CEDTECH International Journal of Educational Research & Human Development
Volume 4, Number 1, March 2023
http://www.cedtechjournals.org
ISSN: 2756-4592

RATIONALE FOR STEADY POWER DISTRIBUTION SYSTEM AND QUALITY OF TECHNOLOGY EDUCATION TEACHER PROGRAMME IN BENUE STATE

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ABSTRACT

This study investigated the rationale for steady power distribution system and quality of technology education teacher training programme with special reference to power implication on steady and unsteady distribution system in Benue State. Three research questions guided the study. A descriptive survey research design was adopted with a population size of 54 respondents. No sampling technique was used because of the manageable size of the population. A self-developed questionnaire was employed to collect data for the study. Three experts from department of vocational and technical education Benue State University, Makurdi faced validated the instrument. The data collected was analyzed via statistical package for social scientist (SPSS 23.0) using mean and standard deviation for research questions, a bench mark of 2.50 was used to determine the acceptability or otherwise of each item. The findings revealed that, steady power distribution system in technology education teacher training programme is a hub for academic excellence using projectors or power point presentation, power tools/machines and computer aided instruction via YouTube. The study identified challenges for late hour/night classes, reduction in productivity, half-baked teachers who are not skillful in theoretical and practical lesson presentation as the implication of unsteady power distribution on the quality of technology education teacher training programme. The study recommended injection sub-stations, the use of renewable energy, seminars and training workshops on teaching strategies and techniques for optimal quality in each of the three government owned technology education teacher training institutions in Benue State.

Keywords: *Steady Power Distribution, Quality, Technology Education Teacher.*

INTRODUCTION

The process of electricity supply to consumers starts from the power generating station, where energy is being generated from available sources like natural gas, oil, coal, hydro, solar, bio-waste, wind among others. Voltage generation usually varies between six kilo volts –eleven kilo volts (6kv-11kv) at the generation rooms and is reasonably stepped up to 132KV or 330KV for onward transmission through pylons (Adesina & Ademola, 2016). It is further transformed into various voltage levels compatible with consumers' requirements via the distribution substations which receive the energy from transmission stations. During this process, power losses are experienced at different stages. In Nigeria, transmission of energy from the receiving station to the distribution substations (Injection substations) is at medium voltage level of 33kV. The 33KV from the injection substation is further stepped down to 11KV which is allotted variously along streets via feeders to consumers through 11KV/415Volts step down transformers. In practice, there are three 11kV feeders per 15MVA, 33/11kV power transformers.

According to Chinwuko, Mgbemena, Aguh, and Ebhota (2011), power distribution system is classified into primary and secondary distribution systems. The Primary distribution systems consist of high voltage networks (33KV and 11KV) from primary and sub-primary substations. These substations are interconnected with high voltage transmission lines. In most cases, large industrial consumers like cement factories, refineries, breweries, steel rolling mills and so on take supply at primary distribution system (33KV) with associated transformers, switchgears and breakers. However, secondary distribution systems consist of low voltage feeder networks (11KV) from the secondary winding of the transformers (415V) that are constructed along main roads and streets. Service connections are made to individual consumers by service cables from these networks feeder lines. The various system of alternating current distribution for domestic consumers includes single-phase 2-wire system, Single-phase 3-wire system, three-phase 3-wire system and three-phase 4-wire system. In Nigeria, the most widely used secondary distribution network system is the single-phase 2-wire (240V) and the three-phase 4-wire system (415V) respectively.

In the words of Chibuzo(2016), of the three stages of processing power to consumers (generation, transmission and distribution), power distribution system is the most essential stage as a wider number of consumers are

serviced at the distribution stage. With the steady rise in the world population, challenges facing the distribution of electricity are bound to multiply. These challenges as identified by the researcher include: poor infrastructure, worn out of distribution grids, climate change, which is further compounded by increase in the demand for electricity consumption by consumers including technology education teacher training institutions that use electrical machines, appliances and tools in their workshops and laboratories for training processes among others.

Technology education is synonymous with technical education, industrial technical education and industrial arts. Technology education is defined by the National Policy on Education(FRN, 2016) as an 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.

The goals of technology education according to the Federal Republic of Nigeria (2016) are to:

i. Provide trained manpower in the applied sciences, technology and business particularly at craft, advanced craft and technical level.
ii. Provide the technical knowledge and vocational skills necessary for agricultural, commercial and economic development.
iii. Give training and impart the necessary skills to individual who shall be self-reliant economically.

To achieve these goals, quality enhancement which is one of the cardinal objectives of technology education teacher training programme is emphasized. In Nigeria, the aim for the establishing technology education teacher training institutions is to meet the manpower needs in technology teacher education for the award of the Nigeria certificate in education (Technical), Bachelor of education technical (B.Ed. Tech) and Bachelor of Technology (B.Tech) programme for technological advancement. The federation government of Nigeria alongside her state governments has established several of such technological related institutions for manpower development. In Benue state, three of these institutions are established. They include; Benue State University, Makurdi, College of Education, Katsina-Ala and College of Education Oju. These institutions offer Vocational and Technical Education Teacher Training Programmes in various fields of vocational and technical education. The vocational and technical education teacher training programmes involve skill and

knowledge training exercise which highly employs electrical power supply for lesson preparation and lesson delivery. Learning experiences are conducted in workshops and laboratories which require constant power supply. This clearly indicates that there is an established relationship between skill acquisition and power supply system in these vocational institutions.

The Relationship between power distribution system and technology education teacher training programme may be positive or negative depending on the nature of the power supplied to these institutions. Power supply distribution has multiple services in institutions of learning; it can be utilize in the classroom, laboratories, and workshops among others. With lights in classrooms, teaching and learning can take place any time. Access to electricity can facilitate the use of information and communication technology (ICT) facilities in the classroom through projectors or power point presentation as well as the use of computers, televisions. Others include the use of electrically powered tools and machines for knowledge and skill acquisition.

According to United Nations Department of Economic, and Social Affairs (UNDESA,2O14) steady power distribution "allows the access of lower-income students and teachers to lighting, communication, learning via YouTube as well as a variety of educational delivery opportunities. A major impact of electrification has been to reduce illiteracy and improve the quality of technological education, (Diniz,. França, Câmara, Morais &Vilhena as cited in UNDESA, 2014, P. 8). Quality technical and vocational teacher education and training, along with other influential factors such as curricula, learning-teaching materials and other factors like constant power distribution can significantly improve the quality of technical and vocational education and training (TVET). This paper therefore is set to determine the rationale for steady power distribution system and quality of technology education teacher programme in Benue State.

STATEMENT OF THE PROBLEM

In Nigeria, education is recognized as an instrument "per excellence" for effective national development (FRN, 2016). The National Policy on Education set the objective for graduates of technical teachers' institutions to be "immediately employable". However, since the inception of the policy, some major constraints to its effective implementation have been

identified. These include: dearth of qualified teachers, lack of adequate teaching materials, equipment, tools and electrical power supply among others (Ammani & Ogunyinka, 2011). Consequently, instructions in technology education teachers training programmes today have remained essentially devoid of practical skills in the different trades which always rely on electrical power supply for operation. Owing to the non-availability and erratic nature of power supply system in Nigeria among others, technology teachers' training institutions are graduating students without or inadequate practical skills required of these students in the various related trade areas. Often times practical lessons are shifted or omitted and alternative to practical lessons are conducted as a result of power failure during lesson delivery. This portrays a bleak future for the attainment of the lofty goals of the National Policy on Education on vocational and technical education, of making technology-oriented institutions graduates "immediately employable" or self-employed. This paper therefore sets out to ascertain the relationship between power supply and the quality of technology teacher products in Benue State Nigeria.

Purpose of the Study

The purpose of the study is to determine the rationale for steady power distribution system and quality of technology education teacher training programme in Benue State. Specifically the objectives sought to:

1. Determine role of steady power supply in technology education teacher training programme..
2. Determine the implication of unsteady power distribution on the quality of technology education teacher training programme.
3. Determine strategies for ensuring the quality of technology education teacher training programme.

Research Questions

The following research questions will guide the study:

1. What is the role of steady power supply in technology education teacher training programme.
2. What is the power implication of unsteady distribution on the quality of technology education teacher training programme
3. What are the strategies for ensuring the quality of technology education teacher training programme.

RESEARCH METHODOLOGY

The study adopted descriptive survey design in determining the rationale for steady power distribution system and quality of technology education teacher training programme for national development. According to Osuala (as cited in Nwokolo, Odaba&Agada, 2018, p265) descriptive survey design is a design that studies characteristics and focuses on people, the vital facts of people and their beliefs, opinions, attitude, motivation and behavior. The study targeted a total of 60 technology lecturers comprising of 18 lecturers from the department of vocational and technical education (VTE) college of education Oju , 17 lecturers from the department of VTE college of education Katsina Ala and 25 lecturers from the department of VTE Benue State University Makurdi (COEO, 2019, COEK/A, 2019 & BSUM, 2019). The whole population was used; therefore, no sampling method was employed. A structured questionnaire was used as instrument for data collection and was on 4-point rating scale of strongly agree 4, agree 3, disagree 2, strongly disagree 1 for the research questions. The structured questionnaire had 20 items developed for collecting data in accordance with the research questions. Three experts from the Department of Vocational and Technical Education Benue State University Makurdi faced validated the instrument. The researchers had 90% return rate retrieved 54 copies of the questionnaires distributed. The data generated were analyzed using mean and standard deviation for research questions. A mean rating value of 2.50 on a four point scale was used as cut-off point. Thus, if the calculated mean rating value is greater than or equal to 2.50, it signifies that the respondents agree with that particular item but if the calculated mean rating value is less than 2.50 it shows that the respondents disagreed with that particular item.

Results

Research Questions 1: What is the role of steady power supply in technology education teacher training programme?

Table 1. The mean ratings and standard deviation responses on the rationale for steady power supply in technology education teacher training programme.

S/No	Item Description	$\bar{X}$	SD	Remarks
1	Steady distribution of power supply will enhance teaching using projector or power point presentation.	3.48	0.746	Agree
2	Constant power supply will enable teachers to handle power tools/machines effectively during workshop practices.	3.11	0.538	Agree
3	Steady power distribution network helps the technology education teacher on training to acquire practical teaching skills/techniques through the internet via YouTube.	3.19	0.646	Agree
4	Computer Aided Instruction may be possible with the help of Steady power distribution system.	3.69	0.609	Agree
5	Steady power supply will equip a technology student teacher with competences required to function as a 21st century teacher.	3.24	0.473	Agree
	Grand mean	3.34	0.603	Agree

Result of data presented in table 1 indicates that respondents agreed that steady power supply in technology education teacher training programme enhances teaching using projectors or power point presentation, power tools/machines and Computer Aided Instruction via YouTube. The grand mean of 3.34 clearly revealed that steady power supply in technology education teacher training programme is a hub for academic excellence.

Research Questions 2: What is the implication of unsteady power distribution on the quality of technology education teacher training programme

Table 2. The mean ratings and standard deviation responses on the implication of unsteady power distribution on the quality of technology education teacher training programme

S/No	Item Description	$\bar{X}$	SD	Remarks
6	Unsteady power distribution will hinder learning resources that embody the flexibility and power of technology to create equitable and accessible learning ecosystems that make learning possible everywhere and all the times for all students.	3.76	0.612	Agree
7	Unsteady power distribution poses a challenge for late hour/night classes.	3.67	0.644	Agree
8	Unsteady power distribution makes electrical/electronic facilities meant for teaching and learning redundant.	3.70	0.603	Agree
9	Unsteady power distribution creates room for half-baked technology teachers in respect to practical skills acquisition.	3.26	0.705	Agree
10	Lack of adequate power distribution system can reduce productivity.	3.69	0.609	Agree
	Grand mean	3.62	0.634	Agree

Result of data presented in table 2 indicates that respondents agreed that unsteady power supply in technology education teacher training programme hinder effective use of learning resources. The grand mean 3.62 clearly shows that unsteady power supply poses a challenge for late hour/night classes, reduce productivity and largely produce half-baked teachers who are not skillful in theoretical and practical lesson presentation.

Research Question 3: What are the strategies for ensuring the quality of technology education teacher training programme in Benue State?

Table 3. The mean ratings and standard deviation responses on the strategies for ensuring the quality of technology education teacher training programme.

S/No	Item Description	$\bar{X}$	SD	Remarks
11	Bring dull technical concepts to life with visual and practical learning experiences helps trainee technology teachers to understand how their programme applies in the real world.	3.02	0.629	Agree
12	Setting up a range of electrical machines work stations around the workshop which contain assorted task for technology teacher trainee to choose from according to their unique learning needs.	3.20	0.595	Agree
13	Teaching and learning can become more interactive when technology is deployed for physical engagement during classes.	3.87	0.516	Agree
14	Classroom experiments and local field trips in the area of technology can be a strategy for improving quality of technology education teacher training programme.	3.81	0.585	Agree
15	Engaging in regular professional development programme is a great way to enhance teaching and learning in your classroom.	3.69	0.609	Agree
	Grand mean	3.52	0.587	Agree

Result of data presented in table 3 shows that respondents are of the opinion that all the strategies are good enough for ensuring the quality of technology education teacher training programme in Benue State. The grand mean 3.52 clearly shows thus, Respondents agreed that dull technical concepts be brought to life with the use of visual and practical learning aids, setting up a range of electrical machines work stations around the workshop, technology be deployed for physical engagement during classes, classroom experiments and local field trips be carried out often and engaging in regular professional development programme is a great strategy for enhancing the quality of technology education teacher training programme in Benue State.

DISCUSSION OF FINDINGS

The finding regarding rationale for steady power distribution system and quality of technology education teacher programme clearly revealed that steady power supply in technology education teacher training programme is a hub for academic excellence through the use of projectors or power point presentation, power tools/machines and Computer Aided Instruction via YouTube. The finding is consistent with UNESCO, (2014) which opined that steady electricity, in addition to providing lights,

fans, computers among others can also improve technology education teachers training programme.

The findings on the implication of unsteady power distribution on the quality of technology education teacher training programme clearly shows that unsteady power supply poses a challenge for late hour/night classes, reduce productivity and largely produce half-baked teachers who are not skillful in theoretical and practical lesson preparation and presentations. This finding agrees with Utung (2017) who observed that in Nigeria, investment on education and its facilities like steady power supply has suffered a considerable neglect. Despite the fact that education and electricity are huge capital investment enterprise, there has been poor budgetary allocation to the education sub-sector. Perhaps, it may be that our leaders have not recognized education as a tool for national development and therefore, have no political commitment in terms of funding towards technology teacher education and training.

Finally, the study identified several strategies for ensuring the quality of technology education teacher training programme. Some of them include: deployment of technology of physical engagement during classes, use of workshop/laboratory/ experiments, engagement of teachers and students in field trips and engaging in regular professional developmental programme to enhance the quality of technology education teacher training programme. This is also consistent with Alazraki, and Haselip (2007) who carried out a survey of schools electrified with solar PV panels in Argentina and found out that almost two-thirds (63%) of staff and faculty were able to improve the quality of teaching because of the better working conditions and teaching aids which electricity offered.

CONCLUSION AND RECOMMENDATIONS

This study investigated the rationale for steady power distribution system and quality of technology education teacher training programme with special reference to the implication of "Steady" and "Unsteady" nature of electrical power distribution system in Benue State Nigeria. Based on the findings; it was concluded that Steady power distribution not only attracts technology education student teachers to the teaching career but also enhances their learning experience and improve their enhance retention memory which lead to better productivity.

The study recommended injection sub-station in each of the three government owned technology education teacher training institutions. The management of the technology education teacher training programmes should collaborate with multinational companies in their domain as well as the Alumni associations to explore the use of renewable energy in their respective institutions as backup systems for quality training. Finally, the institutions should organize training seminars and workshops on relevant teaching strategies and techniques for optimal quality delivery.

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