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Development Needs in Core Competencies of Auto Mechanics for Optimal Vehicle Servicing in Delta State

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Abstract: This study explored the areas in which auto mechanics require further development of core competencies to enhance effective vehicle servicing in Delta State, Nigeria. A descriptive survey research design was used for the study. The population consist of university lecturers and technical school teachers. Using a proportionate stratified random sampling technique, 100 respondents were selected from the population. Data were gathered through a structured questionnaire and analyzed using mean scores, the Development Need Index (DNI), and an independent t-test. The findings indicated that auto mechanics require further development in several key areas, including technical operations, fault diagnosis, auto-electrical systems, workshop management, and engine servicing competencies. The results of the t-test revealed no significant difference between the views of university lecturers and technical school teachers regarding these development needs. Based on the findings, the study recommends regular professional development programmes for auto mechanics, the provision of modern equipment and tools for training and practice, and the review and updating of relevant curricula to align with current industry demands.

Keywords: Auto mechanics, competencies, vehicle servicing, skills development, Delta State, Nigeria.

INTRODUCTION

The automobile industry has witnessed tremendous technological advancement over the years, leading to significant changes in vehicle design, operation, maintenance, and repair. Modern vehicles are increasingly equipped with computerized systems, electronic control units (ECUs), sensors, and advanced diagnostic technologies, making vehicle servicing more complex than ever before. As a result, auto mechanics are required to continuously update their knowledge and skills to remain effective and relevant in the automotive maintenance industry. Auto mechanics are skilled personnel responsible for the maintenance, diagnosis, repair, and servicing of motor vehicles, as well as the management of automobile workshops. According to Penn (2019), an auto mechanic is a trained professional who specializes in one or more areas of automobile technology, including auto-body repair, auto-electrical work, auto-body mechanics, panel beating, and auto-parts merchandising. Depending on their training and experience, some mechanics work across different vehicle systems and models, while others specialize in specific vehicle brands or technical areas. Their responsibilities include identifying vehicle faults accurately and carrying out appropriate repairs to restore vehicles to optimal operating conditions (US Occupational Handbook, 2011–2012).

The importance of competent auto mechanics cannot be overstated, particularly in a society where transportation plays a vital role in economic and social activities. Okeke and Ayaegbunem (2024) emphasized that whenever vehicles develop faults, competent motor

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mechanics are relied upon to diagnose and rectify the problems. This underscores the need for auto mechanics to possess and continually develop the core competencies required for effective vehicle servicing. Such competencies extend beyond technical knowledge and practical skills to include the ability to use modern tools, equipment, and emerging automotive technologies.

The role of auto mechanics has evolved considerably from traditional mechanical repair work to highly technical and technology-driven operations. Vehicle manufacturers continuously introduce innovations aimed at improving vehicle performance, safety, fuel efficiency, and user convenience. Consequently, auto mechanics must upgrade their competencies to match these technological developments. The increasing integration of electronic and computerized systems in modern vehicles demands that mechanics should acquire advanced diagnostic and troubleshooting skills in order to effectively maintain and repair contemporary automobiles.

One critical area of competency development is the ability to utilize modern diagnostic tools and equipment. Despite the growing availability of sophisticated automotive technologies, many mechanics still rely heavily on conventional manual methods of diagnosis and repair. These traditional methods are often time-consuming, less accurate, and inadequate for servicing modern vehicles. Tools such as digital diagnostic scanners enable mechanics to read fault codes, monitor engine performance, and identify malfunctions within electronic control systems. Similarly, computerized wheel alignment and balancing machines improve vehicle safety and fuel efficiency by ensuring proper wheel adjustment and reducing wear on tyres and suspension components. Hydraulic lifts and jacks also enhance safety and efficiency during underbody inspections and repairs. Competence in the use of these modern technologies has become essential for effective vehicle servicing.

Abah (2021) observed that the ability of Nigerian auto mechanics to maintain and service modern imported vehicles would significantly reduce dependence on foreign technical expertise and help conserve foreign exchange. As key stakeholders in the automotive maintenance industry, auto mechanics are therefore expected to possess adequate knowledge of modern vehicle technologies and demonstrate proficiency in the use of contemporary servicing tools and equipment.

Technical knowledge and practical skills remain fundamental competencies for auto mechanics. Francis (2019) and Auta (2022) described technical skills as the ability to effectively repair, service, and maintain vehicle components according to established standards and manufacturers' specifications. These skills encompass engine diagnosis and repair, maintenance of electrical and electronic systems, servicing of transmission and suspension systems, preventive maintenance practices, and the operation of modern diagnostic equipment. Continuous skills development in these areas enables mechanics to perform their duties efficiently and meet the evolving demands of the automotive industry.

In Delta State, vehicle servicing remains an essential component of the transportation sector. However, many auto mechanics face challenges such as inadequate technical training, limited access to modern equipment, insufficient exposure to emerging vehicle technologies, and a lack of opportunities for professional development. These challenges may hinder their ability to provide efficient and high-quality vehicle servicing. Therefore, there is a need to identify the specific areas in which auto mechanics require further development to enhance their competence and improve service delivery. It is against this background that this study seeks to examine the development needs in the core competencies of auto mechanics for optimal vehicle servicing in Delta State, Nigeria.

Statement of the Problem

In recent years, the nature of automobile technology has changed significantly, with modern vehicles becoming more complex and technology-driven. This development requires auto mechanics to possess up-to-date knowledge and practical skills to effectively diagnose faults and carry out proper vehicle servicing. However, in Delta State, there are growing concerns that many practicing auto mechanics may not have fully adapted to these changes.

It is commonly observed that some auto mechanics still rely on outdated methods, trial-and-error approaches, and limited use of modern diagnostic tools. As a result, vehicle servicing is sometimes ineffective, leading to recurring faults, increased maintenance costs, and dissatisfaction among vehicle owners. In some cases, poor servicing can also pose safety risks on the roads. These challenges suggest that there may be gaps in the possession of core competencies required for optimal vehicle servicing. Furthermore, opportunities for continuous training and skill development for auto mechanics appear to be limited. Many mechanics acquire their skills through informal apprenticeship systems, which may not adequately address current technological advancements in the automotive industry. This creates a disconnect between what is required in modern vehicle servicing and the competencies possessed by practitioners. this situation necessitates this study to identified the development needs in the core competencies of auto mechanics for optimal vehicle servicing in Delta State

Research Questions

The following research questions guided the study:

1. What are the development needs in the core competencies of auto mechanics in engine servicing?
2. What are the development needs in the core competencies of auto mechanics in automobile electrical and electronic systems?
3. What are the development needs in the core competencies of auto mechanics in fault diagnosis and use of modern diagnostic tools?
4. What are the development needs in the core competencies of auto mechanics in general workshop practices and effective tools management?

METHODS

Descriptive survey research design was adopted in this study. The descriptive survey research design is appropriate because it enables the researcher to describe existing conditions and collect data from a sampled population. kumar (2023) explain that descriptive research design focuses on describing what is in a given situation, while Creswell noted that it is useful for identifying trends and opinions within a population. The survey design enabled the researcher to collect relevant data from the University lecturer and technical school teachers that are directly connected to the subject under investigation. The population of the study comprised university lecturers in the related department in five Universities and teachers in five technical college in Delta state with practical knowledge and technical skills required in an automobile workshop. Considering the logistic challenges associated with surveying the entire population, a proportionate stratified random sampling technique was employed to select a sample size of 100 respondents. This approach ensured that both university lecturers and technical college teacher's perspectives were adequately represented in the study.

The data were collected using a validated structured questionnaire developed by the researcher. The questionnaire utilized a four-point rating scale: Strongly Needed (SN) = 4, Needed (N) = 3, Not Needed (NN) = 2, and was pre-tested on 10 respondents who were not

part of the study. Data was subjected to an internal consistency reliability test using Cronbach's Alpha method, which yielded a reliability coefficient of 0.83. This was considered adequate, in line with Creswell (2023), who indicated that a reliability index of 0.70 to 1.0 demonstrates high reliability. A total of 100 copies of the questionnaire were personally administered to the respondents by the researcher, with the assistance of four research assistants who had been briefed on the purpose of the study. All administered questionnaires were retrieved, representing a 100% response rate.

The data collected were analyzed using both Mean, Development Need Index (DNI) and inferential statistics. Mean and development needs index (DNI), was used to sought information on the development needs of auto mechanics in engine servicing, automobile electrical and electronic, fault diagnosis and use of modern diagnostic tools and general workshop practices and the effective use of tools for optimal vehicle servicing in Delta State. All statistical analyses were performed using the Statistical Package for the Social Sciences (SPSS), version 22.

RESULTS

Development needs in the core competencies of auto mechanics in engine servicing

Table 1. Performance Gap Analysis of the Mean Responses of Respondents for the development needs in the core competencies of auto mechanics in engine servicing

S/N	Items	Xd	Xp	Xd-Xp	Remark
1	Engine servicing techniques used in current vehicle models.	4.82	3.8	1.02	DN
2	Adequate skills in identifying engine faults accurately.	3.89	2.76	1.13	DN
3	Use of computerized engine diagnostic tools.	3.93	2.62	1.31	DN
4	Fuel injection systems and their servicing procedures.	4.17	3.12	1.05	DN
5	Understanding engine proper lubrication and maintenance practices.	4.33	2.98	1.35	DN
6	Effective management of engine cooling systems.	3.31	1.69	1.62	DN
7	Practical exposure to engine overhaul and rebuilding procedures.	3.25	2.34	0.91	DN
8	Up-to-date knowledge of turbocharged engine servicing.	3.62	2.82	0.8	DN
9	Proper interpretation of engine warning signals and fault codes.	3.75	3.13	0.62	DN
10	Continuous professional development in engine technologies.	3.66	2.65	1.01	DN

The data presented in Table 1 reveal that all ten items recorded positive performance gap values ranging from 0.62 to 1.62. These positive values indicate that auto mechanics require further development in all ten engine servicing competency areas necessary for effective vehicle servicing in Delta State.The findings suggest that auto mechanics need additional training and capacity building in several critical aspects of engine servicing, including modern engine servicing techniques applicable to current vehicle models, accurate diagnosis and identification of engine faults, and the effective use of computerized engine diagnostic equipment. There is also a need to strengthen their knowledge and skills in fuel injection systems and their maintenance procedures, proper engine lubrication practices, and the management of engine cooling systems.Furthermore, the results highlight the need for greater practical exposure to engine overhaul and rebuilding operations, updated knowledge

of servicing turbocharged engines, and improved ability to interpret engine warning indicators and diagnostic fault codes. The study also underscores the importance of continuous professional development to keep auto mechanics abreast of emerging engine technologies and industry best practices.

Development needs in the core competencies of auto mechanics in automobile electrical and electronic systems

Table 2: Performance Gap Analysis of the Mean Responses of Respondents for the development needs in the core competencies of auto mechanics in automobile electrical and electronic systems

S/N	Items	Xd	Xp	Xd-Xp	Remark
11	Skills for diagnosing faults in automobile electrical systems.	3.83	2.81	1.02	DN
12	Skills use for electrical testing tools such as scanners.	2.89	2.76	0.13	DN
13	Understanding vehicle wiring systems and circuit diagrams.	3.83	2.62	1.21	DN
14	Servicing and maintaining vehicle battery systems.	3.18	2.13	1.05	DN
15	Knowledge in troubleshooting electronic control units (ECUs).	4.33	2.98	1.35	DN
16	Handling and repairing vehicle sensors and actuators.	2,36	1.69	0.67	DN
17	Understanding and servicing vehicle lighting systems.	3.25	2.34	0.91	DN
18	Skills in diagnosing and repairing starting and charging systems.	3.62	2.82	0.8	DN
19	Modern automotive electronic systems.	4.65	3.13	1.52	DN
20	Interpreting electrical fault codes and using diagnostic software.	3.89	3.65	0.24	DN

The data presented in Table 2 show that all items 11–20 recorded positive performance gap values ranging from 0.13 to 1.52. The positive gap values indicate that auto mechanics require further development in all ten competency areas related to automobile electrical and electronic systems for effective vehicle servicing in Delta State. The findings reveal that auto mechanics need additional training in diagnosing faults within automobile electrical systems and in the effective use of electrical testing equipment such as multimeters and diagnostic scanners. There is also a need to strengthen their understanding of vehicle wiring systems, circuit diagrams, and battery servicing and maintenance procedures. Furthermore, the results indicate a need for improved knowledge and skills in troubleshooting Electronic Control Units (ECUs) used in modern vehicles, as well as training in the maintenance and repair of vehicle sensors and actuators. Auto mechanics also require greater competence in servicing vehicle lighting systems and diagnosing faults in starting and charging systems. In addition, the study highlights the importance of continuous professional development in emerging automotive electronic technologies, including systems such as Anti-lock Braking Systems (ABS) and airbags. The findings further suggest the need to enhance mechanics' ability to interpret electrical fault codes and effectively use diagnostic software, which are essential competencies for optimal vehicle servicing in today's technology-driven automotive industry.

Development needs in the core competencies of auto mechanics in fault diagnosis and use of modern diagnostic tools

Table 3: Performance Gap Analysis of the Mean Responses of Respondents for the development needs in the core competencies of auto mechanics in fault diagnosis and use of modern diagnostic tools.

S/N	Items	Xd	Xp	Xd-Xp	Remark
21	Skills for identifying faults using systematic diagnostic procedures.	3.65	2.72	0.93	DN
22	Skills for modern diagnostic tools e.g scan tools and code readers.	4.89	2.98	1.91	DN
23	How to interpret diagnostic results from electronic devices.	3.93	2.69	1.24	DN
24	Skills for detecting hidden or complex faults in modern vehicles.	4.1	3.54	0.56	DN
25	Skills for proper diagnostic techniques instead of trial-and-error.	4.33	2.98	1.35	DN
26	Skills for troubleshooting faults in computerized vehicle systems.	3.31	1.69	1.62	DN
27	Skills for the use of advanced diagnostic software for fault detection.	3.25	2.34	0.91	DN
28	Skills for faults identification rather than just treating symptoms.	3.89	2.76	1.13	DN
29	Skills evolving diagnostic technologies in the automotive industry.	3.75	2.98	0.77	DN
30	Skills to combine practical experience with modern diagnostic tools for effective fault detection.	4.14	3.12	1.02	DN

The data presented in Table 3 indicate that all items 21–30 recorded positive performance gap values ranging from 0.56 to 1.93. These positive values suggest that auto mechanics require further development in all ten competency areas related to fault diagnosis and the use of modern diagnostic tools for effective vehicle servicing in Delta State.The findings reveal that auto mechanics need enhanced skills in accurately identifying vehicle faults through systematic diagnostic procedures. There is also a need to improve their proficiency in the use of modern diagnostic equipment such as scan tools, code readers, and other electronic diagnostic devices. Additionally, mechanics require a deeper understanding of how to interpret diagnostic information and results generated by these technologies.The results further indicate the need for additional training in detecting hidden, intermittent, and complex faults commonly associated with modern vehicles. Emphasis should also be placed on adopting proper diagnostic techniques rather than relying on trial-and-error approaches, which may be inefficient and inaccurate. Moreover, auto mechanics need to strengthen their competence in troubleshooting faults within computerized vehicle systems and develop greater proficiency in the use of advanced diagnostic software for fault detection and analysis. The findings also highlight the importance of improving their ability to identify the root causes of vehicle problems rather than merely addressing the visible symptoms.Furthermore, continuous professional development is necessary to enable auto mechanics keep pace with the rapidly evolving diagnostic technologies in the automotive industry. The study also underscores the need for mechanics to effectively integrate practical experience with modern diagnostic tools and techniques to achieve accurate fault detection and optimal vehicle servicing in Delta State.

Development needs in the core competencies of auto mechanics in general workshop practices and effective tools management

Table 4; Performance Gap Analysis of the Mean Responses of Respondents for the development needs in the core competencies of auto mechanics in general workshop practices and the effective use of tools

S/N	Items	Xd	Xp	Xd-Xp	Remark
31	Proper org. and maintenance of workshop tools and equipment.	3.65	2.72	0.93	DN
32	The way to handle and store tools after use.	3.85	2.87	1.02	DN
33	Understanding of the correct tools to use for specific repair tasks.	3.93	2.69	1.24	DN
34	In maintaining a clean and well-organized workshop environment.	3.56	3.2	0.36	DN
35	Skills in the inspection nd servicing of workshop tools and equipment.	4.33	2.98	1.35	DN
36	Skills on safe handling and use of tools to avoid accident in the workshop.	2.31	1.09	1.22	DN
37	The ability to manage and account for tools effectively.	3.25	2.34	0.91	DN
38	Better adherence to standard workshop practices and procedures.	3.86	2.76	1.1	DN
39	Proper time management during repair and servicing tasks.	3.75	2.98	0.77	DN
40	Awareness and practice safety rules and protective measures in the workshop.	4.14	3.12	1.02	DN

The data presented in Table 4 show that all items 31–40 recorded positive performance gap values ranging from 0.36 to 1.35. These positive values indicate that auto mechanics require further development in all ten competency areas relating to general workshop practices and effective tool management for optimal vehicle servicing in Delta State. The findings suggest that auto mechanics need additional training in the proper organization, maintenance, and management of workshop tools and equipment. There is also a need to improve their knowledge of appropriate tool selection for specific repair and servicing operations, as well as proper procedures for handling, storing, and safeguarding tools after use. Furthermore, the results reveal a need to strengthen competencies in maintaining a clean, safe, and well-organized workshop environment. Auto mechanics also require enhanced skills in the routine inspection, servicing, and maintenance of workshop tools and equipment to ensure their efficiency and longevity. The study further highlights the importance of training in the safe handling and operation of tools to minimize workplace accidents and injuries. In addition, mechanics need to improve their ability to effectively manage, monitor, and account for workshop tools and equipment. The findings also indicate a need for greater adherence to standard workshop procedures and best practices, improved time management during repair and servicing activities, and a stronger commitment to observing safety regulations and protective measures within the workshop. Developing these competencies will contribute

significantly to improved efficiency, safety, and service quality in vehicle maintenance operations across Delta State.

DISCUSSION

The findings Table 1 revealed the development needs in the core competencies of auto mechanics in engine servicing in Delta State The results showed that Universities lecturer and technical school teachers agreed that the ten engine servicing skills identified are some of the core competencies skills auto mechanic needs to develop for engine servicing for optimal vehicle servicing in Delta State. These findings align with the opinion of Arinze (2022) that emphasize that auto mechanics education should focus on practical, employable skills. According to Arinze such as diagnostic ability, electrical troubleshooting, and safe work habits are essential for effective engine servicing. He also stressed on aligning training with modern automotive systems and workplace demands and that core competencies must be industry-relevant and skill-based. Similarly, National Institute for Automotive Service Excellence (ASE) (2021–2024 updates) agreed as it highlighted standardized competency frameworks for auto technicians. It emphasizes skills in engine repair, engine performance diagnosis, use of modern diagnostic tools, he also stresses continuous professional development due to evolving vehicle technology and that competence development requires continuous learning and adherence to industry certification standards.

The findings presented in Table 2 revealed significant development needs in the core competencies of auto mechanics relating to automobile electrical and electronic systems for optimal vehicle servicing in Delta State. The results showed that both university lecturers and technical school teachers agreed that the ten identified electrical and electronic competency areas are essential skills that auto mechanics need to further develop in order to effectively service modern vehicles. These findings are consistent with the views of Arinze and Chukwuemeka(2022), who emphasized that contemporary auto mechanics must possess strong competencies in automotive electrical diagnostics and electronic systems troubleshooting. According to their study, critical areas requiring development include proficiency in the use of digital diagnostic equipment such as scan tools and multimeters, the ability to trace faults within vehicle wiring and control systems, and a sound understanding of Electronic Control Units (ECUs). They further stressed the importance of equipping training institutions with modern facilities and technologies that reflect current industry practices. Their position underscores the urgent need to strengthen practical electrical and electronic diagnostic skills to meet the demands of today's automotive sector.

Similarly, the National Board for Technical Education (NBTE, 2023) and Auta (2021) advocates for competency-based training in motor vehicle mechanics. The Board identified several areas where auto mechanics require further development, including the servicing of battery, charging, and starting systems, electronic ignition systems, fuel management systems, and the effective use of modern testing and diagnostic equipment. The NBTE also emphasized the need to integrate workplace safety practices and entrepreneurial skills into technical training programmes. The Board maintains that auto mechanics' training should be highly practical and aligned with advancements in automotive electrical and electronic technologies.

In the same vein, SAE International (2020–2025) highlighted the growing complexity of modern vehicle electronic systems, including sensors, actuators, Controller Area Network (CAN) bus communication systems, and hybrid and electric vehicle technologies. The organization emphasized that auto mechanics must develop competencies in data-driven diagnostics, software-based fault detection, and the integration of mechanical and electronic vehicle systems. According to SAE International, the core competencies required of modern

auto mechanics must continue to evolve to accommodate advances in vehicle electronics, networking technologies, and diagnostic software. Taken together, these studies support the findings of the present research and reinforce the need for continuous skills development in automobile electrical and electronic systems. Such development is essential if auto mechanics in Delta State are to remain competent, productive, and capable of delivering optimal vehicle servicing in an increasingly technology-driven automotive industry.

The findings presented in Table 3 revealed significant development needs in the core competencies of auto mechanics relating to fault diagnosis and the use of modern diagnostic tools. The results showed that both university lecturers and technical school teachers agreed that the ten identified competencies in fault diagnosis and diagnostic tool utilization are essential areas in which auto mechanics require further development for effective and optimal vehicle servicing in Delta State. These findings are consistent with the views of Crolla (2023), who emphasized that modern vehicles have evolved into highly integrated electro-mechanical systems. According to Crolla, effective fault diagnosis now relies heavily on the interpretation of Electronic Control Unit (ECU) data, sensor signal analysis, and software-assisted troubleshooting techniques. Crolla argued that traditional mechanical inspection methods alone are no longer sufficient for diagnosing faults in contemporary vehicles. Consequently, successful vehicle servicing requires the integration of mechanical expertise with electronic diagnostic skills and data analysis capabilities. This supports the need for continuous skills development among auto mechanics in fault diagnosis and the use of advanced diagnostic technologies.

Similarly, William (2020), in his work on emerging automotive technology frameworks, highlighted the importance of developing competencies in the use of Diagnostic Trouble Codes (DTCs), engine management system testing, electrical circuit analysis, and computerized engine diagnostics. He maintained that fault diagnosis is most effective when mechanics combine a sound understanding of vehicle systems with proficiency in the use of diagnostic equipment. This further reinforces the need for auto mechanics to acquire and continually update their diagnostic competencies. In the same vein, Erjavec (2022) emphasized the importance of practical diagnostic competence in servicing modern vehicles. He identified key areas requiring development, including proficiency in operating scan tools, interpreting live sensor data, diagnosing electronic fuel injection systems, and participating in structured technical training programmes. According to Erjavec, modern automotive servicing demands practical diagnostic skills that are supported by the effective use of electronic testing equipment. His position aligns with the findings of this study, which indicate that auto mechanics require further development in fault diagnosis and modern diagnostic tool usage to achieve optimal vehicle servicing in Delta State.

Furthermore, the findings presented in Table 4 revealed significant development needs in the core competencies of auto mechanics relating to general workshop practices and effective tool management. The results indicated that both university lecturers and technical school teachers agreed that the ten identified workshop practice and tool management competencies are critical areas in which auto mechanics require further development for improved service delivery. These findings are in agreement with Bennett (2023), who emphasized the importance of professional workshop practices and efficient tool management in automotive servicing. He highlighted essential competencies such as proper organization and storage of tools, the ability to select appropriate tools for specific tasks, and adherence to workshop safety and cleanliness standards. Bennett noted that poor tool management can reduce productivity, increase repair errors, and negatively affect service quality. He therefore

argued that effective vehicle servicing depends largely on organized workflow systems, proper tool control, and compliance with established workshop procedures.

Likewise, Gilles (2022) focused on the importance of practical workshop competence and efficient tool utilization. He stressed the need for mechanics to develop skills in the proper use of measuring and servicing equipment, routine inspection and maintenance of workshop tools, effective time management during repair operations, and overall workshop efficiency. According to Gilles, effective tool management contributes significantly to repair accuracy, operational efficiency, and reduced downtime. He concluded that competence in workshop practice is achieved through precision, efficiency, and proper maintenance of tools and equipment.

Conclusion

This study investigated the development needs in the core competencies of auto mechanics for effective and optimal vehicle servicing in Delta State, Nigeria. Based on the findings of the study, it was concluded that auto mechanics in Delta State require further development across all forty identified core competency areas. These competencies span key aspects of vehicle maintenance and repair, including engine servicing, automobile electrical and electronic systems, fault diagnosis and the use of modern diagnostic tools, as well as general workshop practices and effective tool management. Addressing these identified skills gaps will not only improve the quality and efficiency of vehicle servicing but will also reduce maintenance costs, enhance workplace productivity, promote customer satisfaction, and ensure that automotive services in the state are aligned with current global standards and industry best practices.

Recommendations

Based on the findings and conclusions of this study, the following recommendations are made:

1. Establish Continuous Professional Development Programmes: Regular training, workshops, seminars, and certification programmes should be organized to enable auto mechanics update their knowledge and skills in emerging automotive technologies.
2. Provide Access to Modern Diagnostic Tools and Equipment: Government agencies, training institutions, and workshop owners should invest in modern diagnostic equipment and servicing tools to enhance practical competence and improve service delivery.
3. Review and Update Technical Education Curricula: Automotive training curricula should be regularly revised to reflect current technological advancements in vehicle systems, diagnostics, electronics, and computerized maintenance practices.
4. Strengthen Industry–Institution Collaboration: Strong partnerships should be established between automotive industries, technical colleges, and higher institutions to facilitate practical training, industrial attachments, technology transfer, and knowledge sharing.
5. Promote Safety Standards and Best Workshop Practices: Automotive workshops should be encouraged to adopt and enforce appropriate safety regulations, proper tool management systems, and standard operating procedures to improve efficiency and reduce workplace accidents.
6. Encourage Lifelong Learning and Professional Certification: Auto mechanics should be motivated to pursue continuous learning opportunities and obtain relevant professional certifications that will enhance their competence and competitiveness within the automotive industry.

7. Support the Integration of Digital and Emerging Technologies: Training programmes should incorporate emerging areas such as computer-based diagnostics, hybrid and electric vehicle technology, automotive networking systems, and software-assisted fault detection to prepare mechanics for future industry demands.

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