

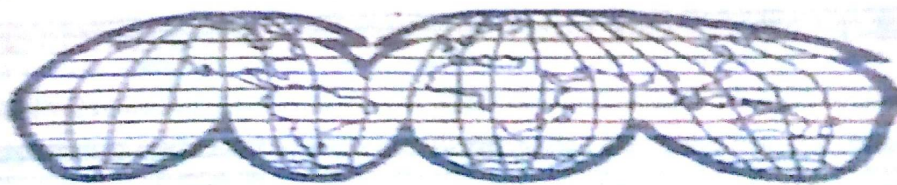
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An Analysis of Issues in Automobile Mechanics' Workplace in Nigeria

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Abstract

This study examined issues in automobile workplace in Nigeria using a 5-point scale questionnaire on 200 purposively sampled respondents from Abuja and Minna. Mean, Standard Deviation and t-test were used to analyze data at .05 level of probability. Findings of the study revealed among others that defective practices dominates automobile workplace and poses a challenge to maintenance of modern automobiles. The current maintenance practice falls below the standard best practice needed for effective maintenance of automobiles; as a result automobile artisans, craftsmen and technicians find it difficult to efficiently maintain and repair the electronic and computer related automobiles faults. The study recommended among others that all stakeholders should periodically organize practical training in the work skills required for improvement of the existing practice.

Keywords: Automobile, Automobile mechanics', Automobile workplace, Automobile mechatronics, Maintenance.

Introduction

The automobile, motor vehicle or automotive vehicle refers to a self-propelled vehicle or wheeled vehicle driven by an internal combustion engine and used for the transportation of goods and people on ground (land). An engine provides the power to move or propel the motor vehicle. The desire by automobile makers to produce more comfortable vehicles has bought a lot of technological innovations in modern vehicles. The automobile components have changed from being highly mechanical to electro-mechanical as a result of the use of automobile mechatronics technology to achieve low emission, better fuel economy, improved comfort and safety. This has made modern automobiles to be dominated by electronic components. To buttress this, Hillier and Coombes (2004), and Kirpal(2006b) revealed that, there have been a transition from coil ignition system to electronic ignition system, carburetor fuel supply system to electronic injection system, pure electrical control system to electronic control unit (ECU), manual braking system to anti-lock braking system (ABS), manual transmission system to automatic transmission incorporated with torque converter ,among others in today's automobiles.

For these new breeds of automobiles to be in good working condition, they need regular maintenance and repairs. Automobile maintenance is the practice of keeping the automobile in good working condition under varying requirements of engine loads. In Nigeria, maintenance activities take place at the automobile workplace. Automobile workplace denotes a place where all forms of maintenance, servicing and repairs are carried out on vehicles by automobile mechanics. The term automobile mechanic refer to a person who is trained to carry out maintenance, servicing and repairs on motor vehicles and earns a living by doing so. According to the National Automotive Council (2010), the automobile workplace in Nigeria could either be in small automobile workshops which exist in isolation and also in clusters at mechanic villages located in various towns or in big workshops/authorized service stations approved by vehicle manufacturers such as Ford, Peugeot automobile, Toyota, Honda among others; usually located in major cities only.

To cope with the new trends, emphasis in the automobile workplace has shifted from pure manual method to automobile mechatronics characterized by the use of diagnostic scan tools, equipment and machines to carry maintenance and repair job. Automobile mechatronics is a field of mechanical engineering that integrates mechanical, electrical and computer-based technologies in the engineering design, production and maintenance of automobiles (Hillier, Coombes & Rogers, 2006). With the current practice in the automobile workplace, a modern automobile mechanic is expected to be able to perform a variety of maintenance and repair tasks which among others include: should be able to carry out inspection and quality check of engine components, sensors and actuators to detect faults; should be able to use automobile scan tools to troubleshoot and diagnose vehicle faults; should be able to replace worn parts to prevent failure; should be able to safely dismount engine units, service, repair, adjust and re-assemble to specifications; should be able to interpret Diagnostic Trouble Code (DTC) as reported by the ECU through the scan tool; and should also be able interpret and use vehicle identification number (VIN) in selecting components for replacement; and also carry out various forms maintenance to bring a mal-functioned vehicle back to its correct working condition. (Okoro,2005).

However these capabilities have not been exploited for the maximum benefit of Nigerians due to varieties of problems that bedeviled the automobile industry and workplace such as: low

participation of government in the informal automobile sector, defects in the traditional apprenticeship system of training, inadequacy of the Nigerian vocational and technical education curriculum, dearth of supporting local industries, massive uncontrolled importation and of dumping of fairly used vehicles (Tokunbo), inconsistency in tariff and government protection policies, low patronage by government and the general public, absence of low cost, long term loans, poor involvement in technology transfer activities; research and development (R & D) activities and staff capacity building (Odigiri & Ogwo, 2013).

Hence it appears as if the bulk of automobile maintenance practitioners: automobile artisans from the informal sector; automobile craftsmen, master craftsmen, technicians, technologists and engineers graduating from technical colleges, polytechnics and the universities are not properly trained for the maintenance challenges posed by modern vehicles. Eric (2008) and Elobuiké (1999) blamed the curriculum for not being adequate and irrelevant to offer enough of the skills needed to meet modern automobile maintenance challenges. The automobile maintenance practitioners must therefore have a good understanding of the principles guiding the traditional mechanical systems as well as the new electronics and computer-based systems to be able to cope effectively with the sudden increase in the use of electronic technologies in modern vehicles (Jain & Asthana, 2006). They further stated that automobile practitioners now require higher training and retraining plus good vocational education to be able to catch up with the diverse issues that arise in the automobile workplace as a result of sophistication in maintenance tools, equipment, machines plus the use of numerous sensors and actuators which has further worsened the situation for mechanics who have no in-depth knowledge of sensors and actuator principles.

The extent of availability of technical knowledge and skills in the utilization of computer scan tools and other maintenance equipment and machines in the Nigeria automobile workplace is worrisome as most vehicle users visit auto mechanic workshops with fear of their vehicles being mal-repaired or temporarily repaired only to further worsen the situation later (Odigiri & Ogwo, 2013). The frequent automobile accident on Nigeria roads resulting from component failures has been attributed to poor maintenance practices. This has led to bad repairs of vehicles by incompetent auto mechanics that are not conversant with the mechatronics technologies in modern vehicles (Ogwo, 2004). Egbuchulam (2000) emphasizes the need for periodic review of the

training curriculum for all categories of automobile practitioners both in the formal and informal sector if the gap between the deficiency in what is obtained in the automobile workplace and what is expected is to be bridged efficiently. From the foregoing, it is obvious that the caliber of Nigeria automobile mechanics that dominated the automobile workplace is not fully trained for the herculean maintenance task posed by modern automobiles. The researcher therefore analyzed the issues in the automobile workplace in Nigeria and ex-rayed the deficiencies that characterized the automobile maintenance practitioners.

Research Questions

The following research questions guided the study:

1. What are the issues that characterized the automobile workplace in Nigeria?
2. How effective are the job skills possessed by automobile mechanics' in meeting the maintenance needs of modern vehicles?
3. What are the training needs of automobile maintenance personnel in relation to innovations in modern vehicles?

Research Hypothesis

The null hypothesis below tested at 0.05 level of significance guided the study:

H₀₁ : There is no significant difference in the mean responses of automobile technology teachers and automobile maintenance personnel on the issues that characterized the automobile workplace in Nigeria.

H₀₂ : There is no significant difference in the mean responses of automobile technology teachers and automobile maintenance personnel on the effectiveness of the job skills possessed by automobile mechanics' in meeting the maintenance needs of modern vehicles.

H₀₃ : There is no significant difference in the mean responses of automobile technology teachers and automobile maintenance personnel on the training needs of automobile maintenance personnel in relation to innovations in modern vehicles.

Methodology

The study adopted survey research design to conduct an analytically survey on the issues in the automobile mechanics workplace in Nigeria. Survey design was considered suitable because it allows a group of people or items representative of the entire group to be studied by collecting and analyzing data from people or items (Olaitan & Nwoke,1999). A purposive sampling technique was used to select the study areas which are: Zuba-Abuja and Minna because there are good concentration of auto mechanic workshops and service centers in these cities. 200 respondents comprising of 60 automobile technology teachers and 140 automobile maintenance practitioners was used. A 45 item questionnaire with 5-point scale response option was used to collect data from respondents. The questionnaire was structured to indicate the degree to which respondents agree to each item as strongly agree (SA),agree(A),undecided(UD),disagree (D) and strongly disagree(SD).

The response category was assigned numerical values as 5,4,3,2,1.The questionnaire was validated by three experts chosen from Peugeot maintenance /dealership outlet and automobile technology instructors/lecturers. Corrections were made before it was administered. The weighted Mean and Standard Deviation (SD) were used to answer the research questions. Therefore items with mean score below 3.00 (cut off point) were regarded as disagreed while those with mean score of 3.00 and above were regarded as agreed. T-test statistics was used to test the hypothesis at 0.05 level of significance. The t-critical (t-table) value for accepting or rejecting the null hypotheses was ± 1.98 .

Results

Research Hypotheses

Analysis on Table 1 shows that 14 of the items presented had their weighted mean values ranging from 3.25-4.36.These values are above the cutoff point of 3.00 which implies that the respondents agreed to the items on the issues that characterized the automobile workplace in Nigeria. The respondents however disagreed with item 14 with a mean score of 2.61. The t-test analysis from table 1 revealed that all the items had their t-calculated (t-cal) values less than the t-table value of ± 1.98 .This implies that there was no significant difference in the mean ratings of the responses of the respondents on the issues that characterized the automobile workplace in Nigeria. Hence the null hypothesis was accepted.

H₀₁ : There is no significant difference in the mean responses of automobile technology teachers and automobile maintenance personnel on the issues that characterized the automobile workplace in Nigeria.

Table 1: T-test analysis of mean responses of respondents on the issues that characterized the automobile workplace in Nigeria.

S/N	ITEM STATEMENT	\bar{X}_1	SD ₁	\bar{X}_2	SD ₂	t-cal	\bar{X}_t	REM
1	Vocational education level of automobile mechanics is generally low.	4.40	0.50	3.80	0.58	0.34	4.10	NS
2	Absent or inadequate diagnostic scan tools, equipment & machines for efficient maintenance.	3.62	0.40	3.08	0.46	0.88	3.35	NS
3	Deficiency in the skills needed in the use of diagnostic scan tools, equipment & machines.	4.10	1.10	3.15	0.40	0.62	3.63	NS
4	They carry out repairs not based on technical reasons but based on previous experience similar to the one at hand.	3.68	0.38	3.30	0.72	1.25	3.49	NS
5	The rudiments of teaching is essentially lacking in the automobile workplace.	3.70	1.50	4.13	0.50	1.21	3.92	NS
6	Non existence of a standard code of practice to guide auto mechanics in job delivery.	4.36	0.95	3.92	1.00	0.60	4.14	NS
7	Automobile mechanics learn only when vehicles are brought to the workshop.	4.18	0.74	4.25	0.81	0.50	4.23	NS
8	Strict supervision, workshop safety and occupational health are not stressed by the trainers.	3.34	1.12	3.17	0.61	0.59	3.25	NS
9	Non availability of a clearly defined curriculum content to be mastered by trainee; learning is presented haphazardly & is informal.	4.10	1.40	4.12	0.60	0.50	4.11	NS
10	There is no individualized training programme for trainees in the automobile workplace.	4.21	1.25	4.51	0.75	0.21	4.36	NS
11	Relevant subjects like record keeping, communication skills and work ethics are not incorporated in the training process.	4.18	0.45	3.81	0.65	1.08	4.00	NS
12	Most automobile mechanics are not computer literate & cannot handle computer related issues during maintenance.	4.40	1.42	4.10	0.75	1.12	4.25	NS
13	Teaching of theoretical principles does not exist in the automobile workplace.	4.11	0.55	4.13	0.91	0.18	4.12	NS
14	Authorized workshops or service stations focuses more on maintenance business than training.	2.60	0.66	2.62	0.82	0.65	2.61	NS
15	Method of evaluation of trainees is poor plus absent of a concrete and workable curriculum for teaching skills.	4.10	0.75	4.40	1.55	1.02	4.25	NS

REM=Remark, NS=Not Significant

Respondents agreed with item 17,18,20, 21,23, 24,27,28, and 29 with their weighted mean values ranging from 3.10-4.26. Since the values are above the cutoff point of 3.00, it indicates that the respondents agreed to all the items as concerning the effectiveness of the job skills possessed by automobile mechanics' in meeting the maintenance needs of modern vehicles. The table however, showed that the respondents disagreed with item 16,19,22,25,26 and 30 with weighted mean ranging from 2.30-2.81. T-test analysis from table 5 revealed that all the items had their t-cal values less than the t-table value of ± 1.98 . This implies that there was no significant difference in the mean ratings of the respondents on the effectiveness of the job skills possessed by automobile mechanics' in meeting the maintenance needs of modern vehicles. Hence we uphold the null hypothesis for the 15 items (See Table 2 for the mean ratings of the statements).

H₀₂ : There is no significant difference in the mean responses of automobile technology teachers and automobile maintenance personnel on the effectiveness of the job skills possessed by automobile mechanics' in meeting the maintenance needs of modern vehicles.

Table 2: t-test analysis of mean responses of respondents on the effectiveness of the job skills possessed by automobile mechanics' in meeting the maintenance needs of modern vehicles.

S/N	ITEM STATEMENT	\bar{X}_1	SD ₁	\bar{X}_2	SD ₂	t-cal	\bar{X}_t	REM
16	Automobile mechanics can efficiently use scan tools to carry out diagnosis & repairs.	2.72	0.60	2.89	0.80	0.46	2.81	NS
17	Auto mechanics can effectively service manual gear box.	3.26	0.20	4.21	0.50	0.89	3.74	NS
18	They can repair faulty clutch.	4.19	0.75	3.78	0.25	0.78	3.99	NS
19	Automobile mechanics can conduct routine service & repairs on automatic transmission.	2.37	0.55	2.90	0.65	1.43	2.64	NS
20	They can efficiently service the braking system.	4.13	0.60	3.23	0.80	1.23	3.68	NS
21	Automobile mechanics can efficiently maintain carburetor fuel system.	4.21	0.76	3.33	1.31	0.64	3.77	NS
22	Automobile mechanics can repair faults in the electronic fuel injection system.	2.56	0.84	2.11	0.81	0.56	2.34	NS
23	Auto mechanics can service and replace spark plugs in modern vehicles.	4.13	1.05	4.21	0.14	0.55	4.17	NS
24	They can service conventional coil ignition system.	4.26	0.68	4.25	1.01	0.54	4.26	NS

25	They can efficiently repair faults in the electronic ignition system.	2.65	0.83	2.43	0.70	0.35	2.54	NS
26	They can service & maintain the electronically controlled systems of the vehicle.	2.41	0.82	2.97	0.65	1.06	2.69	NS
27	Auto mechanics can effectively repair starter motors & alternators.	3.05	0.48	3.16	0.33	1.16	3.10	NS
28	They can efficiently maintain vehicle cooling system.	3.10	0.47	3.33	0.46	0.32	3.22	NS
29	They can service vehicle exhaust system.	3.41	0.49	3.40	0.55	0.77	3.41	NS
30	Automobile mechanics can clear (fault indicator light) check engine light from repair vehicles.	2.57	0.67	2.03	0.33	1.32	2.30	NS

Table 3 shows that all the items presented had their weighted mean values ranged from 3.16-4.35. This values are above 3.00 indicating that the respondents agreed to the items as the training needs of automobile maintenance personnel in relation to innovations in modern vehicles. The t-test analysis from table 6 revealed that all the items had their t-cal values less than the t-table value of ± 1.98 . This implies that there was no significant difference in the mean ratings of the responses of the respondents on the training needs of automobile maintenance personnel in relation to innovations in modern vehicles. Therefore we fail to reject the null hypothesis.

H₀₃ : There is no significant difference in the mean responses of automobile technology teachers and automobile maintenance personnel on the training needs of automobile maintenance personnel in relation to innovations in modern vehicles.

Table 3: t-test analysis of mean responses of respondents on the training needs of automobile maintenance personnel in relation to innovations in modern vehicles.

S/N	ITEM STATEMENT	\bar{X}_1	SD ₁	\bar{X}_2	SD ₂	t-cal	\bar{X}_t	REM
31	Regular review of the automobile technology curriculum to cope with new challenges in automobile maintenance.	3.74	0.40	3.65	0.70	0.44	3.69	NS
32	Organizing training & retraining courses to upgrade technician's skills.	3.64	0.54	2.73	0.11	0.83	3.19	NS
33	Automobile mechanics need training in the use of diagnostic scan tools, equipment & machines for maintenance & repairs.	3.17	1.20	3.80	1.30	0.67	3.49	NS
34	They need training in basic computer skills & its application to automotive maintenance.	3.26	1.50	3.06	0.45	1.26	3.16	NS
35	They need training to carry out diagnosis on electronically controlled systems of the vehicle.	3.34	0.76	4.21	0.44	1.17	3.78	NS

36	Automobile mechanics need training in the interpretation & use of vehicle identification number (VIN) for accurate component replacement.	4.06	1.45	3.95	1.01	0.65	4.01	NS
37	They need training in the production, interpretation, & use of engineering sketches & service manual for maintenance work.	3.15	0.66	3.25	0.68	0.53	3.20	NS
38	They need training in carrying out effective workshop organization & management.	4.60	0.52	4.10	0.64	0.56	4.35	NS
39	They need training for effective communication, team work & to establish good customer relationship in the automobile trade.	3.70	1.22	3.76	1.25	0.66	3.73	NS
40	Automobile mechanics need training on how to apply basic engineering science related to automotive operations.	4.02	0.76	4.38	0.69	0.23	4.20	NS
41	Auto mechanics need training on how to apply basic welding techniques in automotive maintenance work.	4.04	1.00	4.02	0.65	1.19	4.03	NS
42	Needs training on how to carry out basic soft soldering of vehicle electrical wiring & components.	4.08	0.55	3.40	0.57	1.15	3.74	NS
43	They need training on how to examine accident vehicles to determine extent of damage or malfunction.	4.31	1.11	3.89	1.25	0.27	4.10	NS
44	Automobile mechanics need training on how to test drive a modern vehicle to ascertain the efficiency of replaced components.	4.35	0.90	3.05	1.12	0.87	3.70	NS
45	They need training in the maintenance, handling, and storage of diagnostic scan tools, equipment & machines.	4.36	0.85	4.78	0.74	1.22	4.57	NS

Discussion of Findings

Table 1 shows that 14 of the items presented had their weighted mean values ranged from 3.25-4.36. These values are above the cutoff point of 3.00 which implies that the respondents agreed to the items on the issues that characterized the automobile workplace in Nigeria. The adoption of trial and error method in carrying out repairs as observed is due to the deficiency in the rudiments of teaching skills in the automobile workplace. Also the automobile mechanics learn only when vehicles are brought to the workshop. This was supported by Odigiri and Ogwo (2013) who lamented that most modern automobiles suffer trial and error attempts for faults diagnoses and repairs in Nigeria's automobile workplace. They added that these trial and error

challenges are more when automobiles with auto-active automatic transmission, electronic fuel injection and variable valve timing intelligence developed faults. In this regards, Elobuiké (1999) revealed that, this trial and error practice causes most faults repaired by automobile mechanics to be temporary and only to appear within a shorter time. Alan (2003) also lamented on the issue of non compliance with the standard sequence in examining automobile problems common among informal sector automobile mechanics in Nigeria.

The disagreement to item 14 is an indication that in as much as authorized workshops carries out maintenance services in return for financial reward; they also engage their staffs in periodic training to update their work skills. However, Egbuchulam (2000) revealed that the training offered by authorized workshops are only inform of on the job training which focuses on empowering workers with the requisite work skills for effective performance in the use of diagnostic scan tools, equipment & machines for maintenance & repairs of modern vehicles. These authorized workshops or service stations in the course of their training focuses more on component nomenclature, identification, selection ,utilization and correct diagnosis and service procedure (Hillier & Peter 2004; Nice, 2001a).They added that correct identification and selection of appropriate work tools is an imperative step to effective maintenance of modern automobiles.

The data analyzed in table 2 revealed that the respondents agreed with item 17,18,20, 21,23, 24,27,28, and 29 with their weighted mean values ranging from 3.10-4.26. It indicates that the respondents agreed to all the items as concerning the effectiveness of the job skills possessed by automobile mechanics' in meeting the maintenance needs of modern vehicles. Experience shows that the automobile mechanics finds it difficult to maintain faults on electronically controlled systems because of their deficiency in the required automobile mechatronics work skills. This is in agreement with the findings of the National Board for Technical Education (NBTE),(2003), which revealed that most Nigeria automobile maintenance practitioners: artisans, craftsman and technicians can effectively carry out automobile maintenance on mechanical carburetors, contact breaker ignition system, braking system, starter motors ,clutch and other non electronic automobile systems.

NBTE stressed the need for automobile maintenance practitioners to go beyond merely repairing mechanical systems and make effort towards acquiring needed skills for maintenance

of electronic systems in order to ensure attainment of their expected job task. NBTE also pointed out that automobile maintenance practitioners are expected to be able to test, diagnose, service and completely repair any fault on the motor vehicle to the manufacturers' specification.

The findings of the study specifically revealed that the respondents disagreed with items 16,19, 22,25,26 and 30. The respondent's disagreement to these items agrees with the opinion of Ogwo (2004) who in a related study, revealed that most modern motor vehicles suffer disrepair in the hands of Nigeria automobile mechanics. He added that out of ignorance, minor faults are complicated to cause further damage in the automobile electronic system. In the formal sector technical and technological institutions, Odigiri and Ede (2010) and Maigida (2013) complained of the deficiency in the Nigeria curriculum used for training various categories of automobile maintenance personnel.

They blamed curriculum for being rigid for several years and thus deficient in the recent technological knowledge and work skills required for effective maintenance of modern automobiles. This has created a gap between what the school curriculum offers and what is obtainable in the automobile workplace. Consequently the needed work skills for effective maintenance of new breeds of automobiles become a challenge to most auto mechanics in Nigeria. In the informal automobile sector, the Nigeria traditional apprenticeship system of training is responsible for the deficiency in the needed work skills for effective maintenance of modern motor vehicles. Despite the contribution of the informal automobile scheme to job creation, self reliance and national development; there seem to be numerous lapses and defects in the Nigerian apprenticeship system. Okoro (1993) lamented that the training it provided falls below modern training procedures that characterizes the modern apprenticeship.

The training is unorganized, devoid of formal orientation and lacks structured curriculum for training. What is taught depends on the job or maintenance problem at hand. The mode of training and instruction is mostly by observation, practice, and trial by error. Apart from the unemployment and underemployment suffered by graduates of these formal and informal automobile sectors, technical and technological institutions, other consequences are that, the automobile mechanics demonstrate poor maintenance practices in the automobile workplace.

Table 3 showed that all the items presented had their weighted mean values ranged from 3.16-4.35. These values are above 3.00 indicating that the respondents agreed to the items as the training needs of automobile maintenance personnel in relation to innovations in modern

vehicles. This shows that the current challenging issues concerning ineffectiveness in modern automobile maintenance can be improved upon when most of the training needs outlined in Table 3 are provided. The opinions of the respondents on the need to train automobile mechanics was supported by Okorie (2000) who stated that the new technologies in modern automobiles demand new work skills and therefore new training is required. He added that coping with such changes in automobile technology and maintenance skills requires periodic training and re-training of automobile practitioners in order to empower them with the requisite technical knowledge and maintenance skills needed for effective maintenance of modern automobiles. This in turn requires regular review of automobile technology curriculum for both students and automobile instructors so that school programs can reflect the automobile work place (NBTE, 2002). On the hypotheses, the study found out that there was no significant difference in the mean ratings of the responses of the respondents on the issues analyzed in the automobile workplace. Therefore we uphold the null hypotheses (H_{01} , H_{02} , and H_{03}) for all the items.

Conclusion

Based on the findings of the study, it is obvious that a lot of issues exist in the Nigeria automobile workplace which threatens the effectiveness of the maintenance work done on modern motor vehicles. The issues of skill deficiency, technical incompetency, computer illiteracy and equipment inadequacy that dominate the Nigeria automobile workplace falls below the standard practice needed for effective maintenance of modern automobiles. The maintenance problems associated with the use of modern diagnostic scan tools, equipment and machines in the automobile workplace is also numerous due to the deficiency in standard performance skills and obsolete skills possess by most automobile technicians. Therefore, there is need to equip all categories of automobile maintenance personnel with the requisite training and work skills to enable them overcome the maintenance challenges that dominate the automobile workplace in Nigeria.

Recommendations

On the basis of the study findings, the researchers recommend the following:

1. The National Automotive Council of Nigeria (NAC) should periodically organize practical training in the work skills requisite for the improvement of the maintenance activities in the automobile workplace.
2. The National Board for Technical Education (NBTE) and the National Automotive Council of Nigeria (NAC) in collaboration of other Technical and Vocational Education and Training (TVET) experts should develop a concrete and workable practical training curriculum for training all cadres of automobile mechanics and automobile instructors.
3. The federal, state and local government should collaborate with NBTE, NAC and other TVET experts to standard the programme implementation, operation and certification for all categories of automobile maintenance personnel.
4. The National Board for Technical Education (NBTE) should develop modalities to monitor and ensure that instructions in the new technological innovations and requisite maintenance skills in automobiles are fully and regularly implemented in technical and technological institutions so as to enable students to acquire the new work skills and technical knowledge needed for effective maintenance of modern motor vehicles.
5. The National Universities Commission (NUC), National Commission for Colleges of Education (NCCE), curriculum planners and developers should regularly update and upgrade the curriculum of automobile technology and the curriculum for training of automobile teachers to incorporate the new technological innovations in automobiles in order to equip the teachers with the technical and pedagogical skills needed to facilitate teaching and learning of new work skills.
6. Periodically organizing retraining courses to update and upgrade the work skills of technicians.
7. Establishment of more functional automobile skill acquisition centers and also establishing strong linkage between auto industries and training institutions to enhance availability of new technological information and training required to improve the automobile workplace.
8. Government at various levels, relevant ministries and industries, wealthy Nigerians and other stakeholders should collaborate to fund and supply adequate automobile training facilities to

vocational and technical training institutions and training centers to improve the maintenance activities in the automobile workplace.

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