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Competency Improvement Needs of Craftsmen in Motor Vehicle Mechanic Work for Enhancing Employability in Automobile Industries: Evidence from Nigeria

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Abstract

The study examined the competency improvement needs of craftsmen in motor vehicle mechanic work for enhancing employability in Ogun State, Nigeria. Specifically, the study sought to identify areas where craftsmen required improved competencies in order to remain relevant in the dynamic automobile industry. Three research questions guided the investigation, and a descriptive survey research design was adopted. The population consisted of 121 craftsmen currently engaged in motor vehicle mechanic work across industries in the study area. Data were collected through a structured questionnaire, whose internal consistency was determined using Cronbach Alpha, yielding a reliability coefficient of 0.84, indicating high reliability. Data analysis was carried out using weighted mean and improvement Needed Index (INI). Findings revealed that craftsmen demonstrated significant competency deficiencies in critical areas, particularly in engine maintenance, braking systems and auto-electrical operations. The study concluded that these competencies are vital and should be systematically integrated into motor vehicle mechanic curricula in technical colleges to better prepare future graduates for industrial relevance. It was recommended that industries, training institutions, and professional associations should collaborate to organize regular hands-on workshops, refresher courses, and continuous professional development programs to ensure craftsmen keep pace with technological advancements in the automotive sector.

Keywords: Competency, Employability, Improvement needs, Craftsmen

INTRODUCTION

The rapid evolution in the global automobile industry, driven by technological advancements and automation, has heightened the demand for a highly skilled workforce capable of meeting contemporary standards of vehicle diagnostics, repair, and maintenance (Mbah & Umurhurhu, 2016). In developing economies like Nigeria, where the motor vehicle mechanic plays a critical role in job creation and mobility, the technical competencies of craftsmen remain a determining factor in employability and career progression. Olayinka (2009) noted that competences play a key role in achieving targeted outcomes in any profession or occupation; this is not an exemption for those specialized in Motor vehicle mechanic work.

A motor vehicle mechanic craftsman is a skilled tradesperson trained to inspect, maintain, diagnose, repair and overhaul mechanical, electrical, and electronic systems of motor vehicles. According to the National Board for Technical Education (NBTE) in Nigeria, motor vehicle mechanic craftsmen are expected to test, diagnose, service, and repair faults in motor vehicles in accordance with manufacturers' specifications, demonstrating both practical and theoretical competencies acquired through formal vocational training. Modern vehicles now integrate complex electronic and electrical systems that demand advanced technical proficiency beyond traditional mechanical skills. The emergence of hybrid and electric vehicles,

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digital diagnostic tools, and complex vehicle electronic systems requires craftsmen to move beyond conventional mechanical skills to encompass a broader range of competencies, including electro-mechanical diagnostics, computer-assisted repair systems, and environmental compliance techniques (Okoye & Chijioke, 2020). Studies show that effective maintenance and repair of contemporary vehicles require mastery of diagnostic tools and practical skills in electrical and electronic systems alongside conventional mechanical competencies. Consequently, the gap between the existing skill levels of craftsmen and the expectations of modern automobile industries has widened, posing a threat to employability, productivity, and industry standards.

Several studies have pointed out the mismatch between training content and industry demand in technical and vocational education and training (TVET) systems in Nigeria (Ayonmike, 2020; Ezeani, 2022). Despite the increasing sophistication in automotive technologies, many craftsmen in the motor vehicle mechanic trade operate with outdated skills, having limited access to continuing education, exposure to new technologies, or standardized training modules that align with global automotive trends (Jika, 2010). As a result, many are unable to compete in the formal labour market or secure employment in structured automobile service centres, where higher standards of technical efficiency and safety are expected. For instance, research on auto-electricity/electronics graduates in Nigeria by Olaitan and Orji (2022) revealed that graduates needed improvement across multiple technical skills to perform effectively in automotive servicing roles, indicating a persistent skills gap in auto-electrical competencies required in the field.
To enhance employability in this sector, there is urgent need to identify and bridge the specific competency gaps needed by the craftsmen. This includes technical, digital and soft skills necessary for functioning in modern automobile workshops especially in the areas of engine maintenance, braking system and auto electricity. Competency improvement in this context is not merely a function of training availability but must be grounded in labour market demands, industry collaboration, and policy frameworks that support lifelong learning and skills upgrading (Olaitan et al., 2010). However, limited research has systematically examined these specific competency domains and their collective influence on employability outcomes in the automotive industry. It is on this basis that this study investigates the competency improvement needs of craftsmen who are engaged in motor vehicle mechanic work in Nigeria, intending to enhance their employability in the evolving automobile industry.

STATEMENT OF THE PROBLEM

The Nigerian automobile industry has witnessed rapid technological advancement recently, leading to the increasing integration of modern diagnostic tools, computerized vehicle systems, and innovative repair techniques. Despite the growing complexity and sophistication of automotive technologies, a significant proportion of motor vehicle mechanic craftsmen (MVMCs) in Nigeria continue to rely on outdated skills and traditional practices acquired through informal apprenticeships. This competency gap has raised concerns regarding their employability and adaptability in an industry that now demands specialized and up-to-date technical expertise.

Evidence shows that many craftsmen in motor vehicle mechanic work lack proficiency in engine maintenance, braking system and auto electricity, as well as customer service and workplace safety protocols. These deficiencies compromise their ability to meet modern job requirements, thereby limiting their opportunities for gainful employment, especially within organized and formal sectors of the automobile industry. Furthermore, with the influx of foreign-trained technicians and technologically advanced vehicles, Nigerian MVMCs are increasingly being side-lined due to their insufficient competency levels and inadequate access to continuous professional development.

In spite of several initiatives by the government and non-governmental organizations to enhance technical and vocational education and training (TVET), there is still a noticeable disconnect between the training content available to motor vehicle craftsmen and the real-world expectations of the automotive industry. This misalignment underscores the urgent need to identify the specific competency improvement

areas required by these craftsmen to enhance their employability, productivity, and relevance in today's highly competitive labour market. Therefore, this study seeks to investigate the competency improvement needs of craftsmen in motor vehicle mechanic work with the aim of enhancing their employability in Nigeria's automobile industry.

PURPOSE OF THE STUDY

The purpose of this study is to ascertain the competences that craftsmen in the field of motor vehicle mechanic needs to enhance their employability. Specifically, the study aimed to determine the:

1. competency improvement needs in engine maintenance required by motor vehicle mechanic work craftsmen for enhanced employability.

2. competency improvement needs in braking system required by motor vehicle mechanic work craftsmen for enhanced employability.

3. competency improvement needs in auto electricity required by motor vehicle mechanic work craftsmen for enhanced employability.

RESEARCH QUESTIONS

The following research questions guided the study

1. What are the competency improvement needs of motor vehicle mechanic work craftsmen in engine maintenance?
2. What are the competency improvement needs of motor vehicle mechanic work craftsmen in in braking system?
3. What are the competency improvement needs of motor vehicle mechanic work craftsmen in auto electricity?

METHODOLOGY

A descriptive survey research design was adopted for this study, as it was considered appropriate for collecting information from a defined population on their competencies and areas requiring improvement. The study was carried out in Ogun State, Nigeria. The population for the study comprised all one hundred and twenty-one (121) craftsmen currently practicing motor vehicle mechanic work within the automotive industries in the Ijebu-ode area of Ogun state. Given the relatively small size of the population, no sampling procedure was applied; rather, the entire population was studied through a census approach. The instrument for data collection was a structured questionnaire comprising 39 competency items. These items were organized into two categories: *needed competencies* and *performance level*. The *needed* category employed a four-point response scale of Highly Needed (4), Averagely Needed (3), Slightly Needed (2), and Not Needed (1). Similarly, the *performance* category also used a four-point scale consisting of High Performance (4), Average Performance (3), Low Performance (2), and No Performance (1). The instrument was subjected to face and content validation by three experts from the Department of Industrial Technical Education, University of Nigeria, Nsukka. To ensure reliability, the internal consistency of the instrument was established using the Cronbach Alpha method, which yielded a coefficient of 0.84, indicating high reliability. The administration of the instrument was carried out by the researcher with the assistance of three trained research assistants. Out of the 121 copies of the questionnaire distributed, 115 were duly completed and retrieved, representing a return rate of 95.04%. Data collected were analyzed using Weighted Mean and the Improvement Needed Index (INI) to determine the extent of competency gaps. The decision rule for identifying improvement needs was based on comparing the mean ratings of the *needed* and *performance* categories; areas where the *needed* mean exceeded the *performance* mean indicated competencies requiring improvement**.** The following criteria were used to identify the improvement needs:

i. the mean (X_n) of the needed category was determined for each item.

ii. the mean (X_p) of the performance category was also determined for each item.

iii. the performance gap (PG) was therefore determined by finding the difference between X_n and X_p for each item; that is $PG = X_n - X_p$

DATA ANALYSIS AND RESULTS

The results for the study were obtained from the research questions answered through data collected and analysed.

Table 1. Mean Ratings of Motor Vehicle Mechanic Work Craftsmen on Competency Improvement Needs in Engine Maintenance.

S/N	Item statement	X_n	X_p	$PG=X_n-X_p$	Remarks
1	Locate faults in the automobile using appropriate tools and equipment	3.80	2.00	1.81	IN
2	Remove faulty units from the automobile for servicing	3.60	1.78	1.82	IN
3	Use appropriate tools and equipment for a particular operation on the vehicle	3.57	3.28	0.29	IN
4	Dismantle fault unit correctly	3.62	3.55	0.07	IN
5	Identify bad component		3.43	2.35	108
6	Carry out preventive and corrective maintenance correctly	2.82	2.66	0.16	IN
7	Conduct engine performance test and determine needed repair	3.65	1.91	1.74	IN
8	Inspect, repair and replace electronic ignition components	3.78	2.63	1.15	IN
9	Connect types of protective device correctly	3.64	2.61	1.03	IN
10	Carry out engine performance test to determine the ideal repair	2.01	1.51	0.5	IN
11	Diagnose emission control system and determine needed repair	3.76	2.06	1.70	IN
12	Perform on board computer diagnosis	3.75	1.60	2.15	IN
13	Perform oil and lubrication service on normally aspirated and turbo charged engines	3.69	1.99	1.70	IN
14	Servicing carburettors correctly	3.70	2.00	1.70	IN
15	Replace faulty alternator, fuel pump and plugs correctly	3.65	2.03	1.62	IN

Table 1 give responses on performance gap analysis (PGA) of the mean ratings of motor vehicle mechanic work craftsmen on competency improvement needs in engine maintenance. The performance gaps (P.G) for these items ranged from 0.07 to 2.15 and which indicates that there is incompetence in the performance of motor vehicle mechanic work craftsmen in engine maintenance. Overall, the findings showed that there is a need for motor vehicle mechanic work craftsmen to increase their competency in engine maintenance in order to be employable.

Table 2. Mean Ratings of Motor Vehicle Mechanic Practice Craftsmen on Competency Improvement Needs in Braking System.

S/N	Item statements	Xn	Xp	PG= Xn- Xp	Remarks
1	Identify faults in brake system	3.56	2.00	1.56	IN
2	Remove bad brake pad from the drum.	3.67	2.11	1.56	IN
3	Carry out preventive maintenance in braking systems	3.61	2.04	1.57	IN
4	Servicing automatic braking system correctly	2.78	1.10	1.68	IN
5	Tools and equipment for the maintenance of automatic braking system were well selected.	3.03	1.38	1.65	IN
6	Put new braking system in place of bad ones	3.54	1.91	1.63	IN
7	Check operation of anti-lock braking system, adjust and repair according to manufacturer's specifications.	2.99	2.00	0.99	IN
8	Conduct various mechanical test on braking system.	3.56	1.99	1.57	IN
9	Test repaired braking system for functionality	3.45	2.50	0.95	IN

Table 2 give responses on Performance Gap Analysis (PGA) of the mean ratings of motor vehicle mechanic practice craftsmen on competency improvement needs in braking system. The performance gaps (P.G) for these items ranged from 0.91 to 2.08, which indicates that there is incompetence in the performance of motor vehicle mechanic work craftsmen in braking system of vehicles. Overall, the findings showed that the craftsmen need improvement in competency items for braking system.

Table 3. Mean Ratings of Motor Vehicle Mechanic Practice Craftsmen on Competency Improvement needs in Auto Electricity.

S/N	Item Statements	Xn	Xp	PG= Xn-Xp	Remarks
1	Identify faults in battery	2.99	1.56	1.43	IN
2	Conduct simple tests on battery for functionality	3.01	1.89	1.12	IN
3.	Identify bad or malfunctioned relay	3.53	3.02	0.51	IN
4	Detect burnt bulbs with appropriate instrument	2.59	1.70	0.89	IN
5	Check the protective devices on the vehicle for functionality	3.39	2.00	1.39	IN
6	Use testing lamp to detect open or short circuits in motor vehicle	2.98	1.89	1.09	IN
7	Replace faulty cells in the battery	2.90	2.01	0.89	IN
8	Connect two or more battery correctly in series	3.05	2.56	0.49	IN
9	Connect two or more battery correctly in parallel	3.53	2.38	1.15	IN
10	Connect battery in series and parallel	3.21	2.45	0.76	IN
11	Connect electrical components correctly to the motor vehicle	2.98	2.31	0.67	IN
12	Use ohmmeter to test fuses for functionality in the vehicle	2.98	2.51	0.47	IN
13	Rewiring of motor vehicle	3.56	2.78	0.28	IN
14	Tracing electrical faults in a vehicle	3.01	2.25	0.76	IN
15	Apply voltmeter for measuring voltage in the battery	3.21	057	0.64	IN

Table 3 give shows the response on performance gap analysis (PGA) of the mean ratings of motor vehicle mechanic practice craftsmen on competency improvement needs in auto electricity. The performance gaps (P.G) for these items ranged from 0.2 to 1.438, which indicates that there is an incompetency in the performance of motor vehicle mechanic work craftsmen in auto electricity. Overall, the findings showed that the craftsmen need improvement in competency in Auto Electricity.

DISCUSSION OF FINDINGS

The findings of this study revealed a performance gap in the competency levels of motor vehicle mechanic craftsmen in the specific areas of engine maintenance, braking systems, and auto electricity. This indicates that the craftsmen's current skill sets do not sufficiently align with the technical demands of contemporary automotive practice, thereby limiting their effectiveness and employability in modern workshop environments. The aforementioned findings corroborate those of Gyang (2021), who found out that motor vehicle mechanic graduates require improvement in multiple skill areas, including engine maintenance, to carry out effective vehicle servicing and repair. This also aligns with findings of Ogunmilade (2027), who found that graduates lack many of the required servicing, repair, and safety competencies necessary for effective anti-lock braking systems (ABS) maintenance, emphasizing that without targeted skill development, mechanics remain underprepared for modern automotive systems. Similarly, the findings agree with those of Obe et al. (2024) documenting inadequacies in auto-electricity training within motor vehicle mechanic programs. Studies involving technical colleges in Nigeria report that students and graduates often possess only a fraction of the auto-electrical and electronic competencies required for effective vehicle diagnosis and maintenance, and that instructors themselves may need additional training to deliver relevant competencies effectively. Collectively, the performance gaps observed in this study are indicative of a broader skills mismatch between vocational training outputs and industry expectations, a concern echoed across research in automotive industry.

CONCLUSION

This study concludes that significant competency gaps exist among motor vehicle mechanic craftsmen in the areas of engine maintenance, braking systems and auto electricity. These gaps indicate that MVMP craftsmen needed to increase their competency in order to maintain, service, and repair a variety of cars in Ogun State. Therefore, it is advised that all of the competency elements in engine maintenance, steering and braking systems, and auto electrical should be included in technical colleges' motor vehicle mechanic curricula for student training. The persistence of these competency gaps has important implications for employability, as industry employers increasingly seek mechanics who are proficient not only in traditional mechanical tasks but also in modern diagnostic and electrical work. Addressing these gaps through enhanced training, curriculum reform, and targeted capacity building is essential to improve the readiness of motor vehicle mechanics for employment in today's automotive sector.

RECOMMENDATIONS

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

1. Regular in-service training, workshops, and retraining programmes should be organized for practicing motor vehicle mechanic craftsmen, with specific focus on modern engine maintenance techniques, advanced braking systems (such as ABS), and auto electrical diagnostics.
2. Industries and institutions should regularly organize hands-on workshops and refresher courses for craftsmen to upgrade their technical competencies and align with modern automotive technologies.
3. Partnership should be strengthened between training institutions and automobile companies to provide industry-based apprenticeship and on-the-job training opportunities.

4. Training centers and vocational institutions should be equipped with up-to-date tools, diagnostic equipment, and learning resources to simulate real industry conditions.

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