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RESEARCH ARTICLE

Power System Installation Skill Needs of Electrical Craftsmen in the Informal Sector of the Economy for Sustainable Self-Employment in South-South Nigeria

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Abstract

The general purpose of the study was to determine industrial electrical installation skill needs of electrical craftsmen in the formal sector of the economy for sustainable self-employment in South-South Nigeria. One research question and a null hypothesis guided the study. The study was carried out in South-South States of Nigeria using a descriptive survey research design. The population for the study was 417 registered industrial Electrical installation craftsmen and master craftsmen in informal sector of economy in the South-South zone of Nigeria. Census sampling was used because the entire population was studied. The instrument used for data collection was 17-item structured questionnaire developed by the researchers. The instrument was structured using a four-point rating scale for data collection and was face validated by three experts. Two of the experts were from Electrical/Electronic Technology Education in Enugu State University of Science and Technology {ESUT}, Department of Technology and Vocational Education, while the third was from Measurement and Evaluation, Department of Mathematics and Computer Education, ESUT. Cronbach Alpha reliability coefficient was applied to confirm the internal consistency of the instrument. It yielded 0.75 which indicates the instrument was reliable. Mean and standard deviation were used to answer the research questions while t-test was used to test the null hypothesis at 0.05 level of significance. The result showed that all the items under power system installation skills were all highly needed by the craftsmen and master craftsmen in the informal sector of the economy. In addition, there was no significant difference in the mean scores of craftsmen and master craftsmen at 0.05 level of significance. The study therefore concluded that the identified skill needs should be used to improve teaching-learning process and competency development among the students in technical colleges. The master craftsmen on the other hand should put in more efforts towards apprenticeship training in the informal sector of the economy for self-employment. The power system installation skills needed should be integrated in the training scheme of both craftsmen and master craftsmen apprentices for self-employment.

Keywords	*Power System Installation; Skill Needs; Master Craftsmen; Informal Sector; Sustainable Self-Employment; Industrial Electrical Installation*
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Introduction

The achievement of sustainable technological and economic development is dependent on the skills and knowledge of human resource that make up the labour force in the nation. According to Mbah (2016), knowledge-based economy is an economic setting in which ideas, skills and cognitive experiences are used to create wealth instead of depending on extraction and processing of natural resources for business. Also, the innovation in science and technology, exploration, experimentation and development in the 21th century require that attention needs to be directed towards building a knowledgeable and skillful workforce in all areas of technology. It is imperative to note that not only capital investment is needed for sustainable developments but also skills of the citizens upon which sustainable self- employment is dependent upon.

Skill in a job is the capability of accomplishing a task with precision or certainty, practical knowledge in combination with ability, cleverness and expertness. Dem, Anaele and Achanson (2017) opined that skill is the ability to do something expertly and well in accordance to the set standard or manufacturer's instruction. Skill according to Mbah and Umurhurhu (2016) is the ability to make a purposeful movement that is necessary to complete and master a particular task. Possession of skills is the ability to demonstrate the habit of acting, thinking and behaving in a specific way such that the process becomes natural. This can be achieved through repetition of the practice.

The formal sector of the economy consists of the large and small organized private and public organizations; while the informal sector is not organized, irregular and without formality. Alio and Uzor (2010) observed that the formal sector of the economy is officially recognized by all arms of the government of the country, fostered and regulated through tariff protection, trade licenses and quotas, minimum wage, laws among others. In the informal sector, businesses are established without properly defined formal procedures.

Some of these job skills areas are in line with the National Board for Technical Education (NBTE) guide line for technical college programmes. It is pertinent to note that most of the craftsmen that have undertaken jobs in the earlier identified areas might have acquired their skills and experiences from the technical colleges or informal apprenticeship training. In electrical installation technology, skills acquisition and training are provided to the students/apprentices to become competent in electrical domestic installation, electrical industrial installation, electrical equipment and appliances maintenance, etc. However, these trainings are given without appropriate guide or needs area with respect to each of the components identified before.

For instance, in industrial electrical installation works, there is inadequate skilled craftsmen to install and maintain electrical installation works in industries (Yaduma & Agbu, 2017). Also, the increasing complexities of industrial development and production have created new requirements for skilled personnel much more than what the educational system will provide to enable the adjustment to these needs.

An electrical power system is a network of electrical power. Obi (2014) observed that electrical power system installation is the grid that provides power to an extended area. Most of the industrial electrical power installation grid considers the generators that supply the power, the transmission system that carries the power from the genescore centers, and the distribution system that feeds the power to the industrial buildings. It is expected that the craftsmen should be able to draft, measure and fit in the relevant components that make-up the electrical power system. The electrical power system does not work effectively without the control system.

The electrical craftsmen need to have adequate practical skills and knowledge on the installation, design and maintenance of the power control system. The purpose of installing control system in industrial electrical installation according to Akamobi (2017) is to provide the needed security to the industrial machines and facilities. For instance, high value industrial machines like servers, automated processing machines, robot control panel, communication equipment and others should be safeguarded at every access point to keep it safe from harm while other machines can have security that is a little less robust. The design and installation of control system are crucial for effective protection of buildings and industrial equipment. The ability to install a control system in industrial electrical circuits helps in automatic control of the system.

The craftsmen on installation need to utilize their skills in measurement and instrumentation in order to achieve the desired results in the alignment, current carrying capacity and relevant alternatives toward the multifunctional

abilities of the machine. Measurement forms an important area of craftsmanship as it is used to determine quality of the parts or component in the installation work. Obi (2014) stated that measurement and instrumentation help in monitoring functions. These provide information that enables human beings to take some prescribed actions accordingly. A measuring system exists to provide information about the physical values of some variables being measured. The craftsmen of electrical installation is required to conduct measurement, mark out and use appropriate instruments in accordance with drafted schematic drawing with specification. The inabilities of craftsmen to conduct measurement usually result to problems which can even lead to accident.

Furthermore, the craftsmen are expected to perform effectively in data cable installation works as it is the technology of contemporary businesses and industrial organizations. Okeke (2018) observed that a data cable allows base band transmissions to flow from a transmitter to a receiver such as internet cables, networking media and optical fiber cables. Data cables are important for business, as they are required for several reasons including personal computers/servers, access control/Wi-Fi access points, close circuit television (CCTV) or analogue or digital phone systems. Usually, during data cable installation, the cable will be hidden behind walls or in ceiling panels to keep the working environment safe. This skill is novel as it is used in modern communication system. Craftsmen in the informal sector may encounter problem in installing data cable system in offices and industrial work environment. The researcher observed that craftsmen in informal sectors do have difficulty in keeping pace with technological trends in installation works as identified on the discussed variables. This increasing complexity in industrial electrical installation work especially on the control system, cable conduit, alternate current and direct current installation and data cable installation have necessitated the need to identify the required skills needs of the craftsmen for self-employment in the informal sector of the economy in south-south Nigeria.

The craftsmen and master craftsmen that have been in the labour market would be of relevance to the study in that they encounter some problems in their areas. Craftsmen are the sub-professionally trained with the skills and practices at technical college level where they are awarded Trade Test Certificate (TTC), Federal Craft Certificate (FCC) or the National Business and Technical Examination Board (NABTEB) Certificate. Alio (2006) in Silas (2016) posited that most of the craftsmen seem to possess low level of formal education and they have poor background knowledge in theoretical concepts which limits their scope for improvement and servicing of new products in electrical and electronics work activities. Specifically, Alio (2006) noted that most of the electronics craftsmen have difficulty in servicing newer electronic appliances because of their inabilities to interpret circuit diagrams and use modern testing equipment such as digital multimeters, oscilloscope and signal generators. They are not trained to design but to use tools and machines properly to maintain, install and service components of the system in their trade areas.

While the craftsmen are the graduates of technical colleges, the master craftsmen are the craftsmen who have gained advance knowledge, skills and experience in a particular trade or field of engineering and technology (Mbah, 2016). Master craftsmen have additional training and experience more than the craftsmen in repair, maintenance and problem solving in their technical areas. The informal sector of industrial electrical installation works is facing innovations as a result of modern technology which the craftsmen and master craftsmen encounter from time to time. Modern technology requires training in digital related maintenance and installation skills to enable the craftsmen and master craftsmen in informal sector to perform effectively in industrial installation and maintenance work. When the skills in these areas have been identified and made available to the craftsmen, it will help them to develop sound technical and vocational apprenticeship system for training of other craftsmen in cooperative vocational programmes, and for sustainability of informal sector of the economy. Experience of the craftsmen plays a significant role. Eze (2016) stated that the experience of an individual has an impact on the job performance. Good job performances in the informal sector of the economy is very important for sustainable self-employment in South-South Nigeria. South-South Nigeria is one of the geo-political zones of the nation, Nigeria with six States. The Zone is known as oil rich region of the nation with many oil companies, large and small scale industries that need the services of industrial installation and maintenance craftsmen. The youths seem not to have those skills that can keep them away from restiveness. South-South Nigeria has been identified with militancy, kidnapping and restiveness among the youths, Governments need to encourage them to acquire adequate skills so that they can have sustainable self-employment.

The training and acquisition of skills in electrical installation covers areas like installation of cable conduit system, cabling for lighting, power and control installations, measurement and instrumentation, data cable and installation of power system (Beenen, 2019). Considering the objective as stated in NBTE (2004), electrical installation works were designed with the aim of producing competent and productive craftsmen and master craftsmen who should possess the knowledge and practical skills for successful carrier in electrical domestic wiring. In line with this, Akamobi (2015) observed that the relevance of domestic and industrial installation may not be overemphasize. It provides the craftsmen and other trainees with the understanding of the minimum standard and manipulative skills for participation in providing solutions to problems in electrical installation and maintenance works and making economic gain as self-employed professionals.

Power System Installation Skill Needs of Electrical Craftsmen in the Informal Sector for Sustainable Self-Employment

An electric power system is a network of electrical components deployed to supply, transfer and use electric power. Power system installation depicts the installation actions carried out in order in fixing the components parts for an integral function such as in the supply (generate) transmit and consume electric power. An example of an electric power system is the grid that provides power to an extended area. However, there are various kinds of power system such as hybrid power system, industrial power systems and transformers. An electric power system that that supplies power to home and industries for a sizable region is called an electric grid. Ibe (2012) stated that an electrical grid power system can be broadly divided into the generators that supply the power, the transmission system that carries the power from the gene-score centers to the load centers and the distribution system that feeds the power to the nearby homes and industries. Among the advantages of power system are that it facilitates many processes of various kinds (personal, domestic, professional and industrial), for efficient gene-score and transporting of energy, it has led to a huge leap in the development of science and medicine, accessible to majority of the population and has boosted the economic development of cities. Power system has the following disadvantages which includes that the contact of this energy with the human body could generate deadly results, when transported in carbon and silver it can generate many toxic residues, and in balance in energy level of a power system can damage equipment, appliances and others.

A power system is said to have entered a state of voltage instability when a disturbance causes gradual and uncontrollable decline in voltage. Voltage collapse according to Akinloye, Oshevire and Epem (2016) is defined as instability of heavily loaded electrical power system network that led to decrease in voltage level and eventually blackout power system collapse has a severe outcome on the security of the system and also, it reduces the reliability of the power system network. A three-wire three-phase circuit is usually more economical than an equivalent two-wire single phase circuit at the same line to the ground voltage because it uses less conductor material to transmit a given amount of electrical power. It also used to power large motors and other loads. A three-wire three phase circuit is usually more economical than an equivalent two-wire single-phase circuit at the same line to ground voltage because it uses less conductor material to transmit a given amount of electrical power.

In a symmetric three-phase power supply system, three conductors each are carrying an alternating current of the same frequency and voltage amplitude relative to a common reference but with a phase difference of one third of a cycle between each. The common reference is usually connected to ground and often to a current-carrying conductor called the neutral. Due to this difference, Okeke (2016) observed that the voltage on any conductor in the power system reaches its peaks at on third of a cycle after one of the other conductors and one third of a cycle before the remaining conductor. It is imperative to note that this phase delay gives constant power transfer to a balanced linear load. It makes it possible to produce a rotating magnetic field in an electric motor and generate other phase arrangements using transformers. The electrical power installation knowledge and experiences covers ability to maintain, repair, trouble shoot and install modern electrical systems such as; power, lighting, fire protection, security and structured cabling and the equipment they serve to ensure effective and efficient operation (Ibe, 2012). The following skills according to Ibe are required to be demonstrated by craftsmen in power system installation for sustainable work performance in the informal sector:

i. Positioning of electrical components in relation to technical plans.
ii. Installing lighting and power circuits.

iii. Inspecting, testing, fault finding and rectification of electrical power installation.
iv. Correct functioning of electrical circuitry.
v. Compliance with British Standard (BS) 7671; IET power wiring regulation.
vi. Interpreting drawings and electrical power installation details.

The electrical power distribution training system is arranged so that learners can be presented with a wide array of real-world installation problems found in industrial situation. Here, it is expected that one in power system installation install a variety of conduit types, size fuses, install bus plugs and connect motors. The power system installation skills cover safety devices, such as safety switches and knockout/layout lock, helps learners develop the safety skills needed to assure safe operation in an industrial environment. Ibe (2012) stressed that training students in electrical power distribution covers a variety of topics such as conduit basics, conduit benders, over current protection and conductor pulling. The author pointed that electrical power distribution installation provides comprehensive power distribution knowledge and enriches it with interactive conditions.

Statement of the Problem

The available craftsmen lack the needed skills on innovative industrial electrical installation work and maintenance (Amadike & Robinson, 2011). In a related development, most of the craftsmen who were trained through the apprenticeship system, with the conventional and analogue appliances encounter problems when attempting to repair or perform works in electrical/electronic gadgets different from those used during their trainings. This creates a situation aptly described as skill obsolescence which occurs when skills become less valuable or depreciates due to changes in workers themselves or due to changes in production technology and technological improvements. As a result, most of the craftsmen may become unemployed while the few employed may not perform maximally because they lack the desired skills and knowledge needed by the industries. The problems of this study therefore, is the consequence of skill obsolesces among the unemployed craftsmen which do contribute to some social vices such as kidnapping, armed robbery, hacking, political thuggery and other misdeeds to sustain their livelihoods. Therefore, there was need to determine skills in industrial electrical installation needed by electrical craftsmen in the informal sector of the economy for sustainable self-employment in South-South, Nigeria.

Purpose of the Study

The main purpose of this study was to determine the industrial electrical installation skills need of electrical craftsmen in the informal sector of the economy for sustainable self-employment in South-South Nigeria. Specifically, the study sought to determine the:

Power system installation skill needs of electrical craftsmen in the informal sector of the economy for sustainable self-employment in South-South Nigeria.

The study was carried out in Akwa Ibom, Bayelsa, Cross-River, Delta, Edo and Rivers States in South-South geopolitical zone of Nigeria. The craftsmen and master craftsmen were used to determine the skill needs of the craftsmen in industrial electrical installation for self-employment. The respondents' variable was delimited to the levels of the respondents in the informal sector (craftsmen and master craftsmen).

Research Question

The following research question guided the study:

What are the power system installation skill needs of electrical craftsmen in the informal sector of the economy for sustainable self-employment in South-South Nigeria?

Research Hypotheses

The following null hypothesis was tested at 0.05 level of significance.

H_{01}: Significant difference does not exist on the mean scores of electrical craftsmen and master craftsmen on the power system installation skills needs of electrical craftsmen in the informal sector of the economy for sustainable self-employment in South-South Nigeria

Methodology

Research Design

The study adopted a descriptive survey research design. Descriptive survey research design according to Alio (2008) and Nworgu (2015) is one in which a group of people or items are studied by collecting and analyzing data from only a few people or items considered to be representative of the entire group. The survey design specifies how data will be collected and analyzed. This design was used for the study because of the distribution of the respondents' work places and the researcher will make use of polychotomously structured instrument to collect data pertinent to the industrial electrical installation skill needs of electrical craftsmen in the informal sector of the economy for sustainable self-employment in South-South Nigeria. Also, the findings from study would be inferred to the entire population.

Area of the Study

The study was conducted in South-South States of Nigeria. South-South Nigeria is one of the six geo-political Zones of Nigeria with six States. The States are Akwa Ibom, Bayelsa, Cross-River, Delta, Edo and Rivers. Geographically, South-South Nigeria geo-political Zone lie between Latitude 5° 9̀ 20.40 N and 6° 28̀ 8.99̏ E. South-South Nigeria was used for the study because of the growing population and high demand for industrial electrical craftsmen. The geo-political Zone is dominated by the indigenous people of Niger Delta and indigenes of Igbo extraction and they are known for their industry and enterprise, oil rich area and spirit to make wealth. These States have viable industries and high number of craftsmen that can be utilized to improve the Industrial electrical installation skills needs of the informal sector of the economy for sustainable self-employment in South-South Nigeria.

Population for the Study

The population for the study was 417 registered industrial installation Craftsmen and master craftsmen in informal industrial electrical installation workshops in South-South Zone of Nigeria (Source; preliminary survey conducted by the researcher, 2020). The population was chosen because they are in the right position to give valid responses to the instrument on the industrial installation skills need of electrical craftsmen in the informal sector of the economy for sustainable self-employment in South-South Nigeria.

Instrument for Data Collection

The instrument for data collection was structured questionnaire developed by the researcher based on the research question. The questionnaire titled, 'Industrial Electrical Installation Skills Need of Electrical Craftsmen in the Informal Sector of the Economy for Sustainable Self-Employment in South-South Nigeria' was used. The questionnaire is organized into two parts, Part I and Part II. Part I is focused on the personal data of the respondents, Part II contains questionnaire items pertinent to the research question that guided the study. Specifically, the instrument contains 17 items on the power system installation skills required by electrical craftsmen in the informal sector of the economy for sustainable self-employment. All the items are in four-point response categories of Very Highly Required (VHR), Highly Required (HR), Slightly Required (SR) and Not Required (NR) with numerical values of 4, 3, 2 and 1 respectively.

Validation of the Instrument

In order to ensure the validity of the instrument, draft copies of the instrument were given to three experts. Specifically, one of them was in Electrical/Electronic Technology Education option of Department of Technology and Vocational Education in Enugu State University of Science and Technology. The other validate is of Electrical/Electronic Technology in the Department of Technical and Vocational Education Ignatius Ajuru University of Education River State. One was given to expert in Measurement and Evaluation from Department of Computer and Mathematics Education in Enugu State University of Science and Technology. The experts also respectively were given the research topic, purpose of the study, research questions, hypothesis, and scope of the study and the draft

copy of the instrument. They were required to face validate the appropriateness of the items in addressing the research question, clarity of instrument to the respondents and proper wording of the items. The experts made some corrections and added three items.

Reliability of the Instrument

The reliability of the instrument was determined by administering 20 copies of the questionnaire to10 industrial electrical installation craftsmen and 10 master craftsmen in Anambra State South East Geo-Political Zone. The reason for using these industrial electrical installation craftsmen in Anambra State was that they have the same characteristics with the industrial electrical installation craftsmen in South-South of Nigeria. Data collected from the respondents were analyzed using Cronbach Alpha co-efficient to determine the internal consistency of the instrument. The Cronbach Alpha was used because the items on the questionnaire do not have dichotomous (Yes and No) answer. The Cronbach alpha coefficient yielded 0.75. This is in line with Uzoagulu (2013) who noted that reliability coefficient above 0.6 indicates that the instrument is reliable.

Method of Data Collection

A total of 417 copies of the questionnaire were distributed to the respondents for the study with the help of five research assistants who were properly briefed on the content of the questionnaire and its administration to ensure that the questionnaire was properly administered, filled and retrieved. The instrument was retrieved immediately after they were properly filled by the respondents to avoid bias and respondents who were not able to complete the questionnaire items on the spot were followed up through phone calls to ascertain when to return for collection within one week. Out of 417 copies of the questionnaire distributed 396 copies were properly filled returned and used for data analysis, representing 94.96% return rate.

Method of Data Analysis

The data collected from the respondents were analyzed using the mean with standard deviation. The mean was used to answer the research question while standard deviation was used to check the closeness of their responses. T-test was used to test the null hypothesis at .05 level of significance and at 394 degrees of freedom. The t-test was used because of the sample size. The data collected were analyzed using Statistical Package for Social Sciences (SPSS) based on the statistical tools mentioned earlier.

The decision rule was based on the principle of real limit of the mean, thus:

Very Highly Required (VHR)	3.50-4.00
Highly Required (HR)	2.50-3.49
Slightly Required (SR)	1.50-2.49
Not Required (NR)	1.00-1.49

The null hypothesis was significant where the probability value was less than the .05 significant level at 394 degrees of freedom, otherwise the null hypothesis was not significant.

Results

Research Question

What are the power system installation skills required by electrical craftsmen in the informal sector of the economy for sustainable self-employment in South-South Nigeria?

Table 1: Mean Scores and Standard Deviation of craftsmen and Master Craftsmen on the power system installation skills required by electrical craftsmen in the informal sector of the economy for sustainable self-employment in South-South Nigeria N=396

S/N	Power System Installation Skills Required by Electrical Craftsmen in the Informal Sectorability to;	Craftsmen N=160		Mastercraft-smen N= 236		Overall		Decision
		$\bar{X}_1$	SD_1	$\bar{X}_2$	SD_2	$\bar{X}_G$	SD_G	
1	Install lighting circuit.	3.24	0.66	3.22	0.65	3.23	0.65	HR
2	Install power circuit.	3.24	0.69	3.22	0.69	3.23	0.69	HR
3	Understand regulation guiding power system installation.	3.23	0.61	3.19	0.61	3.20	0.61	HR
4	Position electrical components in relation to plan.	3.28	0.55	3.28	0.56	3.28	0.56	HR
5	Interpret drawings on electrical power installation details.	3.28	0.60	3.25	0.61	3.26	0.61	HR
6	Inspect electrical power installation.	3.14	0.57	3.16	0.60	3.15	0.58	HR
7	Trouble shoots/test electrical power installation.	3.21	0.57	3.22	0.59	3.21	0.59	HR
8	Use apparatus to diagnose manufacturing power system.	3.19	0.60	3.24	0.64	3.22	0.62	HR
9	Connect wire to circuit breaker, transformer, etc.	3.26	0.62	3.31	0.62	3.29	0.61	HR
10	Prepare sketches or follow blueprint to determine location	3.18	0.64	3.20	0.63	3.19	0.64	HR
11	Work from ladder, scaffolds and roofs during power installation.	3.26	0.66	3.29	0.64	3.28	0.64	HR
12	Install ground leads and power cables to equipment.	3.28	0.72	3.31	0.69	3.30	0.70	HR
13	Perform physical examination on damage components/tools.	3.23	0.65	3.23	0.61	3.23	0.62	HR
14	Use different tools and equipment in power installation work.	3.21	0.64	3.20	0.62	3.20	0.63	HR
15	Select appropriate circuit for component during power installation.	3.23	0.64	3.22	0.63	3.22	0.63	HR
16	Observe safety measures provided by IEEE.	3.23	0.67	3.21	0.64	3.22	0.65	HR
17	Use appropriate cables in installing components.	3.21	0.65	3.19	0.63	3.20	0.64	HR
	Cluster Mean/SD	**3.23**	**0.60**	**3.23**	**0.63**	**3.23**	**0.63**	**HR**

Note: X=Mean; SD=Standard Deviation; HR = Highly Required

Data presented in Table 1 indicates that items have an overall item mean score ranges from 3.15 to 3.30 depicting highly required. This shows that the items are the power system installation skills required by electrical craftsmen in the informal sector of the economy for sustainable self-employment in South-South Nigeria. The overall cluster mean score of 3.23 indicates highly required. This implies that the itemized are the power system installation skills required by electrical craftsmen in the informal sector of the economy for sustainable self-employment in South-South Nigeria. The low standard deviation of 0.63 shows that the respondent's opinions do not differ remarkably to the itemized.

Null Hypothesis

Significant difference does not exist on the mean scores of electrical craftsmen and master craftsmen on the power system installation skills needs of electrical craftsmen in the informal sector of the economy for sustainable self-employment in South-South, Nigeria.

Table 2: Summary of t-test Analysis of mean scores of electrical craftsmen and master craftsmen on the power system installation skills needs of electrical craftsmen in the informal sector of the economy for sustainable self-employment in South-South, Nigeria

Variables	N	t	df	Sig. (2tailed)	Mean Difference	Std. Error Difference	Decision
Craftsmen	160	.052	394	.958	-.03644	.69453	NS
Master Craftsmen	236						

NS = Not Significant

The result of t-test analysis in Table 2 shows that the t-value at 0.05 level of significance and 394 degree of freedom for the items is 0.052 with a significant value of 0.958. As the significant value of 0.958 is more than the 0.05 level of significance the null hypothesis is not significant. This means that there is no significant difference with respect to the items on the mean scores of electrical craftsmen and master craftsmen on the power system installation skills needs of electrical craftsmen in the informal sector of the economy for sustainable self-employment in South-South, Nigeria.

Findings of the Study

Based on the results of data analysis, the following findings were made:

1. Power system installation skills required by electrical craftsmen in the informal sector of the economy for sustainable self-employment in South-South Nigeria. Among the identified power system installation skills required include; ability to install lighting circuit, install power circuit, understand regulation guiding power system installation, position electrical components in relation to plan, interpret drawings on electrical power installation details and inspect electrical power installation.
2. The result indicated that there is no significant difference with respect to the items on the mean scores of electrical craftsmen and master craftsmen on the power system installation skills needs of electrical craftsmen in the informal sector of the economy for sustainable self-employment in South-South, Nigeria.

Discussion of Findings

The findings from this study are discussed in respect to the research question answered and null hypothesis tested for the study.

Power System Installation Skills Required by Electrical Craftsmen in the Informal Sector of the Economy for Sustainable Self-Employment

The study depicted the power system installation skills required by electrical craftsmen in the informal sector of the economy for sustainable self-employment in South-South Nigeria. The identified power system installation skills highly required by electrical craftsmen in the informal sector includes; install lighting circuit, install power circuit, understand regulation guiding power system installation, position electrical components in relation to plan, interpret drawings on electrical power installation details, inspect electrical power installation, trouble shoots/test electrical power installation, use apparatus to diagnose manufacturing power system, connect wire to circuit breaker, transformer, prepare sketches or follow blueprint to determine location, install ground leads and power cables to equipment, use appropriate cables in installing components and use different tools and equipment in power installation work. The findings of the study are supported by Thomposon (2015) that lighting circuit and power circuit work skills are essential component of skills needs of the craftsmen in contemporary labour market. This indicates that the identified signal trapping work skills are needed for self-employment of the craftsmen in the informal sector of the economy.

Furthermore, the findings of the study indicated that there was no significant difference with respect to the items on the mean scores of electrical craftsmen and master craftsmen on the power system installation skills needs of electrical craftsmen in the informal sector of the economy for sustainable self-employment. The implication of no significant difference was that the craftsmen and master craftsmen had homogeneity in their responses of electrical

craftsmen and master craftsmen on the power system installation skills needs of electrical craftsmen in the informal sector of the economy for sustainable self-employment in South-South, Nigeria.

Conclusion

Power system installation skills are needed by Industrial electrical installation craftsmen in the informal sector of the economy for sustainable self-employment. This is necessary in order to keep the craftsmen abreast of the skill requirement in the performance of task in industrial electrical installation. Based on the findings, the industrial electrical installation works teachers in technical colleges and the government are expected to adopt the identified industrial electrical installation skills in the training and re-training programmes provided to the people. This is pertinent as there is need to achieve the desired growth, development and self-employment based on the identified industrial electrical installation skills.

Recommendations

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

1. Industrial electrical installation works trade teachers should include the identified power system installation skills in their instructional delivery. The facilities for teaching industrial electrical installation skills should be provided for the teachers to utilize in teaching and learning programme.
2. The government and National Board for Technical Education reviewers in technical colleges should be encouraged to integrate industrial electrical installation skills in the training curriculum for students.
3. Master craftsmen in the informal sector should increase efforts in the quality of apprenticeship training provided in industrial electrical installation using the identified power system installation skills.

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