

**EMERGING TECHNICAL SKILLS EXPECTED OF MOTOR  
VEHICLE MECHANIC STUDENTS IN THE MAINTENANCE OF  
LUBRICATION SYSTEM FOR SUSTAINABLE MANPOWER  
DEVELOPMENT RIVERS STATE**

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**ABSTRACT**

This study identified emerging technical skills expected of motor vehicle mechanic students in the maintenance of lubrication system sustainable manpower development in Rivers State. The population of the study consisted of 153 respondents, comprising of 140 motor vehicle technicians and 13 motor vehicle technical teachers of four National Board for Technical Education (NBTE) accredited technical colleges in Rivers State. Four research questions were posed to guide the study. No sampling was taken considering the manageable size of the population. A self-developed instrument was used to obtain information from the respondents. The instrument was validated by three experts. Mean and the standard deviation was used to analyse the research question while t-test was used to test the hypotheses at 0.05 level of significance. 153 copies of the questionnaire were distributed to the respondents, with only 143 copies retrieved and were used for the study. Findings revealed 15 items of emerging technical skills expected of students of MVM in maintaining lubrication system which include: Mount the oil pressure alarm sensor, check and replace defective oil pump, replace wearing part with new ones, check power supply to the oil pressure alarm sensor, select appropriate tools for the repairing of lubrication system, clean the paper filter thoroughly to allow free flow of oil, perform a test through the electronic control unit to check the high pressure fuel injection pump, carry out oil pressure alarm sensor for damage part amongst others. Findings also revealed that there is no significant difference in the mean response of technical teachers and motor vehicle technicians in maintaining lubrication system. As the study recommended, the Government should make available modern tools, equipment and machines used in the teaching and learning of motor vehicle mechanic courses in technical colleges ,the motor vehicle service companies should partner with the authorities of technical college with the aim to enhance robust practical oriented exercise on motor vehicle, Modern equipment and materials of the lubrication system should be imported annually to the college for effective teaching and learning in the technical college.

**Keywords:** TVET, Motor Vehicle, Lubrication System, Skills

**1.0 INTRODUCTION**

Education is a decisive tool for achieving the promotion of skilled workforce, socioeconomic and cultural development of individuals that drastically decrease the population of persons from the stream of the labour market. The sophisticated nature of this labour market demands dynamic manpower sufficiently prepared through TVET institutions with the aim to tackle faults emerges on modern products, equipment and tools that required technical skills in TVET. Okwelle (2013) stated that Technical and Vocational Education and Training refers to education which is mainly to

lead participants to acquire practical skills, technical know-how and understanding essential for employment in a particular occupation, trade or group of occupations. According to Federal Republic Nigeria on National Policy on Education (FRN, 2013) TVET is defined as a comprehensive term referring to those aspects of the educational process involving, in addition to general education, the study of technologies and related sciences, and the acquisition of practice skills, attitudes, understanding and knowledge relating to occupations in various sectors of economic and social life. The goals of vocational-technical education shall be to Provide trained manpower in applied sciences, technology and business particularly at the craft, advanced craft and technical levels. Provide the technical knowledge and vocational skills necessary for Agricultural, Commercial and Economic development, acquire technical and vocational skills. Give training and impart the necessary skills to the individual who shall be self-reliant economically. Hence, these objectives listed are driven by the formal vocational institutions in Nigeria such as polytechnics, mono technics and technical colleges (National Board for Technical Education, 2013).

Technical colleges are regarded as one of the principal Technical Vocational Education and Training (TVET) institutions in Nigeria for the training of craftsmen. Technical college students are persons who offered vocational courses in technical college in order to acquire practical skills and basic scientific knowledge through vocational-technical training. Adebayor (2010), technical college students are students who are acquiring skills in Technical College Education programme in a particular occupation, trade or craft. In line with this study, technical college students refer to persons who are receiving vocational training in technical college in motor vehicle mechanic work to improve technical skills towards manpower development. FRN (2013) reported that trades offered in the Technical Colleges in Nigeria include: Electrical Engineering Trade, Wood trades, Printing trades; Textile trades; Building trades, Beauty Culture Trades; computer craft practice, Hospitality and Mechanical trades which the Motor vehicle mechanic is derived.

The motor vehicle is an indispensable channel of movement of persons and goods from one point to another in society. Bhandari (2015), the motor vehicle is a complex technical system in which various subsystems operate in harmony to discharge a certain defined role. Motor Vehicle is a self-propelled land vehicle usually having four wheels and an internal combustion engine, used for personal and public transportation. It is of the assorted brand with respect to its styles, the number of doors and purpose of uses (Okwelle, Beako and Ajie, 2017). In the opinion of Tezu (2014), the motor vehicle is a wheeled vehicle that carries its own motors and has seats for both the drivers and passengers. It is of different brands and models depending on the company or country that produced it, and are used for either public or convenience for private use. Giri (2014), most motor vehicle systems, such as engine components, braking, cooling, lubrication, transmission and steering systems, are controlled primarily by computers and electronic devices. Each of these systems requires Electronic Control Unit (ECU) which reads sensors values from various parts of the engine and depending on these values it performs the appropriate actions that require technical skills to service and maintain.

The motor vehicle mechanic is of the mechanic's trade in technical colleges is subdivided into Auto electric works, Vehicle bodybuilding, Agricultural Implement mechanics and motor vehicle mechanic's work (NBTE, 2011). The introduction of motor vehicle mechanics work and other occupational trades in the technical colleges is geared towards imparting basic knowledge as well as training skills leading to the production of skilled craftsmen who will be improving manpower, self-reliant and sufficiently competent to meet the demands in the world of work through motor vehicle mechanic students (Olaitan and Ikeh, 2015). Motor Vehicle Mechanic students of technical colleges are expected to acquire knowledge in diagnoses, services and completely repair any fault

relating to lubrication system in the conventional motor vehicle to manufacturers specification(Beako, 2017).

The lubrication system of an engine is an arrangement of mechanism which maintains the supply of lubricating oil to the rubbing surfaces of an engine part at correct pressure and temperature (Erjavec,2012)). Lubrication of these moving parts is essential to prevent wearing of components, regulates the engine temperatures, reduce the loss of energy and other harmful effects on engine components. Tribonet (2016) lubrication is the process or technique employed to reduce friction between, and wear of one or both, surfaces in proximity and moving relative to each other, by interposing a substance called a lubricant in between them. The lubricant can be a solid (e.g. molybdenum disulfide MoS<sub>2</sub>) a solid/liquid dispersion, a liquid such as oil or water, a liquid-liquid dispersion (a grease) or a gas. (2015) asserted that, the purposes of lubrication are reducing the frictional effect, cooling effect, sealing effect, cleaning effect amongst others. Wilcox (2013) stated that when dealing with any lubricating system, that there is a need to use the liquid alert machine make to service all filters to keep dust and debris out of the lubricant. And ensure the indicator reads at least 150g/h to ensure accuracy in a motor vehicle. Wilcox further stated that skills in lubrication system include locate on-board diagnostic disc in the vehicle, fix diagnostic device through a 16-pin onboard diagnostic connector, mount the oil pressure alarm sensor, overhaul oil pressure alarm sensor among others. Beako (2018) stated that there is need for students of motor vehicle mechanic to acquire these skills, through vigorous training on maintenance, repair and constant services of engine components (lubrication system) of modern motor vehicles in order to acquire requisite skills and be conversant with operations and working principles of the lubrication system in modern motor vehicles.

Skills is an ability and capacity acquired through deliberate, systematic, and sustained effort to smoothly and adaptively carryout complex activities or job functions involving ideas (cognitive skill), things (technical skills), and/or people (interpersonal skills) (Bekijk, 2016). Medina (2013) defined technical skills as the expertise or technical competence related to the field of the worker, whether engineering or technical. Crammer (2014) stated that technical skills are hard skills associated with the use of tools, equipment related to work properly and efficiently, as well as all technical matters. Okwelle and Beako(2018) skills refer to the ability to do things expertly or well in accordance with set standards or manufacturer specification. Emerging technical skills can be seen as skills which arise from new knowledge or the innovative application of existing knowledge leading to the rapid development of new capacities. Okereke in Udogu (2015) describe emerging technical skills as skills that are new or fairly well established but yet to be fully exploited by enterprises and individuals. Students of motor vehicle mechanic work in technical colleges are expected to acquire these skills with the aim of repairing modern lubrication channels in the newly invented vehicles in line with the manufacturer's specifications. This situation requires competent technical skills manpower that will bring sustainable development into the motor vehicle maintenance sector of the economy.

Sustainable manpower development is achieved through imparting necessary skills needed for the building of capacities and competencies of the learners for socio-economic growth and development of such nation (Suleiman, 2012). According to Scott (2013), sustainable development is a process by which the needs of present generations can be satisfied without compromising the ability of future generations to satisfy their needs. Scott further explained that sustainable technical skills and programmers in technical colleges will involve the renewal of individual skills, labour market skills requirement, and the transformation of the world of work through the efforts and contributions of technical college students. Hence, motor vehicle mechanic students of motor vehicle mechanic trade are expected to acquire emerging technical skills for an upgrading of

knowledge in order to repair and maintain lubrication system of newly invented or modern vehicles and equally to be familiar with modern tools and equipment used in the repair of the lubrication system. In light with this background, the study was undertaken to ascertain emerging technical skills expected of motor vehicle mechanic students for sustainable manpower development in Rivers State.

## 1.1 Statement of the Problem

Motor vehicle mechanic works as a trade in technical colleges, refer to a vocational trade geared towards producing competent motor vehicle mechanics with sound practical skills, knowledge and ability to diagnose and carry out repairs and/or maintenance on all types of motor vehicles. Considering the rapid advancement in vehicle technology, the motor vehicle that is manufactured, imported or assembled in the territory of Nigeria are mostly controlled primarily by computers, electronic components and controls that require a higher degree of sophistication for testing and servicing, as well as special diagnostic equipment and instruments (Udogu, 2015). However, motor vehicle technology had improved on its lubrication systems where available motor mechanics are unable to repairing and servicing when developed faults as many lack the expected technical skills. As a result of the sizeable vehicular population increase, it is no longer hidden that the repairing of the contemporary and modern motor vehicle is still lacking. Beako (2017) observed that most of the sophisticated vehicles are abandoned due to lack of requisite skills and knowledge to repair the lubrication system. This contributed to many vehicles seen unattended to at motor mechanic workshops in the state. Hence, the study is undertaken to ascertain emerging technical skills expected of students of Motor Vehicle Mechanic Work in the maintenance of lubrication system for sustainable manpower development in Rivers State.

## 1.2 Purpose of the Study

The purpose of this study was to determine the emerging technical skills expected of motor vehicle mechanics students for sustainable manpower development in Rivers State. Specifically, the study sought to:

- i) Identify emerging technical skills expected of Motor Vehicle Mechanic students in the maintenance of lubrication channels for sustainable manpower development in Rivers State.

## 1.3 Research Question

The research question was formulated to guide the focus of this study.

- 1) What are the emerging technical skills expected of motor vehicle mechanic students in the maintenance of lubrication channels for sustainable manpower development in Rivers State?

## 1.4 Hypothesis

The null hypothesis (H<sub>0</sub>) was tested at 0.05 level of significance.

**H<sub>01</sub>:** There will be no significant difference in the mean responses of motor vehicle mechanic industry staff and technical teachers on the emerging technical skills expected of motor vehicle mechanic students in the maintenance of lubrication systems for sustainable manpower development in Rivers State.

2.0 METHODS

The study adopted a descriptive survey design. The study was conducted in Rivers State. The population of the study consists of 153 respondents, comprising 140 motor vehicle technicians drawn from Rivers State Ministry of Commerce and Industry, Port Harcourt and 13 motor vehicle technical teachers of four National Board of Technical Education (NBTE) accredited technical colleges in the State. No sample was taken considering the manageable size of the population. Hence, the entire population was used for the study. A self-designed instrument titled “Technical Skills of Motor Vehicle Mechanics Questionnaire” (TSMVMQ) was used to collect data for the study. The instrument was divided into two sections A and B. Section A sought information on the respondent’s demographic data while section B was used to elicit information on the technical skills expected of motor vehicle mechanic students in maintaining lubrication system. The instrument was designed on five-point Likert scale with number values which include: Strongly Agree (SA) = 5, Agree (A) = 4, Undecided (U) = 3, Disagree (D) = 2 and Strongly Disagree (SD) =1. The instrument was validated by three experts. One from the AUTO-PLANET GALLERA, 98 Olu-Obasanjo Road, Port Harcourt, a reputable motor vehicle services and maintenance firm, one from the Automobile Technology Unit, Department of Industrial Technology Education, Michael Okpara University of Agriculture, Umudike Abia State and one from the Department of Vocational and Technology Education, Rivers State University, Port Harcourt. The reliability of the instrument was determined through the pilot test method for a measure of its ability. The result of the Pilot test was subjected to Cronbach-Alpha which yielded 0.84. The instrument was administered to the respondents by the researchers. Hence, 153 copies of the questionnaire were printed and distributed. However, only 143 copies of the instruments were retrieved, given rise to 93.3% return rate. The 143 copies were analyzed and used for the study. The research question was analyzed using mean and standard deviation. Mean values greater than or equal to 3.50 were accepted while mean values less than 3.50 were rejected. The hypothesis was tested using t-test statistics. When the t-calculated is lower than the t-critical, the hypothesis was accepted and when the t-calculated is greater than the t-critical, the hypothesis was rejected.

3.0 RESULTS

Table 1 Mean and Standard Deviation on the Emerging Technical Skills of Motor Vehicle Mechanic (MVM) in the Maintenance of Lubrication System.

S/No	Skills expected in the maintenance of lubrication system	Motor Vehicle Technicians			Technical Teachers		
		$\bar{x}_1$	S.D <sub>1</sub>	Remark	$\bar{x}_2$	S.D <sub>2</sub>	Remark
1	Locate on-board diagnostic disc in vehicles.	4.14	1.14	Accepted	3.85	1.15	Accepted
2	Fix diagnostic device through 16-pin on-board diagnostic connector.	3.72	1.29	Accepted	3.65	1.13	Accepted
3	Mount the oil pressure alarm sensor.	3.69	1.34	Accepted	3.74	1.29	Accepted

4	Carry out oil pressure alarm indication test.	4.37	1.31	Accepted	3.67	1.18	Accepted
5	Verify power supply to oil pressure alarm sensor.	3.56	1.38	Accepted	4.34	1.12	Accepted
6	Overhaul oil pressure alarm sensor.	3.89	1.26	Accepted	3.61	1.25	Accepted
7	Visually inspect the oil pressure alarm sensor for damage part.	3.93	1.23	Accepted	3.79	1.29	Accepted
8	Replace wearing moving parts with new ones.	4.01	1.13	Accepted	3.83	1.18	Accepted
9	Check and replace defective oil pump linking sensor.	3.60	1.36	Accepted	3.98	1.16	Accepted
10	Clean the paper filter thoroughly to allow free flow of oil.	4.10	1.12	Accepted	4.27	1.17	Accepted
11	Replace faulty lubrication system and oil pressure alarm sensor.	3.71	1.29	Accepted	3.57	1.36	Accepted
12	Verify the operation of the lubrication system.	3.88	1.26	Accepted	3.73	1.20	Accepted
13	Select appropriate tools for the repairing of lubrication system.	4.09	1.11	Accepted	3.55	1.32	Accepted
14	Provide the right quantity of the lubricants to the moving parts.	3.92	1.17	Accepted	3.61	1.23	Accepted
15	Perform a test through the electronics control unit to check the high pressure fuel injection pump.	3.69	1.21	Accepted	3.51	1.36	Accepted
	<b>TOTAL MEAN/S.D</b>	<b>58.3</b>	<b>18.60</b>		<b>56.7</b>	<b>18.39</b>	
	<b>GRAND MEAN/S.D</b>	<b>3.88</b>	<b>1.16</b>		<b>3.78</b>	<b>1.23</b>	

**Where,**

Number of Motor Vehicle Technicians (MVT)= 130

Number of Motor Vehicle Technical Teachers (MVTT) =13

Table 1 shows the opinions of respondents which have the grand mean values of 3.88 and 3.78. These grand means values are seen to be greater than the criterion mean of 3.50, signifying that 15skills items are accepted by respondents as the emerging technical skills expected of students of Motor Vehicle Mechanic work for the maintenance of lubrication system for sustainable manpower development in Rivers State.

**Table 2 t-Test Analysis of the Responses of Motor Vehicle Mechanic (MVM) Industry Technicians and Technical Teachers on the Emerging Technical Skills Expected in the Maintenance of Lubrication System.**

S/No	Group	N	$\bar{x}$	SD	DF	$\alpha$	$t_{cal}$	$t_{cri}$	Remark
1	MVM Industry Technicians	130	3.88	1.16	141	0.05	0.271	$\pm 1.96$	Accepted
2.	MVM Technical Teachers	13	3.78	1.23					

Motor Vehicle Mechanic (MVM)

The information presented in table 2 shows the calculated t-value 0.271 at 141 degrees of freedom and 0.05 level of significance, while the tablet-value is 1.96. This implies that since the calculated t-value 0.271 is less than the tablet-value of 1.96. Hence, the null hypothesis is accepted. Based on this result, the researcher concluded that there is no significant difference in the mean responses of Motor Vehicle Technical Teachers and Motor Vehicle Industry Technicians on the emerging technical skills expected of students of Motor Vehicle Mechanic Works in the maintenance of lubrication system for sustainable manpower development in Rivers State.

**4.0 DISCUSSION OF FINDINGS**

The findings of this study revealed the emerging technical skills expected of students of motor vehicle mechanics in the maintenance of the lubrication system of a motor vehicle for sustainable manpower development. The emerging technical skills identified include locate on-board diagnostic disc in vehicle, fix diagnostic device through 16-pin onboard diagnostic connector, mount the oil pressure alarm sensor, overhaul oil pressure alarm sensor, mount the oil pressure alarm sensor, check and replace defective oil pump, replace wearing part with new ones, check power supply to the oil pressure alarm sensor, select appropriate tools for the repairing of lubrication system, clean the paper filter thoroughly to allow free flow of oil, perform a test through the electronic control unit to check the high pressure fuel injection pump, carry out oil pressure alarm sensor for damage part amongst others. This finding is in line with the opinion of Beako (2018) stated that there is need for students of motor vehicle mechanic to undergo vigorous training on maintenance, repair and constant services of engine components of modern motor vehicles in order to acquire requisite skills and be conversant with operations and working principles of the lubrication system in modern vehicles. The findings also is in agreement with Olaitan&Ikeh (2015) which stated that for a competent workforce and progress in automobile business, employable skills, technical skills, basic tools as well as facilities are of great importance to prospecting motor vehicle mechanics in maintaining lubrication systems as it reduces friction between two

mechanisms in the engine block, introduce oil, grease and other lubricants to the moving parts for smooth operation

The result of the analysis of hypothesis identified that there is no significant difference in the means responses of motor vehicle technical teachers and motor vehicle industry technicians on the 15 technical skills expected of students of motor vehicle mechanic for sustainable manpower development. This indicated that the motor vehicle technical teachers and motor vehicle technicians had the same opinion on the effectiveness of these 15 technical skills items in the maintenance of lubrication system in motor vehicles. This finding also signified that these skills items are suitable and most useful in the maintenance of lubrication systems in modern motor vehicles, and as such would ensuring competent motor vehicle mechanic workforce towards sustainable manpower development in Rivers State.

## 5.0 CONCLUSION

1. It is penitent to regularly revive and renew equipment and tools used in teaching students in technical colleges considering the annual arrival of modern motor vehicles that require contemporary skills to maintain and services. This situation will allow students of motor vehicle mechanic to be abreast with the knowledge to repair them and enable the students to be relevant in the world of work. It is equally noticed that engine components of motor vehicles changes and modernized day after day, as such require teachers and students of motor vehicle discipline to be updated, dynamic and versatile in tackling mechanical issues and other related ones in the modern vehicles.

## 6.0 RECOMMENDATIONS

Based on the findings, the researchers recommend as follows:

2. Government should make available modern tools, equipment and machines use in the teaching and learning of motor vehicle mechanic courses in technical colleges.
3. The motor vehicle service companies should partner with the authorities of technical college with the aim to enhance robust practical oriented exercise on motor vehicle.
4. Modern equipment and materials of lubrication system should be imported annually to the college for effective teaching and learning in the technical college in Rivers State.

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