ASSESSMENT OF COMPETENCIES AND TRAINING NEEDS OF AUTOMOBILE MECHANICS IN JIGAWA STATE

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ABSTRACT
Land transport which comprises of automobile, railways and others are among the main mean of transportation in Nigeria since eighteenth century. Automobile as a mean of land transport carries more than eighty percent of the transportation sector in Nigeria. There are high and rapid technological advancements in the field of automobile which give birth to an area of specialization called autotronic. Today cars are equipped with electronic controls, actuators, sensors, navigation controls, intelligent controls and many more complex systems which make automobile industry the highest in technological development across the globe. The technical personnel that repair most of the vehicle in Nigeria are called roadside mechanics. These mechanics are more conversant with older model of vehicle, because they are manufactured, operated and controlled mechanically and majority of them are illiterate. Cars imported nowadays into the country are more electronically operated and controlled which make present roadside mechanics at a greater disadvantage stage. The rapid, complex and high technological development in automobile posed great challenges to Nigerian roadside mechanics due to their inability to repair majority of the latest cars imported into the country because they were equipped with electronic gadgets and intelligent controls. These problem need to be curtailed or completely eliminated, otherwise over two millions Nigerian roadside mechanics would be rendered jobless. Federal government in its effort to reduce the existing problem, introduces skills upgrade for these mechanics to make them relevant, efficient and effective in carrying out maintenance repair of the autotronic vehicle as for them to contribute towards the economic development of the country, by transporting people and goods, agricultural products, power generation and defense. But from the survey carried out it was discovered that the programme was not successful due to low literacy level, inability to read and interprete diagrams and sketches by the roadside mechanics. The research conducted revealed gap still exists between skills competencies needed and skills competencies acquired in carrying out efficient and effective maintenance repair on autotronic vehicle. It also shows over two million Nigerian roadside mechanics will be rendered unemployed as a result of this short coming. A questionnaire and oral interview were used as instrument for data collection; results obtained were analyzed and presented using percentage and frequency. Recommendations were given on how to address the problem.

KEYWORDS*: Autotronic, Roadside mechanic, Mechatronics, Skill and Repair*

INTRODUCTION

The automotive industry in Nigeria and the world over is generally being recognized as an engine of growth in any economy because of the important roles it plays in the execution of various activities. The roles of the industry include of the manufacture of cars, commercial vehicles, motorcycles, bicycles, boats, airplanes, agricultural implements and their component parts. These are meant for transporting people and goods from one place to another, power generation, in agriculture and defense sector.

Nigeria in its efforts towards the realization of the above roles, established two passenger car assembly plants in 1972 which includes Volkswagen of Nigeria (VWN) and Peugeot Automobile of Nigeria (PAN) limited that have production capacities of 150 and 260 vehicles per day, respectively (Raw Materials Research and Development Council (RMRDC, 2000). These plants assembled cars from Completely Knocked Down (CKD) parts and had an initial capacity of not less than 100,000 cars annually (RMRDC, 2000). In 1975, four (4) more vehicle assembling plants were established. The plants include; Leyland Nigeria Limited, Anambra Motor Manufacturing Company Limited (ANAMMCO), Steyr Nigeria Limited and the National Trucks Manufacturers Limited (NTM), (RMRDC, 2000).

Automobile trade like any other discipline experiences very high level of technological advancement which led to a new area of specialization called Automotive Mechatronics.Lamar (2010) explains Mechatronics as "the automation of machines by introducing computers and other electronics equipment to develop a system which provides new functions and capabilities with more accuracy at a lower cost". Automobile Mechatronics (automobile system), more technically refers to as Autotronic is an area of specialization from a body of knowledge called Mechatronics. With the rapid advancement in technology, the automobile roadside mechanic's job has evolved from purely mechanical to include electronics technology (Wikipedia, 2011). Vehicles of nowadays possess complex computer and electronic system, for this reason automobile technicians need to have a broader base of knowledge and skills than in the past. This means that the present practicing roadside mechanic need to acquire knowledge of today's computerized and electronically equipped vehicles, in order for them to be relevant with the present maintenance system.There has been tremendous change in modern car technology. They use sophisticated computer technology, advanced wiring, intricate circuitry and complex engineering. From 1985 to 1995 cars were equipped with first and second generation on-board diagnostic (OBD I and OBD 2) systems. The development went further from mild hybrid to strong hybrid vehicles according to New York State Automobile Dealers Association (NYSADA, 2006). Another powerful invention was extra sensory perception (ESP).It is recommended by many lawmakers and carmakers to be a standard feature in all cars sold in the European Union (EU). Fully autonomous vehicles also known as robotics cars or driverless cars already exist in prototype and are expected to be commercially available around 2020 (Wikipedia, 2010).

Jalal (2019), stressed that over two million Nigerian automobile roadside mechanics may be rendered unemployed, by the influx of new cars into the country. He explained that it is because the type of vehicles that they are trained to fix are getting extinct and in their place are wide range of fanciful/sophisticated vehicles imported into the country by individuals, firms and various governments, which they are not conversant with. In a country, where majority of the practicing automobile roadside mechanics cannot interpret drawing and sketches, does not possess knowledge of electronics devices and computers, the high sophisticated combination of mechanical, electronic, computer and electrical parts put them at a disadvantage. Their knowledge of most new system in modern vehicles is generally low, while their inability to read and interpret electronics circuit diagrams is also a big problem (Jalal, 2009).He added that most of the independent workshop service technicians cannot repair many of the vehicles plying the Nigerian roads today.

Automobile roadside mechanics of today, therefore, must be well and specially trained and equipped for an on-board diagnostic technology, if at all they want to remain in the profession. For the professional mechanics to effectively service and repair modern cars, they must have training and experience in a diverse range of subjects, which includes motor vehicle mechanics work, electrical and electronics craft practice, chemistry, physics and many more. NYSADA (2006) posited that, automobile technicians must have an extensive knowledge in motor vehicle mechanic work, electrical and electronic plus computer craft practices, and the knowledge must be updated constantly to cope with rapid changes.

The automobile roadside mechanics must understand not only the parts, nomenclature and operation, but also understand the diagnostic and service procedure for each system in the vehicle. The high technological nature of today's vehicles necessitates the need for regular mechanics training. It is highlighted by Jalal (2009) that Nigerian automobile roadside mechanics need to be re-trained to enable them cope with the high level of technological advancement particularly in the field of automobile.

Abasa (2014) explained in his research that most of the problem encountered by many car owners is as a result of unskilled mechanics. More interesting is the fact that the vehicles come with contemporary technology, which many automobile technicians are not familiar with. But, because of the desperation to stay in business, many mechanics pretend to know everything so that they don't lose customers. Many cars are now fully automated, requiring that any mechanic who handles them must possess basic computer knowledge to diagnose faults and rectify them. From the survey conducted by News Agency of Nigeria (NAN, 2014), an automobile roadside mechanic said it was unfortunate that Nigerians automobile mechanics were among the most laidback in automobile knowledge. He said that although many vehicles were now fully automated, the average technician in Nigeria had yet to catch up with the technology of cars manufactured eight

or ten years ago, not to talk of the more recent models and latest technology. He said, “There are vehicles that sometimes require your automobile technician accessing the server of the manufacturer via the internet to re-programme the software. “Nigerian mechanics are going through the second leap of technical disconnection with global trends in automobiles. ”He urged government to encourage young graduates with interest in this field to acquire relevant skills because it would make them self-employed and reduce unemployment (Vanguard, 2014).

It is in the light of the above reasons that it becomes necessary to conduct a research study in order to find out the competencies needed, competencies acquired and to develop a suitable training modules that would cover the needed skills for automobile roadside mechanics within the study area. The study will also find-out the proportion of automobile roadside mechanics that have the potentiality of receiving training, and those that cannot cope with the ever changing technology.

Statement of the Problem

Over the years there has been enormous technological improvement to the modern day vehicle design for it to be safer, efficient and pleasing to customers. The most recent achievement in the modern vehicle with regards to repair is the on-board diagnostic (OBD), (Isaac, 2015). Result of this technological advancement in modern automobile design and repairs pose great challenges to most automobile roadside mechanics (Akpakpavi, 2015). It was observes by Jalal (2009) that over two million automobile technicians may be rendered unemployed as a result of modern vehicle imported into the country and their inability to repair them. Akpakpavi (2015) revealed that large number of automobile roadside mechanics lack ability to inspect and repair modern vehicle due to low educational and technical expertise. According to Fapetu and Akinola (2008) fifty six percentages of the automobile roadside mechanics are illiterate.

Considering the aforementioned problem, it was reasoned that if this problem is not solved or curtailed, the prospect of automobile roadside mechanics in Nigeria is very blink. This study is therefore designed to solve these problems by assessing the competencies acquired by automobile roadside mechanics, competencies and skills that are needed and the literacy level of the practicing mechanics in the study region.

Purpose of the Study

The main purpose of the study is to determine the literacy level and competencies need of automobile roadside mechanics in Automotive Mechatronics in Jigawa State of Nigeria. Specifically, the study will seek to achieve the following objectives:-

1. To find-out the literacy level of the practicing automobile roadside mechanics.
2. To find-out competencies acquired by the automobile roadside mechanics in automotive Mechatronics.

3. To find out the competencies and skills needed in automotive mechatronics by the automobile roadside mechanics.

Research Questions

The study will investigate the following research questions:

1. What is the literacy level of the automobile roadside mechanics?
2. What are the competencies acquired by the automobile roadside mechanics in automotive mechatronics?
3. What are the competencies needed by the automobile roadside mechanics in automotive mechatronics?

Theoretical Framework

Servicing automobile mechatronics components continue to pose difficulties for informal sector, particularly the Nigerian automobile roadside mechanics who majority of them acquired their skills through the informal apprenticeship type of training (Ogwo and Ede, 2010). Thus the theoretical framework for this study will be based on determining the competency needs and developing a suitable module that can be used in training automobile roadside mechanics in Jigawa state of Nigeria. Swanson (1994) defined human capital as an investment in people, while Van Loo and Rocco (2004) stated that "it is an investment in skills and knowledge". Often times this investment is employed to enhance knowledge and skills of employees in the hope of increasing workers' productivity (Swanson 2001, Van Loo and Rocco 2004).

Swanson (2001) conceptualized a System Model for Performance Improvement (SMPI). This model was developed as a tool for industry to assess employees' performance within the company. The SMPI was designed to increase individual performance and productivity. The performance improvement factor was designed to increase productivity and maximize financial gains while providing quality services to customers. Training is a circular process that begins with needs identification and after a number of steps ends with evaluation of training activity. A change or deficiency in any step of the training process affects the whole system, and therefore it is important for trainers to have a clear understanding about all phases and steps of the training process. In the broadest view, there are three phases of a training process: Planning, implementation and evaluation.

The planning phase encompasses several activities, two of which are training needs identification and curriculum development. Training need identification is a condition where there is a gap between "what is" and "what should be" in term of incumbent knowledge skills, attitude and behavior for a particular situation at one point in time. This gap is called "problem" which usually occurs when a difference exists between "desired performance" and "actual performance". The needs identification process assists trainers in making sure that they have matched training programme to training problems. Curriculum Development/Modules is the most important parts in

a training programme after a need for training has been identified. The curriculum/module specified what will be taught and how it will be taught. It provides the framework and foundation of training. The first phase of curriculum/module development determines what will be taught, that is the training content followed by needs analysis which encompasses job analysis, task analyses, knowledge and skills-gap analysis (Swanson, 2001).

Skills Training Processes in Vocational and Technical Education in Nigeria

The integration of the practical with the theory can only be effectively achieved if other people's works on how best to impart both theory and practice were reviewed. One of the objectives of Vocational and Technical Education as enshrined in the National Policy on Education (FRN, 2013) is: "To give training and impart the necessary skills leading to the production of craftsmen, technicians and other skilled personnel who will be enterprising and self-reliant".

According to Malaga (2001), in South Africa skill development has been identified as national priority. The national skill development strategy and the human resources development strategy are overarching strategic framework that have been devised to drive the development of education and training. The main roles of these strategies are to ensure that skill development is driven and aligned with the need of the society. A lot of problems such as retrenchment, unemployment and closure of industries, forced Cameroonian government to establish youth development centers which came into being since 1998 to begin organizing some skills training which could enable some youth to create their own jobs and also to acquire knowledge and skills on activities which could make them qualify for the job market. A skilled practitioner through apprenticeship gives the training. Mwene and Akang (2001) stressed that learning for survival certainly become effective if theory and practice were fully integrated in the training modules.

In Germany, Manfred, (2001) stressed that technical and vocational education and training in developing countries (Nigeria inclusive) continue to raise major problems which the training systems in these countries have long failed to address. Failure to gear vocational and technical curricular to the actual demand and the requirement of the business sector is one of a major problem. These and other points as contained above will assist the researcher in finding solution to the problem of maintenance facing the practicing roadside mechanics particularly in the area of automotive mechatronics. The automobile roadside mechanics also used apprenticeship training approach in imparting the required skills to their trainees. In this approach the trainee uses observation, trial and error to acquire the skill needed. This approach is effective in acquiring practical experience, but there are some lapses which need to be addressed.

Autotronic Apprenticeship Training and Curriculum Development in Nigeria

The training needed for automobile roadside mechanics' qualification has changed significantly in the past few years. A wide variety of technological developments in the car industry is responsible for this. Modern cars are as much electronic as they are mechanical, thus creating a new

autotronicarea (automobile + electronic). A modern car has several control modules, which monitor and manage most of the major systems in the vehicle. The most common types are engine and drive line control, cruise control, suspension control, anti-lock braking and airbag control, climate control, GPS-based navigation system, stability management system, instrumentation, etc. Systems such as 'by-wire' braking and steering systems, collision warning, voice recognition, internet access, night vision enhancement and collision avoidance systems all start to be introduced. The growing demands for complex features, including increased safety brake systems, electronic stability program (ESP), increased comfort (automatic transmission), driver assistance systems (navigation, night vision, blind spot detection) or to comply with legal requirements (reducing the emission of pollutants by intelligent engine control) also increases the demands placed on diagnostics, maintenance and repair. As a result of the growing technical complexity of cars a continuous need to upgrade the technical competencies of roadside mechanics and employees is emerging.

A curriculum/ modules has been designed and used to train the practicing roadside mechanics on autotronic, but a lot of problems were noticed due to non considering of literacy level, competencies acquired and competencies needed by the roadside mechanics in drafting the modules. Majority of the automobile technicians in Nigeria belong to informal sector and there is an urgent need for them to be exposed to elements of mechatronics to enable them repair the new generation vehicles that are being manufactured. The technological changes around the world cannot be ignored and we cannot afford to remain static, otherwise our automobile technicians would soon be out of job while our vehicles remain unrepaired. It is hoped that, our automobile technicians will be able to repair new generation vehicles flooding the streets today, provide prompt and good quality service to vehicle owners wherever they reside, saving them money and time.

Roadside Mechanics Needs for Autotronic Skills Upgrade

The issue of training and re-training of automobile mechanics in Ghana, indicates that more than eighty percent have not received any additional training after graduation. Indeed, education and training is a lifelong process. The mechanics in this country should see re-training programs as fundamental to their sustenance and survival in the current automobile repair industry. According to King (2000), diagnosing problem on modern vehicles fitted with complicated electronic systems takes a little different approach than many automotive technicians are used to. Any mechanic who has previously acquired formal education will have little or no problem dealing with modern electronic control units (ECU) vehicles. This ability will make it easy for him to be able to read service manual and use the computerized equipment (e.g. scanners, monitor set etc) usually used to diagnose and solve problems. Therefore, education and training in information and communication Technology (ICT) are important requirements needed by every automobile mechanic. In Ghana, Edunyah (2015) identified changes in modern vehicle technologies, as a major challenge facing roadside mechanics in the advent of technology is the lack of skills on the use of the on-board diagnostic scan tool. Following the influx of sophisticated cars into the country

from different parts of the world, automobile technicians in Nigeria have called for special training on the use of computers to repair faulty vehicles. Survey conducted by News Agency of Nigeria (NAN, 2014) revealed that, the needs for skills upgrade in autotronic is of paramount importance, as it will assist the roadside mechanics in repairing modern vehicles. The study shows that lack of knowledge and skills in computer was a major obstacle for the roadside mechanics in repairing autotronic vehicle.

Research conducted by Akinola (1995) show that most of the mechanics do not have good educational background which prevent them from acquiring modern knowledge. It revealed that only six percent of the auto technicians interviewed wereOND holders, which represent the highest educational qualification of all the respondents. Eight percentshad City and Guilds Certificates, nineteen percent primary school, eleven percent secondary school certificates and fifty six percent apprenticeship. This has caused a major setback in that most of the automobile mechanics are ignorant and not quite familiar with the advancing technological know-how of the trade. Some of them cannot read and write, and so find it difficult referring to instruction manuals. It is in the light of the above, that a reliable and suitable modules need to be drafted by considering the literacy level, competencies acquired and competencies needed by the roadside mechanics which will bridge the existing knowledge gap. (Vanguard 2014).

Nigerian Government Efforts in Bridging the Existing Gap

The Government in its effort to achieved achieving the skill upgrade of the roadside mechanics come-up with programme like mechatronics training for members of the Nigerian Automobile Technicians Association (NATA) mechatronics training, the automotive industry in Nigeria is one of the largest economic sectors in the country and has become a major job provider within the West African nations. However, a large number of actors in this important sector work in the informal part of the industry. In recent years, automobile mechanics/electricians in Nigeria realized that the number of modern vehicles with new technologies is on the increase. Yet, technicians in Nigeria have not been fully trained in dealing with highly sophisticated electronics and automobile system designs, and the maintenance of these state-of-the-art cars seriously challenges the capabilities of the professionals.

Global technological innovations pose major challenges to Nigerian automobile technicians and seriously threaten their source of livelihood. Trained in conventional automobile system designs and maintenance procedures, the professionals are now facing the following problems that the new generations of cars bring along:-

1. Automobile technicians are not conversant with the operation of modern vehicles, including their various electronic control units / modules and the new automobile safety standards.
2. Inability to recognize and correctly interpret warning and trouble codes of modern vehicles electronic systems.

3. Inability to perform engine diagnoses by using computerized diagnostic equipment.
4. Inability to delete stored system faults on electronic dash-boards even after such faults have been rectified.
5. Inability to use and correctly read the micrometer, dial gauge, vernier, caliper, etc.for engine components checks and tests.
6. Automobile technicians are not familiar with the use of digital test tools.
7. Inability to correctly service and maintain electronic fuel injection systems.
8. Difficulties in working on diesel electronic engines (Albert, 2011).

Based on the economic importance and growth potential of the automotive industry in Nigeria, Employment-oriented Private Sector Development Programme (EoPSD) started interventions in Nigeria in 2003 in order to tackle the existing problems of the industry. Thereby, the Nigerian Automobile Technician Association (NATA) became the biggest and most important partner of the EoPSD automotive sector programme.

NATA tries to upgrade the skills of its members through regulating the training and work practices. Members are encouraged to take a labour trade test organized by the Federal Ministry of Labour. However, this test is not compulsory and only very few of the automobile technicians have earned this nationally-recognized certificate yet (Albert, 2011). A lack of generally accepted standards and organized training centers poses not only major challenges to the organization, but negatively affect the whole automotive industry in Nigeria. A thorough skills needs assessment among NATA members in Nigeria conducted by German Agency for International Cooperation (GIZ)-EoPSD, yielded the result that an upgrade of knowledge and skills in regard to new technologies as well as the establishment of a Tools and Service Centre are urgently needed.

RESEARCH METHODOLOGY

Research Design

The study adopted Research and Development (R & D) design. Gall, Gall, and Borg (2007) described Research and Development as an industry-based development model in which the findings of research are used to design new products and procedures, which then are systematically field-tested, evaluated, and refined until they meet specified criteria of effectiveness, quality, or standards. Nworgu (2006) said that R & D is aimed at developing and testing more efficacious educational products that could be text book, equipment and curricula.

Area of the Study

The area of the study in this research is Jigawa State of Nigeria. The state consists of five emirates with twenty seven local government areas with Dutse as its capital.

Population

The population of the study comprises of all automobile engine mechanics that are within the state. From the record available with NATA, Jigawa state chapter, about fifty (50) automobile engine garages were scattered across the state.

Sample Size

Twenty nine (29) master craftsmen from the garages within the five (5) emirates headquarters were taken as sample.

Instrument for Data Collection

An interview schedule was used in obtaining information about the roadside mechanics educational attainment, the competencies acquired and the competencies required to service modern automobile vehicle. The interview was administered and conducted by the researcher.

Method of Data Collection

The administration and conduct of the interview are done by the researcher with the help of research assistance.

Method of Data Analysis

The data collected were analysed using percentage and frequency statistical tools.

RESULTS AND DISCUSSIONS

The presentation and analysis of the data contains the answers to the research questions.

Research Question 1:*What is the literacy level of the automobile roadside mechanics?*

Table 1.Level of Education

Educational Status	**Frequency**	**Percentage**
Apprenticeship/ No Formal Education	15	51.74
Primary	6	20.70
JSS/Vocational/Trade Test	3	10.35
SSS/Technical/TC/Trade Test	4	13.79
ND.NCE	1	3.50
B. Sc/HND	0	-
Others (Specify)	0	-
Total	**29**	**100%**

Table one above show the educational level of the automobile engine mechanics in Jigawa state, out of the 29 respondents only 5 (17.29%) that have attained educational qualification above basic level. The distribution indicates that 15 (51.74%) mechanics have no formal education they only acquired the skills through apprenticeship training by their master craftsmen, whereas 6 (20.70%) respondents obtained primary education and 3 (10.35%) engine mechanics attended junior secondary school education. The distribution of education level from the table indicate that 4 respondents attained senior secondary school level which represent 13.79% and only 1(3.50%.) engine mechanic that attained tertiary education level. This indicates that majority of the engine mechanics in the state have no formal education, which make them at a disadvantage stage and have a negative effect in carrying out effective maintenance services of present day modern vehicle.

Research Question 2: *What are the competencies acquired by the automobile roadside mechanics in automotive mechatronics?*

Table 2 Car specialization

Car specialization	**Frequency**	**Percentage**
Non OBD Compatible	23	79.31
OBD Compatible	6	20.69
Total	**29**	**100%**

Table 2 above shows that more than two third (2/3) of the respondent only repair cars that are non-OBD compatible this indicates that majority of the mechanics cannot service or repair modern vehicles. The table revealed that 23 (79.31%) out of 29 of the engine mechanics do not possessed skill to repair cars that are OBD compatible (computerize), while 6 (20.69%) out of 29 respondents which is less than one third (1/3) are those who can handle latest cars with advance technology. Table 2 shows clearly that skills acquired by the practicing roadside mechanics in automotive mechatronics is very low, which means that more than 2/3 of the mechanics in the State cannot carry out maintenance repairs on autotronic vehicle. This indicates that a problem of shortage of skilled mechanics that can handle maintenance and servicing of modern cars still exist and needs to be eliminated or curtailed to a minimal level.

Research Question 3: *What are the competencies needed by the automobile roadside mechanics in automotive mechatronics?*

Table 3 Usage of Digital Tools

Do you use digital Tools	**Frequency**	**Percentage**

Yes	5	17.24
No	24	82.76
Total	**29**	**100%**

Table reveals that only 5 (17.24%) respondents out of 29 use electronic tools in diagnosing vehicle fault, which means 24(82.76) technicians did not use electronic tools to diagnose modern vehicle fault. Table 3 furtake that majority of the engine mechanics didn't use digital tools to diagnose vehicle. As a result of this, the quality of services of the mechanics will have a detrimental effect on the repairs rendered to the modern vehicle equipped with electronic gadgets that run on our roads.

Table 4 Usage of Computer

Using Computer in fault diagnosing	**Frequency**	**Percentage**
Yes	5	17.24
No	24	82.76
Total	**29**	**100%**

Table 4 describes those 5 respondents which represent 17.24% of the mechanics uses computer in fault diagnosing of modern cars. While 24 (82.76%) of the technicians did not use computer in vehicle fault diagnosing. This shows that almost 5/6 of the mechanics cannot diagnose the present day vehicles.

Table 5: Explaining Engine Performance with sketches

Explain engine performance with sketch	**Frequency**	**Percentage**
Yes	4	13.79
No	25	86.21
Total	**29**	**100%**

Table 5 explains that only 4 (13.79%) technicians can explain the performance of an engine with sketches and diagrams, 25 out of the total respondent which is 86.21% cannot explain the performance with sketches and diagrams. This shows that majority of the practicing technicians lack theoretical aspect of an engine working principle which in turn can affect their future training potential. Table 6 below shows that, only 7 mechanics can carry out maintenance services of

modern vehicle electrical systems and it represents 24.14%. From the table it was indicated that 22 (75.86%) out of the mechanics lacked skills to repair modern vehicle electrical system.

Table 6 Maintenance Repair on Electrical Systems

Maintenance repair on electrical systems	**Frequency**	**Percentage**
Yes	7	24.14%
No	22	75.86%
Total	**29**	**100%**

Tables 3, 4, 5 and 6 revealed that the automobile mechanics in Jigawa State need skills upgrade and training on modern vehicle electrical and electronic systems. The mechanics as indicated by the tables show that additional training on principles of engine operations needs to be taught and explained. On – board – diagnostic training also need to be acquired by the mechanics for them to be equipped with the skills necessary for modern vehicle maintenance.

RECOMMENDATIONS

The following recommendations will be useful if implemented:

1. Government should consider the educational level of the engine mechanics within Jigawa State before drafting any module to their skill upgrade training. This will assist the government in knowing where to start and suitable modules for each category of trainees.
2. A formal training should be organized for the mechanics to equip them with the basic education for them to cope with the technological development of today's vehicles.
3. The training modules should be drafted in simpler form and should be easy to interpret.
4. Scan tools should be provided to the trained mechanics at subsidized cost in order to improve their maintenance services skills.
5. Soft loan should be given to the trained mechanics without interest.
6. Automobile companies, road transport workers and other stakeholders should be encouraged to fully participate in the mechanics skill upgrade financially or otherwise.

   It is hoped that if these recommendations and suggestions are fully adhered to and implemented, the existing skill gap, will be completely filled or reduced to minimal level.

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