Niger State do not have adequate workshop facilities. This corroborates with the views of Moja (2000) who opined that the problem of Vocational and Technical Education are made worse by the inadequate workshop training facilities. Similarly, Umar (2008) lamented that inadequate workshop facilities in technical colleges' programmes deterred skill acquisition. Adequate workshop facilities are necessary for any quality learning to take place as training facilities aid the instructors to communicate more effectively and the learners to learn more interestingly, meaningfully and permanently. The development of useful skills can only be reinforced by the adequacy and appropriate use of workshop facilities (Adetokunbo,1992).

The findings as contained in table 3 revealed that teachers do not adopt good safety measures in the use of workshop facilities for the teaching and learning of practical skills

in motor vehicle mechanic trade. This finding is in line with the views of Danjuma(1996) who noted that the teachers needed to provide well organized and complete safety instructions with periodic inspections to ascertain the safety precautions that are to be adhere to in the course of working. Abdulsalam (2010) opined that periodic oiling or greasing of machines reduces the wear of moving parts and prolongs the life of workshop facilities. It is therefore important for teachers to organize the safety measures so that students will be the proper servicing of such workshop facilities at the designated time.

## **Conclusion**

Evident from this study formed the basis for the following conclusion: the objectives of vocational and technical education programme which motor vehicle mechanic trade is an integral part of are not completely achieved as a result of non availability and inadequate workshop facilities as well as non adoption of effective safety measures in the use of workshop facilities for the teaching and learning of motor vehicle mechanic trade. Accordingly, if the findings of this study are effectively utilized a batch of highly skilled motor vehicle mechanic craftsmen will be produced to develop this aspect of national economy.

## **Recommendations**

Based on the findings, the following recommendations were made:

1. Enough funds should be provided by the government for the provision of workshop facilities for teaching and learning of motor vehicle mechanic skills.
2. The community where these technical colleges are located should be encouraged to help in the provision of training facilities through donation and collaborations.
3. NGO's should also be encouraged to participate in the provision of workshop facilities through regular invitations to participate in the school activities.
4. Teachers should on regular basis organise special safety awareness for the students through seminars and film shows.

## **References**

- Abdul, B.K. (2012). Performance evaluation of higher national diploma building technology graduates in the construction industry in Niger state and Federal Capital territory, Abuja, Nigeria. Unpublished M.Tech thesis. Federal University of Technology, Minna.
- Abdulkadir, M. (2011). Assessment of teaching-learning practices in practical motor vehicle mechanics work at technical college level in Niger State, Nigeria. Unpublished M. Tech thesis. Federal University of Technology, Minna.
- Abdulsalam. M.A. (2010). Evaluation of Vocational education programmes of Technical colleges in Niger state and Federal Capital territory, Abuja. Unpublished M.Tech thesis. Federal University of Technology, Minna.



- Adetokunbo, O.F (1992). Management of Workshop facilities in technical Education. *Forum Academia Multidisciplinary Journal of Education*, 1(1&2), 23-30.
- Akinote, O. (2005). *An introduction teaching*. Horden publishers, Ibadan, Nigeria.
- Danjuma, S.B. (1996) The state of the art Facilities in Technical and Vocational Education. *Journal of Educational Development*, 1(2), 23-31).
- Enemali, J.D. (1994). Strategies for effective management of technical colleges in Northern States of Nigeria. Unpublished PhD Dissertation. Department of Vocational Teacher Education, University of Nigeria, Nsukka.
- Gana, F.Z. (1989) National seminar on teaching and vocational training sub-section of Nigerian Education system. Organized by NBTE, Kaduna, Nigeria.
- Moja, T (2000) Nigeria education sector analysis: An analytical synthesis of performance and issues. Document produce for the World Bank.
- National Board for Technical Education. (2001). *National Technical Certificate Programme in Mechanical Engineering Craft Practice Curriculum*. Kaduna: NBTE/Layon.
- Oguntonade, C.O. (1998). Promoting teaching and learning of mathematics in higher education. A paper presented at the *UNESCO Workshop on Teaching and Learning of Higher Education in Nigeria*. University of Ibadan.
- Okoro, O.M. (1991). *Principles and methods in vocational and technical education*. Ibadan: Ectasy publishers.
- Puyate, S.T. (2002) Survey of Vocational Education Facilities in Government Technical Colleges in Rivers State. *Journal of Nigeria Association of Teachers of Technology*, 4(1), 175-181.
- Temidayo, A.O. (2005). Factor affecting the effective teaching and learning of Motor Vehicle Mechanics in Technical Colleges in Lagos State. Unpublished B.Tech thesis. Federal University of Technology, Minna.
- Umar, I.Y. (2008) An assessment of management of technical colleges workshop in North Central States of Nigeria. Unpublished M.Tech thesis. Federal University of Technology, Minna.
- Uzoagulu, A.E. (1992) Towards an effective equipment management (EEM) in schools for economic and technological self-reliance. A paper presented at the 7<sup>th</sup> annual conference of the NVA held at the FCE (T). Umuze November 25<sup>th</sup> – 28<sup>th</sup>