



Improving Practical Skills Required By Students Of EIM Work Trade Of Science And Technical Colleges In Gombe State, Nigeria

Umar Ibrahim¹, Ishaya Tumba² and Zakari Isiyaku M.³

¹Gombe State Ministry of Education, Gombe - Nigeria..

²Department of Electrical Technology Education,
Modibbo Adama University, Yola Adamawa State-Nigeria

³Gombe State Ministry of Education, Gombe, - Nigeria..

Correspondence Address: email:-ibistronix1623@gmail.com, (+2347039634092)

ABSTRACT

The purpose of this study was to “Improving Practical Skills Required by Students of EIM Work Trade of Science and Technical Colleges in Gombe State”, this to enhance their employability chances after graduation with a view to find out new optimizing practical skills required among students. The study was guided by two research questions and two null hypotheses. A descriptive survey was used as the design of the study. The population of the study comprised 35 Teachers and 35 Electrical Technicians making a total of 70 respondents. The entire population of 70 was used as the sample for the study. A structured questionnaire tagged I-PREIM Questionnaire, was used for data collection. The questionnaire has 47 items with two sections. The instrument was validated by three experts in the Department of Electrical Technology, Modibbo Adama University, Yola, Adamawa State Nigeria, and it was trial-tested on 10 respondents for internal consistency using Cronbach Alpha (α) method. The reliability coefficient of the entire instrument was 0.90. The researchers with the help of three research assistants administered the instrument. The data for the study were analyzed using Grand Mean, and t-test statistical methods. The findings of the study include among others; learning improved skills in Domestic Installation and Industrial Installation, in order for them to be employed or be self-dependent after graduation. This study also reveals that both EIM Work Trade Teachers and Electrical Technicians in both the two areas of EIM Work Trade have the same opinion that almost all the skills are required by the students to enhance their employability after graduation. It was concluded among others that the students of Electrical Installation and Maintenance Practice needed improvement for work skills. Based on the findings of the study the following recommendations were made; The identified work skills need to be reviewed by the National Board for Technical Education (NBTE) as they make provision for other skills demanded by the society to be included in the curriculum, Emphases should be laid on practicals while as a student. The following skills were also recommended to improve those skills required by the students; Solar Installation and Maintenance, DC Wiring and Maintenance, Connection of a Change-Over switch for a stand-by generator, Installation of Water Pump, Connection of Energy Meter of single and three phase systems, Installation of Ceiling Fan etc.

Keywords: Electrical Installation and Maintenance Work Trade, Domestic Installation, Industrial Installation, EIM Work Trade Teacher, Electrical Technician.

INTRODUCTION

Technical and Vocational Education and Training (TVET) as used in a comprehensive terms refers to those aspect of the educational process, involving, in addition to general education, the study of technologies and related sciences and the acquisition of practical skills, attitudes, understanding and knowledge relating to occupations in various sectors of economic and social life, (Odika & Tom 2020). This type of education is what takes place in technical colleges where the three domains of learning exist (i.e. cognitive, affective and psychomotor). According to FRN (2014), the goals of the TVET shall be to:

- a) provide trained manpower in the applied science, technology and business particularly at craft, advance craft and technical levels;
- b) provide the technical knowledge and vocational skills necessary for agricultural, commercial and economic development; and
- c) give training and impart the necessary skills to individuals for self-reliance economically.

To achieve the TVET objectives, Technical Collages are established. Technical colleges are institutions which provide students through training with relevant and adequate knowledge, skills and attitudes for employment under the guidelines of a teacher in related occupations. Technical Colleges are post-primary institutions where students obtain full vocational training that will enable them acquire relevant skills and attitudes for paid or self-employment in various occupations in the world of work, Odika and Tom (2020). Technical Colleges in Nigeria are established to prepare individuals to acquire practical skills and basic scientific knowledge for entry into various occupations. According to Federal Republic of Nigeria (FRN 2014), Technical Colleges in Nigeria are established to train students in vocational courses such as Auto-mechanics, Plumbing, Electrical Installation and Maintenance Practice, Computer Craft Practice, Woodwork, Block laying, Bricklaying and Concreting trade to mention just a few. One of the electrical engineering trades offered in technical colleges is Electrical Installation and Maintenance (EIM) Work, which comprises of three modules, namely:

1. Domestic and Industrial Installation,
2. Cable jointing and battery charging
3. Winding of Electrical Machines (FRN 2014).

This study was mainly targeted to improve the practical skills required by students of Electrical Installation and Maintenance (EIM) Work Trade of Science and Technical Collages to enhance their employability after graduation in Gombe State,

The three modules were divided into five distinct courses of studies in those technical collages as; Domestic Installation and Maintenance, Industrial Installation and Maintenance, Cable Jointing, Battery Charging and Maintenance and Winding of Electrical Machines. This study is specifically targeting to:

Improve the Domestic Installation and Maintenance Work Skills required by EIM Works Trade students of Science and Technical Collages to enhance their employability after graduation in Gombe State, These skills tend to equip the students with the technical knowledge of installing electrical wiring, outlets and accessories into the residential buildings for electrical consumption. Domestic installation is “the installation that does not require heavy and special materials but for simple materials to intermediate materials to wire the various type of residential and commercial places (Manabete & Makinde, 2016).

Improve the Industrial Installation and Maintenance Work Skills required by EIM Works Trade Students of science and Technical Collages to enhance their employability after graduation in Gombe State,, these skills equip the students to install, operate and maintain industrial machines such as machine drills, lathe machines, cutting machines etc. Industrial electrical installation module is intended to provide trainee with the knowledge and skills to enable him / her carryout the types of industrial / factory electrical installations and maintenance work (Mbag, 2011).

These subjects are thought formally in technical collages under the guidance of a teacher. According to Tumba and Halliru (2016), a teacher of Electrical Installation and Maintenance (EIM) Work is the one who gives instruction and communication knowledge, skills and attitudes to EIM Work students. He is the conduit through which knowledge and practical skills of EIM Work could be transmitted to learners through the use of appropriate teaching and supervisory strategies. In addition to using learning resources, he must use relevant pedagogically. All of these will enhance student’s acquisition of practical skills

through activity-base instructions, where students are given opportunities to be more active in the class. The teacher is expected to plan his lesson properly by carefully choosing the objectives of the lesson, devising on making the learners participate in the learning process in a more responsible way, selecting the appropriate strategies of teaching, appropriate strategies for supervision as well as determining the appropriate strategies for assessment (Tumba & Halliru 2016). Such a student is expected to graduate at the end of training course in three years. In the informal sector, these five areas are thought to trainee by an expert called a Road-side Electrical Technician. A Graduate in Electrical Installation and Maintenance (EIM) Work can be referred to an individual who undergoes a three year technical training, acquired relevant skills, knowledge, attitudes and values in the technical college, satisfied the examiners and certified as an Electrical Technician. Such a trainee upon completing Technical College program shall have three options according to FRN (2014) as follows:

- I. Secure employment either at the end of the whole course or after completing one or more modules of employable skills.
- II. Set up their own businesses and become self-employed and be able to employ others.
- III. Pursue further education in post-secondary (Tertiary) technical institution such as Polytechnics, Colleges of education (Technical) and Universities.

The graduates that opted to secure their business that is to be self-employed usually open their workshops and use their skills to render services for some form of payment. The graduates who were opted to be employed usually prepared their CV and strive into the labour market seeking for job. The last segment may decide to further their studies into the tertiary education. Electrical Installation and Maintenance (EIM) Work has the aim of preparing individuals who complete the program to Install, Operate, Maintain and Repair electrically energized systems such as residential, commercial and industrial devices, also electrical wiring of DC and AC motors, generators, controls devices, and electrical distribution panels. Electrical Installation and Maintenance Work provide technical training to the demand of electrical industries and needs of the individuals allowing the students to identify their career objectives, (Ogwa, 2015).

For a graduate to succeed in the job market he requires to possess some skills added to the acquired technical skills, these are called “Employability Skills”. Employability is the combination of acquired characteristics skills, knowledge, attributes and attitudes that maximize a person's potentials to obtain retain and if necessary regain satisfactory employment. Employability is a set of achievements, skills, understanding and personal attributes that makes graduates more likely to gain employment and be successful in their chosen occupations, which benefit themselves, the workforce, the community and the economy. According to Maciej (2021), employability can be defined as the set of skills employers want from a potential employee. He further identifies ten (10) employability skills that employers needs apart from the basic technical skills as: (1) Problem-solving (2) Communication skills (3) Adaptability (4) Collaboration (5) Time management (6) Organisation (7) Technology use (8) Information use (9) Personality traits and (10) Leadership skills.

In Gombe State there are eight Science and Technical Colleges located in six local government areas of the state, established to implement the NPE Policy and ensure the attainment of the said goals and objectives. These Colleges were provided with infrastructures, but equipping the Laboratories and workshops with adequate and relevant instructional materials has become a problem. However, students’ acquisition of practical skills is necessary for the attainment of the above mentioned purposes which cannot be realized in a non-supportive school environment. This is supported by Ogbuanya (2022) who asserted that practical teaching materials available in most technical colleges in Gombe State are obsolete and not functional and consumable materials do not commensurate with students’ population, as a result of this, technical graduates are deficient in practical skill were produced over the year.

Statement of the Problem

The ultimate goal of vocational technical education training is for the acquisition of knowledge, attitude and practical skills for sustainable development, the training of vocational technical education students is based on the production of goods and services that are not only relevant to themselves but to the society (Tumba & Halliru 2016). Vincent & Udeme (2014) stated that the acquisition of life-long practical skills

calls for effective and efficient teaching strategies, appropriate evaluation methods and utilization of standard teaching materials; tools, machines, and equipment to ensure the production of desired graduates with practical skills. Other requirements include training manuals and availability of qualified teachers with experiences.

Electrical Installation and Maintenance Work program in technical colleges is designed to produce skilled craftsmen who will be able to perform basic functions in electrical installation and maintenance work both in private and public sector (FRN 2014). This calls for the necessity of acquiring high quality practical skills through the use of appropriate teaching and assessment strategies to be complemented with competent and experienced teachers, well-equipped workshops, adequate supply of teaching materials, adequate supervision of practical lessons and proper linkages between technical colleges and local industries (Mason, William & Craimer 2006). Unfortunately, practical skills acquisition in Nigerian technical colleges are battling with numerous problems among which are poor teaching strategies. Teachers in most cases use lecture method only in a programme instead of applying a variety of strategies like demonstration and discussion or guided discovery and discussion. In a similar perspective, (Isaac 2011) also reported that wrong approach to teaching and evaluation of practical subjects in technical colleges rather than impart skills to students, produce students who are ill-equipped with practical skills, inadequate creative power and unable to secure employment. EIM Work departments in technical colleges of Gombe State are no exception to this problem of learning resources that hamper with career education. A teacher of vocational and technical subject must not only teach but must use activity-based strategies (such as project and field trip methods) that will enhance students' acquisition and sustenance of knowledge, skills and self-concept formation as well as interest (Isaac 2011)

In the opinion of the researchers, students in EIM Work departments receive ineffective instruction and become weak in practical skills due to wrong approach to teaching, supervising, and assessment of students. Federal Republic of Nigeria (FRN, 2014) stressed that individuals trained in electrical installation and maintenance work in Technical Colleges in Nigeria are expected to acquire skills for manufacturing and servicing in industry, power generation, utilization and realization of goals. The realization of such goals in technical colleges in most states in the country seems to be far below expectation, this may be due to low level of exposure of students in training in practical skills in the school workshops and laboratories, inadequacy of books, learning environment, computer rooms, instructors and curriculum content, Akhuesonkhan and Raimi, (2013). The problem of inadequate skills among technical graduates initiated the expensive venture of opening training schools in many industries where fresh graduates are being trained (NICHE, 2010). It further posits that the training of technical students has been very theoretical. Another problem is the mismatch between the theory and demand of the labour market, (Hadromi, 2018). Consequently, graduates tend to shy away from taking up employment where they might be called upon to demonstrate their skills, because they were not exposed to work-based instructions during their learning activities in schools. These lapses could be responsible for ill-equipped graduates who have remained unemployed, because graduates of technical institutions need the appropriate skills and practical knowledge for the production of goods and services in industries or work force. Therefore, improving the required skills and increasing the employability chances in either of these various aspects is one of the fundamental factors to the technical college students that the diverse employers needs through acquisition of relevant technical skills. Since global technology advancement lead to the use of electricity in various homes, offices, industries, institutions as well as many aspect of human endeavour.

Another problem is the too much complaints from the students that some skills were not though during the school programme. According to unpublished verbal interview so far conducted by a Gombe Media Corporation (GMC) Gombe reporter Baban-Kawu Babayo Hashidu (2020), with some of the Technical College Graduates in the State at their sent-forth party, the skills acquired by the technical college graduates in Gombe State needs to be improved as most of the graduates of technical colleges are complaining of lack of training and incompetency, which letter leads them to become unemployed nor self-reliant.

Another problem is the too much complaints from the employers of labour on the level of skills acquired by Electrical Graduates. In its effort to reduce the problems of skill acquisition among technical college graduates, the Lafarge Africa Plc Director of Communications, Public Affairs and Sustainable Development, Mrs. Ambrose F.M in Kingsley (2017), Lafarge Africa Plc launches a skill acquisition program titled the “Dearth of Artisans” for youths from the area and Gombe State as beneficiaries, those who took part were trained in automation, electrical and mechanical skills and were awarded a Diploma Certificates after the 18-month programme, the certificates awarded after the programme was accredited by NBTE and valid for admission into Nigerian universities”, Mrs. Ambrose also said, by this programme, the company is contributing its quota to addressing the issue of untrained artisans and technicians from the various technical collages in the housing and construction industry. She added that “These youths that we are training eventually will become self-sufficient and are able to support the local economy.

Unemployment in Nigeria can be a major problem that has bewildered the economic and educational systems. For the economy, unemployment means wasted work force and the loss of the potential for production of goods and services. Mrs. Ambrose in Kingsley (2017), disclosed that the youth unemployment is a major issue in Nigeria, pointed out that the rate of unemployment among Nigerians aged between 15 and 25 years was 25.2% in 2016, according to the Nigeria Bureau of Statistics NBS. She said for young Nigerians who form the bulk of the population, securing a decent paying job is a difficult task, adding that the dwindling standards of education due to poor funding means a number of graduates from technical and tertiary institutions do not have the requisite skills for employment. The economic situation in Gombe State and the resultant massive of unemployment, calls for real emphasis on the need for every technical college graduates of EIM Work Trade to strive towards self-reliance through self-employment. Unemployment can be one of the major setback especially among school leavers and graduates of technical collages and tertiary institutions; this can be one of the fundamental challenges threatening the economic development of Gombe State and Nigeria at large, and it’s one of the main issues that prompt the researcher to embark into this study.

It is now evident that the importance of this study cannot be over emphasized since it has a direct link with solving the problems of youth unemployment which has jeopardised the peace and economy as well as improving the quality of productivity of technical colleges in Gombe State. If this study were not appropriately conducted, the technical colleges in Gombe State will remain the productive institutions of quack and incompetent craftsmen and technicians that can always become a threat to the society. On the other hand, if this study were properly conducted, peace shall reign in Gombe paving way for graduates to strive into the labour market and succeed because necessary skills had been acquired. Therefore it’s highly imperative to improve the technical skills acquired by electrical graduates of technical collages in electrical installation and maintenance work trade in Gombe State so as to increase their chances of becoming employable as self-dependence or paid employment. This research work will suggest some technical skills that will improve the practical skills required by technical college students of electrical installation and maintenance work trade which might have been low due to inadequate instructional materials and accessories, inadequate electrical hand tools and machineries in the school laboratories, limited time frame for the instructional or practical lessons, low students-equipment ratio per session, lack of readiness and passion of the trade from the students etc. Hence, improving students’ acquisition of practical skills in Electrical Installation and Maintenance Work trade in technical colleges are important factor for acquiring high quality practical skills. It is therefore important to investigate some sets of skills that will bring forth appreciable improvement in the acquisition of practical skills among the students of EIM Work trade in the eight technical colleges of Gombe State. From the above overview, it has come to the mind of the researcher that, the technical college graduates seeking employment couldn't secure the job nor establish their own businesses because they lack the needed skills and competences to become self-dependents, hence, it becomes very important to conduct this study.

Purpose of the Study

The major purpose of this study was to find out ways to improve the electrical installation and maintenance work skills required by technical college students so as to enhance their employability chances after graduation in Gombe State, specifically, the study determined the:

1. Domestic installation skills required by EIM Work Trade students to enhance their employability after graduation in Gombe State.
2. Industrial installation skills required by EIM Work Trade students to enhance their employability after graduation in Gombe State.

Research Question

The following questions were formulated to guide the study.

1. What are the Domestic Installation Skills required by EIM Work Trade students to enhance their employability after graduation in Gombe State?
2. What are the Industrial Installation Skills required by EIM Work Trade students to enhance their employability after graduation in Gombe State?

Hypotheses

The following null hypotheses were formulated for this study and were tested at 0.05 level of significance.

HO1: There is no significant difference between the mean responses of EIM Work Trade Teachers and Electrical Technicians on the Domestic Installation skills required by EIM Work students to enhance their employability after graduation.

HO2: There is no significant difference between the mean responses of EIM Work Trade Teachers and Electrical Technicians on the Industrial Installation skills required by EIM Work students to enhance their employability after graduation.

1.6 Scope of the Study The study was restricted to improving practical skills required by Students of EIM Work Trade of Science and Technical Colleges in Gombe State, Nigeria that will enhance their employability in after graduation. EIM Work Teachers and Electrical Technicians from the various workforces were involved in this study. The study covered practical skills required to enhance the employability of the students when they face the workforce after school training programme in vocational and technical education. Only fifteen (15) improving skills were identified.

RESEARCH METHODOLOGY

Design of the Study

A Descriptive Survey Research Design were used for this study, this is because, Okpala (2006), stated that, survey design is used in a situation where the study employs the use of questionnaire to determine opinions, characteristic, perceptions, preferences, and attitudes of people about an issue. The descriptive survey design is considered most appropriate for this study since it sought to find out the actual characteristics and opinions of respondents by improving on the skills the students of electrical installation required from electrical Installation and Maintenance Work Departments of the various Science and Technical Colleges in Gombe State, by the use of a well-structured questionnaire.

Area of the Study

The area of the study is Gombe State of Nigeria. Gombe State is a state in the northeastern Nigeria, bordered to the north and northeast by the states of Borno and Yobe, to the south by Taraba State, to the southeast by Adamawa State, and to the west by Bauchi State. Gombe State was formed from a part of Bauchi State on October 1, 1996, with geographical coordinates of 10°15'N 11°10'E. In Nigeria, Gombe is the 21st largest in area with a total area of 18,768km² and the 32nd most populous, with an estimated population of about 3.25 million as of 2016. The State has eleven Local Governments Areas; Akko, Balanga, Billiri, Dukku, Funakaye, Gombe, Kaltungo, Kwami, Nafada, Shongom and YamaltuDeba. The state has a concentration of industries and government parastatals as the employers of labour, eight science and technical colleges and adequate personnel to be used for the study. The science and technical colleges are; GSTC Gombe in Gombe LGA, GSTC Amada, GSTC Barunde and GSTC Kumo in Akko

LGA, GSTC Deba in YamaltuDeba LGA, GSTC Kwami in Kwami LGA, GSTC Tula in Kaltungo LGA and GSTC Tanglang in Billiri LGA.

Population for the Study

The population of this study was 78 respondents, which comprises of 38 Electrical Teachers from the colleges and 40 Electrical Technicians from various Industries and Government parastatals that specialized in electrical works. The population was obtained from the Gombe State Ministry of Education and Electrical Installation and Maintenance Association (ELWIA) which includes; The eight Colleges, Engineering Departments of Gombe States Ministries of Works and Transports, Health, Science and Technology, Housing and Regional Planning, as well as DEKIT Construction LTD, ASHAKA Cement Plc, JAHIN Contractor Nigerian LTD, NADABO Engineering and Technical Services (NETS) Nigerian Ltd, LUBEL Building Construction and lastly Electrical Installation and Maintenance Association (ELWIA) Skills Acquisition Center.

Instrument for Data Collection

The instrument used for data collection was a structured questionnaire tagged “Improving Practical Skills Required by Students of EIM Work Trade of Science and Technical Colleges in Gombe State” abbreviated as I-PREIM Questionnaire which seeks the opinions of the electrical teachers and technicians on the employability skills required by the electrical students, this instrument was developed by the researchers after the review of related literature. The I-PREIM Questionnaire comprises of three sections (A - C). Section A comprises two items seeking information on personal data of the respondents. Section B has 20 items which was designed to find out the Domestic Installation skills that can enhance the employability of electrical students after graduation. Sections C were designed to find out the Industrial Installation skills that can enhance the employability of electrical students, consisting of 27 items. A total of 47 items of I-PREIM Questionnaire had been formulated base on a five-point likert’s rating scale. The response categories for Sections 'B', and 'C', are; Very Highly Required (VHR), Highly Required (HR), Moderately Required (MR), Slightly Required (SR) and Very Slightly Required (VSR). These responses were assigned numerical values of 5, 4, 3, 2, and 1 respectively. The respondents were required to check (√) against the response category that best satisfies their opinion.

Validation of the Instrument

To ensure that the instrument has measured the characteristics it supposed to measure, the Instrument has been subjected to face and content validation by three lecturers in the Department of Electrical Technology Education of the Modibbo Adama University Yola. Each of them was served with a copy of the instrument for corrections, modifications and suggestions that will improve the instruments towards meeting the objectives of the study. The expert’s suggestions were taken into consideration in the final draft of the questionnaire that will be used for this study. Robson (2011), Validity of a research instrument assesses the extent to which the instrument measures what its designed to measure; it is the degree to which the results are truthful. The face validation is to ensure that the questionnaire items were eliciting the desired responses in the research questions. It is also to ensure that the questionnaire items are representing the behaviour being considered.

Reliability of the Instrument

The reliability of a test instrument is the measure of the internal consistency of the instrument in measuring what it supposes to measure. For determining the reliability of the instrument, a trial test was conducted on 10 electrical installation and maintenance (EIM) work trade personnel, comprising 5 electrical technicians and 5 teachers of electrical installation and maintenance work discipline in Government Technical College Azare in Katagum Local Government Area of Bauchi State, which is not part of the study Area. This enables the researcher to identify the workability of the instrument. The Crombach alpha (α) was used to determine the reliability coefficient of the instrument and 0.90 was obtained as a reliability coefficient meaning that the instrument is highly reliable to collect the data; The Crombach alpha (α) method was chosen because of its uniqueness in determining the internal consistency of the instrument and calculating reliability index, (Uzoagulu, 2011).

Method of Data Collection

Seventy eight (78) I-PREIM Questionnaire was administered by the researchers with the help of three research assistants who were trained on how to carry out their functions, seventy (70) of the instruments were collected back to the researchers for analysis which represent 89.74%. The research assistant's help was necessary due to the distances and complexity involved in reaching the respondents. The respondents are located at various science and technical colleges and at the various electrical sections of the workforce or employment organizations.

Method of Data Analysis

The statistical mean, grand mean and standard deviation was used to answer the two research questions; t-test was used to test the two null hypotheses at 0.05 level of significance. Data collected for this study was analysed using the Statistical Package for Social Sciences (SPSS) V.25.

The Decisions Rule: the cut-off point for the decision is 3.00, this is obtained from the average value of all the response points (ie, $5+4+3+2+1+5= 3.00$), and any value from 3.00 to 5.00 point were accepted as positive response, and therefore any skill whose item has a mean of 3.00 and above was considered "Highly Required (HR)" while any skill whose item has a mean less than 3.00 will be considered "Slightly Required (SR)". This method of analysis helped the researchers to present the data in a more meaningful way, which allows simpler interpretation of the data for easy assimilation for people even without the knowledge of statistics.

RESULTS

Table 1: Mean Grand Mean and Standard Deviation of the Responses of EIM Work Trade Teachers and Technicians on the Domestic Installation Skills Required by EIM Work Students.

S/No	ITEMS (the Students Requires the Ability to....)	TEACHERS N=35		TECHNICIANS N=35		\bar{X}_G	REMA RK
		\bar{X}_T	SD _T	\bar{X}_t	SD _t		
1	Draw simple electrical Installation layout of 2 and 3 bedroom living house	4.40	0.60	3.91	0.92	4.16	HR
2	Mark-out Cable runs on wiring board.	4.17	0.75	3.89	0.76	4.03	HR
3	Cut P.V.C insulated twin core cable to specification.	4.09	0.74	3.60	0.98	3.84	HR
4	Assemble cables and accessories on the wiring board.	4.17	0.75	4.17	0.79	4.17	HR
5	Conduct polarity, Continuity, Insulation and Earthing tests.	3.86	0.73	4.09	1.01	3.97	HR
6	Carry out the Installations, according to the specifications under practical learning outcome.	4.09	0.82	3.97	0.95	4.03	HR
7	Cut conduit pipes to specification	3.83	0.86	3.71	1.02	3.77	HR
8	Clean burs at the end of each conduit pipe length using reamer.	2.09	0.74	1.89	0.76	1.99	SR
9	Assemble prepared conduit pipes on the wiring board, (called surface conduit).	4.03	0.95	3.63	0.97	3.83	HR
10	Draw-in the cables using fish wire/tape.	3.89	0.90	3.97	1.04	3.93	HR
11	lect the accessories on the board.	3.83	0.95	4.03	0.95	3.93	HR
12	Carry out the Insulation test, polarity test, continuity test and earthing test.	4.06	0.87	4.00	0.97	4.03	HR
13	Connect to supply and test.	5.26	8.69	4.26	0.82	4.01	HR
14	Carry out the Installation and conduct the necessary tests according to the specification under practical learning outcome.	4.03	0.86	4.14	0.81	4.09	HR
15	Connect to supply and test	3.77	0.97	4.51	0.70	4.14	HR
16	Inspect electrical machines for loose, partial contacts etc.	4.00	0.80	4.11	0.83	4.06	HR
17	Carry out the tests in practical learning outcome.	3.66	1.03	3.94	0.80	3.80	HR
18	Use photometer to measure the illuminating power of a given lamp.	2.00	0.77	1.89	0.76	1.94	SR
19	Determine the number of lamps required in a given area using illumination table and formulae.	3.83	0.92	3.43	1.04	3.63	HR
20	Identify different types of lamps	3.74	0.89	3.54	0.95	3.64	HR
	GRAND MEANS	3.84		3.73			

Key: N = Number of Respondents, X_T = Mean Responses of Teachers, X_t = Mean Responses of Technicians, SD_T = Standard Deviation of Teachers, SD_t = Standard Deviation of Technicians, X_G = Grand Mean, HR = Highly Required, SR = Slightly Required

Table 1 revealed that, eighteen (18) Domestic Installation Skills are highly required (HR) by the students of electrical installation and maintenance work trade as they satisfied a grand mean of 3.77 to 4.17, this is

the view of both EIM work trade teachers and electrical technicians meaning that the Gombe State as a society needs the services of these skills. On the other hand, two (2) of the skills in items eight (8) and eighteen (18) satisfied a very low grand mean figures which are 1.99 and 1.94 respectively, showing that the need of these skills is rare in the society.

Research Question 2: *What are the Industrial Installation Skills required by EIM Work Trade students to enhance their employability after graduation in Gombe State?*

The data for answering research question 2 are presented in the table 3 below;

Table 2: Mean Grand Mean and Standard Deviation of the Responses of EIM Work Trade Teachers and Technicians on the Industrial Installation Skills Required by EIM Work Students.

S/No	ITEMS (the Students Requires the Ability to....)	TEACHERS N=35		TECHNICIANS N=35		\bar{X}_G	REMA RK
		\bar{X}_T	SD _T	\bar{X}_t	SD _t		
1	Identify symbols as they appear on the drawing.	4.31	0.87	3.97	1.04	4.14	HR
2	Install two points of light controlled by two independent switches.	4.03	0.71	3.74	0.85	3.89	HR
3	Carry-out simple installation MICC Cable and test it.	2.26	1.77	1.94	0.94	2.10	SR
4	Install trucks and ducts systems.	3.69	0.87	3.31	0.76	3.50	HR
5	Prepare length of Trucking for bending.	3.57	1.07	3.14	1.17	3.36	HR
6	De-couple a machine, the constructional parts of electrical machines and generators and identify their differences	3.77	0.84	3.23	1.11	3.50	HR
7	Construct a plinth and allow it to set.	3.60	0.88	2.03	0.71	1.96	SR
8	Mount the Machine	3.83	0.99	3.49	0.98	3.66	HR
9	Install the Machine with the necessary controls	3.91	0.74	3.71	1.13	3.81	HR
10	Conduct necessary tests	3.89	0.90	3.80	1.02	3.84	HR
11	Connect direct online starter using all the necessary equipments.	3.66	0.94	1.86	0.81	3.56	HR
12	Connect a flexible conduit to a machine.	3.83	0.82	2.23	1.00	3.64	HR
13	Connect the Star-Delta using contactors.	3.89	0.99	3.37	1.06	3.63	HR
14	Carry-out a task in equipment's maintenance	3.94	0.91	3.71	1.05	3.83	HR
15	Operate the setup	3.83	0.86	3.66	0.91	3.74	HR
16	Observe necessary Statutory regulations	4.14	0.77	3.91	0.89	4.03	HR
17	Apply lubricants (grease, oil)	4.06	0.87	4.14	1.06	4.10	HR
18	Cleaning and Blowing	3.80	0.83	3.77	0.91	3.79	HR
19	Tightening of loosed nuts	3.91	0.89	4.29	0.99	4.10	HR
20	Replacement of worn-out parts	4.06	0.84	4.03	1.10	4.04	HR
21	Adjust Belt tension and alignment of machine parts	3.89	0.80	3.89	1.02	3.89	HR
22	Record and keep data of maintenance	3.94	0.80	3.63	1.03	3.79	HR
23	Service bearings of an electric motor.	3.86	0.85	3.77	0.97	3.81	HR
24	Trouble shoot the appliance	4.00	0.77	3.49	1.22	3.74	HR
25	Detect the fault	3.91	0.82	1.86	0.88	3.97	HR
26	Effect repairs	3.97	0.82	3.80	1.05	3.89	HR
27	Install Mineral Insulated Copper Conductor (MICC) cable	2.09	0.85	2.17	0.86	2.13	SR
	GRAND MEANS (X_G)	3.76		3.33			

Key: N = Number of Respondents, X_T = Mean Responses of Teachers, X_t = Mean Responses of Technicians, SD_T = Standard Deviation of Teachers, SD_t = Standard Deviation of Technicians, X_G = Grand Mean, HR= Highly Required, SR = Slightly Required.

The Table 2 above revealed that, twenty four (24) Industrial Installation skills are highly required (HR) by the students of electrical installation and maintenance work trade as the skills satisfied a grand mean of 3.36 to 4.14, this is the view of both EIM work trade teachers and electrical technicians meaning that the Gombe State populace needs the services of these skills. On the other hand, three (3) of the skills in items eight (3), eighteen (7) and twenty seven (27) satisfied a low grand mean figures ranging from 1.96 to 2.13, showing that the need of these skills is rare in the society.

Based on the first hypothesis HO_1 which states that “there is no significant difference between the mean responses of EIM Work Teachers and Electrical Technicians on the Domestic Installation skills required by EIM Work students to enhance their employability after graduation”, data presented in Table 8 below

shows that the p-value (0.76) was greater than the alpha value (0.05) at 68 degree of freedom, hence, the null hypothesis HO_1 was accepted indicating that there is no significant difference between the mean responses of EIM Work Teachers and Electrical Technicians on the Domestic Installation skills required by EIM Work students to enhance their employability after graduation in Gombe State.

Table 3: T-test Analysis of Mean Responses of EIM Work Trade Teachers and Technicians on the Domestic Installation skills required by EIM Work students to enhance their employability after graduation.

Respondents	N	Mean	SD	Df	F	P-value	Remark
Teachers	35	75.34	10.59	68	2.88	0.76	Fail to Reject
Technicians	35	74.63	8.55				

Key: X = Mean Responses of Teachers and Technicians, df = Degree of Freedom, SD = Standard Deviation, N = Number of Respondents, F = F-Ratio, P-value = Probability Value.

In the same vein, the study find out that there is no significant difference between the mean responses of EIM Work Teachers and Electrical Technicians on the Industrial Installation skills required by EIM Work students to enhance their employability after graduation. Data presented in Table 9 below shows that the p-value (0.14) was greater than the alpha value (0.05) at 68 degree of freedom. Hence, the null hypothesis HO_2 was accepted indicating that there is no significant difference between the mean responses of EIM Work Teachers and Electrical Technicians on the Industrial Installation skills required by EIM Work students to enhance their employability after graduation in Gombe State.

TABLE 4: T-test Analysis of Mean Responses of EIM Work Trade Teachers and Technicians on the Industrial Installation skills required by EIM Work students to enhance their employability after graduation.

Respondents	N	Mean	SD	Df	F	P-Value	Remark
Teachers	35	99.91	14.24	68	0.04	0.14	Fail to Reject
Technicians	35	94.94	13.82				

Key: X = Mean Responses of Teachers and Technicians, df = Degree of Freedom, SD = Standard Deviation, N = Number of Respondents, F = F-Ratio, P-value = Probability Value.

Findings of the Study

The following are findings of the study based on the research questions answered and hypotheses tested

1. The study revealed that students of Electrical Installation and Maintenance works required improved Domestic Installation skills in Electrical works to enhance their employability in the society after graduation.
2. The findings of the study indicated that the students of Electrical Installation and Maintenance works required improved Industrial Electrical Installation skills to enhance their employability after graduation
3. There is no significant difference between the mean responses of teachers of Electrical Installation and Maintenance works and technicians on Domestic Electrical Installation skills required by students of Electrical Installation and Maintenance works to enhance their employability after graduation
4. There is no significant difference between the mean responses of teachers of Electrical Installation and Maintenance Works Trade and technicians on Industrial Electrical Installation skills required by students of Electrical Installation and Maintenance works to enhance their employability after graduation

DISCUSSION OF FINDINGS

The result of the study revealed that the students of Electrical Installation and Maintenance Work Trade from all the Government Science and Technical Colleges in Gombe State requires almost all the work skills in Domestic Installation and Industrial Installation in order to be employed or be self-dependent after graduation. The above results agreed with the findings of Akinduro (2006) who conducted a study on Electrical Installation Work Skills Needed by Technical Colleges Graduates to enhance their Employment in Ondo State, where he found out that those graduates require various work skills in domestic and industrial installations for employment after graduation. In Amadike and Reagan (2012), the study was carried out to determine Electrical Installation and Maintenance Practice for Work Skills Improvement Needs of Technical College Graduates for Employment in Rivers State, the study revealed that graduates of technical Colleges need improvement in identified skills in Electrical Installation and Maintenance Practice for employment in Rivers State. The result in table 1 of this study reveals that the grand means of the responses of teachers and technicians in Domestic Installation Skills which are 3.84 and 3.73 indicates that almost all the skills are highly required to be thought to the students; therefore none of the skills in the curriculum will be neglected. Also table 2 shows that the grand mean response of teachers and technicians on the Industrial Installation skills which was found to be 3.76 and 3.33 indicates that almost all the skills listed are highly required by the students, thus they should be thought to the students.

This study discovered that there is no significant difference between the mean responses of EIM Work Teachers and Electrical Technicians on the Domestic Installation skills required by EIM Work students to enhance their employability after graduation. Data presented in Table 8 above shows that the p-value (0.76) was greater than the alpha value (0.05) at 68 degree of freedom. Hence, the null hypothesis HO1 was accepted indicating that both Electrical Teachers and Technicians have the same opinion on need of the Domestic Installation skills by EIM Work students to enhance their employability after graduation in Gombe State. In the same vein, the study find out that there is no significant difference between the mean responses of EIM Work Teachers and Electrical Technicians on the Industrial Installation skills required by EIM Work students to enhance their employability after graduation. Data presented in Table 9 below shows that the p-value (0.14) was greater than the alpha value (0.05) at 68 degree of freedom. Hence, the null hypothesis HO2 was accepted indicating that there is no significant difference between the mean responses of EIM Work Teachers and Electrical Technicians on the Industrial Installation skills required by EIM Work students to enhance their employability after graduation in Gombe State, this means that both teachers and technicians have the same opinion on the need of those industrial installation skills by the students to enhance their employability after graduation.

CONCLUSION

Based on the results of this study, it is concluded that EIM Work Trade in Science and Technical Colleges is all about teaching skills to students for employment and wealth creation. In order for the students to acquire practical skills, teachers are required to teach relevant skills to students by adopting appropriate teaching methods such as demonstration, field trip, supervisory, and assessment strategies. Also it has been concluded that the students of electrical Installation and Maintenance Practice needed improvement for work skills in Domestic and Industrial Installation courses in order to:

1. Install electrical wiring and accessories in a small building, trace fault and maintain existing electrical installations.
2. Install and maintain industrial cables, accessories and machineries in-line with the laid down procedures.

RECOMMENDATIONS

The following recommendations were made based on the findings and conclusions so far discussed in the study;

1. The grand mean of both teachers and technicians depicts that there is need to continue teaching all the skills in this section as none of the skills is wasteful.

2. Teachers will be more of the times expose to skill acquisition workshops to be trained even by the road-side electricians as this is vital for training the students.
3. Skill improvement course is needed by electrical installation and maintenance work students of technical colleges to enhance their employability in Gombe State
4. The following skills were also recommended to improve those skills required by the students, they should be included into the curriculum;
 - (i) Solar Installation and Maintenance
 - (ii) Connection of a Change-Over switch for a stand-by generator
 - (iii) Installation of Water Pump
 - (iv) Connection of Energy Meter of single and three phase systems
 - (v) Installation of Ceiling Fan
 - (vi) Assembling and Installation of Wall Brackets and Chandeliers
 - (vii) Installation of ceiling recess fittings
 - (viii) Installing two or more final circuits in Radial and Ring systems
 - (ix) Maintenance of domestic electrical appliances such as water heaters, pressing irons toasters, blenders etc
 - (x) Earthing of electrical appliances, machines and transformers
 - (xi) Assembling of new machine/appliances
 - (xii) Carrying out service drop of single and 3-phase systems
 - (xiii) Installation and connections in a Busbar system of distribution
 - (xiv) Trouble shooting of 1 to 5 KVA AC Generator
 - (xv) Wiring design and preparation of electrical estimate.

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