Technical Skills Needed by Motor Vehicle Mechanic Apprentice to Establish Standard Motor Mechanic Enterprise in Port Harcourt Metropolis, Rivers State

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ABSTRACT
The study investigated mechanical technical skills required by apprentice of motor vehicle mechanic (MVM) to qualify for graduation as MVM artisan and establish standard motor mechanic enterprise in Port Harcourt metropolis. The study adopted the descriptive survey research design. The sample of the study comprised 63 MVM artisans operating in MVM workshops in Ikoku Mechanic village Diobu, Port Harcourt, who were purposively sampled. The instrument used for data collection was a structured questionnaire which was faced validated by three experts. The reliability of the instrument was established by using Cronbach Alpha reliability method to obtain the reliability coefficient was 0.86. Three research questions guided the study. Mean and standard deviation were used to answer the research questions. The study revealed modern technical skills in maintenance of ignition systems, carburetors as well as wheel alignment and balancing required by MVMW apprentice to qualify for graduation as MVM artisan and establish standard Motor Vehicle Mechanic enterprise in Port Harcourt metropolis. Based on the findings, recommendation were made among which included: Government should establish modern motor vehicle mechanic workshops that would train apprentice of MVM on technical skills required in maintaining and repairing of fuel system, ignition system and wheel alignment and balancing of motor vehicles wheels and tyres. The industries and motor vehicle companies should establish more service centres in Port Harcourt metropolis to train interested youths at subsidized rate.

Keywords: TVET, Motor Vehicle mechanic, Skill Acquisition and Maintenance.

INTRODUCTION
Technical Vocational Education and Training (TVET) is widely recognized as the most effective means of empowering the citizenry to stimulate sustainable national development, enhance employment, improve the quality of life, reduce poverty, limit the incidence of social vices due to joblessness and promote a culture of peace, freedom and democracy. UNESCO (2004) identified the two main objectives of TVET as; the need to train the workforce for self-employment as well as to raise the productivity of the informal sector of the economy. According to Olaitan (2012) vocational education, an aspect of TVET is a designed field of study for the development of work skill attitudes, appreciations, and creativity in the individuals as well as the creation of awareness of occupational entry and progression demands. Emphasis in vocational training is on skill acquisition. Skill acquisition can be defined as the form of training by individuals or group of individuals that can lead to acquisition of knowledge for self sustenance; it involves the training of people in different fields of
trade under a legal agreement between the trainers and the trainees for certain duration and under certain conditions (Idoko, 2014). Skills acquisition has been described by scholars as the recipe for eradicating extreme poverty and hunger by creating avenues for employment, thereby introducing an avenue for jobs and wealth creation while instilling self-sufficiency and reliance (Isaac, 2011).

Motor Vehicle Mechanic (MVM) trade is one of the vocational training skill programmes operated basically through the informal setting with apprenticeship mode of instruction. It is designed to produce competent motor vehicle artisans for the technological and industrial development of the society. In Nigeria, Motor Vehicle Mechanic Works trade as a vocational training programme is offered in Technical Colleges, companies and designated skills acquisition centers of Motor Vehicle Workshops across the Nigeria. It is expected that those who acquired MVM skills will be gainfully employed or self employed after their training.

A workshop, according to Jubril (2011) is a place, area or building where machines, equipment, hand tools, workbenches and materials are used in manufacturing or repairing of things. Hence, Motor Vehicle Mechanic workshop is a designated place, room or hall where workbenches, mechanical toolbox, other basic vehicle maintenance and repair equipment are used for vehicle maintenance by motor vehicle mechanic. With proper ventilation and layout plan in place, include modern machines and tools available for work. A Motor Vehicle Mechanic is a skilled personal, trained in auto mechanics which include: Auto body repair and spraying, auto electrical work, auto body mechanic work, auto body building (panel beating) and auto parts merchandise (Penn, 2011). According to Hiller & Coombes (2014) Motor Vehicle Mechanic is skilled personnel who specialized in motor vehicle maintenance, repairs and sometimes modification of motor vehicles. Motor Vehicle Mechanic Apprentice is a trainee who acquired technical skills through the informal setting at a designated motor vehicle mechanic workshop within a specify time duration.

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 assorted brand with respect to its styles, number of doors and purpose of uses (Abwage, 2010). Motor Vehicle consists of different systems available for efficient functioning of an engine which includes fuel supply system, lubrication system, ignition system, cooling system and governor. Understanding of the principle of operations of the various motor vehicle systems by a skilled apprentice is vital to efficient and effective repairs and maintenance of motor vehicles.

According to Cranmer (2014) 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). Medina (2011) 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. In the view of Abinu (cited in Agada, 2014) technical skills are the knowledge and skills specific to a particular occupation or group of occupations. In this study, mechanical technical skills refer to the ability to repair, service and maintain engine components expertly and well in accordance to set standard or manufacturer instructions. Giri (2015) stated that mechanical technical skills expected in maintaining and servicing of carburetor include: cleaning and fixing to ensure float chamber allows fuel through the jet into an enlarged carburetor passages, replace the defective pump, clean properly the fuel lines and connecting unit and a new gasket should be used while installing the pump at its place. Udougu (2015) stated that the mechanical technical skills that are needed in maintaining and servicing modern motor vehicle ignition system includes, perform magnetic sensor testing, use plug wire or adapter to check for spark, test run the ignition system using the multimeter, check the crank sensor using diagnostic tool, check the battery to make sure there is ample voltage to start the engine, test and diagnose defective regulator sensor. Furthermore, Abwage (2011) stated that the fuel supply system of spark ignition engine consist of fuel tank, fuel lift pump, fuel pipes, sediment bowl and carburetor. further stated that the functions of the carburetor includes: to mix the air and fuel thoroughly, atomize the fuel, regulate the air-fuel ratio at different speeds and loads on the engine and supply correct amount of mixture at different speeds and loads. These roles are paramount in the operations of an engine as from the carburetor the fuel goes to the engine cylinder through inlet manifold of the engine.
The National Business and Technical Examinations Board (2007) stated that motor vehicle mechanic needed technical mechanical skills in maintaining, balancing and alignment of wheels and tyres in order to set up a befitting standard motor vehicle mechanic enterprise. These set of skills are required by Motor Vehicle Mechanic artisans for the maintenances and services of modern motor vehicles. Maintenance is described as an action taken on anything to keep it working or to restore it to a good working condition. This ensures that a piece of equipment or item remains functional and serves us better (Abwage, 2010). 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. For effective maintenance on motor vehicle, expert opinion of mechanical technical skills obtained through organized vocational skill at the Mechanical Workshops and other skill acquisition centers that will improve entrepreneurship in the economy is essential and demanding. entrepreneurship is a process where an individual identify opportunities, allocate resources and create value through the identification of unmet needs of the society (Payton, 2011). The MVM apprentice needs entrepreneurship skills to succeed in motor vehicle mechanic enterprise. Abuda (2015) stated that entrepreneurship skills are the abilities needed for autonomy and independence, taking initiative, looking for possibilities to carry out business, self-confidence and endurance in any business opportunity. According to Anyadike, Emeh and Ukah (cited in Udogu, 2015) entrepreneurship is the capacity and attitude of a person or group of persons to undertake ventures with the probability of success or failures. However, most successful entrepreneurship reproduced new corporate enterprise. Enterprise in the opinion of medina (2011) is an organized business activity which is specifically aimed at growth and profit making. Agada (2014) stated that enterprise as an organization with partly overlapping objective working together with the rules and regulations guiding them for some period of time in order to achieve stated objectives of the organization. In this context, enterprise could refer to private motor vehicle services and maintenance workshops undertaken by individual artisans in a designated space. The concern of the research is to ascertain if motor vehicle artisans in Port Harcourt metropolis possessed relevant and current skills to deliver on the basis which they were trained and good coordinating spirit to establish an enterprise after graduation in Port Harcourt metropolis of Rivers State.

Statement of the Problem
The Motor Vehicle Mechanic enterprise ought to be managed by an artisan with practical skills, mechanical knowledge and the ability to diagnose and carryout repair works and maintenance of motor vehicles, acquired through apprenticeship in a designated MVM skill acquisition centre. However, the prospects of establishing and running standard motor vehicle mechanic enterprises by graduates of apprenticeship programmes are in doubt by many researchers. Thomas (2013) stated that greater proportion of the graduates of apprenticeship programme who established motor vehicle mechanic enterprises are unable to service the carburetor, fuel lift pump, fuel pipes and are unskilled in their respective area of specification considering the low quality instruction, teaching and training received while on the training. According to Abuda (2015) an average motor vehicle mechanic operating an enterprise lacked the requisite mechanical skills to diagnose, maintain and repair the ignition system, carburetor, aligning and balancing of wheels of motor vehicle. This situation had adversely affected vehicle owners and transportation system in Port Harcourt metropolis based on declining maintenance operational standard, non-application of technical skills, poorly equipped workshop, and non-functional motor vehicle enterprises in the area. It is against this backdrop therefore, this study is undertaken to determine the skills gap needed by apprentice of Motor Vehicle Mechanic for establishing standard Motor Vehicle Mechanics enterprise after graduation in Port Harcourt metropolis of Rivers State.

Purpose of the Study
The main purpose of this study is to determine the mechanical skills needs by Motor Vehicle Mechanic apprentice for establishing standard motor vehicle mechanic enterprises after graduation in Port Harcourt metropolis of Rivers State. Specifically, the study intends to:

1) Identify the skills needed by apprentice of Motor Vehicle Mechanic in repairing and maintenance of ignition system for establishing standard motor vehicle mechanic enterprise after graduation in Port Harcourt metropolis.
2) Ascertain the skills needed by apprentice of Motor Vehicle Mechanic in the repairing and maintenance of carburetor for establishing standard motor vehicle mechanic enterprise after graduation in Port Harcourt metropolis.

3) Find out the skills needed by apprentice of Motor Vehicle Mechanic in wheel alignment and balances for establishing standard motor vehicle mechanic enterprise after graduation in Port Harcourt metropolis.

Research Questions
1) What are the technical skills needed by apprentice of Motor Vehicle Mechanic in the maintenance of ignition system for establishing standard motor vehicle mechanics enterprise after graduation in Port Harcourt metropolis?
2) What are the technical skills needed by apprentice of Motor Vehicle Mechanic in the repairing and maintenance of carburetor for establishing standard motor vehicle mechanic enterprise after graduation in Port Harcourt metropolis?
3) What are the technical skills needed by apprentice of Motor Vehicle Mechanic in wheel alignment and balances for establishing standard motor vehicle mechanic enterprise after graduation in Port Harcourt metropolis?

RESEARCH METHODS
The study adopted a descriptive survey design. The population of the study was 63 senior MVMW artisans operating in Mechanical workshops registered and obtained operational permit in Port Harcourt metropolis of Rivers State. No sample was taken considering the small and manageable size of the population; hence the entire population was used. According to Nwana (cited in Nwosu & Mbaezue, 2016) the entire population could be studied when the size of the population is considered manageable. The instrument for data collection was a structured questionnaire titled “Technical Skills Needs by Motor Vehicle Mechanic Inventory” (TSMVMI). The TSMVMI is patterned to solicit response in five point Likert type scale of Highly Needed (5), Needed (4), Moderately Needed (3), Not Needed (2), Highly Not Needed (1). The questionnaire was validated by three experts from Department of Vocational and Technology Education, Rivers State University, Port Harcourt and one each from two registered Motor Vehicle Services and Maintenance Company operating in Port Harcourt. Their observations, corrections and suggestions were incorporated in the final version of the instrument before administration. The reliability of the instrument was determined through pilot-test on 10 senior motor vehicle mechanic artisans operating in Ahoada East Local Government Area, Rivers State. The results obtained from the pilot-test were subjected to test the reliability of internal consistency using Cronbach’s Alpha coefficient which yielded a coefficient of 0.86. Nunnally (cited in Okwelle & Ayonmike, 2014) recommended acceptable value of 0.7 for good reliability coefficient. Since the reliability coefficient obtained is above this value, the instrument was considered suitable for the study. Mean and standard deviation were used to analyze the research questions. All the copies of the instrument were completely filled and returned by the respondents. In analyzing the data, any mean value equal and above a criterion mean value of 3.00 was accepted as “Needed” and below the criterion mean value was rejected as “Not needed”. Standard deviation values were used to determine the level of homogeneity among the respondents.
RESULTS
Research Question 1
What are the technical skills needed by MVMW apprentices in the repairing and maintenance of ignition system for establishing small scale motor vehicle mechanics enterprise in Port Harcourt metropolis?

<table>
<thead>
<tr>
<th>S/No</th>
<th>Items</th>
<th>( \bar{X} )</th>
<th>SD</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Identify the on-board diagnostic port in vehicles</td>
<td>4.10</td>
<td>0.19</td>
<td>Accepted</td>
</tr>
<tr>
<td>2</td>
<td>Inspect throttle cable and adjust where necessary</td>
<td>3.70</td>
<td>0.25</td>
<td>Accepted</td>
</tr>
<tr>
<td>3</td>
<td>Use multimeter to check voltage supply</td>
<td>3.80</td>
<td>0.23</td>
<td>Accepted</td>
</tr>
<tr>
<td>4</td>
<td>Carry out a careful visual inspection of the wiring and the mechanical components</td>
<td>4.17</td>
<td>0.14</td>
<td>Accepted</td>
</tr>
<tr>
<td>5</td>
<td>Replace distorted electronic ignition components</td>
<td>4.40</td>
<td>0.10</td>
<td>Accepted</td>
</tr>
</tbody>
</table>

Table 1 revealed that all the items listed had their mean values ranging from 3.70 to 4.40. This implied that the mean value of each item was above the cut-off point of 3.00, indicating that these five mechanical technical skills are needed by apprentice of Motor Vehicle Mechanic Works in maintenance and repairing of ignition system for establishing standard motor vehicle mechanic enterprise in Port Harcourt metropolis. The table also showed that the values of the Standard Deviation (SD) range from 0.10 to 0.25. This indicated that the mean responses of respondents are not far from each other in their responses.

Research Question 2
What are the technical skills required by Motor Vehicle Mechanic artisans in the maintenance of carburetor system for establishing standard motor vehicle mechanic enterprise in Port Harcourt metropolis?

<table>
<thead>
<tr>
<th>S/No</th>
<th>Items</th>
<th>( \bar{X} )</th>
<th>SD</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>Cleaning and fixing to ensure float chamber allows fuel through the jet into an enlarge carburetor passage.</td>
<td>4.3</td>
<td>0.12</td>
<td>Accepted</td>
</tr>
<tr>
<td>7</td>
<td>Fix to ensure the fuel jet is always slightly higher than the float chamber fuel level.</td>
<td>4.2</td>
<td>0.90</td>
<td>Accepted</td>
</tr>
<tr>
<td>8</td>
<td>Locate the carburetor on the intake manifold</td>
<td>3.9</td>
<td>0.81</td>
<td>Accepted</td>
</tr>
<tr>
<td>9</td>
<td>Replace the defective pump and ensure new gasket should be used while installing the pump at its place.</td>
<td>3.6</td>
<td>0.75</td>
<td>Accepted</td>
</tr>
<tr>
<td>10</td>
<td>Clean properly the fuel lines and the connecting unit</td>
<td>3.5</td>
<td>0.78</td>
<td>Accepted</td>
</tr>
</tbody>
</table>

The data in Table 2 showed that all the items had their mean values ranging from 3.50 to 4.30, above the cut-off point of 3.00, signifying that all the highlighted mechanical technical skills are needed by Motor Vehicle Mechanic Works apprentice in maintaining of carburetor for establishing standard motor vehicle mechanic enterprises after graduation. The table also proved that the standard deviation (SD) of the items were within the ranges of 0.12 to 0.90, indicating that the respondents were not far from one another in their responses.
Research Question 3
What are the mechanical technical skills needed by MVMW apprentice in wheel adjustment and balancing for establishing standard motor vehicle mechanic enterprises in Port Harcourt metropolis?

Table 3: Mean Responses on MVMW on Maintenance of Wheel Adjustment and Balancing

<table>
<thead>
<tr>
<th>S/No</th>
<th>Items</th>
<th>X</th>
<th>SD</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>11</td>
<td>Identify defective wheel speed sensor and tyre sizes for categories of vehicle</td>
<td>3.8</td>
<td>0.84</td>
<td>Accepted</td>
</tr>
<tr>
<td>12</td>
<td>Exchange wheel and tyre positions in the correct sequence.</td>
<td>4.5</td>
<td>0.13</td>
<td>Accepted</td>
</tr>
<tr>
<td>13</td>
<td>Careful carryout visual inspection and perform wheel alignment using appropriate modern equipment</td>
<td>4.0</td>
<td>0.93</td>
<td>Accepted</td>
</tr>
<tr>
<td>14</td>
<td>Repair and replace distorted wheels and apply required grease to the wheel bearings and sprockets</td>
<td>3.7</td>
<td>0.79</td>
<td>Accepted</td>
</tr>
<tr>
<td>15</td>
<td>Check and tight ensuring the nuts and bolts hook to the wheels properly.</td>
<td>3.9</td>
<td>0.82</td>
<td>Accepted</td>
</tr>
</tbody>
</table>

The data presented in Table 3 revealed that all items had their mean values ranging from 3.70 to 4.5, above the cut-off point of 3.00, indicating that the five mechanical technical skills are needed by apprentice of Motor Vehicle Mechanic in wheel adjustment and balances for establishing small scale enterprise after graduation. The table further showed that the standard deviation (SD) of the items were within the range of 0.13 to 0.93, signifying that the respondents were not far from one another in their responses.

DISCUSSION
The study with respect to the first research question revealed that, replacing faulty electronic ignition components, use of multimeter to check voltage supply, inspection of throttle cable and adjusting where the needs arises, are the technical skills required by motor vehicle mechanic artisans in repairing and maintaining the ignition system which would guarantee the establishment of standard motor vehicle mechanic enterprise that will provide solutions to various mechanical faults of motor vehicles operating in Port Harcourt metropolis. The finding is in line with the position of Giri (2015) that the ignition system is among the main components of motor vehicle that require technicality, as it ON and OFF the motor vehicle, hence expected to be holistically monitored and repaired when faults are developed, replace faulty electronic ignition components and inspect throttle cable thoroughly, application and use of multimeter to check voltage supply regularly.

The study also revealed that technical skills needed by MVMW apprentice in maintaining the carburetor system that will guarantee the establishment of standard motor vehicle enterprise in Port Harcourt metropolis include; cleaning and fixing to ensure float chamber allows fuel through the jet into an enlarge carburetor passage, fixing to ensure the fuel jet is always slightly higher than the float chamber fuel level, locating the carburetor on the intake manifold, replace the defective pump, clean properly the fuel line and connecting unit. The finding agreed with the report of Giri (2015) who stated that all carburetors operate on the same basic principle pressure differential and incorporate same basic system of passages, ports, jets and pumps. Giri further stated that the location of the carburetor on the intake manifold is important, incorrect placement in relation to the manifold passages can interfere with proper fuel distribution.

The finding further revealed that for standard motor vehicle enterprise to be established in Port Harcourt metropolis, the Motor Vehicle Mechanic apprentice must be conversant with wheels adjustment and balancing by acquiring skills in the application of modern equipment and technologies such as computer...
diagnose that will identifying defective wheel speed sensor; capable to use modern instruments to fix wheels and tyres and replace mechanical parts where necessary, apply the required grease and other lubricants to the wheel bearings and sprockets, carry out visual inspection on the wheels, and ensuring the bolts and nuts are fixed squarely. This finding is in agreement with Bestman (2012) which stated that, in a contemporary society like ours, for a viable Motor Vehicle Mechanic enterprise, artisans needs to be proactive, versatile and be acquainted with modern electronic and mechanical devices in diagnosing the defective wheels and other engine components of motor vehicles. This finding also is in consonant with the report of Thomas (2013) which stated that with the rapid advancement in technology, the mechanic’s job has evolved from purely mechanical, to include electronic technology, because vehicles today possess complex computer and electronic systems, mechanics need to have a broader base of knowledge than in the past.

CONCLUSION
The establishment of modern motor vehicle enterprise requires competent artisans that would apply the electronic devices to diagnose the defective sections of motor vehicles. These competent craftsmen will pave way for enhancement of scope of proper maintenance of motor vehicle in vicinity such as Port Harcourt metropolis and enable customers to continually access Motor Vehicle Mechanic workshops in this environment considering these perfect works despite the location situated. These workshops will also go a long way to improve the economic base and develop this area as youths will be encouraged in acquiring motor vehicle mechanic trade within their environs. Establishing modern motor vehicle mechanic enterprise lies solely on the availability of experts and equipment. It is only these specialists that can establish standard Motor Vehicle Mechanic workshop that will guarantee quality manpower in the area of Motor Vehicle Mechanic trade and improve youth empowerment and development of the society.

RECOMMENDATIONS
1) Government should establish a modern motor vehicle mechanic workshop that would train competent craftsmen on mechanical technical skills required maintaining and repairing of ignition systems, carburetor as well as wheel alignment and balancing in Port Harcourt metropolis.
2) The Government should provide a take up grant to every apprentice that completes stipulated training to acquire skills in motor vehicle trade in the Port Harcourt metropolis.
3) The industries and motor vehicle companies should establish more service centers in Port Harcourt metropolis to train interested youths in a subsidize rate, and use modern computer diagnostic equipment in the motor vehicle mechanic workshop to encourage perfect mechanic works in Port Harcourt metropolis.

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