

Automobile Workshop Management Skills Improvement Needs of Auto-Mechanic for Effective Maintenance of Motor Vehicles in Delta State

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ABSTRACT

This paper investigated automobile workshop management skills improvement needs of auto-mechanic for effective maintenance of motor vehicles in Delta State. Two research questions guided the study and two null hypotheses were formulated. Descriptive survey research design was used in this study. The study involved 120 mechanics from 28 automotive workshops in six main cities in Delta State, including managers, supervisors, and technicians. A validated structured questionnaire was created, divided into two parts, A and B, with each part consisting of 25 pieces. The questionnaire was divided into A1, B1, and B2 clusters. A 5-point answer scale was used for both categories, and the instrument had a Cronbach Alpha reliability coefficient of 0.77. Data was analyzed using weighted mean and improvement needed index (INI) for both 'Needed' and 'Performance' sets. The independent samples t-test was used to test hypotheses at a 0.05 level of significance. The finding revealed that auto mechanics need to enhance their motivational skills in automobile workshop management for effective maintenance. These skills include awarding performance-based bonuses or salary increases, fostering non-judgmental discussions with fellow mechanics, learning from mistakes instead of punishing mistakes, and recognizing unique talents among team members.

More so, it was found out that auto mechanics need to enhance four safety precautionary skills for effective vehicle maintenance. Based on the findings, it was recommended amongst others that Government and members of society should equip all the training institutions with modern tools, machines and equipment and qualified personnel for effective teaching and learning.

KEYWORDS

motivational skills; safety precautionary skills; vehicle maintenance; auto-mechanic

INTRODUCTION

With the rapid advancement in technology, the mechanic's job has evolved from being purely mechanical to include auto electronic technology. Because vehicles today possess complex computer and electronic systems, mechanics need to have a broader base of knowledge than in the past. Lately, the term "auto mechanic" is being used less and less frequently and is being replaced by the euphemistic title "automotive service technician. Due to the increasingly complicated nature of the technology that is now incorporated into automobiles most automobile dealerships now provide sophisticated diagnostic computers to each technician, without which they may not be able to diagnose or repair electronic issues in modern vehicles (Patrick, 2021). There are things that mechanics can still do without the use of scanners and but manufacturers are incorporating more and more electronics into all systems. This is a challenge to those who may not have access to these modern systems.

Auto-mechanics is the blend of automobile and mechanical works. Auto-mechanics is referred to as modern automotive technology in the field of automobile engineering (Fapetu & Akinola, 2018). An auto mechanic is a mechanic who specializes in automobile maintenance, repair, and sometimes modification. Olawale (2015) described auto-mechanics as workers whose job requires knowledge and the use of scientific and mathematical theory. Brickman (2018) described an auto-mechanic as somebody who is skilled in industrial techniques or in the practical application of science and technology.

According to George (2012) an auto-mechanic is one who has mechanical curiosity, eager to learn, aims at solving challenging problems, has high skill level in automobile technology and maintenance work. Operationally, auto-mechanics are people trained or skilled in the technical details of a particular art or science, especially one skilled at operating, maintaining, or repairing equipment. In this context, the role of auto-mechanics cannot be overstated. Auto-mechanics are the linchpins in ensuring that vehicles remain operational, safe, and efficient. However, to achieve optimal performance in vehicle maintenance, auto-mechanics must possess a diverse set of skills that extend beyond technical know-how. Two crucial areas requiring significant attention are motivational skills and safety precautionary skills.

Motivational skills are essential for auto-mechanics as they directly influence productivity, job satisfaction, and the quality of work performed. In the demanding environment of an automotive workshop, motivation drives mechanics to persist through challenging tasks, continuously improve their skills, and deliver superior service (Achilike, 2013). Lack of motivation can lead to complacency, reduced efficiency, and higher rates of errors, which can compromise vehicle safety and reliability. In Delta State, many auto-mechanics operate in small, often informal workshops with limited resources and support. This environment can contribute to low morale and motivation, exacerbated by insufficient training opportunities, inadequate remuneration, and the lack of a clear career progression path. Enhancing motivational skills involves not only providing external incentives but also fostering an internal drive towards excellence. Strategies to improve motivation may include implementing reward systems, offering professional development opportunities, and creating a supportive and collaborative work culture.

Safety precautionary skills are paramount in ensuring that auto-mechanics conduct their work in a manner that prevents accidents and injuries, both to themselves and their clients. The automotive workshop is fraught with potential hazards, including exposure to hazardous materials, heavy machinery, and the risk of physical injuries (Dius, 2019). Without proper safety protocols and training, these risks can lead to severe consequences, ranging from minor injuries to fatalities. In Delta State, the emphasis on safety in many workshops is often minimal due to a lack of awareness, training, and resources. Improving safety precautionary skills among auto-mechanics is crucial for creating a safer working environment and ensuring that vehicles are serviced without compromising the health and safety of the mechanics. This improvement requires comprehensive safety training programs, regular safety audits, and the provision of necessary safety equipment. Additionally, fostering a culture of safety where all workers are vigilant and proactive about identifying and mitigating risks is essential.

The enhancement of both motivational and safety precautionary skills among auto-mechanics will have a profound impact on the effectiveness of vehicle maintenance in Delta State. Motivated mechanics who are well-versed in safety protocols are more likely to perform their duties with diligence, attention to detail, and a commitment to quality (Belt, 2016). This dual improvement can lead to higher standards of vehicle maintenance, reduced downtime due to mechanical failures, and a decrease in work-related accidents and injuries. Moreover, Audu (2014) reiterated that as auto-mechanics become more skilled and motivated, the overall perception of the profession can improve, attracting more individuals to the field and fostering a cycle of continuous improvement and innovation. This transformation can have ripple effects throughout Delta State, enhancing the reliability of the transportation sector, boosting economic activities, and contributing to the overall well-being of the community.

Empirical studies have consistently shown a strong correlation between employee motivation and job performance. A study by Deci and Ryan (2020) on self-determination theory highlights that intrinsic motivation—stemming from personal satisfaction and interest in the job—significantly enhances job performance. Auto-mechanics who are motivated are more likely to take pride in their work, persist through challenges, and continuously seek to improve their skills. More so, Olaitan (2020) revealed that roadside motor vehicle mechanics did not possess the needed computer skills for the effective manipulation of automotive digital diagnostic tools and this poses challenges to the diagnosis, repair and maintenance of modern vehicles. The current maintenance practice fell below international best practices required for effective manipulation of automotive digital diagnostic tools. As a result, roadside motor vehicle mechanics loss daily patronage from customers who use modern vehicles. The finding of Hyginus (2014) showed that the caliber of workshop technicians/assistants available in schools today did not apply the desired safety skills in managing the technical college workshops.

In the discussion of enhancing motivational and safety precautionary skills for effective vehicle maintenance in Delta State, the distinction between experienced and less experienced auto-mechanics is crucial. These two groups have different needs, strengths, and areas for improvement that must be addressed to maximize their effectiveness in the automotive maintenance sector. Although, experienced mechanics are generally more adept at navigating workshop hazards, complacency can set in over time. Stasz (2021) highlighted that even experienced and inexperienced workers need continuous safety training to prevent accidents but the study of (Olawale, 2015) debunked such assertion. This therefore motivated the study to examine enhancing motivational and safety precautionary skills of auto-mechanics for effective vehicle maintenance in Delta State.

STATEMENT OF THE PROBLEM

The effective maintenance of motor vehicles is a critical component of Delta State's transportation infrastructure, essential for the smooth operation of both personal and commercial activities. However, the current state of vehicle maintenance in Delta State is fraught with challenges that undermine efficiency, safety, and overall service quality. Many auto-mechanics operate in small, often under-resourced workshops where motivation can be low due to inadequate compensation, lack of recognition, and limited career advancement opportunities. More so, safety precautionary skills among auto-mechanics are often lacking. Workshops frequently fail to adhere to basic safety standards due to limited access to safety training and equipment. Preliminary investigations revealed that without ongoing safety education and a strong safety culture, workers are more prone to accidents and injuries. In Delta State, this translates to higher rates of workplace injuries, which not only affect the health and well-being of mechanics but also disrupt maintenance operations and increase costs. This backdrop therefore necessitated this study. In specific terms the study determined:

- (1) motivational skills improvement needed of Auto-mechanics for the effective maintenance of Motor Vehicles in Delta State.
- (2) safety precautionary skills improvement needs of Auto-mechanics for the effective maintenance of Motor Vehicles in Delta State.

RESEARCH QUESTIONS

- (1) What are the motivational skills improvement needs of auto-mechanics for the effective maintenance of Motor Vehicle in Delta State?
- (2) What are the safety precautionary skills improvement needs of Auto-mechanics for the effective maintenance of Motor Vehicles in Delta State?

HYPOTHESES

The following null hypotheses were formulated at 0.05 alpha level.

- (1) There is no significant difference between the mean ratings of experienced and less experienced Auto-mechanics on motivational skills improvement needs of auto mechanics for effective maintenance of Motor vehicle in Delta State.
- (2) There is no significant difference between the mean ratings of experienced and less experienced Auto-mechanics on workshop safety precautionary skills improvement needs of auto mechanics for effective maintenance of Motor vehicle in Delta State.

REVIEW OF LITERATURE

Theoretical Underpinning

Theory of Technical and Vocational Skill Development (TTVSD).

This study was built on the theory of technical and vocational skill development (TTVSD) by Stevenson in 2003 based on Buford Steffle's ten propositions in search of a theory of vocational development. TTVSD states that "Improvement needs in skills development underlie vocational choice, development, employability, mobility and sustainability of socio-economy of every progressive society". The Theory of Technical and Vocational Skill Development (TTVSD) focuses on the systematic development of skills required for specific trades, professions, or vocations. It addresses the processes and methodologies involved in imparting technical and vocational education and training (TVET) to individuals, equipping them with the necessary competencies to perform specific tasks or jobs effectively. This theory is particularly relevant in the context of improving workforce readiness and enhancing employability, especially in technical and vocational fields.

TTVSD posits that effective technical and vocational education requires a comprehensive approach that integrates both theoretical knowledge and practical skills. The theory emphasizes several key components:

Competency-Based Training: TTVSD advocates for training programs that are designed based on the specific competencies required in a particular occupation. Competency-based training ensures that learners acquire the exact skills and knowledge needed to perform their jobs effectively.

Work-Based Learning: A significant aspect of TTVSD is the inclusion of practical, hands-on experience. This involves apprenticeships, internships, and on-the-job training, which provide learners with real-world experience and help them apply theoretical knowledge in practical settings.

Continuous Assessment and Feedback: The theory highlights the importance of continuous assessment and feedback throughout the training process. Regular evaluations help identify areas where learners need improvement and ensure that they meet the required competency standards.

Lifelong Learning and Adaptability: TTVSD recognizes the rapidly changing nature of the workforce and technology. It stresses the importance of lifelong learning and the need for workers to continuously update their skills and adapt to new developments in their field.

Collaboration with Industry: The theory emphasizes the need for close collaboration between educational institutions and industry. This partnership ensures that the training provided is relevant to current industry needs and standards, and helps bridge the gap between education and employment.

This theory is relevant to this study because Automobile workshop skills improvement needs of auto mechanics for effective maintenance of motor vehicle are complex and each sub-system of the automobile workshop management is indeed a challenge to the automobile maintenance industry in Delta. This can be seen by the calls made by stakeholders in the industry to the Nigerian automobile maintenance mechanics to upgrade their skills in order to meet up the challenges posed by modern automobiles in terms of maintenance (Abah 2010).

METHODOLOGY

Research Design: Descriptive survey research design was used in this study.

Population and Sample Size: The study encompassed 120 mechanics with and without experience, comprising 50 managers, 40 supervisors, and 30 technicians from 28 automotive workshops located in six main cities in Delta State. Because the population size was reasonable, the entire population was investigated.

Instrument: Two portions, A and B, of a validated structured questionnaire were created. The background information of the respondents, including years of experience managing car workshops, was covered in Part A. Two parts, each with twenty-five pieces, made up Part B. The portion was divided into A1, B1 and A2, B2 clusters. A 5-point answer scale with the given values of 5, 4, 3, 2, and 1 was used for both categories. The needed category of the questionnaire is made up of Very Highly Needed (VHN)=5, Highly Needed (HN)=4, Moderately Needed(MN)=3, Lowly Needed (LN)=2, Very Lowly Needed(VLN)=1; while the performance category was made up of Very Highly Performance (VHP)=5, Highly Performance(HP)=4 Averagely Performance (AP)=3, Low Performance (LP)=2 and Very Lowly Performance (VLP)=1

Reliability: Cronbach Alpha reliability coefficient (α) to establish the internal consistency of the instrument and an overall reliability coefficient of 0.77 was obtained.

Method of Data Collection: To ensure high percentage return of the instrument the researcher engaged the help of four research assistants who were adequately briefed on what to do and administer the instrument on the respondents in their various workshops.

Method of Data Analysis: Data collected were analyzed using weighted mean and improvement needed index (INI) for both 'Needed' and 'Performance' sets in order to answer the research questions. Inferential statistics t-test was used to test the hypotheses at 0.05 level of significance. The tests of the hypotheses analysis were done using the statistical package for the social sciences (SPSS) version 22.

RESULT AND DISCUSSIONS

TABLE 1: Performance Gap Analysis of the Mean Responses of Respondents on the Motivational skills performance by auto-mechanics for the effective maintenance of Motor Vehicle in Delta State.

S/N	Items	N	Xn	Xp	Xn-Xp	Remark
1	Ability to award performance-based bonus or salary increase to employees who achieve the right results.	120	3.2333	2.7643	0.469	IN
2	Ability to open to discussion in non-judgmental manner with fellow mechanics.	120	3.0167	2.7562	0.2605	IN
3	Ability to give Credit where It's due.	120	3.2417	3.3648	-0.123	INN
4	Ability to focus on ways to learn from others rather than punishing mistakes.	120	3.2083	3.0134	1.1949	IN
5	Ability to recognize unique talents among team members.	120	2.8	2.548	0.252	IN

Key: IN – Improvement Needed: INN- Improvement Not Needed.

The results in Table 1 show that four items out of five have performance gap values ranging from 0.252 to 1.1949 and are positive indicating that the auto mechanics need improvement in four motivational skills which include; ability to award performance-based bonus or salary increase to employees who achieve the right results, ability to open to discussion in non-judgmental manner with fellow mechanics, ability to focus on ways to learn from others rather than punishing mistakes and ability to recognize unique talents among team members for effective maintenance of motor vehicles in delta state. One item has a negative performance gap of -0.123 indicating that improvement is not needed by auto mechanics in the item which is ability to give credit where it is due. Generally, auto mechanics need improvement in all the five motivational skills for effective maintenance of motor vehicles. but less emphasizes on item with negative performance gap value.

TABLE 2: Performance Gap Analysis of the Mean Responses of Respondents on the Safety precautionary skills performance by Auto-mechanics for the effective maintenance of Motor Vehicles.

S/N	Items	N	Xn	Xp	Xn-Xp	Remark
31	Ability to keep workshop areas clean.	120	3.2917	3.0364	0.2553	IN
32	Ability to use fire extinguishers effectively	120	3.6167	3.3267	0.29	IN
33	Ability to apply use of support to a vehicle on a jack before working under the vehicle.	120	3.35	2.9453	0.4297	IN
34	Ability to check vehicle's temperature before starting any work in a motor vehicle	120	3.375	3.4923	-0.1173	INN
35	Ability to apply the right procedures to follow in case of common auto shop safety risks.	120	3.0583	2.9845	0.0738	IN

Key: IN – Improvement Needed: INN- Improvement Not Needed.

The results in Table 2 show that four items out of five have performance gap values ranging from 0.0738 to 0.4297 and are positive indicating that the auto mechanics need improvement in four precautionary safety skills which include; ability to keep workshop areas clean, ability to use fire extinguishers effectively, ability to apply use of support to a vehicle on a jack before working under the vehicle. and ability to apply the right procedures to follow in case of common auto shop safety risks for effective maintenance of motor vehicles in delta state.

One item has a negative performance gap of -0.1173 indicating that improvement is not needed by auto mechanics in the item which is the ability to check vehicle's temperature before starting any work in a motor vehicle. Generally, auto mechanics need improvement in all the five safety precautionary skills for effective maintenance of motor vehicles. but less emphasizes on the item with negative performance gap value.

TEST OF STATISTICAL HYPOTHESES

TABLE 3: Summary of t-test Analysis of the mean ratings of experienced and less experienced Auto-mechanics on motivational skills improvement needs of Auto-mechanics for effective motor vehicle maintenance in Delta State.

S/N	Items	\bar{X}_1	\bar{X}_2	Sig	Sig (2-tailed)	LO	UP	Remark
1	Ability to award performance-based bonus or salary increase to employees who achieve the right results.	2.9714	3.6000	0.047	0.002	-0.23060	0.22657	NS
2	Ability to open to discussion in non-judgmental manner with fellow mechanics.	2.8714	3.2200	0.007	0.085	-0.72648	0.02934	NS
3	Ability to give Credit where It's due.	3.0286	3.5400	0.389	0.024	-0.06290	0.07999	NS
4	Ability to focus on ways to learn from others rather than punishing mistakes.	2.9429	3.5800	0.121	0.003	-1.04689	-0.22740	S
5	Ability to recognize unique talents among team members.	2.7143	2.9200	0.008	0.287	-0.58639	0.17496	NS

S= Significant Difference, SN= No Significant difference

Data in Table 3 reveal that the lower and upper limits of the five competency items (1, 2, 3 and 5) except item 4 that do not crossed the zero limit at 95% Confidence Interval of the Difference since the lower limit is negative and upper limit is positive while Item 4 crossed the zero limit because both lower and upper limits are positive. This indicates that there is no significant difference between the mean ratings of experienced and less experienced Auto-mechanics on motivational skills improvement needs of Auto-mechanics for effective motor vehicle maintenance in Delta State. Therefore, the null hypothesis of no significant difference between the mean ratings of experienced and less experienced Auto-mechanics on motivational skills improvement needs of Auto-mechanics for effective motor vehicle maintenance in Delta State is not rejected.

TABLE 4: Summary of t-test Analysis of the mean ratings of experienced and less experienced Auto-mechanics on safety precautionary skills improvement needed by Auto-mechanics for effective motor vehicle maintenance in Delta State.

S/N	Items	\bar{X}_1	\bar{X}_2	Sig	Sig (2-tailed)	LO	UP	Remark
6	Ability to keep workshop areas clean.	3.6714	2.7600	0.125	0.001	-1.39727	1.42559	NS
7	Ability to use fire extinguishers effectively	3.5143	3.7600	0.948	0.387	-0.80655	0.31513	NS
8	Ability to apply use of support to a vehicle on a jack before working under the vehicle.	3.1143	3.6800	0.159	0.037	-1.09805	-0.03338	S
9	Ability to check vehicle's temperature before starting any work in a motor vehicle	3.5714	3.1000	0.552	0.086	-0.06828	1.01113	NS
10	Ability to apply the right procedures to follow in case of common auto shop safety risks.	3.2714	2.7600	0.055	0.054	-0.00925	1.03211	NS

S= Significant difference , SN= No Significant Difference

Data in Table 4 reveal that the lower and upper limits of the five competency items (6, 7, 9 and 10) except item 8 that do not crossed the zero limit at 95% Confidence Interval of the Difference since the lower limit is negative and upper limit is positive, while Item 8 crossed the zero limit because both lower and upper limits are positive. This indicates that there is no significant difference between the mean ratings of experienced and less experienced Auto-mechanics on safety precautionary skills improvement needs of Auto-mechanics for effective motor vehicle maintenance in Delta State. Therefore, the null hypothesis of no significant difference between the mean ratings of experienced and less experienced Auto-mechanics on safety precautionary skills improvement needs of Auto-mechanics for effective motor vehicle maintenance in Delta State is not rejected.

DISCUSSION

The findings of this study revealed that auto mechanics need improvement in four motivational skills of automobile workshop management skills for effective motor vehicle maintenance. These skills include ability to award performance-based bonus or salary increase to employees who achieve the right results, ability to open to discussion in non-judgmental manner with fellow mechanics, ability to focus on ways to learn from others rather than punishing mistakes and ability to recognize unique talents among team members. The findings are in line with the finding of Igwe, Ikenwa and Jwasshaka (2017) which stated that the incorporation of new technologies with new subsystems and system components into modern automobiles have changed their configurations and made their maintenance a more complex task hence motivation is needed by mechanics and apprentice to hone their commitment towards the job, Focusing on ways to learn from others rather than punishing mistakes and ability to recognize unique talents among team members encourage team work. The study is in line with Vrienten (2022) that with the technological advancement in computer assisted learning, there was need to enhance the strength of cognitive structure in order to increase students' motivation, curiosity and interest in problem solving automobile faults.

The findings of this study revealed that auto mechanics need improvement in four safety precautionary skills of automobile workshop management skills for effective motor vehicle maintenance. These skills include, ability to keep workshop areas clean, ability to use fire extinguishers effectively, ability to apply use of support to a vehicle on a jack before working under the vehicle, ability to apply the right procedures to follow in case of common auto shop safety risks. These findings are in line with the opinion of Vasquez-Ordas (2017) which state despite the emphases on safety in the workshop, one major accident stemming from rule noncompliance can call into question the safety of the entire work environment so keeping the workshop clean and functioning fire extinguisher should be readily available in every workshop in case of fire. There is no significant difference between the mean ratings of experienced and less experienced Auto-mechanics on safety precautionary skills improvement needs of mechanics for effective motor vehicle maintenance in Delta State. The implication of the findings is that auto mechanics truly need improvement in their safety precautionary skills of workshop management skills for effective motor vehicle maintenance in Delta state.

CONCLUSION

Based on the findings, it was concluded that auto mechanics need to enhance their motivational skills in automobile workshop management for effective maintenance. These skills include awarding performance-based bonuses or salary increases, fostering non-judgmental discussions with fellow mechanics, learning from mistakes instead of punishing mistakes, and recognizing unique talents among team members. More so, auto mechanics need to enhance their four safety precautionary skills for effective vehicle maintenance: maintaining clean workshop areas, using fire extinguishers effectively, applying support to vehicles on jacks, and following proper procedures to avoid common auto shop safety risks.

RECOMMENDATIONS

The following recommendations were made:

- (1) Government, automobile industries and professional vocational associations should organize seminars and workshops for auto mechanics in order to build their capacity on how to effectively carryout maintenance on motor vehicles in the society. Programmes should be established as vocational improvement centres under the entrepreneurial programmes for auto mechanics and their supervisors in local government areas.
- (2) All the skills acquisition centers in the study area should be equipped with necessary tools and machines for training auto mechanics by state ministry of technical and vocational education.

- (3) Government and members of society should equip all the training institutions with modern tools, machines and equipment and qualified personnel for effective teaching and learning.
- (4) Government should license any auto mechanic to operate in the state without being certified by authorized government training Agency.

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