



Work Skills and Competencies Required By Auto-Mechanics Graduates of Technical Colleges in Lagos State for Employment in the Automobile Industries

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Abstract

This study examined the work skills and competencies required of automobile mechanics graduates of Technical Colleges in Lagos State for effective employment in automobile industries. A survey research design was adopted, guided by three research questions. The population comprised fifty-six (56) automobile mechanics graduates currently employed in automobile industries across Lagos State, out of which forty (40) valid responses were retrieved and analyzed. Data were collected using a researcher-developed structured questionnaire covering vehicle engine maintenance, steering and braking systems, and auto electrical systems. The instrument was validated by three experts in Technology Education, and a split-half reliability coefficient of 0.83 was obtained. Data were analyzed using weighted mean scores and Competency Gap Analysis (CGA). The findings revealed positive competency gaps across all skill areas, indicating that graduates' current skill levels fall below industry expectations. Specifically, competencies were required in engine diagnostics and maintenance, steering and braking system servicing, and automotive electrical diagnostics and repairs. The study concluded that automobile mechanics graduates require comprehensive, industry-relevant skills to function effectively in modern automobile industries. It was recommended that identified skills and competencies be fully integrated into the automobile mechanics curriculum in Technical Colleges, while governments and stakeholders provide adequate funding for modern equipment, facilities, and instructional materials to enhance practical skills acquisition and employability.

Keywords: Automobile mechanics, work skills, professional competencies, technical colleges, employability

1. Introduction

Vocational education equips learners with occupational skills and practical competencies necessary for gainful employment and sustainable livelihoods. Through hands-on training and skills development, vocational education enhances employability, promotes economic independence, and supports technological and industrial development (Lemo, Owoso and Adenuga, 2023). The integration of theoretical knowledge with practical expertise enables graduates to secure paid employment or engage in self-employment, thereby contributing to national economic growth.

In Nigeria, Technical Colleges serve as the principal institutions responsible for producing skilled craftsmen required in various sectors of the economy (Okoro, 2015). These colleges provide structured training programmes designed to equip learners with relevant knowledge, skills, and work attitudes under the supervision of qualified instructors (Nwachukwu, Bakare, & Jika, 2009). Trades offered include machine shop practice, electrical installation, plumbing, building construction, and automobile mechanics.

Automobile mechanics is a skill-oriented vocational trade that exposes students to vehicle diagnosis, servicing, and repair. According to Olayinka (2019), the programme aims to produce competent craftsmen capable of contributing meaningfully to technological and industrial development. The National Board for Technical Education (NBTE, 2014) emphasized that automobile mechanics graduates should be able to diagnose faults, service vehicles, and carry out repairs in accordance with manufacturers' specifications.

Despite the relevance of vocational education, Technical College programmes in Nigeria have suffered neglect compared with general academic education. This neglect has resulted in inadequate funding, obsolete equipment, and excessive emphasis on theory rather than practical skills (Aworonti, 2017). Aina & Lawal (2020) revealed that many employment-generation initiatives failed largely because graduates lacked adequate hands-on skills. The rapid advancement of automotive technology, characterized by electronic and computerized vehicle systems, has further widened the skill gap between graduates and industry requirements.

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Competency refers to the ability of an individual to perform occupational tasks effectively to an acceptable standard. Olaitan (2010) described competency as the attainment of a high level of performance and proficiency in a particular occupation. In automobile

mechanics, competency involves the integration of knowledge, skills, attitudes, and abilities required to diagnose, service, and repair vehicles efficiently in real-life industrial settings.

1.2 Purpose of the Study

The purpose of this study was to identify the work skills and competencies required by automobile mechanics graduates of Technical Colleges in Lagos State for effective employment in automobile industries. Specifically, the study sought to determine the work skills and competencies required in:

1. Vehicle engine maintenance;
2. Vehicle steering and braking systems;
3. Vehicle auto electrical systems.

1.2 Research Questions

1. What work skills and competencies are required of Technical College graduates in vehicle engine maintenance for employment in automobile industries?
2. What work skills and competencies are required in vehicle steering and braking systems?
3. What work skills and competencies are required in vehicle auto electrical systems?

2. Methodology

A survey research design was adopted for the study. The population comprised fifty-six (56) automobile mechanics graduates of Technical Colleges employed in automobile industries in Lagos State. A structured questionnaire containing forty-two (42) items was used for data collection. The instrument consisted of two sections measuring competency level and competency required, using a four-point rating scale. Face and content validation were carried out by three experts in Technology Education. A split-half reliability coefficient of 0.83 was obtained. Forty (40) completed questionnaires were retrieved and analyzed using weighted mean scores and Competency Gap Analysis (CGA).

3. Results

The findings of the study were derived from the research questions, which were addressed through the analysis of data collected from the respondents. The analyzed data provided empirical evidence used to present and discuss the results of the study.

3.1 Research Question I:

What specific work skills and competencies are required by graduates in vehicle engine maintenance? Data used to address Research Question One were analysed and are presented in the Table 1.

The findings presented in Table 1 show that the competency gap values for all fifteen (15) engine maintenance skill items were positive, with the gaps ranging from 0.07 to 2.15. This outcome indicates that the current performance levels of the graduates fall

below the level of competence required for effective practice, thereby signifying the need for improvement across all identified skill areas. Overall, the results demonstrate that graduates of automobile mechanics programmes in technical colleges are expected to acquire and demonstrate adequate work skills and professional competencies in engine maintenance in order to be considered suitable for employment within automobile industries.

3.2 Research Question Two

What work skills and competencies are required by graduates in vehicle steering and braking systems? Data used to address Research Question Two were analyzed and are presented in the table below.

The analysis presented in Table 2 demonstrates that the competency gaps for all thirteen (13) identified work skills and competencies in vehicle steering and braking systems ranged between 0.91 and 2.08. The fact that all competency gap values are positive indicates a clear shortfall between the current performance levels of the graduates and the expected industry standards. This suggests that while the graduates possess some proficiency, they still require further development to fully meet the demands of the automobile industry in relation to steering and braking system maintenance and repair. Overall, the findings emphasize that technical college graduates in automobile mechanics need to enhance their practical skills and competencies in steering and braking systems to achieve optimal employability and effectiveness in industrial settings.

3.3 Research Question Three

What work skills and competencies are required by graduates in vehicle auto electrical systems? The data used to address Research Question Three were analyzed and are presented in the table below.

The analysis presented in Table 3 shows that the competency gaps for all fifteen (15) identified work skills and competencies in vehicle auto electrical systems ranged from 0.28 to 1.43. The fact that all competency gap values are positive indicates that graduates' current levels of proficiency fall short of the standards required by the industry. This highlights that the work skills and competencies related to auto electricity possessed by the graduates need significant enhancement. Overall, the findings suggest that technical college graduates in automobile mechanics must strengthen their practical and theoretical expertise in automotive electrical systems to meet industry expectations and ensure effective performance in their professional roles.

4. Discussion of Results

The findings indicate that automobile mechanics graduates of Technical Colleges require enhanced competencies in engine diagnostics, preventive and corrective maintenance, steering and braking systems, and automotive electrical systems to meet industry standards in Lagos State. The observed competency

Table 1: Competency Gap Analysis (CGA) of the mean ratings by automobile mechanics graduates on work skills and competency requirements in vehicle engine maintenance.

S/N	Reframed Skill/Competency Description	XC	XR	GC (XC-XR)	Decision
1	Detect mechanical faults in vehicles using suitable diagnostic tools and instruments	3.80	2.00	1.80	Required
2	Detach defective vehicle components for maintenance and servicing purposes	3.60	1.78	1.82	Required
3	Apply appropriate tools and equipment effectively for specific automotive operations	3.57	3.28	0.29	Required
4	Disassemble malfunctioning engine units accurately and systematically	3.62	3.55	0.07	Required
5	Recognize and isolate damaged or worn-out engine components	3.43	2.35	1.08	Required
6	Perform preventive and corrective maintenance procedures appropriately	2.82	2.66	0.16	Required
7	Carry out engine performance assessments to determine necessary repairs	3.65	1.91	1.74	Required
8	Examine, service, and replace electronic ignition system components	3.78	2.63	1.15	Required
9	Correctly install and connect various protective automotive devices	3.64	2.61	1.03	Required
10	Utilize engine analyzers to evaluate engine performance and identify repair needs	3.52	2.01	1.51	Required
11	Diagnose faults and carry out repairs on vehicle emission control systems	3.76	2.06	1.70	Required
12	Conduct vehicle diagnostics using onboard computer diagnostic systems	3.75	1.06	2.15	Required
13	Perform oil servicing and lubrication on naturally aspirated and turbocharged engines	3.69	1.99	1.70	Required
14	Service and adjust carburetors in accordance with standard procedures	3.70	2.00	1.70	Required
15	Replace defective alternators, fuel pumps, and spark plugs accurately	3.65	2.03	1.62	Required

Table 2: Competency Gap Analysis (CGA) of Mean Ratings by Automobile Mechanics Graduates on Work Skills and Competencies Required in Vehicle Steering and Braking Systems

S/N	Reframed Skill/Competency Description	XC	XR	GC (XC-XR)	Decision
1	Detect and diagnose faults in vehicle brake systems	3.56	2.00	1.56	Required
2	Remove worn-out or defective brake pads from drums	3.67	2.11	1.56	Required
3	Perform preventive maintenance procedures on both steering and braking systems	3.61	2.04	1.57	Required
4	Detach power steering components safely from the main assembly	3.20	1.98	1.22	Required
5	Service and adjust automatic braking systems accurately according to standards	2.78	1.10	1.68	Required
6	Choose and apply suitable tools and equipment for maintaining steering and braking systems	3.03	1.38	1.65	Required
7	Replace faulty braking system components with new or functioning parts	3.54	1.91	1.63	Required
8	Inspect, adjust, and repair anti-lock braking systems following manufacturer specifications	2.99	2.00	0.99	Required
9	Operate, service, and maintain all-wheel steering systems efficiently	3.05	2.01	1.04	Required
10	Conduct comprehensive mechanical tests on steering and braking systems	3.56	1.99	1.57	Required
11	Assemble, repair, or restore steering system components correctly	3.67	1.59	2.08	Required
12	Test repaired braking systems to ensure full functionality and safety	3.45	2.50	0.95	Required
13	Reinstall maintained or repaired power steering systems in modern vehicles	2.60	1.69	0.91	Required

Table 3: Competency Gap Analysis (CGA) of Mean Ratings by Automobile Mechanics Graduates on Work Skills and Competencies Required in Vehicle Auto Electrical Systems

S/N	Reframed Skill/Competency Description	XC	XR	GC (XC-XR)	Decision
1	Identify faults and irregularities in vehicle batteries	2.99	1.56	1.43	Required
2	Perform basic diagnostic tests on vehicle batteries	3.01	1.89	1.12	Required
3	Detect and isolate malfunctioning or defective relays	3.53	3.02	0.51	Required
4	Use appropriate instruments to identify burnt-out bulbs	2.59	1.70	0.89	Required
5	Inspect and verify the functionality of protective devices in vehicles	3.39	2.00	1.39	Required
6	Apply a test lamp to detect open or short circuits in automotive electrical systems	2.98	1.89	1.09	Required
7	Replace defective battery cells accurately and safely	2.90	2.01	0.89	Required
8	Correctly connect multiple batteries in series configurations	3.05	2.56	0.49	Required
9	Connect multiple batteries in parallel arrangements accurately	3.53	2.38	1.15	Required
10	Install batteries in both series and parallel connections correctly	3.21	2.45	0.76	Required
11	Properly connect electrical components to the vehicle's electrical system	2.98	2.31	0.67	Required
12	Utilize an ohmmeter to test fuses and ensure proper functionality	2.98	2.51	0.47	Required
13	Rewire motor vehicle electrical circuits according to standards	3.56	2.78	0.28	Required
14	Trace and diagnose electrical faults throughout the vehicle system	3.01	2.25	0.76	Required
15	Measure battery voltage accurately using a voltmeter	3.21	2.57	0.64	Required

gaps suggest that existing training programmes do not adequately reflect current technological and operational demands of the automobile industry.

These findings align with Olusiji & Adenuga (2022), who reported that Technical College graduates require improved practical competencies to enhance employability in industrial settings. Similarly, Nwosu & Okafor (2018) found that electrical and electronic students required additional safety and operational skills to perform effectively in workshops and industries. The present study further confirms that modern automobile industries demand graduates who can work with computerized diagnostic tools, electronic control systems, and advanced vehicle technologies.

The implication of these findings is that automobile mechanics curricula in Technical Colleges must be regularly reviewed and updated to incorporate emerging technologies and industry-driven competencies. Without such updates, graduates will continue to experience skill mismatches that limit their employability and productivity.

5. Conclusion

The study concluded that automobile mechanics graduates of Technical Colleges in Lagos State require comprehensive work skills and professional competencies in vehicle engine maintenance, steering and braking systems, and auto electrical systems for effective employment in automobile industries. The existence of positive competency gaps across all skill areas indicates the need for curriculum enhancement and improved practical training.

6. Recommendations

Based on the findings of the study, the following

recommendations were made:

1. Identified work skills and competencies should be fully integrated into the automobile mechanics curriculum of Technical Colleges.
2. Governments and relevant stakeholders should provide adequate funding for modern tools, equipment, and instructional materials.
3. Technical Colleges should collaborate with automobile industries to ensure curriculum relevance and effective skills acquisition.
4. Regular in-service training should be organized for automobile mechanics teachers to update their technical competencies.

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