

**CULTIVATING ELECTRICAL POWER TECHNOLOGY SKILLS FOR STUDENTS  
IN TECHNICAL COLLEGES THROUGH PARTNERSHIP WITH KATSINA  
ELECTRICITY DISTRIBUTION COMPANY**

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## Abstract

Despite inclusion of excursion and Students' Industrial Work Experience Scheme (SIWES) to address aspects of power technology in the curriculum of technical colleges as proposed by the National Board for Technical Education, a cavity exists in the relationship between technical colleges in Katsina State and Katsina Electricity Distribution Company (KEDCO). As a result of this gap students from technical colleges in Katsina lacks adequate skills in power technologies that will empower them to become self-enterprising or be consumed by power industries. The purpose of conducting this study is to investigate cultivation of electrical power technology skills in technical colleges in Katsina State of Nigeria. Survey research design is used as the design of the study. Questionnaire served as the data collection instrument whilst descriptive statistics analysis is used in the representation of data as results of the study. The area of the present study covered five (5) technical colleges and eight (8) designed power sub-stations, namely: IBB, Kofar Guga, Fadama, Kofar Sauri, Daura, Musawa, Malumfashi, Funtua KTRD, and Textile Injection sub-stations. However, findings revealed that no relationship exists between technical colleges and power industry such as KEDCO towards excursion as well as SIWES which expose students to various skills in power technologies. Quite a few means of cultivating electrical power technology skills by students in technical colleges included: inviting and involving qualified electrical engineers as guest lecturers during school activities and as resource persons during curriculum review. Finally, conclusion was hinged on functional context theory and recommendations were advanced.

**Keywords:** Electric Power; Technology Skills; Technical College; Partnership; KEDCO.

## 1.0 Introduction

The general aim of electrical power technology skills is to effectively equip craftsmen, technicians and technologists with tenable skills necessary to fit into power technology industries or become self-enterprising. Technology refer to knowledge of techniques, and processes which is usually embedded in machines to allow for smooth operations. The simplest form of technology is the development and use of basic tools. By and large, technology has many facets. For instance, the pre-historic discovery of how to control fire and later Neolithic revolution which increase available sources of food, invention of wheel to assist humans travel in and control their environment. In addition, printing press, telephones, and the internet have significantly reduced the physical barriers to communication and allow humans to interact freely on a global scale. Moreover, the steady progress of military technology yielded sophisticated weapons of ever increasing destructive power – from clubs to nuclear weapons. Altogether, power technology affects so many aspects of development in every society and the world at large.

Many literatures reveal and emphasized the importance of technical education including power technology skills acquired from technical colleges. For instance, a policy promulgated by the Federal Republic of Nigeria (FRN), 2014 referred to technical education as “those aspects of educational processes involving, in addition to general education, the study of technologies and related sciences and the acquisition of practical skills, attitudes, understanding and knowledge of relating to occupations in various sectors of the economic and social life”. This type of education is significant to help people improve their skills, in another vein, technical colleges can be described as institutions that give full vocational training intended to prepare students for entry into various occupations. The scope of the present study covers component of electrical power technology skills which is among such category of skills provided by technical colleges and if students completed their training they are expected to become enterprising in power related industry. Moreover, effective power technology skills are acquired through regular workshop practice which is readily available in Katsina Electricity Distribution Company (KEDCO).

KEDCO is one of the eleven (11) distribution companies privatized by FRN as part of the electricity power sector reform in May, 2012. It is located in North-West geopolitical zone of Nigeria. KEDCO is given license to generate, distribute and market electricity in three (3) States of Nigeria, viz: Kano, Jigawa, and Katsina. As distribution company, its core business activities were spelt out under section 67 of the Electricity Power Sector Reform Act:

- a. The connection of customers for the purpose of receiving supply of electricity.
- b. The installation, maintenance and funding of meters, billing, and connection, and

c. Such other distribution services as may be prescribed for the purpose of this section.

However, KEDCO discharges its duties of electricity distribution through nine (9) designated control rooms in Katsina State, namely: I.B.B, Kofar Guga, Kofar Sauri, Fadama, Daura, Musawa, Malumfashi, Funtua Katsina Road, Funtua Textile Injection Sub-stations. Consequently, this study is carried out to determine cultivating electrical power skills for students in technical colleges through partnership with KEDCO.

## 1.2 Statement of the Problem

Technical education, particularly, component of electrical power skills need practical engagement for students in order to be proficient in power technology skills to adequately address the challenges in industry. Unfortunately, among the challenges being faced by electrical power technology skills acquisition in technical colleges include poor standard in workshop practice due to insufficient equipment and facilities as well as inadequate competent trade teachers. This assertion has been buttressed by Attamah and Isiyaku (2017) who opined that qualitative human and material resources are deminishing by the day in technical colleges due to movement of staff for greener pastures.

## 1.3 Purpose of the Study

The main objective of conducting this study is to uncover strategies for cultivating electrical power technology skills. Specifically, the study determines:

- a. Benefits of partnership between technical colleges and KEDCO, and
- b. How to create partnership between technical colleges and KEDCO.

## 1.4 Research Questions

The following two (2) research questions guided the study:

- a. What are the benefits of partnership between technical colleges and KEDCO?
- b. How could partnership be created between technical colleges and KEDCO?

## 2.0 Methodology

This section presents a description of the research design, area of the study, population and sample of the study, and instrument used for data collection. Others are validation and reliability of the instrument, method of data collection, and analysis.

### A. Research Design

Descriptive survey design is adopted to collect relevant data for this study. According to Creswell (2013) descriptive survey is used to describe any research activity in which the investigator gathers data from a sample of a population for the purpose of examining the characteristics, opinions, or behavioural intentions of the population. The survey method of obtaining information is based on question statements for respondents (Durepos & Wiebe, 2010). Given the above stated attributes, a survey research design is found to be suitable for the present study.

### B. Area of the Study

The present research is carried out in Katsina State of Nigeria. Katsina State is situated in the North-West part of Nigeria, and shared common boundaries with Kano State to the West, Kaduna State to the North, Zamfara State to the East, and Niger Republic to the North. In addition, 5 technical colleges and 8 power sub-stations covered the area of the study.

### C. Population of the Study

The population of the study comprises 68 electrical trade teachers from 5 technical colleges and 110 members of staff from KEDCO pulled from 8 power sub-stations. The total number of the population stands at 178.

### D. Sample and Sampling Technique

Sample is a portion of the population being studied which is usually drawn from through a definite procedure. The sample size for this study comprises 50 electrical trade teachers and 30 KEDCO staff who are directly involved in running the power stations. Procedure for determining the required sample size from a given population is guided by Krejcie and Morgan Table, 1971.

Table 3.1: Distribution of Sample

| Number of Electrical Technology Teachers | Number of KEDCO Staff | Total |
|--|-----------------------|-------|
| 32                                       | 48                    | 80    |

Purposive Sampling Technique is used to select electrical trade teachers from 5 technical colleges and members of staff from 8 KEDCO power sub-stations.

#### *E. Instrument for Data Collection*

Structured questionnaire entitled “Strategies for Enhancing Power Technology Skills (SEPTS)” is developed, validated, tested, and used as an instrument for data collection in this study. The researchers divided the research instrument into two (2) sections, ‘A’, ‘B’ and ‘C’. Section ‘A’ of the instrument is designed to reveal 3 items on personal information of respondents, namely: Gender (sex), years of professional experience, and qualification. Whilst section ‘B’ entailed 8 item statements on benefits of partnership and collaboration between technical colleges and KEDCO towards improving power technologies skills. Furthermore, section ‘C’ contained 7 item statements on how to create partnership between technical colleges and KEDCO. Data collected on both sections ‘A’ and ‘B’ are used for analysis. The instrument is structured on five-points Likert Scale, viz: Strongly Agree (SA), Agree (A), Undecided (UD), Disagree (D), and Strongly Disagree (SD). Likert Scale is assigned values of 5, 4, 3, 2, and 1 respectively. Respondents were required to rate the items by checking suitable responses by following instruction indicated on the instrument.

#### *F. Validation of the Instrument*

Three experts validated the instrument for face and content validity. Two experts in the field of technology education from Hassan Usman Polytechnic and one expert in the field of measurement and evaluation from Umar Musa Yar’adua University. Corrections issued by the experts were accepted and used to produce the final instrument used in the study. The essence of subjecting the instrument to face and content validation is to ensure that item statements conform to concepts and language need of the subject. In addition, validation safeguard that all the variables in the study were adequately addressed in the instrument.

#### *G. Reliability of the Instrument*

Trial test is conducted with 5 electrical technology teachers and 5 KEDCO staff in Katsina to determine internal consistency of the instrument before embarking on the main study. Data collected from the trial test was analyzed using Cronbach Alpha reliability coefficient. Results of the Cronbach Alpha analysis is shown in Table 3.1.

| S/N | Title  | Items | Alpha |
|-----|--|-------|-------|
| 1.  | Benefits of partnership between technical colleges and KEDCO   | 08    | .78   |
| 2.  | How to create partnership between technical colleges and KEDCO | 07    | .80   |

The information in Table 3.1 provided enough evidence that the items included in the instrument were consistent in measuring the ideas intended. The test could be said to be reliably high.

#### *H. Method of Data Collection*

The instrument was administered to the sample of 32 teachers and 48 KEDCO staff in 5 technical colleges and 8 power sub-stations of KEDCO. The instrument was administered personally by the researchers. A total of 80 questionnaires were used in conduction the survey and all of them were retrieved for data analysis. This amounted to 100% return.

#### *I. Method of Data Analysis*

The study has two (2) research questions which were analyzed by using descriptive statistics (frequency, percentage, mean, and standard deviations). Frequency and percentage were used

to analyse the demographic data whilst mean and standard deviations were used to answer the research questions 1 and 2.

### 3.0 Results/Findings

The study is designed to identify strategies for enhancing electrical power skills in students in technical colleges of Katsina State through partnership with KEDCO. In this section, data were analyzed, and presented in tables according to research questions. Results were also discussed under each research question and in relation to scholars' opinions and other validated assertions.

Table 1: Demographic Information of Respondents.

| S/N | Variable                         | Group         | Number | %  |
|-----|----------------------------------|---------------|--------|----|
| 1.  | Gender                           | Male          | 48     | 84 |
|     |                                  | Female        | 32     | 16 |
| 2.  | Years of professional experience | 1 – 5 years   | 18     | 36 |
|     |                                  | 6 – 10 years  | 15     | 30 |
|     |                                  | 10 - Above    | 17     | 34 |
| 3.  | Qualification                    | NCE (Tech.)   | 32     | 64 |
|     |                                  | B. Tech.      | 15     | 30 |
|     |                                  | M. Sc/M. Tech | 3      | 6  |

**Research Question 1:** What are the benefits of partnership between technical colleges and KEDCO?

The data obtained, analyzed, and presented in table 2 answered research question 1.

Table 2: Benefits of Partnership and Collaboration

| S/N | Statement  | Mean | SD   | Decision |
|-----|--|------|------|----------|
| 1.  | Technical colleges electrical technology students acquire more practical skills through industrial training (SIWES) with KEDCO | 3.11 | 1.40 | Agreed   |
| 2.  | Improvement in KEDCO community relations   | 3.08 | 0.51 | Agreed   |
| 3.  | Supply of workshop tools and equipment to technical colleges   | 3.24 | 1.00 | Agreed   |
| 4.  | It reduces the burden of training electrical students on the side of government  | 3.04 | 0.92 | Agreed   |
| 5.  | Increase return-on-investment in training electrical technology students   | 3.16 | 0.56 | Agreed   |
| 6.  | Create employment for electrical technology graduates  | 3.06 | 0.74 | Agreed   |
| 7.  | Technical colleges receive more technical support through supervision of students during SIWES                                 | 3.14 | 1.65 | Agreed   |
| 8.  | Reflect burden reduction on KEDCO  | 3.13 | 0.98 | Agreed   |

**Research Question 2:** How could partnership be created between technical colleges and KEDCO?

The data obtained, analyzed, and presented in table 3 answered research question 2.

Table 3: How to create partnership between technical colleges and KEDCO

| S/N | Statement  | Mean | SD   | Decision |
|-----|--|------|------|----------|
| 1.  | Committee for partnership should be set up for proper collaboration between technical colleges and KEDCO                     | 3.70 | 0.93 | Agreed   |
| 2.  | KEDCO and technical colleges should collaborate in conducting capacity building for teachers, technologists, and KEDCO staff | 3.80 | 1.74 | Agreed   |
| 3.  | KEDCO should be assisting technical colleges by supplying modern workshop tools and equipment                                | 3.10 | 0.92 | Agreed   |
| 4.  | KEDCO should be absorbing some technical college electrical technology students for their industrial training (SIWES)        | 3.10 | 0.89 | Agreed   |

|    |   |      |      |        |
|----|---|------|------|--------|
| 5. | There should be sharing of information on electrical technology modern techniques between KEDCO and technical colleges                              | 3.90 | 1.73 | Agreed |
| 6. | There should be staff exchange between KEDCO and technical colleges for effective team work and interactions to update their technical competencies | 3.50 | 1.69 | Agreed |
| 7. | KEDCO should be assisting technical colleges in funding students field trips  | 3.80 | 1.92 | Agreed |

#### 4.0 Discussion of Results

Findings on the benefits of partnership between technical colleges and KEDCO shows that item statements 1 to 8 were accepted because the range of mean and standard deviations fall between 3.04 and 3.16 as well as 0.51 to 1.65 respectively. This means that all the 8 items were considered important by the respondents in the present study.

Technical colleges electrical technology students acquire more practical skills through industrial training (SIWES) with KEDCO. In this study, it was revealed that proficiency in cultivating electrical technology skills is more efficient whenever technical college students are involved in industrial training engagement. Attamah and isiyaku (2017) shared similar finding with this finding in their study titled employers' perception of the applied skills of NCE graduates of electrical and electronics technology in Nigerian public and private organisations.

Moreso, the finding of the present study revealed that improvement in KEDCO community relations strongly influence cultivation of electrical technology skills for technical college students. This finding depicts that effective relationship is necessary for smooth transformation from novice to advanced beginner in terms of cultivating electrical technology skills through partnership with master skilled men. This finding is supported by the result of Akanibi and Ugbe (1997) research work who discovered that personnel and apprentices interaction was cordial for the advancement of work skills acquisition.

Further, supply of workshop tools and equipment to technical colleges students is another finding discovered in the present study which fosters electrical technology skills attainment through partnership with masters in the field of electrical technology such as KEDCO personnel. Ezegualu (2000) also buttressed this finding in his study where result indicated that availability and utilization of correct tools and pieces of trade equipment rapidly enhance mastery of electrical technology skills.

Likewise, reducing the burden of training electrical students on the side of government is upheld by Braimoh (1998). This means that non-governmental organisations who provided financial and materials supports to technical colleges assist the government in its duty of financing education. Egwelu (1992), also stated that there is an increased return-on-investment in training electrical technology students through reception of revenues after graduates secured employment. Godstime and Joseph (2016), equally, found out that effective electrical power skills pave way for creating employment for electrical technology graduates in technical colleges especially if more technical supportis received through supervision of students during SIWES. This reflect burden reduction on the part of the government by receiving support from KEDCO.

Similarly, findings on how to create partnership between technical colleges and KEDCO reveals that item statements 1 to 7 were accepted because the range of mean and standard deviations fall between 3.10 and 3.90 as well as 0.89 to 1.92 respectively. This means that all the 7 items were considered important by the respondents in the present study.

The finding of the this study on establishing committee for partnership to be set up for proper collaboration between technical colleges and KEDCO was similar to that of Okorie and Ezeji (1998) who discovered that committee members will spring up divergent opinions on collaboration and partnership. Finding on KEDCO and technical colleges to collaborate in conducting capacity building for teachers, technologists, and KEDCO staff was found out by Ogbonna (2003) in his study and it was postulated that capacity buiding through exchange and partnership strengthen power technology skills acquisition.

Another finding of the present study is on KEDCO to be assisting technical colleges by supplying modern workshop tools and equipment by accommodating students for workshop practice during SIWES. Odigbo and Owaseye (2005) obtained identical result in their study that supported absorbing some technical college electrical technology students for their industrial training (SIWES). Moreso, Oderinde (2005) discovered that sharing of information on electrical technology modern techniques between KEDCO and technical colleges is paramount so as to foster efficient workforce. However, Manabete and Kamaunji (2005) and Egwelu (1992) reported their findings as that there should be staff exchange between KEDCO and technical colleges for effective team work and interactions to update their technical competencies. This ideas was favoured by Madueme (2002) who maintained that KEDCO should be assisting technical colleges in funding students field trips.

### **5.0 Recommendations**

Based on the findings of the present study, it is recommended that:

1. Technical colleges should explore collaboration potentials with KEDCO especially in areas of staff exchange and capacity building or upskilling in new power technologies.
2. A framework for creating partnership should be developed and be renewed periodically in order to cater for the changes in power technologies invented frequently by industries. This would allow power technology students to upskill and become relevant in the field.

### **6.0 Conclusion**

In conclusion, the researchers grounded the findings of the present study into Functional Context Theory. Thomas Sticht in 1975 propounded a theory called Functional Context Theory which stated that education as an instructional strategy integrates the teaching of literacy skills and job content to move learners more successfully and quickly toward their education and employment goals. Functional context education stresses on building upon prior knowledge to construct new concepts to accomplish difficult tasks (power technology skills). Sticht proposed that instructors (electrical technology teachers) should formulate better learning environments that incorporate real world situations (KEDCO power technology sub-stations) to increase students' performance. Therefore, Functional Context Theory is relevant to this study because of its emphasis on teaching literacy skills (power technologies) through teaching strategies (excursion) of transmitting information for effective goal attainment which can be acquisition of practical power technology skills by the students in electrical technology in technical colleges. The theory also guided the researchers on the job content aspect because job content needs to be supervised and assessed thus distinguishing between functional (SIWES) and academic learning among the students. In addition, the theory establishes linkages between power technology skills (job content) and instructional strategies (industrial visit and guest lectures) organized by teachers for improving the areas of deficiencies.

### **7.0 Acknowledgement: Nil.**

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