

WORKSHOP MAINTENANCE SKILLS NEEDED BY MOTOR VEHICLE MECHANICS CRAFTSMEN IN TECHNICAL COLLEGES IN ONDO STATE, NIGERIA.

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Abstract

The study was carried out to determine the workshop maintenance skills needed by motor vehicle mechanic works' craftsmen in technical colleges in Ondo State. The study adopted descriptive survey design. The population for the study comprised 18 motor vehicle mechanic works teachers and 56 motor vehicle mechanic works' final year students of technical colleges in Ondo State. A structured questionnaire item was used for collecting data from the respondents. The instrument was validated by three experts. Cronbach alpha reliability method was employed to determine the internal consistency of the questionnaire items and 0.82 was obtained as the reliability coefficient. Two research questions was raised to guide the study while two null hypotheses formulated were tested at 0.05 level of significance. Mean was used to answer the research questions while t-test statistics was used to test the hypotheses of no significant difference at 0.05 levels of significance. The findings revealed that workshop craftsmen are not adequate and the available ones lack maintenance skills. It was also revealed that most of the available workshop maintenance facilities and equipment are not functional effectively. The study therefore recommends that all the workshop maintenance skills identified in the study should be used to train the MVMW craftsmen in technical colleges in Ondo State. In addition, government should make provision for periodic repair and maintenance of the available facilities and equipment in MVMW workshops in technical colleges in Ondo State.

Keywords: Workshop, Maintenance Skills, Motor Vehicle Mechanics Works, Craftsmen, Technical College.

Introduction

Technical Colleges are post basic institutions where students are giving full vocational training that will enable them acquire relevant knowledge, skills and attitude for paid or self-employment in various occupations in the world of work. Technical colleges according to Olakotan (2021) are post-basic education institutions where students are exposed to programmes targeted towards acquiring relevant knowledge and skills in different trades for self-reliance, and employment in the world

of work. Technical colleges constitute a vital aspect of the Nigerian education system as the goal of their establishment dwelt on the production of competent manpower for the nation at craftsmen and master craftsmen level (Oke & Olakotan, 2020).

Technical colleges admit Junior Secondary School leavers and provide them with a full vocational course of three years. However, National Board for Technical Education (NBTE 2011) reported that the quality of academic programmes in technical colleges is regulated by its body of curriculum

development, supervision and periodic accreditation visits while the National Business and Technical Examinations Board (NABTEB) is responsible for the examination and certification of the occupational trades leading to the award of National Business Certificate, National Technical Certificate (NTC), Advanced National Business Certificate (ANBC) and Advanced National Technical Certificate (ANTC).

Technical colleges provide specialized education and training in various vocational fields such as: Block laying and Concreting Works, Plumbing and Pipe Fitting, Carpentry and Joinery, Painting and Decorating, Electrical Installation and Maintenance Work, Radio and Television Repairs, Fabrication and Welding, Mechanical Engineering Craft Practices, Motor Vehicle Mechanics Works

Motor vehicle mechanic works is a vocational trade offered in the technical college, which involves the acquisition of scientific knowledge in design, selection of materials, construction, operation and maintenance of motor vehicles. Motor vehicle mechanic works was designed to produce competent auto mechanics craftsmen in various automobile trades such as repairs and maintenance of brake, transmission, engine, fuel, cooling and lubricating systems on a motor vehicle.(NABTEB,2011). Olayinka (2009) also posited that MVMW was designed to produce competent auto mechanics craftsmen for Nigeria technological and industrial development. .

Motor vehicle mechanics craftsmen are competent and skillful personnel that repair and maintain different brands of motor vehicles. According to Baba, Jacob and Issifu (2018), motor vehicle mechanics craftsmen are personnel that diagnoses

the problem of motor vehicle accurately and quickly which can save owners time and potentially a substantial amount of money. Motor mechanics craftsmen are expected to test, diagnose service and completely repair any fault relating to the conventional automobile assembly main units and systems to the manufacturers specification (NBTE,2001).

Motor Vehicle Mechanic craftsmen (MVMC) in the content of this study are those personnel who maintain and repair a wide range of vehicle including cars, buses and trucks among others. Their responsibilities include inspecting, assessing, repairing, diagnosing and maintaining the engine components of a motorized vehicle. Motor mechanics craftsmen employed for the purpose of directing and instructing the students on practical activities in the technical colleges' workshops.

Workshops are designated areas for the purposes of practical skill acquisition in technical colleges. Technical college workshop for motor mechanics, students engaged practical activities where they learn to diagnose, inspect, maintain, and repair vehicles. These workshops are equipped with various tools, equipment, and simulated or real vehicles to give students practical experience in working with different automotive systems. Motor mechanic workshops offered training in various areas, such as engines refurbishment, electrical systems, diagnostics, brake system, transmission systems and general vehicle maintenance.

Maintenance is crucial for keeping vehicles running smoothly..Okwelle, Beako and Ajie, (2017), stated that maintenance is a repair activity carried out on equipment, vehicles or other machineries to keep them unaltered,

and if altered, to restore them to their original state. Maintenance in the content of this study is the process at which motor vehicles parts get serviced or change the parts before they break down. The knowledge, altitude, competencies and abilities required by craftsmen for proper maintaining of motor vehicles is maintenance skills.

Maintenance skills involve the ability to identify troubleshoots, and repair issues in various system or machinery. These skills encompass knowledge of tools, equipment and techniques required to keep things in working order. In motor vehicle mechanic works, maintenance skills involve expertise in diagnosing issues, inspecting vehicles, conducting regular servicing, and repairing vehicles. This includes knowledge of engine systems, electrical components, brakes, and suspension and transmission systems.

Unfortunately, workshop craftsmen in technical colleges who supposed to carried out maintenance of different brands of vehicles seems to lack maintenance skills. Therefore, the study seek to identify the workshop maintenance skills needed by motor vehicle mechanics craftsmen in technical colleges in Ondo State.

Statement of the Problem

Despite the major role motor vehicle mechanics craftsmen play in the maintenance and repair of different brands of vehicles, there is a growing concern about the inadequate of workshop maintenance skills among majority of them.. This setback may be due to some factors such as lack of workshop maintenance skills, lack of exposure to modern diagnostic equipment, lack of modern workshop tools and equipment, poor maintenance training, and so on. Consequently, this may lead to substandard maintenance and repair or breaking down of a vehicle on the

road due to lack of competent motor vehicle mechanics craftsmen . Therefore, it is essential to identify and address the workshop maintenance skills needed by motor vehicle mechanics craftsmen in technical colleges in Ondo state, Nigeria.

Purpose of the Study

The main purpose of this study is to determine the workshop maintenance skills needed by motor vehicle mechanic craftsmen in technical colleges in Ondo state. Specifically, the study intends to:

- i. Identify the workshop maintenance skills needed by Motor Vehicle Mechanics craftsmen for diagnosing vehicle in technical colleges.
- ii. Ascertain the workshop maintenance skills needed by Motor Vehicle Mechanics craftsmen for performing routine inspection in vehicles in technical colleges.

Research Questions

- i. What are the workshop maintenance skills needed by Motor Vehicle Mechanic craftsmen for diagnosing vehicles in technical colleges?
- ii. What are the workshop maintenance skills needed by Motor Vehicle Mechanic craftsmen for performing routine inspection in vehicles in technical colleges?

Research Methods

The study adopted descriptive survey research design. A survey research according to Olaitan and Nwoke (1993) is one in which the entire population or representative sample is studied by collecting and analyzing data from the group through the use of questionnaire. The population for the study was 74 made up 18 motor vehicle mechanics work's teachers and 56

motor mechanics vehicle final year students of technical colleges in Ondo State.. The entire population was used, hence there was no sampling. The instrument for data collection was a structured questionnaire. The instrument was divided into three sections – A, B and C. Section A sought for information of the respondents, . Section B contained 20 items developed to find workshop maintenance skills needs by motor mechanics work craftsmen for diagnosing vehicles and . Section C consisted 20 items designed to find out workshop maintenance skills needs by motor mechanic works craftsmen for performing routine inspection in vehicle. The questionnaire response options were formulated based on 5-point Likert Scale. The response categories for sections B and C were Strongly Needed (SA), Needed (N), Undecided (U), Slightly Needed, (SN), Not Needed (NN). These response categories were assigned numerical

values of 5, 4, 3, 2, and 1 respectively. The data collected from the respondents were analyzed by using mean to answer the two research questions. The two null hypotheses were tested using the t-test at 0.05 level of significance. Based on the five point Likert scales, items with mean of 3.00 or above were regarded as needed while items with mean below 3.00 were regarded as not needed. A null hypothesis was accepted when a t-calculated value is less than the table t-value. Also the null hypotheses were rejected if the table t value is less than t calculated value.

Results and Discussions

Research Question 1: What are the workshop maintenances skills needed by motor mechanics works craftsmen for diagnosing vehicles in the technical colleges? The data for answering research question 1 are presented in Table 1

Mean Responses of the Respondents on the workshop maintenance skills needed by Motor Vehicle Mechanic craftsmen for diagnosing vehicle in technical colleges.
N = 74

SN	Item statements	X	SD	Remark
1.	Understanding engine components	4.01	0.80	Needed
2.	Familiarity with vehicle wiring	3.91	0.86	Needed
3.	Ability to use scanners	4.06	0.78	Needed
4.	Diagnosing brake related problem	3.87	0.88	Needed
5.	Identifying issues with shock absorbers		3.96	0.83 Needed
6.	Recognizing transmission issues		4.03	0.80 Needed
7.	Diagnosing heating and cooling system problems		4.01	0.84 Needed
8.	Identifying and fixing electrical	3.68	0.80	Needed
9.	Diagnosing problems related to fuel injection and delivery		3.79	0.84 Needed
10.	Diagnosing battery issues and replacing when necessary	4.02	0.85	Needed
11.	Checking and maintaining fluid levels for various system		3.91	0.88 Needed
12.	Noting symptoms accurately to pinpoint problems		3.96	0.76 Needed
13.	Diagnosing steering problems	3.91	0.84	Needed
14.	Using service records to aid diagnosis	3.88	0.80	Needed
15.	Identifying tire wear patterns and wheel related issues	4.10	0.81	Needed
16.	Troubleshooting electrical issues and circuits	3.96	0.87	Needed
17.	Assessing handing and alignment problems	4.02	0.81	Needed
18.	Identifying problems in fuel delivery and injection systems.	4.05		0.79 Needed
19.	Identifying abnormal noise or vibration	3.95	0.83	Needed
20.	Understanding issues related to spark plugs and ignition coils	3.90		0.88 Needed
GRAND MEAN		3.95		Needed

X = Mean, SD=Standard deviation , N= Number of Respondents

The data presented in Table 1 revealed that all the 20 workshop maintenance skill needs for diagnosing vehicles have their Mean value ranged from 3.68 to 4.06. This showed that Mean value of each item was above the cut-off point of 3.00, indicating that all the 20 workshop maintenance skills needed by motor mechanic works craftsmen for diagnosing vehicle in technical college. The table also showed that the standard deviation of

the items are within the range of 0.78 to 0.88, this indicated that the values of the respondents were not far from one another in their responses.

Research Question 2: What are the workshop maintenance skills needed by Motor Vehicle Mechanic craftsmen for performing routine inspection in vehicle in technical colleges?

The data for answering research question 2 are presented in Table 2:

Mean Responses of the Respondents on the workshop maintenance skills needed by Motor Vehicle Mechanic craftsmen for performing routine inspection in vehicle in technical college.

N = 74

S/N	Item statements	X	SD	
	Remarks			
1.	Ability to assess levels and conditions of engine oil Needed		4.00	0.79
2.	Check tire pressure, tread depth and overall tire condition Needed		3.98	0.84
3.	Examine brake pad, and brake lines	3.80	0.83	Needed
4.	Inspect battery terminals, check electrolyte levels Needed		3.86	0.81
5.	Check the condition and tension of belts in the engine compartment	4.03	0.78	Needed
6.	Assess the cleanliness and condition of the air filter Needed		4.07	0.84
7.	Inspect exhaust pipes, mufflers, and catalytic converters Needed		3.96	0.83
8.	Examine shock absorbers, and struts	3.95	0.83	Needed
9.	Wheel alignment inspection	4.01	0.79	Needed
10.	Check all exterior lights, including headlights, and break lights	3.56	0.85	Needed
11.	Inspect wiper blades for wear and replace	4.03	0.83	Needed
12.	Check radiator, hoses, and thermostat for leakages Needed		3.87	0.78
13.	Assess transmission fluid levels and condition	3.95	0.89	Needed
14.	Ensure proper functioning if ignition components like coil and wires	3.98	0.84	Needed
15.	Assess power steering fluid levels and condition	4.00	0.82	Needed
16.	Look for any loose, damage or improperly connected components throughout the vehicles	4.00	0.7	Needed
17.	Conduct battery voltage and charging system tests Needed		4.10	0.81
18.	Check and adjust engine belts for wear and tension	3.97	0.85	Needed
19.	Test and replace bulbs as needed in the lighting system	4.01	0.77	Needed
20.	Inspect heating, ventilation, and air conditioning systems for functionality	3.89	0.80	Needed
	GRAND MEAN	3.95	0.80	Needed

The data presented in the Table 2 revealed that all the 20 workshop

maintenance skills have their Mean value ranged from 3.56 to 4.10. This

showed that the Mean value of each item was above the cut-off point of 3.50, indicating that all the 20 workshop maintenance skills were required by motor mechanic works craftsmen. The table also showed that the standard deviation (SD) of the items are within the range of 0.77 to 0.89, this indicated that the means values of the respondents were not far from one another in their responses.

Testing of Hypotheses

Hypotheses 1

There is no significant different between the mean responses of motor mechanic works teachers and motor mechanic works final year students on the workshop maintenance skills needed by motor mechanic works craftsmen for diagnosing vehicles.

Table 3
The t-test Analysis of the Mean Responses of the Respondents on the workshop maintenance skills needed by motor mechanic works craftsmen for diagnosing vehicles.

S/N	Item statements	X ₁	S ₁ ²	X ₂	S ₂ ²	t-test	Remarks
1.	Understanding engine components	3.90	0.81	4.04	0.77	0.81	NS
2.	Familiarity with vehicle wiring	4.09	0.71	3.97	0.92	0.65	NS
3.	Ability to use scanners	3.69	0.66	4.09	0.77	1.25	NS
4.	Diagnosing brake related problem		3.76	0.84	3.95	0.99	0.84
5.	Identifying issues with shock absorbers	3.53	0.82	3.86	0.69	1.27	NS
6.	Recognizing transmission issues	3.60	0.95	3.65	0.55	0.25	NS
7.	Diagnosing heating and cooling system	3.53	0.56	3.72	0.89	0.83	NS
8.	Identifying and fixing electrical	3.40	0.89	2.86	0.85	0.66	NS
9.	Diagnosing problems related to fuel						
	Injection and delivery	3.69	0.70	3.93	0.66	0.28	NS
20.	Diagnosing battery issues and replacing						
	when necessary	3.39	0.77	3.86	0.73	0.82	NS
20.	Checking and maintaining fluid levels for						
	various system	3.58	0.53	3.77	0.98	0.76	NS
12.	Noting symptoms accurately to pinpoint						
	problems	3.88	0.83	3.72	0.99	0.72	NS
13.	Diagnosing steering problems		3.78	0.68	3.60	0.67	0.38
14.	Using service records to aid diagnosis	3.81	0.79	3.43	0.78	0.55	NS
15.	Identifying tire wear patterns and wheel						
	related issues	3.66	0.83	3.65	0.69	0.45	NS
16.	Troubleshooting electrical issues and circuits	3.74		0.73	3.59	0.76	0.43
17.	Assessing handling and alignment problems	3.89		0.69	3.56	0.92	0.62
18.	Identifying problems in fuel delivery and						
	injection system	3.61	0.76	3.72	0.60	0.59	NS
19.	Identifying abnormal noise and vibration		3.77	0.69	3.78	0.78	0.45
20.	Understanding issues related to spark plugs						
	and ignition coils	3.51	0.95	3.59	0.75	0.51	NS
GRAND MEAN		3.69		3.72			

Data presented in Table 3 revealed that each of the 20 workshop maintenance skill had their calculated t-values

ranged from 0.25 to 1.27 which were less than t-table value of 1.98 at 0.05 level of significance and at 273 degree

of freedom (df). This indicated that there was no significant difference between Mean responses of motor mechanics works teachers and motor

mechanics works final year students on the workshop maintenance skills needed by motor mechanics works craftsmen.

Table 4
The t-test Analysis of the Mean Responses of the Respondents on the Workshop maintenance skills needed by motor mechanic works craftsmen for performing routine inspection in vehicles

S/N	Item statements	X_1	S^2_1	X_2	S^2_2	t-test	Remarks
1	Ability to assess levels and conditions of engine oil	4.34	0.85	4.04	1.08	1.52	NS
20.	Check tire pressure, tread depth and overall tire conditions	4.20	1.06	4.10	1.12	0.54	NS
3.	Examine brake pad and brake lines	4.27	0.82	4.08	1.14	0.07	NS
4.	Inspect battery terminals and check electrolyte levels	3.47	1.12	3.42	1.23	0.24	NS
20.	Check the condition and tension of belts in the engine compartment	3.85	0.87	3.93	1.02	0.50	NS
20.	Assess the cleanliness and condition of the air filter	3.86	0.90	3.92	1.02	0.50	NS
20.	Inspect exhaust pipes, muffler and catalytic converters	3.45	1.08	3.24	1.23	1.03	NS
8.	Examine shock absorbers and struts	3.70	0.895	3.80	0.88	0.56	NS
9.	Wheel alignment inspection	3.19	1.015	3.22	1.14	0.13	NS
10.	Check all exterior light including headlight and backlights	3.47	1.16	3.28	1.16	0.89	NS
11.	Inspect wiper blades for wear and replace	3.50	1.07	3.56	0.86	0.32	NS
12.	Check radiator, hoses and thermostat for linkage	3.43	1.11	3.52	0.99	0.45	NS
13.	Assess transmission fluid levels and condition	3.23	1.20	3.34	1.11	0.48	NS
14.	Ensure proper functioning of ignition components like coil and wires	3.72	1.15	3.64	0.94	0.41	NS
15.	Assess power steering fluid levels and condition	3.77	1.23	3.98	1.03	0.94	NS
16.	Look for any loose damage or connected components	3.58	1.32	3.27	1.35	1.21	NS
17.	Conduct battery voltage and charging system tests	3.26	1.29	3.18	1.28	0.35	NS
18.	Check and adjust engine belts for wear and tension	3.63	0.98	4.00	0.87	0.12	NS
19.	Test and replace bulbs	3.68	0.73	0.82	0.83	0.12	NS
20.	Inspect heating and ventilation systems	3.98	0.67	3.82	0.78	0.57	NS
GRAND MEAN		3.68		3.66			

Data presented in Table 4 revealed that each of the 20 workshop maintenance skills had their calculated t-values ranged from 0.07 to 1.52 which were less than t-table value of 1.98 at 0.05 level of significance and at 273 degree of freedom (df). This indicated that there was no significant difference.

Discussion of Findings

The findings of the study were discussed based on the research questions and answered and hypothesis tested. The finding of the study with regard to research question one revealed that the motor vehicle mechanic craftsmen needed workshop maintenance skills to diagnose vehicles in technical colleges. All the 20 items were found to be needed.

Finding of the study with regard to research question two revealed also

revealed that the motor vehicle mechanic craftsmen needed workshop maintenance skills to perform routine inspection on vehicle in technical college. All the 20 items were found to be needed.

Finding of the study with regard to hypothesis one revealed that there was no significant difference between Mean responses of motor mechanics works teachers and motor mechanics works final year students on the workshop maintenance skills needed by motor mechanics works craftsmen in for diagnosing vehicles in technical colleges in Ondo state. This indicated that calculated t-values ranged from 0.25 to 1.27 which were less than t-table value of 1.98 at 0.05 level of significance.

Finding of the study with regard to hypothesis two revealed that there was no significant difference between Mean responses of motor mechanics works teachers and motor mechanics works final year students on the workshop maintenance skills needed by motor mechanics works craftsmen for performing routine inspection on vehicles in technical colleges in Ondo state. This indicated that their calculated t-values ranged from 0.07 to 1.52 which were less than t-table value of 1.98 at 0.05 level of significance.

Conclusion

Based on the findings of the study, the following conclusions were drawn:

It is concluded that the identified workshop maintenance skills should be included into the curriculum of technical colleges programmes. Inclusion of the identified workshop maintenance skills into the curriculum will benefit the students in many ways. It will prepare them for self employment after graduation and therefore reduce youth unemployment.

Recommendations

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

1. All the workshop maintenance skills identified in this study should be used to train craftsmens and student of MVMW.
2. Government and administrators of technical colleges should organize seminar and workshop for motor mechanics works teachers and craftsmen on how to diagnose vehicles with On Board Devices(OBD).
3. Motor vehicle mechanics craftsmen in technical colleges should be exposed to some training/programmes regarding workshop maintenance skills through in house training.

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