# SKILLS POSSESSED BY MECHANICAL TECHNOLOGY GRADUATES FOR EMPLOYABILITY IN MECHINE-SHOP AUTOMOBILE INDUSTRY IN RIVERS STATE

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## ABSTRACT

*The study assessed the Employability skills of Mechanical Technology Graduates in Automobile Industry in Rivers State. Two (2) objectives, two (2) research questions and one (1) hypotheses guided the study.The study adopted descriptive survey research design. The population of the study was 28 lecturers in Technical Education in College of Education, Port-Harcourt and 74 technicians in the five automobile industries in Rivers State. There was no sampling due to the small population of the study. Data were collected using structured questionnaire designed in 5-point Likart rating scale. The instrument was face and content validated by experts in Rivers State University. A reliability coefficient of 0.82 was obtained using Cronbach Alpha. The research questions were analyzed using mean and standard deviation while z-test was used to test the hypotheses at 0.05 level of significance. The study revealed that the ability to performing phase angle test accurately, ability to install sensors in the engine management system, helps to improve graduates in automobile industry in Rivers State. Based on the findings, the study recommended that Government should strictly organize training and re-training programmes for Lecturers and Technicians on modern trends of technological advancement on Perception of Employability Skills in Rivers State. By this, new technologies and new techniques can be achieved, Government should build a multi capacity workshop strictly for teaching and learning of industrial perspectives on employability skills for automated/manual cars for entrepreneurial development of Rivers youths to reduce the level of unemployment in the State.*

**KEYWORDS:** *Skills, Mechanical Technology, Automobile Industries, Machine-shop, Employability*

## INTRODUCTION

The issue of graduate employability has been a source of major concern all over the world as to whether our educational institutions are meeting the need for their establishment. Employability of graduates to a large extent determines the functionality and viability of a school program. Unemployment has been identified as one of the major challenges of the 21st century and

Nigeria as a nation is not spared by the scourge of unemployment. In most developing countries like Nigeria, governments and policy makers are increasingly finding it difficult to deal successfully with the problem of unemployment. Among other things, this high level of unemployment can be attributed to lack of relevant marketable skills that will make them employable in industries or related organizations as well as self-employment (Audu, Kamin & Balash, 2013).

Employability skills denote essential competencies needed for worker success on the job (Carnevale, Gainer, & Meltzer, 2000). Overtoom (2000) further defines employability skills as "transferable core skill groups that represent

essential functional and enabling knowledge, skills, and attitudes required by the 21st century workplace". Examples of employability skills include communication, teamwork, problem solving, and work ethic. The graduates of all levels of higher institutions are no exemption. As a result, students who graduate from technical institutions acquire little knowledge and practical skills that would enable them, on graduation to practice what was learnt in school, create jobs for themselves and participate in economic development (Okafor, 2011).

Over a decade ago, De la Harpe (2000) identified a worldwide concern that undergraduate programs do not produce graduates with the kind of lifelong learning and professional skills needed for workplace success. Numerous research studies continue to highlight a skills gap between the demands of employers and the level of workforce preparedness of university graduates. Despite current high unemployment rates, employers continually report their inability to find qualified workers (Weitmen, 2010). Fenster (2005) paradoxically asks, "How can we have too few jobs for our workers and yet have too few workers for our jobs?". This gap directly impacts the stability of human capital development within Nigeria.

According to Cranmer (2014) skill is an ability and capacity acquired through deliberate, systematic and sustained effort to smoothly and adaptively carryout complex activities or job functions involving ideas (cognitive skill) things (technical skills) and/or people (interpersonal skills). Technical skills are skills expertise or technical competence related to the field of the worker, whether engineering or technical (Medina, 2011). Today's workplace requires highly skilled professionals prepared to meet the challenges of increased global competition. Bailey (2000) describes the current workplace as one in which jobs integrate through cross-functional teams, workers receive more responsibility, employees solve non-routine problems, organizations emphasize continuous improvement, and workers understand their jobs within broader organizational purpose and context. Therefore, organizations need professionals responsive and flexible enough to navigate economical, social, cultural, technical and environmental change (Precision, 2007). Meeting the need requires more than technical skills. Research findings identify employability skills as a possible solution.

According to Evers, Rush and Berdow (2008) "the skills most in demand are least in supply". ''University with their heads full of theories, principles, and information but are often ill-equipped to deal with aspects of the workplace such as problem-solving, decision-making, working in a team, and learning for themselves". Simyilarly, Brown, Hesketh, and Williams (2003) state that a consistent cry exists among employers that college graduates lack adequate preparation for the workforce. This cry reverberates across multiple industries including manufacturing.

In a 2003 study investigating workforce issues in manufacturing, the National Association of Manufacturing (NAM) and the Society of Manufacturing Engineers (SME) found more than 80% of manufacturers surveyed reported a "moderate to serious" shortage of qualified job applicants (NAM, 2003). The study highlights a mismatch between the competencies employers expect of employees and the competencies employees possess. As a follow-up study, The Skills Gap Report (2005) reveals an increasing need for an appropriately prepared workforce to help maintain Nigerian" manufacturing companies" competitiveness in the global marketplace.

**STATEMENT OF THE PROBLEM**

Both national and local studies indicate that graduates of Automobile manufacturing-related degree programs may not be adequately prepared to meet workforce demands. Employers believe that higher education does not adequately develop employability skills of graduates in general (Houghton & Proscio, 2001; Martin, Milne-Home, Barrett, Spalding, & Jones 2000; Robinson, 2006). A consistent mismatch exists between what employers expect of graduates and what graduates entering organizations are prepared to offer. The skills gap impacts productivity levels and the ability of organizations to meet customer demands (Cebesi, 2003). Consequently, it is very necessary to call upon higher education to improve the students during their course of study to improve their employability skills of the workforce. This call presents an opportunity to determine the degree to which Automobile manufacturing-related degree programs focus on developing graduates" employability skills. It is base on these needed employability skills for training, that Skills Possessed by Mechanical Technology Graduates for Employability in machine-shop Automobile Industries in Rivers State which prompted this study. The problem of this study therefore posed as a question is what are the Skills Possessed by Mechanical Technology Graduates for Employability in machine-shop Automobile Industries in Rivers State?

**PURPOSE OF THE STUDY**

The purpose of this study was to assess the skills possessed by Mechanical Technology Graduates for employability in machine-shop Automobile Industries in Rivers State. Specifically, the study sought to:

1. Assess the Diagnostic skills possessed by Mechanical Technology Graduates for employability in machine-shop Automobile Industries in Rivers State.
2. Determine the Problem-solving skills possessed by Mechanical Technology Graduates for employability in machine-shop Automobile Industries in Rivers State.

**RESEARCH QUESTIONS**

The following research questions were posed

1. What are the Diagnostic skills possessed by Mechanical Technology Graduates for employability in machine-shop Automobile Industries in Rivers State?
2. What are the Problem-solving skills possessed by Mechanical Technology Graduates for employability in machine-shop Automobile Industries in Rivers State?

**HYPOTHESES**

The following null hypotheses guided the study and tested at 0.05 level of significance.

1. There is no significant difference in the mean responses of lecturers and Technicians on skills possessed by Mechanical Technology Graduates for employability in machine-shop Automobile Industries in Rivers State.

**METHODOLOGY**

The study adopted descriptive survey design. The study was carried out in Rivers State**.** The population of this study comprised 102 respondents. (28 lecturers in Technical Education in College of Education (Technical) Omoku, Ignatius Ajuru University of Education, Port-Harcourt and Rivers State University and 74 Technicians in the five automobile industries in Rivers State). (Source: Office of Heads of Departments in the Concerned Institutions, 2013). There was no sampling considering the small and manageable size of population. Therefore, the entire population of the study was used. The instrument used for data collection was survey questionnaire titled "Employability skills of Mechanical Technology Graduates on Machine-shop Automobile Industries" (SPMTGEMAI). It was structured in the pattern of 5 point Likert rating scale of Strongly Agree (SA-5), Agree (A-4), Undecided (U-3), Disagree (D-2) and Strongly Disagreed (SD-1). The instrument was face and content validated by three experts in Faculty of Education. The reliability of the instrument was 0.82 obtained using Cronbach Alpha Reliability Coefficient Method. Data collected were analyzed using descriptive statistics (Mean and Standard Deviation) to answer the research questions while inferential statistics (Z-test) was use to test hypothesis at 0.05 level of significance. The decision on the answered research questions was based on the cutoff point of 3.00, meaning any mean value equal or above 3.00 was considered a positive response. Also for the hypotheses tested, when z-calculated is equal or greater than z-critical, hypothesis was rejected, otherwise accepted.

**RESULTS**

**Research Question 1:** What are the Diagnostic skills possessed by Mechanical Technology      Graduates for employability in machine-shop Automobile Industries in Rivers State

**Table 1: Mean Responses and standard deviation on Diagnostic skills possessed by Mechanical Technology Graduates for employability in machine-shop Automobile Industries in Rivers State.**

| S/N | Staff and Students' Perception | Lecturers _N28 | | | Technicians  N74 | | |
| --- | --- | --- | --- | --- | --- | --- | --- |
| | | X | SD | Decision | X | SD | Decision |
| 1 | Ability to performing phase angle test accurately | 3.45 | 1.43 | Agreed | 3.85 | 1.39 | Agreed |
| 2 | Ability to install sensors in the engine management system | 3.42 | 1.47 | Agreed | 4.15 | 0.96 | Agreed |
| 3 | Identify screw extruder and its various features | 3.54 | 1.32 | Agreed | 4.12 | 0.33 | Agreed |
| 4 | Ability to Detect and replace default parts detected | 3.63 | 1.38 | Agreed | 4.69 | 0.74 | Agreed |
| 5 | Ability to Detect  problems on water cooling systems | 3.21 | 1.50 | Agreed | 4.79 | 0.44 | Agreed |
| 6 | Ability to Detect problem in engine | 4.60 | 0.49 | Agreed | 4.15 | 0.86 | Agreed |
| 7 | Ability to Attach mixing zones | 4.00 | 1.22 | Agreed | 4.28 | 0.76 | Agreed |
| 8 | Ability to read and analyzed diagnostic machine | 4.57 | 0.50 | Agreed | 4.96 | 0.19 | Agreed |
| 9 | Ability to Perform trouble shooting after diagnose | 3.69 | 1.68 | Agreed | 4.00 | 1.19 | Agreed |
| 10 | Ability to Check and tight ensuring the nuts and bolts are in order | 4.03 | 1.38 | Agreed | 4.06 | 0.82 | Agreed |
| 11 | Ability to Detect and Carry out a careful visual inspection of the wiring electrical components | 4.48 | 0.50 | Agreed | 4.58 | 0.65 | Agreed |
| 12 | Ability to operate the engine | 4.18 | 0.95 | Agreed | 4.34 | 0.55 | Agreed |
| | **Grand Mean** | **3.90** | **1.15** | | **4.33** | **0.68** | |

**Source: Field Survey, 2021.**

The findings in Table 1 revealed that the ability to performing phase angle test accurately (3.45 & 3.85), ability to install sensors in the engine management system (3.42 & 4.15), identify screw extruder and its various features (3.54 & 4.12), ability to Detect and replace default parts detected (3.63 & 4.69), ability to Detect  problems on water cooling systems (3.21  & 4.79), ability to Detect problem in engine(4.60 & 4.15), ability to Identify the on-board diagnostic port in vehicles (4.00 & 4.28), ability to read and analyzed diagnostic machine (4.57 & 4.96), ability to Attach mixing zones (3.69 & 4.00), ability to Check and tight ensuring the nuts and bolts are in order (4.03 & 4.06), ability to Detect and Carry out a careful visual inspection of the  wiring electrical components(4.48 & 4.58), ability to operate the engine (4.18 & 4.34). Table 1 equally revealed that a ground mean of 3.90 and 4.33 and a ground standard deviation of 1.15 and 0.68 respectively which  implies that the respondents were close in their opinions.

**Research Question 2:** What are the Problem-solving skills possessed by Mechanical Technology Graduates for employability in machine-shop Automobile Industries in Rivers State

**Table 2: Mean Responses and standard deviation on Problem-solving skills possessed by Mechanical Technology Graduates for employability in machine-shop Automobile Industries in Rivers State**

| S/N | Staff and Students' Perception | Lecturers _N28 | | | Technicians  N74 | | |
|---|---|---|---|---|---|---|---|
| | | X | SD | Decision | X | SD | Decision |
| 1 | Operation processes on industrial machine | 3.55 | 1.43 | Agreed | 3.65 | 1.39 | Agreed |
| 2 | Operate  spray up methods | 3.45 | 1.47 | Agreed | 4.05 | 0.96 | Agreed |
| 3 | Operate  hand-lay-up process | 3.44 | 1.32 | Agreed | 4.20 | 0.33 | Agreed |
| 4 | Operate  hot gas welding machine | 3.50 | 1.38 | Agreed | 4.30 | 0.74 | Agreed |
| 5 | Clamp pipes between two metal plates | 3.54 | 1.50 | Agreed | 4.32 | 0.44 | Agreed |
| 6 | Handle  the heated tool (knife or rod) | 4.50 | 0.49 | Agreed | 4.35 | 0.86 | Agreed |
| 7 | Operate  the induction or electric welding | 4.10 | 1.22 | Agreed | 4.18 | 0.76 | Agreed |
| 8 | Operate  the infrared welding machine | 4.45 | 0.50 | Agreed | 4.12 | 0.19 | Agreed |
| 9 | Drive screws into a thread in the metal component using a scre w driver. | 3.59 | 1.68 | Agreed | 4.00 | 1.19 | Agreed |
| 10 | Clean the surfaces to be joined | 4.02 | 1.38 | Agreed | 4.04 | 0.82 | Agreed |
| | **Grand Mean** | **3.81** | **1.23** | **Agreed** | **4.12** | **0.68** | **Agreed** |

**Source: Field Survey, 2021.**

The findings in Table 1 revealed that the Operate  perform process on industrial machine with (3.55 & 3.65), Operate  spray up methods (3.45 & 4.05), Operate  hand-lay-up process (3.44 & 4.20), Operate  hot gas welding machine (3.50 & 4.30), Clamp pipes between two metal plates (3.54 & 4.32), Handle  the heated tool (knife or rod) (4.50 & 4.35), Operate  the induction or electric welding (4.10 & 4.18), Operate  the infrared welding machine (4.45 & 4.12), Drive screws into a thread in the metal component using a screw driver (3.59 & 4.00) and  Clean the surfaces to be joined (4.02 & 4.04). Table 2 equally revealed that a ground mean of 3.81 and 4.12 and a ground standard deviation of 1.23 and 0.68 respectively which  implies that the respondents were close in their opinions.

**HYPOTHESES**

The following results of the null hypotheses were tested.

**Hypothesis 1:** There is no significant difference in the mean responses of lecturers and Technicians on Skills Possessed by Mechanical Technology Graduates for Employability in Machine-Shop Automobile Industries in Rivers State

**Table 1:    z-Test Analysis on the Skills Possessed by Mechanical Technology Graduates for Employability in Machine-Shop Automobile Industries in Rivers State**

| Groups | N | Mean | SD | df | Z-cal | Z-crit | α | Decision |
|---|---|---|---|---|---|---|---|---|
| Lecturers | 28 | 3.90 | 1.15 | | | | | |
| | | | | 100 | 2.45 | 1.96 | 0.05 | Rejected |
| Technicians | 74 | 4.33 | 0.68 | | | | | |

**Source: Field Survey, 2021.**

From the analysis in the Table 1, the result showed that the z-cal is greater than the z-crit. Hence the hypothesis was rejected. This is an indication that there is a significant difference in the opinion of respondents in the institutions (Lecturers) and the (Technicians) in industries on their perception on employability skills for mechanical technology graduates on machine-shop automobile industries in Rivers State.

**DISCUSSION OF FINDINGS**

**Diagnostic skills possessed by Mechanical Technology Graduates for employability in machine-shop Automobile Industries in Rivers State.**

The findings in research question one revealed that the Employability skills are considered important student outcomes that every mechanical technology graduate must be able to learn and possess upon leaving the academic institutions for them to overcome the challenges of stiff competition when it comes to job placement. This study also revealed how mechanical technology students viewed these skills as still needed for development to become job ready. Differences exist in the employability skills development needs in terms of ability to performing phase angle test accurately, ability to install sensors in the engine management system, identify screw extruder and its various features, ability to detect and replace default parts detected , ability to detect  problems on water cooling systems, ability to detect problem in engine, ability to identify the on-board diagnostic port in vehicles, ability to read and analyzed diagnostic machine. This is an indication that there is a significant difference in the opinion of respondents in the institutions (Lecturers) and the (Technicians) in industries on their perception on employability skills for mechanical technology graduates on machine-shop automobile industries. The findings of this study agreed with Osswald, Baur, Brinkmann, Oberbach and Schmachtenberg (2006) who identified technical    work-skills in compounding of raw plastic materials to involve three stages which include: premixing, gelatin or melt compounding and granulation or cutting of scraps.

**Problem-solving skills possessed by Mechanical Technology Graduates for employability in machine-shop Automobile Industries in Rivers State.**

In addition, the findings on table two of this study revealed that mechanical technology graduates and the teachers/Instructors rated all the 10 items on skills possessed by mechanical technology students is in agreement with that of Okwelle, Beako & Ajie (2017) that skill is an ability and capacity acquired through deliberate, systematic and sustained effort to smoothly and adaptively carry out complex activities or job functions involving ideas. Therefore, Operate  perform process on industrial machine with, Operate  spray up methods, Operate  hand-lay-up process, Operate  hot gas welding machine, Clamp pipes between two metal plates, Handle  the heated tool (knife or rod), Operate  the induction or electric welding, Operate  the infrared welding machine, Drive screws into a thread in the metal component using a screw driver and  Clean the surfaces to be joined respectively which also implies that the respondents were close in their opinions among others.

**CONCLUSIONS**

Based on the finding of this study, the findings in research question one revealed that the Employability skills are considered important student outcomes that every mechanical technology graduate must be able to learn and possess upon leaving the academic institutions for them to overcome the challenges of stiff competition when it comes to job placement. This study also revealed how mechanical technology students viewed these skills as still needed for development to become job ready. Differences exist in the employability skills development needs in terms of ability to performing phase angle test accurately, ability to install sensors in the engine management system. The aim of passing through the college are defeated, since they lack some of these skills. The study also conclude that an average Technician can Operate  perform process on industrial machine, Operate  spray up methods, Operate  hand-lay-up process, Operate  hot gas welding machine. Finally it was concluded that all problems surrounding the Technicians has tuned to be an issue and problem to the automobile industries in Rivers State.

**RECOMMENDATIONS**

Based on the findings, the following recommendations were made:
1. Government should strictly organize training and re-training programmes for Lecturers and Technicians on modern trends of technological advancement on Perception of Employability Skills in Rivers State. By this, new technologies and new techniques can be achieved.
2. Government should build a multi capacity workshop strictly for teaching and learning of industrial perspectives on employability skills for automated/manual cars for entrepreneurial development of Rivers youths to reduce the level of unemployment in the State.

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