



## Perception of Employers and Technical College Graduates on Skills Improvement Needs in Electrical Equipment Maintenance and Repairs Required by Technical College Graduates in Adamawa State

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### ABSTRACT

The purpose of this study is to determine the perception of employers and graduates of technical colleges on skills improvement needs in electrical equipment maintenance and repairs in Adamawa state. Three research questions and three null hypotheses guided the study. The study adopted descriptive (survey) research design. Purposive sampling was technique was used to select a sample of 114 respondents made up of 83 graduates of technical colleges and 31 employers. The instrument for data collection was a structured questionnaire titled: Perception of Employers and Graduates of Technical Colleges on Skills Improvement Needs in Electrical Equipment Maintenance and Repairs of in Adamawa State. Cronbach's Alpha was used to compute the reliability for internal consistency. A reliability index of 0.82 was obtained. The research questions were answered using mean and standard deviation while the hypotheses formulated were tested using t-test at .05 level of significance. Some of the findings of the study revealed that the practicing technical college graduates needed advanced skills in domestic and industrial wiring such as interpretation of wiring diagrams of building plans and repairs of modern electrical equipment using diagnosing machines. The researchers concluded that graduates of technical colleges in Adamawa state needed skills improvement in some modern electrical equipment and the use of modern diagnosing machines. It was recommended that curriculum reviewers should include modern electrical equipment and modern techniques of diagnosing and repairs in the curriculum of technical colleges.

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### INTRODUCTION

The aims of technical colleges in Nigeria as specified by the National Policy on Education (FRN, 2013) are as firstly, to provide trained manpower in the applied sciences, technology and business particularly at craft, advance craft and

technical levels. Secondly, to provide the technical knowledge and vocational skills necessary for agricultural, commercial and economic development; and thirdly, to give training and impart the necessary skills to individual for self-reliance economically. Thus, technical colleges provide training in technical and vocational education (TVET)



at the post primary level. Caleb and Udofia (2013) stressed that if TVET in Nigeria must be a system for technological development, then it must equip its recipients with adequate technical skills that allow for flexibility and the ability to work across a wide range of work. They of the view that TVET in Nigeria should prepare its graduates with skills that go beyond taking up immediate employment, but with skills that enhance the employability of its graduates so they can adapt to choice trade throughout their life time.

Nwachukwu, Bakare and Jika (2011) maintained that the place of skills acquisition in technical education cannot be over-emphasized and to achieve these objectives, different trades are learnt in technical colleges that will enhance students to be self-reliant after graduation. With focus on Electrical engineering trade, this trade is vital in the production of workforce with understanding in diverse skills in the design, development, production, management and utilization of trending electrical and electronics devices and circuits. Electrical Installation and maintenance works (EIMW) is one of the electrical engineering trades offered in technical Colleges. It is a Vocational trade that exposes students to skills in domestic electrical wiring, industrial electrical wiring, battery charging and installation and repairs of machines. The following show the course modules in Electrical Installation and Maintenance Practice, they are as follows: CEI 12 – Domestic electrical Installation, CEI 13 - Industrial electrical Installation, CEI 14 - Cable Joining, CEI 15 - Battery Charging and Repairs, CET 16 - Winding of Electrical Machines.

Domestic electrical installation is the assembly of associated electrical equipment supplied from a common point of origin to fulfill a specific purpose and having certain coordinated characteristics. It involves the

systematic and professional approaches to fixing (installing) and implementing cables, electrical accessories and other electrical materials and equipment needed for home use, by employing functionally prepared wiring or working diagrams. Domestic electrical installation can be grouped into electrical drafting or working diagrams, surface wiring, trunking, ducting and conduit wiring.

Industrial electrical installation is the assembly of associated electrical equipment supplied from a common point of origin to fulfill a specific purpose and having certain coordinated characteristics. It involves the systematic and professional approaches to fixing (installing) and implementing cables, electrical accessories, electric motors and other electrical materials and equipment needed for industrial use, by employing functionally prepared wiring or working diagrams.

Cable joining provides the trainee with knowledge and skill to enable him undertake with proficiency various methods of cable joining and terminations. Electrical joints and termination of cables provide the required electrical connection as well as the mechanical support and physical protection of the cable. The factors that determine the type of joint and termination of cable are: outdoor or indoor use, voltage, current, overhead or underground and type of connector on the equipment where the cable will be connected.

Battery Charging and Repairs module is to provide the trainee with knowledge and skill to maintain repair and charge batteries efficiently, while the module of winding of Electrical Machines is aimed at providing the trainee with the knowledge and skill to enable him maintain, repair and wind or rewind AC & DC rotating static machines up to 10 KVA, (NBTE, 2007).

Merriam (2005) defined skill as the ability and capacity acquired through



deliberate systematic and sustained effort to smoothly and adaptively carryout complex activities or job functions involving ideas (cognitive) skills, things (technical) skills and/or people. So to possess a skill is to demonstrate the habit of acting, thinking and behaving in a specific activity in such a way that the process becomes natural to the individual through repetition or practice. Furthermore, skills according to Merriam Webster Dictionary (2019) are the abilities to use one's knowledge effectively and readily in execution or performance of task. It is expected that technical college graduates in Adamawa state acquire higher level work skills proficiency and self-confidence in executing work competently. Improvement according to Merriam Webster dictionary is the act of making something better than the way it used to be. Improvement in this study is a process of helping graduates of Technical colleges in Adamawa state for greater efficiency. For work to be done, it requires energy and manipulative skills.

Repairs according to Bridgestone (2013) are services that are required or necessary when something on a system is not working properly or have worn out to the point where a replacement is required to maintain the performance of the system. Repair can also be done through application of computer software or constructing new electronic circuit, such as oscillator circuits or amplifier circuit to solve electronics appliances problems (Goldwasser, 2011). Selecting learning experience and teaching techniques that involve repairs processes is another vital aspect of skills acquisition programmes, which Electrical engineering trade teachers should strive to be skillful in imparting the knowledge into the lives of the students. (Ogbuanya & Owodunni, 2015).

Ado (2018) said Maintenance is just one of the activities for up keeping or, if

necessary, improving the level of reliability of components and systems. Others include increasing system capacity, reinforcing redundancy and employing more reliable components. However, accurate documentation is essential for an effective maintenance programme whether performing preventive, predictive, corrective or reliability-centered maintenance keeping track of equipment condition and maintenance is critical. From the above, it is clear that, for technical and vocational education to attain its objectives, which include producing of skilled craftsmen and master craftsmen for technological, social and economic development and for adequate preparation for the world of work after graduation, there is need to improve on the skills needed by technical college graduates in maintaining and repairs of electrical/electronic equipment.

Technical education is a form of education through which technical skills are acquired as well as basic scientific knowledge that will enable individuals to be enterprising, self-reliant and useful members of the society. Graduates of technical colleges are employed in public and private service. There are also those who are gainfully self-employed. As specified in the National Policy on Education of the Federal Republic of Nigeria FRN (2013) the objectives is to produce graduates with appropriate skills and abilities that will provide trained manpower in the applied sciences, technological and business at the craft and advanced craft levels; provide training and impart the necessary skills to individual s who shall be self-reliant economically. In order to achieve these noble objectives students passed through rigorous curriculum in their areas of choice. However, with the rapid technological development of electrical equipment and information and



communication technology, it is not certain whether these graduates are effectively meeting up with the demand on them with respect to effectively carry out repairs and maintenance on the modern electrical gadgets. These modern innovations in technology will certainly require specialized skills which these graduates did not pass through during their training. It is against this background the researchers embarked on a study to determine the technological skills improvement needs required for effective maintenance and repairs of electrical equipment by technical college graduates in Adamawa State.

#### **Purpose of the Study**

The main purpose of this study was to determine the perception of employers and technical college graduates on skills improvement needs in electrical equipment maintenance and repairs required by technical college graduates in Adamawa state. Specifically, the study sought to:

1. Determine the skills improvement needs required in electrical machine winding by technical college graduates in Adamawa State.
2. Determine the skills improvement needs required in domestic electrical wiring by technical college graduates in Adamawa State.
3. Determine the skills improvement needs required in industrial electrical wiring by technical college graduates in Adamawa State.

#### **Research Questions**

The following research questions were used to guide the study.

1. What are the skills improvements needs in maintenance and repairs of machine winding by technical college graduates in Adamawa State?
2. What are the skills improvements needs in maintenance and repair of domestic

electrical wiring by technical college graduates in Adamawa State?

3. What are the skills improvements needs in maintenance and repairs of industrial electrical wiring by technical college graduates in Adamawa State?

#### **Hypotheses**

Ho<sub>1</sub>: There is no significance difference between the mean ratings of employers and technical college graduates on skills improvement needs in electrical machine winding.

Ho<sub>2</sub>: There is no significance difference between the mean ratings of employers and technical college graduates on skills improvement needs in domestic wiring.

Ho<sub>3</sub>: There is no significance difference between the mean ratings of employers and technical college graduates on skills improvement needs in industrial wiring.

#### **METHODOLOGY**

The design of this study was a descriptive survey design. According to Alio (2008), a descriptive survey is one in which a group of people or items are studied by collecting and analyzing data from only a few people or items (sample) considered to be representative of the entire group. This research design was considered appropriate for this study as it allowed for respondents' perception on the skills improvement needs of graduates of technical colleges in electrical equipment maintenance and repairs of in Adamawa State.

The area of the study is Adamawa state. All the three State owned Government science and technical colleges in Adamawa state were used for the study and these are Government science and technical colleges Yola, Mubi and Numan. The target population of the study was 348 respondents of Electrical Engineering trade graduates from 2010 to



2017 and all the employees (both private and public) in Adamawa State. A structured questionnaire titled: Perception of Employers and Graduates of Technical Colleges on Skills Improvement Needs in Electrical Equipment Maintenance and Repairs Questionnaire (PEGTCSINEEMRQ) developed by the researcher was used as for data collection. The questionnaire was divided into two section, A and B. Section A addressed the personal data of the respondent; while Part B was divided into part I, II and III with each part addressing

the research questions. The data collected was through the administration of the questionnaire and was analyzed using descriptive statistics and independent sample t-test at 0.05 level of significance.

## RESULTS

**Research Question One:** What are the skills improvements needs in electrical machine winding by technical college graduates in Adamawa State?

**Table 1:** Mean and Standard Deviation of Employers and Technical College Graduates on Skills Improvements Needs in Machine Winding

| S/NO | ITEMS   | Respondents |            |                |            |             |            | RMK    |
|------|---|-------------|------------|----------------|------------|-------------|------------|--------|
|      |   | $N_E = 31$  |            | $N_{TCG} = 83$ |            | $N_T = 114$ |            |        |
|      |   | $\bar{x}_E$ | $\sigma_E$ | $\bar{x}_T$    | $\sigma_T$ | $\bar{x}_M$ | $\sigma_G$ |        |
| 1.   | Identify tools used in winding electrical machines                        | 4.10        | 0.75       | 3.81           | 0.59       | 3.89        | 0.65       | Needed |
| 2.   | Correct selection of tools  | 3.32        | 0.48       | 4.13           | 0.73       | 3.91        | 0.76       | Needed |
| 3.   | Ability to prepare types of winding drawings                              | 3.06        | 0.25       | 4.49           | 0.92       | 4.11        | 1.02       | Needed |
| 4.   | Ability to interpret types of winding drawings                            | 4.00        | 0.00       | 3.98           | 0.22       | 3.98        | 0.19       | Needed |
| 5.   | Ability to apply types of winding drawings                                | 3.81        | 0.60       | 3.92           | 0.80       | 3.89        | 0.75       | Needed |
| 6.   | Ability to carry out maintenance on a faulty parts of electrical machines | 3.94        | 1.46       | 3.88           | 1.12       | 3.89        | 1.21       | Needed |
| 7.   | Ability to dismantle machines for rewinding using extractor               | 3.00        | 0.00       | 3.72           | 0.48       | 3.53        | 0.52       | Needed |
| 8.   | Ability to assemble machines using appropriate tools                      | 2.39        | 1.02       | 4.46           | 1.16       | 3.89        | 1.45       | Needed |
| 9.   | Ability to locate position of brushes                                     | 4.00        | 0.00       | 3.98           | 0.22       | 3.98        | 0.19       | Needed |
| 10.  | Ability to differentiate types of conductors used in winding              | 4.00        | 0.00       | 4.06           | 0.94       | 4.04        | 0.80       | Needed |
| 11.  | Proper identification of classes of insulating materials                  | 3.84        | 0.90       | 4.11           | 1.21       | 4.04        | 1.14       | Needed |
| 12.  | Ability to fix winding coils in their slots                               | 4.52        | 1.03       | 3.93           | 0.56       | 4.09        | 0.76       | Needed |
| 13.  | Ability to prepared data to connect winding                               | 3.74        | 0.93       | 4.10           | 0.73       | 4.00        | 0.80       | Needed |
| 14.  | Ability to apply varnish  | 3.39        | 1.09       | 3.81           | 0.59       | 3.69        | 0.78       | Needed |
| 15.  | Ability to carry out tests on completed winding work                      | 4.06        | 0.51       | 3.65           | 1.11       | 3.76        | 1.00       | Needed |
| 16.  | Ability to determine coil span per pitch, per phase, per pole             | 3.81        | 0.60       | 3.80           | 0.60       | 3.80        | 0.60       | Needed |



| S/NO | ITEMS  | Respondents         |            |                       |            |                      |            | RMK           |
|------|--|---------------------|------------|-----------------------|------------|----------------------|------------|---------------|
|      |  | N <sub>E</sub> = 31 |            | N <sub>TCG</sub> = 83 |            | N <sub>T</sub> = 114 |            |               |
|      |  | $\bar{x}_E$         | $\sigma_E$ | $\bar{x}_T$           | $\sigma_T$ | $\bar{x}_M$          | $\sigma_G$ |               |
| 17   | Ability to skim/undercut armature/commutator/slip ring   | 3.29                | 1.16       | 3.67                  | 0.99       | 3.57                 | 1.05       | Needed        |
| 18   | Ability to identify different winding paths by inspection                                      | 3.29                | 1.07       | 3.60                  | 1.04       | 3.52                 | 1.05       | Needed        |
| 19   | Detect bad ball bearing  | 4.29                | 0.78       | 3.77                  | 0.90       | 3.91                 | 0.90       | Needed        |
| 20   | Conduct proper test to ensure that the maintenance parts of machines in good working condition | 2.71                | 1.60       | 4.72                  | 5.70       | 4.18                 | 1.01       | Needed        |
| 21   | Proper application of grease to the appropriate machine parts                                  | 4.48                | 0.93       | 3.57                  | 1.01       | 3.82                 | 1.07       | Needed        |
| 22   | Use of Merger to test insulation resistance of a machine                                       | 4.55                | 0.93       | 3.72                  | 1.39       | 3.95                 | 1.33       | Needed        |
| 23   | Ability to carry out test-run of machine ensuring correct rotation                             | 3.94                | 0.57       | 3.87                  | 1.37       | 3.89                 | 1.20       | Needed        |
| 24   | Conducting appropriate tests to manufacturers specification                                    | 4.26                | 0.93       | 3.28                  | 1.23       | 3.54                 | 1.23       | Needed        |
| 25   | <b>AVERAGE</b>   | <b>3.74</b>         |            | <b>3.92</b>           |            | <b>3.87</b>          |            | <b>Needed</b> |

$N_E$  = Number of Employers,  $N_{TCG}$  = Number of Technical College Graduates,  $N_T$  = Total Number of respondents,  $\bar{x}_E$  = Mean of Employers,  $\bar{x}_T$  = Mean of Technical College Graduates,  $\bar{x}_G$  = Grand Mean,  $\sigma_E$  = Standard Deviation of Employers,  $\sigma_T$  = Standard Deviation of Technical College Graduates,  $\sigma_G$  = Grand Standard Deviation

standard deviation of 1.07 by the technical college graduates indicated that all of the 24 items were needed. This implies that both employers and graduates of technical college graduates indicated that for effective performance graduates of electrical engineering trade needed retraining in the skills identified in electric machine winding.

From the 21 items presented on Table 1, all of the items were rated as needed by employers with grand mean response of 3.74 and standard deviation of 0.73 by employers and a grand mean of 3.92 and

**Research Question Two:** What are the skills improvements needs in domestic electrical wiring by technical college graduates in Adamawa State?

**Table 2:** Mean and Standard Deviation of Employers and Technical College Graduates on Skills Improvements Needs in Domestic Electrical Wiring

| S/NO | ITEMS   | Respondents         |            |                       |            |                      |            | RMK    |
|------|---|---------------------|------------|-----------------------|------------|----------------------|------------|--------|
|      |   | N <sub>E</sub> = 31 |            | N <sub>TCG</sub> = 83 |            | N <sub>T</sub> = 114 |            |        |
|      |   | $\bar{x}_E$         | $\sigma_E$ | $\bar{x}_T$           | $\sigma_T$ | $\bar{x}_G$          | $\sigma_G$ |        |
| 26.  | Take into consideration the IEE regulation required for surface wiring. | 4.00                | 0.00       | 3.45                  | 1.22       | 3.60                 | 1.07       | Needed |
| 27.  | Make accurate sketches and drawings of electrical circuit               | 4.35                | 0.80       | 3.60                  | 1.16       | 3.81                 | 1.12       | Needed |
| 28.  | Select appropriate electrical components to be used for installation.   | 3.84                | 0.78       | 3.86                  | 1.12       | 3.85                 | 1.03       | Needed |





| S/NO | ITEMS  | Respondents         |            |                       |            |                      |            | RMK           |
|------|--|---------------------|------------|-----------------------|------------|----------------------|------------|---------------|
|      |  | N <sub>E</sub> = 31 |            | N <sub>TCG</sub> = 83 |            | N <sub>T</sub> = 114 |            |               |
|      |  | $\bar{x}_E$         | $\sigma_E$ | $\bar{x}_T$           | $\sigma_T$ | $\bar{x}_G$          | $\sigma_G$ |               |
| 29.  | Select appropriate tools and equipment for installation of the electrical wiring | 3.74                | 1.03       | 3.46                  | 1.02       | 3.54                 | 1.02       | Needed        |
| 30.  | Identification of electrical wiring accessories                                  | 3.90                | 0.83       | 3.54                  | 1.20       | 3.64                 | 1.12       | Needed        |
| 31.  | Identification of cable size   | 3.35                | 1.14       | 3.88                  | 0.76       | 3.74                 | 0.90       | Needed        |
| 32.  | Identification of single and three phase wiring system                           | 3.81                | 0.87       | 3.90                  | 1.02       | 3.88                 | 0.98       | Needed        |
| 33.  | Use suitable earthing system to prevent electric shock.                          | 4.39                | 1.02       | 3.89                  | 1.13       | 4.03                 | 1.12       | Needed        |
| 34.  | Connect suitable protective devices such as fuses and circuit breakers           | 3.48                | 0.77       | 3.82                  | 0.50       | 3.73                 | 0.60       | Needed        |
| 35.  | Installation of distribution board (D6 and D12)                                  | 4.61                | 0.50       | 3.77                  | 0.95       | 4.00                 | 0.93       | Needed        |
| 36.  | Installation of fans and lightings   | 3.84                | 1.04       | 3.55                  | 1.07       | 3.63                 | 1.07       | Needed        |
| 37.  | Installation of socket outlet  | 4.32                | 0.48       | 3.51                  | 0.74       | 3.73                 | 0.77       | Needed        |
| 38.  | Ability to carry out testing for continuity                                      | 4.23                | 0.88       | 3.75                  | 0.78       | 3.88                 | 0.83       | Needed        |
| 39.  | Measuring and marking out  | 4.13                | 0.72       | 3.64                  | 0.73       | 3.77                 | 0.75       | Needed        |
| 40.  | Plan the layout of electrical installation                                       | 4.29                | 0.74       | 3.78                  | 0.83       | 3.92                 | 0.83       | Needed        |
| 41.  | Carry out maintenance on distribution board                                      | 3.87                | 0.92       | 4.25                  | 1.06       | 4.15                 | 1.03       | Needed        |
| 42.  | <b>AVERAGE</b>   | <b>4.01</b>         |            | <b>3.73</b>           |            | <b>3.81</b>          |            | <b>Needed</b> |

Table 2 has sixteen (16) items. The employers' grand mean response of 4.01 and standard deviation of 0.78 indicated that all the items were rated as needed by graduates of technical colleges. In the same vein, with grand mean response of 3.73 and standard deviation of 0.96, by the technical college graduates indicated that all the items were rated as needed. Accordingly, with a grand mean of 3.81 and standard deviation of 0.95, the respondents rated all of the 16 listed items as skills improvement

needed by the technical college graduates in domestic electrical wiring in Adamawa State. This implies that graduates of technical college graduates need retraining on the aspect of skills identified in electric machine winding.

**Research Question Three:** What are the skills improvements needs in Industrial Electrical Wiring by technical college graduates in Adamawa State?



**Table 3:** Mean and Standard Deviation of Employers and Technical College Graduates on Skills Improvements Needs in Industrial Electrical Wiring

| S/NO | ITEMS  | Respondents         |            |                       |            |                      |            | RMK    |
|------|--|---------------------|------------|-----------------------|------------|----------------------|------------|--------|
|      |  | N <sub>E</sub> = 31 |            | N <sub>TCG</sub> = 83 |            | N <sub>T</sub> = 114 |            |        |
|      |  | $\bar{x}_E$         | $\sigma_E$ | $\bar{x}_T$           | $\sigma_T$ | $\bar{x}_G$          | $\sigma_G$ |        |
| 43.  | Identification of Mineral Insulated Copper-clad Cable (MICC) cables                                  | 4.10                | 0.54       | 3.77                  | 0.69       | 3.86                 | 0.66       | Needed |
| 44.  | Correct selection of tools materials used in the installation of Mineral Insulated Copper-clad Cable | 4.23                | 1.09       | 3.60                  | 0.75       | 3.77                 | 0.89       | Needed |
| 45.  | Carry out of Mineral Insulated Copper-clad Cable (MICC) installations observing relevant regulations | 4.19                | 0.98       | 3.77                  | 1.14       | 3.89                 | 1.11       | Needed |
| 46.  | Termination of Mineral Insulated Copper-clad Cable (MICC) emphasizing IEE regulation                 | 2.87                | 0.88       | 4.05                  | 1.32       | 3.73                 | 1.32       | Needed |
| 47.  | Conducting various test on of Mineral Insulated Copper-clad Cable (MICC)                             | 2.61                | 0.72       | 3.94                  | 0.67       | 3.58                 | 0.90       | Needed |
| 48.  | Ability to carry out simple surface wiring for industrial installation                               | 4.06                | 1.15       | 4.05                  | 0.81       | 4.05                 | 0.91       | Needed |
| 49.  | Ability to carry out conduit wiring system for industrial installation                               | 3.06                | 0.89       | 4.11                  | 1.02       | 3.82                 | 1.09       | Needed |
| 50.  | Ability to carry out trunking wiring system in industry  | 3.68                | 1.01       | 3.99                  | 0.37       | 3.90                 | 0.62       | Needed |
| 51.  | Ability to carry out duck wiring system in the industry  | 2.58                | 1.18       | 3.84                  | 0.92       | 3.50                 | 1.14       | Needed |
| 52.  | Ability to join cables in industrial wiring  | 4.35                | 1.20       | 3.69                  | 1.11       | 3.87                 | 1.17       | Needed |
| 53.  | Ability to install air condition in industry   | 3.58                | 1.12       | 3.72                  | 1.07       | 3.68                 | 1.08       | Needed |
| 54.  | Maintenance of push buttons in industry  | 4.13                | 0.99       | 3.72                  | 1.13       | 3.83                 | 1.10       | Needed |
| 55.  | <b>AVERAGE</b>   | <b>3.62</b>         |            | <b>3.85</b>           |            | <b>3.79</b>          |            |        |

From Table 3 above, twelve (12) items were identified as skills improvements needs of technical college graduates in Industrial Electrical Wiring. The grand mean of the items rated by the employers was 3.62 and standard deviation of 0.98, this implies that the skills itemized were needed. This is similar to that of

technical college graduates whose grand mean is 3.85 and standard deviation of 0.92 also indicating that the graduates needed retraining in those areas identified. This implies that the graduates of technical college graduates need retraining on the aspect of skills identified in electric industrial wiring.





**Hypothesis one:** There is no significance difference between the mean ratings of employers and technical college graduates on skills improvement needs in electrical machine winding.

**Table 4:** t – test Statistical Analysis of Difference between the Mean Rating of Employers and Technical College Graduates on the Skills Improvement Needs in Electrical Machine Winding

| Respondents                 | N  | $\bar{x}$ | S.D  | df  | t     | P – value | Remark                    |
|-----------------------------|----|-----------|------|-----|-------|-----------|---------------------------|
| Employers                   | 31 | 3.31      | 0.55 | 112 | 3.527 | 0.001     | Uphold<br>H <sub>01</sub> |
| Technical College Graduates | 83 | 2.99      | 0.37 |     |       |           |                           |

P > 0.05 N= Number of respondents, S.D = Standard Deviation

Table 4 shows the independent sample t-test analysis of hypothesis 1. From the table, employers had a mean of 3.32 and standard deviation of 0.55 and the technical college graduates had a mean rating of 2.99 and standard deviation of 0.37. The p-value is p=0.001 < 0.05 at 112 degree of freedom. Thus, as p-value is less than the alpha value of 0.05, the null hypothesis is accepted. This

means that there was significance difference between the mean ratings of employers and technical college graduates on skills improvement needs in electrical machine winding.

**Hypothesis Two:** There is no significance difference between the mean ratings of employers and technical college graduates on skills improvement needs in domestic wiring.

**Table 5:** t – test Statistical Analysis of Difference between the Mean Rating of Employers and Technical College Graduates on the Skills Improvement Needs in Domestic Wiring

| Respondents                 | N  | $\bar{x}$ | S.D  | df  | t     | P – value | Remark                    |
|-----------------------------|----|-----------|------|-----|-------|-----------|---------------------------|
| Employers                   | 31 | 3.32      | 0.48 | 112 | 2.848 | 0.005     | Uphold<br>H <sub>02</sub> |
| Technical College Graduates | 83 | 3.06      | 0.41 |     |       |           |                           |

P > 0.05 N= Number of respondents, S.D = Standard Deviation

The result of table 5 indicates that the employers had a mean of 3.32 and standard deviation of 0.48 and the technical college graduates had a mean rating of 3.06 and standard deviation of 0.41. The p-value is p=0.005 < 0.05 at 112 degree of freedom. Thus, as p-value is less than the alpha value of 0.05, the null hypothesis was upheld. This means that there is no significance difference between the mean

ratings of employers and technical college graduates on skills improvement needs in domestic wiring.

**Hypothesis Three:** There is no significance difference between the mean ratings of employers and technical college graduates on skills improvement needs in industrial wiring.



**Table 6:** t – test Statistical Analysis of Difference between the Mean Rating of Employers and Technical College Graduates on the Skills Improvement Needs in Industrial Wiring

| Respondents                 | N  | $\bar{X}$ | S.D  | df  | t     | P – value | Remark          |
|-----------------------------|----|-----------|------|-----|-------|-----------|-----------------|
| Employers                   | 31 | 3.21      | 0.42 | 112 | 1.421 | 0.158     | reject $H_{03}$ |
| Technical College Graduates | 83 | 3.06      | 0.50 |     |       |           |                 |

P > 0.05 N= Number of respondents, S.D = Standard Deviation

The result depicted on table 6 shows that the employers had a mean of 3.21 and standard deviation of 0.42 and the technical college graduates had a mean rating of 3.06 and standard deviation of 0.50. The p-value is  $p = 0.158 > 0.05$  at 112 degree of freedom. Thus, as p-value is greater than the alpha value of 0.05, the null hypothesis is rejected. This means that there is significance difference between the mean ratings of employers and technical college graduates on skills improvement needs in industrial wiring.

#### FINDINGS OF THE STUDY

1. Technical college graduates of Adamawa State need retraining to advance their skills on electrical machine winding. The grand mean of the 24 skills identified is 3.87.
2. Technical college graduates of Adamawa State needs retraining to improve their skills on domestic electrical wiring. The grand mean of the 16 skills identified is 3.81
3. Technical college graduates of Adamawa State needs retraining to further improve their competencies on industrial electrical wiring. The grand mean of the 12 skills identified is 3.79.
4. There is no significance difference between the mean ratings of employers and technical college graduates on skills improvement needs in electrical machine winding

5. There is no significance difference between the mean ratings of employers and technical college graduates on skills improvement needs in domestic electrical wiring
6. There is significance difference between the mean ratings of employers and technical college graduates on skills improvement needs in industrial wiring.

#### DISCUSSION OF FINDINGS

The study revealed that technical college graduates of Adamawa State needs retraining to advance their skills on electrical machine winding. The grand mean of the 24 skills identified is 3.87. This finding is in agreement with Dagogo, (2014) who asserted that competencies on the part of technical college graduates in machine winding include ability to identify the size of wire needed for a given winding to produce the required efficiency. The finding further coincided with the report of Onoh and Onyebuenyi (2017) who reported that technical college graduates needed to improve their skills in machine winding as what is obtained in schools cannot make them compete favorably in the labour market or enable them to be self-reliant.

The finding based on research question two revealed that Technical College graduates of Adamawa State needs retraining to improve their skills on domestic electrical wiring. The grand mean of the 16 skills identified is 3.81. This



finding is in agreement with Okechukwu and Reagan (2016) who reported that skills possessed by technical college graduates are supposed to be equipped with the required knowledge in other for them to fit into the world of work but recent development in technology has rendered some of the techniques irrelevant and as such an improvement is needed by technical college graduates in domestic electrical wiring. Furthermore, in support of this finding, Bakare (2017) maintained that skills possessed needed to be improved upon on intervals to enable it functionality at all times.

The finding of the study revealed that Technical College graduates of Adamawa State needs retraining to further improve their competencies on industrial electrical wiring. The grand mean of the 12 skills identified is 3.79. The finding is in agreement with Ehimen and Ezeora (2018) who reported that employers prefer workers that have skills on the job. Ehimen and Ezeora further stated that skills such as termination of Mineral Insulated Copper-clad Cable and installation on conduits are very vital to industries. To further buttress the finding, Onoh and Onyebuanyi (2017) reported that industries require manpower that is knowledgeable in the field as the training needs is limited.

The findings revealed that there is significance difference between the mean ratings of employers and technical college graduates on skills improvement needs in electrical machine winding. This finding is in contrast with Bakare (2017) who examine the opinions of industrialist and engineering graduates of polytechnics on the competences needed of the graduates and found out that there was no significant difference in their opinions. The finding is also supported by the work of Ehimen and Ezeora (2018) who reported that graduates

and students were of the same view on the competences needed of them.

The finding of the study revealed that there is significance difference between the mean ratings of employers and technical college graduates on skills improvement needs in domestic electrical wiring. This finding is in contrast with the finding of Ogbuanya (2009) who reported that technical college graduates are expected to fill the gap of the needed manpower in the industries and as such there was no significant difference in the opinions of the graduates and employers of labour on the need manpower skills in the industry.

The study reveal that there is no significance difference between the mean ratings of employers and technical college graduates on skills improvement needs in industrial wiring. this finding is in agreement with Promise (2018) who reported that there is no significance difference between the mean ratings of industrialist, practicing technical college graduates and technical college student on skills improvement needs in electrical industrial winding. Furthermore, in support of the finding, Onyebuanyi (2017) reported that the respondent were of the same opinion on the skill required in the repair and maintenance of industrial fittings.

## CONCLUSION

Based on the findings of the study it was concluded that technical college graduates of electrical engineering trade of Adamawa State needs retraining programs in electrical machine winding, electrical domestic wiring and electrical industrial wiring.

## RECOMMENDATIONS

1. Retraining workshop should be organized by Nigerian Society of Engineers (NSE) for technical college



- graduates to enhance their skills in electrical machine winding.
2. Industries should collaborate with the state government to organize a retraining program for technical college graduates on domestic and industrial electrical wiring.
  3. Graduates of electrical engineering trade should be encouraged to start their television repair firms by providing the graduates with a starter-pack such as tools and equipment

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