



Analyzing the Need of Technical Teacher's Skill Upgradation in Practical Electrical and Electronic Courses at Technical Colleges of Katsina State, Nigeria

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Abstract

The main objective of this research was to study the need of technical teacher's skill upgradation in practical courses of technical colleges in Katsina State, Nigeria. This study intends to understand the necessity to upgrade and increase the capabilities of the teachers of technical colleges and vocational centers in Katsina State. Specifically, the key research questions addressed in this study are: to what extent the practical skills and knowledge part of the curriculum in electrical installation are applied by the teachers in the colleges? To what extent the in-service training's program meets the professional development of teachers of technical colleges? And to what extent the teachers feel about the needs of skill upgradation?

With regard to collect the data, this research used a validated questionnaire as an instrument to accomplish the main goals of the research. The main population of this study were teachers of technical colleges. For the data analysis, the study used the SPSS program and Chi-square to test the research question of the study. The result of the study indicated that, the skill upgradation is needed to keep teachers up to date and competent where the necessary reforms and new changes should be made on the initial and in-service programs particularly in regard to practical skills to fulfill the professional development of teachers.

The findings of this study can help design suitable teacher training program and to support teacher professional development that make teachers in their field to become a competent person.

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Eventually, all praise is due to Allah who made possible to finish my study by His own will.

Declaration

I am hereby declaring that this thesis document which is submitted to the partial fulfillment of the degree of Master of Science in Technical Education (Specialization in Electrical and Electronic Engineering) is an original work of me, Yusuf Sani Abu, a student of Department of Technical and Vocational Education (TVE), Islamic University of Technology (IUT), and has not or never been submitted for any other degree to any university or institution.

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Dedication

This work is dedicated to my lovely parents, family, all my relatives and friends who missed me during my studies.

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CHAPTER ONE

Introduction

1.1 Background of the Study

Technical and vocational education is a program which prepare someone for occupational skills, self-reliant, independent and earning for living. Technical education has a vital role to play in preparing young people for self-reliant. Now a day, a country would never ever achieve its economic and social development without skills and productive labor force, that was the reason why TVET was emphasized and considered to be an important thing that can meet the changing requirement of any nation. This is because technical education offers a wide range of program in science and technology. For example, program such as Auto mechanics, Metal work, Building, Wood work, Electrical and Electronic, Plumbing, Carpentry, and so forth are meant to provide knowledge and skills that would make the learners functional members of the society. When such skills are imbibed by the learners, they would be able to participate gainfully in the development process. This is also true for the context of third world countries, such as Nigeria and the world at large. However, there are still formidable challenges in addressing to get the full benefits of the wide range of skills and course offered by TVET sector in Nigeria. In particular, the need of skill upgradation of TVET teachers requires further attention. It is because, technical teachers are largely stagnant with their existing skills and sometimes show lack of motivation to cope with the current trends of TVET sector. Therefore, this research attempts to analyzing the need of technical teacher's skill upgradation in practical electrical and electronic courses in technical colleges of Katsina State. Nigeria.

1.2 Problem statement

It was noticed that, teachers that are working in technical colleges in Katsina State were categorized into three classes based on their level of training they acquired. The first group do not have practical skills at all, the second group do not have adequate training and the third group have an early training program. All the teachers in these three groups need to upgrade their skill, because many of them did not acquired adequate skills on operation of some tools and machines to be used

in the workshops. For this reason, there is an urgent need to conduct a research to study on analyzing the need of technical teachers' skill upgradation in practical electrical and electronic courses in technical colleges of Katsina State, Nigeria.

This research would investigate the existing condition of the teachers with regard to their training program, training process, training requirements, training place, field of study, competencies and suggest the new training approach in order to upgrade the teachers' skills in Nigeria.

1.2 Objectives of the study

The general objective of this study is to analyze the need of technical teacher's skill upgradation in practical electrical and electronic courses in technical colleges of Katsina State, Nigeria. The specific objectives of the study are as following;

1. To examine the existing practical skills of electrical installation required for the teachers to be applied in the colleges of Nigeria
2. To identify the teacher's opinion about the existing and additional required skills that can contribute their professional development.
3. To find out the technical teachers' opinion towards the need of skill upgradation through in-service training programs.

1.3 Research Question

This study will find the answers of the following research questions

- 1 To what extent the practical skills and knowledge part of the curriculum in electrical installation are applied by the teachers in the colleges?
- 2 To what extent the in-service training's program meets the professional development of teachers of technical colleges?
- 3 To what extent the teachers feel about the needs of skill upgradation?

1.4 Possible outcome of the study

This study can be used to design new training approach to upgrade the skill capacity of teachers of technical colleges in Nigeria. The findings of the study would reveal information about the existing teacher's professional skills of the technical colleges in Nigeria. Also, it helps to find out the requirements of teachers training, knowledge, skill upgradation in the field of training. It could help the future policy maker in deciding level of skill training program need to run as well as help the teacher how to develop positive attitude towards the need of skill upgradation to cope with the ever-changing technology in the field of education.

1.5 Area of the Study

This research work has been designed to study on analyzing the need of technical teacher's skill upgradation in practical electrical and electronic courses in technical colleges of Nigeria with a particular reference of Katsina State. In view of this, four Government Technical Colleges were selected for the study to analyze the need of technical teacher's skill upgradation in practical electrical and electronic courses in technical colleges of Katsina State, Nigeria.

1.6 Significance of the study

Since the skill upgradation is a program that skillfully prepare someone with a practical knowledge that he can work productively in industrial and commercial occupation. This study would encourage teachers to upgrade or reacquire more skills related to their area of specialization or field that can help him to be more competent in their field.

It would also encourage the intensive and extensive use of tools, materials and machines in workshops for practical in technical colleges at Katsina State. It is equal expected that the study would help teachers to educate themselves and see how workshops' equipment should be used and managed.

Finally, with this study, it is hoped that, the Government and Managements would see the importance of releasing their teachers to go for in-service training to improve their knowledge and skills.

1.7 Conclusion

Absolutely, the importance of Skill Upgradation cannot be over emphasized. Because with the availability of workshops' equipment and well adequate practical training skills, the teacher would be able to conduct effective practical classes in the workshop. Therefore, teacher should be a well-trained person in practical skills and know how to manage the workshops' equipment during practical work for his/her student.

CHAPTER TWO

Literature Review

2.1 Introduction

Skill can be referred as a capability or ability developed in the course of training and experience. It involves high grade performance in many fields, like trade, craft work and professional practice (Studies, International, & Centre, 2015).

Skill are can be seen as a talent or capacity to perform a task with predetermined result often within a given amount of time, energy or both. Skill is also defined as the ability of workers or employees to carry out their work effectively. (van der Waldt, Fourie, Jordaan, & Chitiga-Mabugu, 2018). Now, the technical and vocational education and training TVET was emphasized to trained skilled and entrepreneurial people for the development of the nation (McClean and David, 2009).

Skill is regarded to as experiences, practical ability, dexterity and tact. It would be an organized sequence of actions, competencies and the acquisition of performance capability (Ben, 2010). Skill acquisition needs intelligent human for learning. Most of the skill training have many challenges to the apprentice like combining the practical work and theoretical fields, critical thinking, absolute concentration and willingness to learn. Ben (2010) stated that, for someone to become a skilled person, he has to portrays his zeal of action, thought and believing in the work activities for the process to become natural to the person through repetition and practice.

TVET is concerned with the gaining knowledge and skills for the world of work to raised up the opportunities of the productive empowerment and socioeconomic development of the nation. TVET therefore, equipped people with technical and vocational skills and attitude that are now recognized as indispensable for meaningful participation in work and life (Chinyere Shirley et al., 2015).

Skill and knowledge are the bedrock of economic growth and social development of any nation (Chinyere Shirley, Chijioke, & Benjamin Chukwumaijem, 2015).

Skill upgradation can be seen as a training which skillfully prepare someone with a practical skills and theoretical fields that can make to be competent and work productively in industries and commercial occupation. It can also be seen as a program where someone can regain or reacquire more skills related to his area of specialization or field that can help him to be more competent in his field.

Since the needs of practical skills of technical education is very important and also means of national development, economic development and social development, emphasis must be put on TVET in order to develop economic of the nation, improve the quality of life, alleviate the poverty, upgrade the society, promote peace and provide employment to the citizens.

2.2 Technical Education in Nigeria

Technical Education is an education which was programed at senior secondary school, some high institutions to produced technicians and universities to produced engineers and technologies in Nigeria. Technical education comprises general education, science and technical studies, practical skills and general knowledge (Umunadi, 2013).

Technical and Vocational Education and Training (TVET) is a training which comprises the study of technologies, related science and the acquisition of practical skills, attitudes and knowledge relating to occupation in many areas of economics and social life (UNESCO, 2002; Chinyere Shirley et al. 2015).

The term technical and vocational education is a conjoined term made up of technical education and vocational education. It is an aspect of Nigerian education system that provide room for vocational training, skill acquisition and adequate scientific competence (C. PHD. & Monday, 2017).

TVET is concerned with the acquiring training, knowledge and skills for the betterment of life, socioeconomic development and to provide more opportunities for productive empowerment (Chinyere Shirley et al, 20115).

United National Education Science and Cultural Organization (UNESCO) 2013, defines TVET as all forms and level of the educational process which generally involves the study in the field of engineering, technologies, sciences, attitudes, skills and ethics in relation to the economic development of the nation and earning for living.

The Nigerian system of technical and vocational education started with vocational and technical training at junior secondary school at the grass roots for students to have concepts and some skills as a basic knowledge. Then technical colleges which offered practical skills and some theories to produce technical personal grade II. Then technical teachers' college or polytechnic at the post-secondary level to produce technicians. Indeed, at the post-secondary we have universities that are offering engineering and technology courses for someone to be an engineer or technologist.

Dike (2015) have realized that, technical and vocational education and training (TVET) is growing so fast in many parts of countries, but Nigeria neglected this aspect of education. As a result of this, the society lack skilled technicians which is affecting the economy of the nation (Olumide, 2015).

2.3 Aims of Technical Colleges in Nigeria

The aims of technical colleges in Nigeria is for training the citizens to become well creative men, technicians, craftsmen and engineers who can work in the public and private sector of the country. It is the nation vision to see that, they produced a well-qualified, trained and competent engineers and technicians who can boost the economics of the nation and bring some developments to the nation. That is the main reasons why many technical colleges, polytechnics, technical colleges of education and universities of technology were opened to trained people and graduated them with enough practical skills and knowledge which they can work competently in their work area.

Nigeria technical colleges were created with the aims of training people to possess appropriate technical and vocational skills, knowledge, attitudes and creative mind. They are established to developed students thinking, creativity, intellectual, skills, knowledge and attitudes to enable them

to become self-reliant and contribute to the economic growth and development of the nation (Okolie, Elom, Unchechukwu & Igwe 2019).

The main objective of technical schools is to prepare students for employment in the labor market (Finch & Crunkilton, 1999).

The Nigerian National Policy (2013) on education outline the aims of technical education as follows:

- To provide the technical knowledge and vocational skills necessary for agricultural, industrial, commercial and economic development.
- To give training and impart the necessary skills leading to the production of craftsmen.
- To provide trained manpower in applied science, technology and commerce particularly at sub-professional grades.
- To give an introduction to professional studies in engineering and other technologies.
- To provide who can apply scientific knowledge to the implementing and solution of environmental problems for the use and commerce of man. (p. 16)

Now all these aims can be achieving by a well-designed curriculum content that is well understood and systematically arranged and designed to the level of the learners with the aids of well-equipped workshops and training facilities and equipment.

School workshops help to equip students with practical skills in their technical trade areas for future occupation and national development. The practical aspect should be emphasized and also a major part of curriculum and the school should play a vital role in implementing the curriculum content effectively and successfully (Bybee & Loucks-Horsely, 2002, Penney & Fox 1997). The practical aspects can only be implemented if there is availability of tools, facilities and equipment in the workshop where the students can be convenient and feel free to participate in the practical work that can increase their skills, talent, creativity and knowledge.

2.4 Teacher's Attitude: Needs of Skills Upgradation

Jibola (2008) said that teaching is the most important and strategic profession for national development. It is one of the major roles of the teacher to apply curriculum in the school, know

the kind of method or technique to use, understanding the educational policies and objectives and assessment of the students. They ultimately interpret and implement the policies which are preserved in the school curriculum, designed to calculate the established educational goals. According to Ajibola (2008) teacher is the bedrock of every field, when we lack qualified teachers, we would never get qualified medical doctors, good technicians, engineers, lawyers etc. Indeed, if we lack qualified teachers and standard educational system, we would not produce good medical doctors to treat patient, good engineers to construct roads or good lawyers to handle cases. Omojuwa (2007) expressed a similar opinion that, education play a fundamental role in national development, and the teachers are the success of any educational system (Kennedy, Udoetuk & Ufot 2017).

Teaching provides knowledge and skills to the human-being by utilizing the communication strategies. It can be seen as a way of imparting knowledge, skills and attitudes to the learner. In another hand, it can be seen as a process of developing knowledge (cognitive), skills (psychomotor) and attitude (affective). In fact, teaching can be seen as a professional and competent work that is systematically and procedurally designed for changing the behavior of the learner in terms of attitudes, skills and knowledge.

A teacher is an important person in the educational system, his impact on students can never be emphasized, has a great influence on students and vital role in the educational system rather than anyone. In this regard teachers must have an attitudes and zeal to teach if they want to be successful in their profession. They have to accept the profession wholeheartedly and unconditionally and do it with love and passion. The work is a professional work which deal with molding individual behavior, changing someone's life (Kdi, Beytekin & Arslan 2015).

According to National Policy on Education (FRN.2013), technical and vocational teachers refers to professional teachers that are trained with skills, knowledge and attitudes and employed based on the national policy of education which are expected to contribute in the classroom, school and society at large. They can be a well-trained and skillfully prepare people for effective performance on practical tasks (Kennedy et al. 2017).

A technical teacher would be known as a vocational education teacher or a trainer, who conduct and demonstrate practical activities to the students in the laboratories or workshops of the school. He is also a guider who guides, monitored, organized and instructs students on practical work and supervised them during the practical activities.

The role of technical teachers is to impart the knowledge, skills and attitudes that would help their students in the future. They should prepare and equip their students with the skills and all the capabilities that they would exhibit in their future occupation. In regards, teachers should know which kind of students that they are dealing with, their level of mentality and maturity, the kind of tools and equipment they are going to use and what type of practical should be suitable and appropriate to those students or should be according to the level those students.

Becoming a technical and vocational teacher, it needs someone to possess a bachelor's degree in technical education (B. Tech.) or Nigerian certificate in education technical (NCE Technical), followed by possessing teachers' registration council of Nigeria certification or licensing.

Here, attitudes should be developed towards the teaching profession, if someone lacks passion and love of his/her profession would not practice it competently and satisfactorily. Therefore, teaching needs positive attitudes and willingness. In this regard teachers have to develop a positive attitude towards teaching profession that can make learning to take place in a very suitable way and effective manners. Positive attitudes and devotion towards teaching profession must be needed and very important teaching line (Kadı et al., 2015).

2.5 Teacher Training

Okafor describes that teacher training would be a kind of education which is systematically organized, planned and designed purposely to produce teachers who would teach in different various level of educational system. Teacher is a bedrock of educational system that was the reason why he needs a special training in different ways, content and field. The purpose of teacher education obviously stipulated in the National Policy of Education (2013)

- To produce highly motivated, conscientious and efficient classroom teachers for all levels of the education system.
- To encourage further the spirit of enquiry and creativity in teachers.
- To help teachers to fit into the social life of the community and society at large and to enhance their commitment to national objectives.
- To provide teachers with the intellectual and professional background adequate for their assignment and to make them adequate to any changing situation not only in the life of their country, but in the wider world.
- To enhance teachers' commitment to the teaching profession. (p. 28)

There are different kinds of teacher training in Nigeria such as; post graduate diploma in education, bachelor degree in education, Master degree in education and Nigerian certificate of education.

The degree training for teacher education program is a training offering by many universities and some high recognize institution where the program requires a minimum of four years for the person to have the certificate. The post graduate diploma in education is a training program which is mainly in education, the training is giving to those that possessed degree without education in order to have knowledge in the field of education and to become a teacher, where the training is just only one year. Master degree in education is a training which takes two years of study in the university after having a bachelor degree. Then the Nigerian Certificate of Education (NCE) it Is also a program for training new teachers in the colleges of education which needs a complete three years for the person to be graduated. It is an immediate training after accomplishing secondary school.

Therefore, for the technical teachers, it is a great task to the government and administrators to encourage and put more effort in order to see that the technical teachers have upgrade their studies and acquire a very good practical skill that can help them to deliver an effective and efficient knowledge and skills to their students.

Government should also put more effort in physical and financial issues by providing well equipped facilities and gadgets that practical skills can be acquire more easily.

2.6 Teacher Professional development

Teacher professional development can be seen as a systematic way for ensuring the teachers that are well trained and equipped with the knowledge and skills of teaching which will help them perfectly to deliver in the classroom of learning. Professional development would help teachers to improve in their learning, practices, understanding, knowledge and skills (Darling-hammond, Hyler, & Gardner, 2017), (Kennedy, 2016). Professional development can help teachers to become more effective in their profession and it would also benefit students having good and up to date knowledge from their teachers (Luft & Hewson, 2014).

Effective professional development in science should not only help teachers develop content knowledge, but also help teachers integrate their knowledge of science, learning, pedagogy, and students and apply that to their practice. Professional development programs in science education should help teachers develop and apply pedagogical content knowledge.

Desimone (2009) insinuated that, an effective professional development should involve teacher learning, changes in attitude and beliefs and development in his teaching practices.

Therefore, effective professional development should be seen as a way that the teachers should develop their knowledge, skills, attitudes, method of teaching, learning habitual in any area and integrate all these by applying them in to practice.

Professional development can be seen as a specialized training, formal education or a way of advancing professional learning intended to help teachers, administrators and other educators to improve their professional knowledge, competence, skills and effectiveness.

Teacher Professional development is vital thing in human resource management and development in education, where by teachers would be well trained and equipped with the sufficient knowledge, skills and all the pedagogies of teaching that they can deliver in the school environment. Professional development can be achieved by attending symposiums, conference, intellectual discussion, seminars, workshops, professional meetings and advanced studies. It can also help the teachers to have a more versatile knowledge and experience through the reading of

journals, magazines, academics publications, listening and watching documentaries related to academic line, and etc. All these can help someone to develop his professional area and work competently and effectively.

In fact, professional development would prepare teachers to execute their task competently, successfully, and effectively and also help them to have a lot of experience which they can be able to show within or outside their domain.

2.7 In-service Training for Teachers of Technical Colleges

In fact, the training that the teacher possessed during his studies would not be enough for him to teach students base on the demands of the society, industries and the country due the rapidly changing of society, economy, content, educational environment and industrial needs. Where this has to be by sending teachers going to in-service training.

It can be seen as a training that is concurrent to official teaching responsibilities to improve teachers' qualifications and skills. It can also be seen as a training which is relating to official professional development activities to maintain or upgrade professional qualifications. this training is normally offer to teachers to enhance their teaching skills.

Teachers who teach in technical colleges in developing country often feel the need for upgrading their knowledge of new trends by attending in-service training programs or professional development courses. Teachers are in need of appropriate in-service training to upgrade their knowledge and skills in their area of specialization, pedagogy of teaching, field of educational theory and any course or field which is related or requires as part of his work.

The in-service training must to be under the responsibility of the ministry of education or the government where they should put much effort and emphasizes for teachers' in-service training to meet the current requirement of teaching career for the development of students, schools, society and the nation at large,

There are several federal and state universities of technology which cannot be mentioned that are offering in-service training in the field of TVET programs in Nigeria for producing good,

competent and well skilled technological teachers and workers. They are so many programs or courses that these universities are offering, which are; Woodwork Technology, Building, Computer, Drafting, Electrical, Electronics, Automobile, Mechanical, Printing technology, Agriculture, Business Education and etc. The main aims are to provide them with employability skills.

Where the employability skills would be regarded as a knowledge, skills, experiences that a person would acquire and used the skills that he has acquired in a better way in his work environment or the skills that can scaled him to have an employment base on his field (Crebert, 2004; Idris, 2012; and Rasul et al. 2010).

The employability skills have been classified in to three categories, namely: core skills, generic skills and personal attributes (Australian learning and teaching council, 2011; and Zaharim, 2009a). The table below show us how these employability skills are categories, such as:

Table 1: Employability Skills

Category	Employability Skills
Generic Skills	Problem Solving and Adaptability skills Professionalism Teamwork skills Lifelong learning Communication Skills Information and Communication Technology and Computer Skills Leadership Skills Initiative and Enterprises Skills Personal Organization and Time Management skills Self-awareness and Self-learning Skills Goal Setting Skills
Core TVET Skills	Knowledge of Science, Technology, Engineering and Mathematics (STEM) and Education Principles Electrical Technology Education System Approach Knowledge of contemporary issues Problem solving and decision-making skills lifelong Lifelong learning Competency in Electrical Technology Education Discipline
Personal Attributes	Attitude Traits

2.8 Practical training to the Teachers of Technical Colleges

Technical teachers needed practical training that can help them to guide students in the school to perform practical work. The practical knowledge must be a mandatory part of the teachers of technical colleges work, it develops competence in relation to the professional field and working life.

The practical training can be obtained from practically oriented short-term courses, workshops or seminars through the practical lessons in workshops of the colleges, it is goal oriented and diverse work which the teacher has to undergo through to participate and analyzing the development needs of his field. Practical training help teachers to develop a professional identity, conduct a practical to the students for them to be well trained and skilled people and help them find employment after graduation.

2.9 Electrical Technology Education Program in Nigeria

Electrical technology education program is a course offered as a vocational course at technical colleges, polytechnics, colleges of technical education and universities as higher education level. It comprises two disciplines which are electrical technology discipline and educational discipline.

The main objectives of the electrical technology education program is to prepare an individual with the knowledge and skills of electrical and electronics technology where the learner must to learn theoretical and practical aspects during the program. The courses that the learner should undergo are: first aid and safe work practice, good housekeeping and workshop practices, interpreting circuit diagrams, sourcing circuit components and constructing circuits, taking measurements, installation, testing and troubleshooting of circuits (National Curriculum Statements, 2011).

2.10 Electrical Technology Education Curriculum in the Universities of Technology, Nigeria

The term curriculum refers to the knowledge and skills that are expected to learn, which include learning objectives that are expected to achieved, teaching strategies which are more

suitable to the learners, learning materials that are more appropriate to the lesson and the test or assessments that are used to evaluate the student level of understanding (University Design for Learning Guidelines, 2014). The Summary of the Curriculum Structure should be as follow in the bellow table;

Table 2: Summary of the Curriculum Structure

Area	Percentage	Nature
Engineering	55.6	Core Skill
Science	8.3	Core Skill
Social Science	36.1	Core Skill, Generic Skill and Personal Attitude

The core skill are technical courses which are the essential skills that combined theoretical and practical aspects to provide students with the technical competencies which consist explicit knowledge and abilities that would help them to deal with the equipment, tools and other facilities effectively in the workshop (Zaharim, 2009b).

Generic Skills are the skills or attributes such as problem solving, decision making skills, communication, social relationship, technology usage and working in teams. The above listed courses are the completed courses that someone has to undergo during his program of studies which can help him to become good competent and well-trained person to contribute to the work environment (Australian learning and teaching council, 2011).

Personal attributes are the good attitudes and behavior that someone has to possessed and exhibit them his employment place (Zaharim, 2009a).

2.11 Conclusion

Absolutely, many facts revealed that TVET teachers should be trained and equipped with the knowledge and skills which they can teach in the school for the benefits of their students. They should have the maximum knowledge on theory, practical skills and information and communication technology knowledge at the beginning of their studies and in the in-service training in order to face rapid challenges of the technological, social, economic, industrial, national, or world demands. Industrial training is very important to the teachers of technical

colleges where their training should be link with the industries for them to know the practical work and the industrial needs.

CHAPTER THREE

Research Methodology

3.1 Introduction

The section represents the research methodology of the study where quantitative data has been selected for achieving acceptable information on the existing skills, standard of the teachers and their attitude towards the needs of skills upgradation for their professional development. Therefore, this section explains the method where the procedures of research design, instrument development, data collection procedure, data analysis and reporting of the results are inclusive.

3.8 Design of Study

In this quantitative study, the cross-sectional survey design has been used as the method to collect the data. The cross-sectional survey design has been chosen because data had been collected at one point in time and it was effective in finding the pattern of the data by collecting the views of the people about a particular issue that are related to them.

3.2 Population

The main population of the study were the teachers, where the three Government Technical Colleges and Business Apprenticeship Training Centre (BATC) at Katsina state are selected as the target population for the study to analyze the need of technical teacher's skill upgradation.

The main population of the study were the teachers, workshop attendance and administrators, where the three Government Technical Colleges and Business Apprenticeship Training Centre. (BATC) Katsina are selected as the target population for the study to analyze the need of technical teacher's skill upgradation in practical electrical and electronic courses in technical colleges of Katsina State, Nigeria.

3.9 Data Sources

The researcher has collected the data through a structure questionnaire to get the desirable data from the teachers of technical colleges in Katsina state.

The data was collected from teachers of the above-mentioned schools as stated in the sample where 92% percent rate of questionnaires were fully returned with their answers where the data obtained was coded in to the Statistical Packages of Social Science (SPSS) to analyze and interpret the data. 0.05 was used as a P value to measure the internal consistency of the questions and to know the reliability.

3.3 Sampling Technique

Purposive sampling has been used for the convenience of the data collection as it is the process of selecting a sample that is believed to be representative of a given population (Eckart, 2004). Here, the researcher selects the sample from those who voluntarily show their interest based on their experience and knowledge in the specific domain.

Due to the nature of the schools and teachers' availability, the researcher selects 160 sample size from the respondents. A close-ended questionnaire was distributed to technical teachers in four colleges to collect the data.

3.5 Data collection tools

With regards to data collection, this research has used a closed ended questionnaire as an instrument to achieve the objectives of the research. Where data has been obtained from the technical teachers.

A validated closed ended questionnaire was designed to get data from the teachers of technical colleges in Katsina State where the first research question consisted 14 items, the second research question consisted 13 items and third research question consisted 5 items.

3.6 Validity and reliability of the Instrument

The questionnaire for this study has been validated by the expert's opinion of the teachers of Department of Technical and Vocational Education, Islamic University of Technology (IUT), where their comment has been used in modifying this questionnaire.

To ensure the reliability of the tool, the pilot test was conducted by administering the questionnaire to five teachers of Government Technical College Mashi, Katsina State, Nigeria purposely to know the reliability of the instrument.

3.7 Ethical Issues

The process of conducting this research and procedure of selecting the participants and participation process was approved by the each of the principal of the four technical colleges where all the participants have voluntarily participated with their consents and given consent form to sign and the data collected from the participants was highly confidential and only used for this study. All the activities with regard to this research was done in agreement with the Federal Republic of Nigeria, particularly Katsina state and in accordance to the rule and regulations governing research at Islamic University of Technology (IUT) Bangladesh.

CHAPTER FOUR

Data Analysis and Interpretation

4.1 Introduction

The analysis for the data collected of this study has been carried out through quantitative method, where the data collected from questionnaire was encoded and put into the computer to analyze it by the software called Statistical Package for Social Sciences (SPSS) to ensure the achievement of the objectives.

The output of this research was interpreted by using descriptive statistics (frequency and percentages, normality test, histograms, normal Q-Q plots and box plots). Reliability coefficient has been measured too to understand the internal consistency of the items.

The data were organized under the three research questions corresponding themes written as (RQ1, RQ2 and RQ3). First research question was, RQ1: To what extent the practical skills and knowledge part of the curriculum in electrical installation are applied by the teachers in the colleges? Second research question, RQ2: To what extent the in-service training' s programs meet the professional development of teachers of technical colleges? And third research question, RQ3: To what extent the teachers feel about the needs of skill Upgradation?

4.2 Descriptive Statistics of the data

Table 3: Descriptive Statistic

Descriptive Statistics											
	N	Range	Minimum	Maximum	Mean	Std. Deviation	Variance	Skewness	Kurtosis	Valid	Missing
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic
TRQ1	146	32.00	35.00	67.00	51.8356	8.18832	67.049	.270	.945	146	0
TRQ2	146	37.00	21.00	58.00	41.4452	7.80984	60.994	.041	.960	146	0
TRQ3	146	12.00	13.00	25.00	21.4932	2.21981	4.928	.557	.440	146	0
ValidN (listwise)	146										

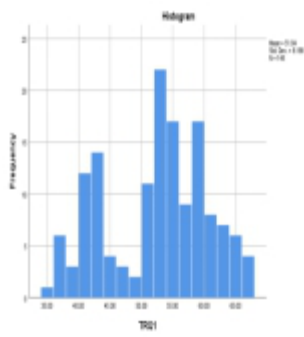
The above table describes the mean value of TRQ1, TRQ2 and TRQ3. Base on the output of the practical skills and knowledge part of curriculum in electrical installation which are applied by the teachers in the colleges (TRQ1), where the mean was 51.8356, for the technical college teachers' in-service programs that meet the professional development. (TRQ2), the mean is 41.4452, and for the extent to which the teachers feel about the needs of skill upgradation (TRQ3), the mean is 21.4932. And there was no missing value in the participants' response where the valid value of the respondents was 146, where from the mean perspective we can said that the data was normally distributed.

Table 4: Mean, Percentage Trimmed Mean, Test of Normality and Percentage Confidence Interval

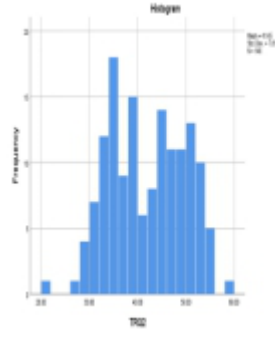
	Mean	5% Trimmed Mean	Test of Normality		95% confidence Interval	
			Kolmogorov-Smirnov^a Sig.	Shapiro-Wilk Sig.	Lower Bound	Upper Bound
TRQ1	51.8356	51.9132	.000	.000.	50.4962	53.1750
TRQ2	41.4452	41.4848	.003.	.003	40.1677	42.7227
TRQ3	21.4932	21.5685	.000	.000	21.1301	21.8563

The table above shows the result of weighted mean and 5% trimmed mean of the TRQ1 (Skill apply), TRQ2 (Professional development) and TRQ3 (Skill upgradation) which indicated very minor difference between them which shows the distribution of data does not vary widely. For the confidence interval (lower bound and upper bound) we are 95% confidence/certain that the true mean of TRQ1, TRQ2 and TRQ3 are within our confidence interval.

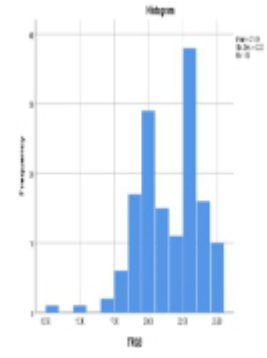
To test the normality, we can use the Shapiro-Wilk test where the null hypothesis should be normally distributed if the P-value is = Or > 0.05. The P-value is labeled as "Sig". Now, the P-values of TRQ1, TRQ2 and TRQ3 violated to the normality; which means the data are not perfectly normal and this is very true in most of cases when data has been collected from the actual research context.



a)



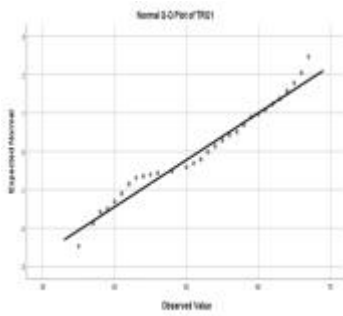
b)



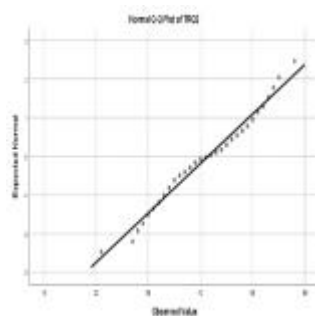
c)

Figure 1: Histogram of teachers' opinion in different research questions

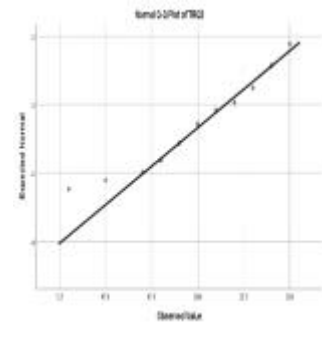
The histograms of all the total research questions (TRQ) should have the shape of a normal curve but show close to the normal curve shape.



TRQ1



TRQ2



TRQ3

Figure 2: Normal Q-Q Plots

For the above Normal Q-Q Plots for TRQ1 (Skill apply), TRQ2 (Professional development) and TRQ3 (Skill upgradation), the dots should be along the line which will indicate that the data are approximately or normally distributed but, from our Q-Q plot we can say that our data is close to normality, though there are some violation.

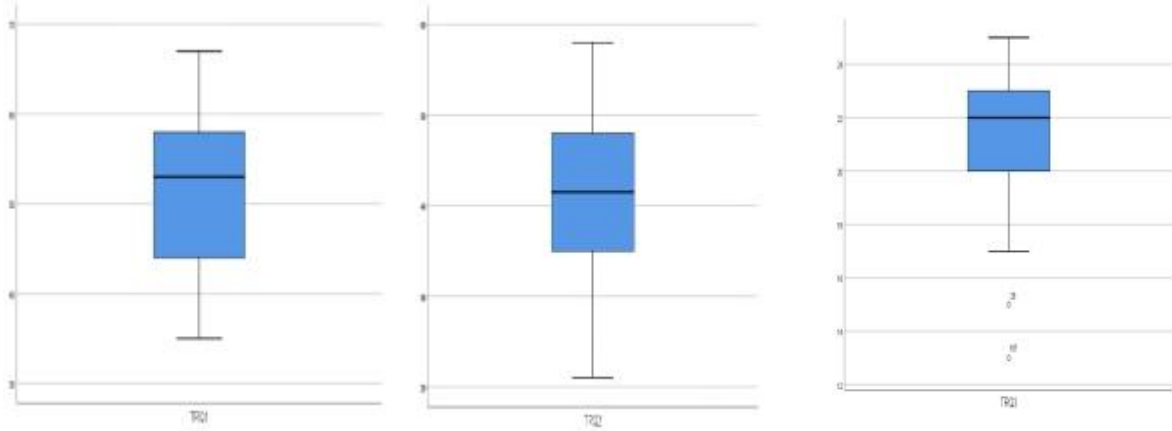


Figure 2: Box Plots

The above box plots are approximately symmetrical as possible the way how it should be. The first and second box plot shows that our data is close to normality, But the third one has some outliers. where these outliers do not have much effect on the mean value. Compare with 5% trimmed values.

4.3 Reliability and Correlations of Research Instruments Items

Table 5: Reliability Test

Categories of Items	Items Reliability test	
	Cronbach's Alpha	N of Items
RQ1	.819	14
RQ2	.775	13
RQ3	.387	5

The above table shows the reliability and validation of the research instrument items, where Cronbach's alpha test was carried out in SPSS software. From the table, both the RQ1 and RQ2 in the questionnaire produced a Cronbach's alpha score above the .7 which show that the research instruments were reliable for its internal consistency.

From the .387 we can understand that the last two items of RQ3 are not internally consistent, as found from the Cronbach's alpha analysis, because the research question contains only five items which are not that much to become internally consistent but the first three items were internally content and the last two (i.e., Item 4 and 5) were not.

4.4 scatter plots

The scatter plots is going to used dots in order to represent values for two different numeric variables and to observe the relationship between these variable. It is going to show us how the two variables are correlated with each other. Although, all the TRQs are continuous variable but from the below figures we made TRQ3 as a dependent variable to correlate with TRQ1 and TRQ2 as independent variables.

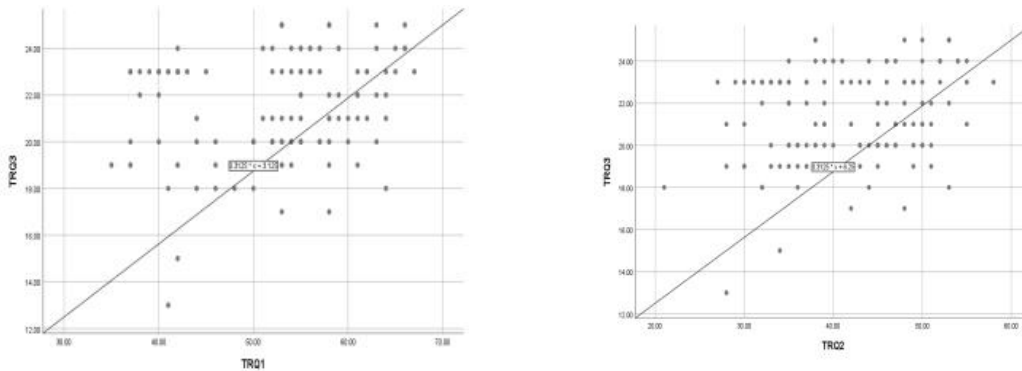


Figure 4: Scatter Plots

In statistics, the correlation coefficient r measures the strength and direction of a linear relationship between two variables on a scatterplot. From the above plots, it indicates us that, there is a positive relationship between the TRQ3 (Skill upgradation) with TRQ1 (Skill apply) and TRQ2 (Professional development) which shows that the high level of the TRQ3 associated with the high level of TRQ1 and TRQ2.

4.5 Pearson r correlation:

The Pearson r correlation has the value which is within $+1$ and -1 , so from range we can determine our value of correlation r is near to.

Many significant statistical differences were calculated according to different categories of teachers in terms of gender, college and department in relation to TRQ1, TRQ2 and TRQ3 in the below tables. The decision rule for Levene's test ($\alpha=0.05$). If $P>0.05$ then it shows no

significant relation and if $P < 0.05$ or $P = 0.05$ then there was a significant association and the results were as follows in the below tables:

Table 6: Correlation of TRQ3 and TRQ1

		Correlations		
		TRQ3	TRQ1	
TRQ3	Pearson Correlation	1	.170*	
	Sig. (2-tailed)		.040	
	N	146	146	
TRQ1	Pearson Correlation	.170*	1	
	Sig. (2-tailed)	.040		
	N	146	146	

*. Correlation is significant at the 0.05 level (2-tailed)

From the above table we can noticed that there was a significant relation between the TRQ3 (Skill upgradation) and TRQ1 (Skill apply), which indicated 0.040; $p < .05$

Table 7: Correlation of TRQ3 and TRQ2

		Correlations		
		TRQ3	TRQ2	
TRQ3	Pearson Correlation	1	.200*	
	Sig. (2-tailed)		.016	
	N	146	146	
TRQ2	Pearson Correlation	.200*	1	
	Sig. (2-tailed)	.016		
	N	146	146	

*. Correlation is significant at the 0.05 level (2-tailed).

Indeed, from the above table we can noticed that there was a significant relation between the TRQ3 (Skill upgradation) and TRQ2 (Professional development), which indicated 0.016; $p < .05$

Table 8: Correlation of TRQ1 with Gender, Colleges and Department of the participant.

		Correlations			
Category		gender	Collage	department	TRQ1
gender of the participant	Pearson Correlation	1	-.096	.044	-.113
	Sig. (2-tailed)		.250	.597	.174

	N	146	146	146	146
collage of the participant	Pearson Correlation	-.096	1	-.043	.502**
	Sig. (2-tailed)	.250		.608	.000
	N	146	146	146	146
department of the participant	Pearson Correlation	.044	-.043	1	.124
	Sig. (2-tailed)	.597	.608		.135
	N	146	146	146	146
TRQ1	Pearson Correlation	-.113	.502**	.124	1
	Sig. (2-tailed)	.174	.000	.135	
	N	146	146	146	146

** . Correlation is significant at the 0.01 level (2-tailed).

From the above table we can understand that the correlation between TRQ1 and gender shows .174, which indicated that no significant relation, for TRQ1 and college it shows .000, this shows that there was a significant relation and for the TRQ1 and department, it shows .135, indicating that there was no significant relation.

Table 9: Correlation of TRQ2 with Gender, Colleges and Department of the participant

Correlations					
		gender of the participant	collage of the participant	department of the participant	TRQ2
gender of the participant	Pearson Correlation	1	-.096	.044	-.087
	Sig. (2-tailed)		.250	.597	.294
	N	146	146	146	146
collage of the participant	Pearson Correlation	-.096	1	-.043	.387**
	Sig. (2-tailed)	.250		.608	.000
	N	146	146	146	146
department of the participant	Pearson Correlation	.044	-.043	1	.086
	Sig. (2-tailed)	.597	.608		.300
	N	146	146	146	146
TRQ2	Pearson Correlation	-.087	.387**	.086	1
	Sig. (2-tailed)	.294	.000	.300	
	N	146	146	146	146

** . Correlation is significant at the 0.01 level (2-tailed).

From the above table we can understand that, the correlation between the TRQ2 and gender the result shows .294, which indicated that no significant relation, for TRQ2 and college it shows .000, indicated that there was a significant relation and for the TRQ2 and department it shows ,300, indicating that there was no significant relation.

Table 10: Correlation of TRQ3 with Gender, Colleges and Department of the participant

				Correlations			
				gender of the participant	collage of the participant	department of the participant	TRQ3
gender of the participant	Pearson Correlation		1	-.096	.044		.075
	Sig. (2-tailed)			.250	.597		.371
	N		146	146	146		146
collage of the participant	Pearson Correlation		-.096	1	-.043		-.162
	Sig. (2-tailed)		.250		.608		.051
	N		146	146	146		146
department of the participant	Pearson Correlation		.044	-.043	1		.172*
	Sig. (2-tailed)		.597	.608			.038
	N		146	146	146		146
TRQ3	Pearson Correlation			-.162	.172*		1
	Sig. (2-tailed)		.371	.051	.038		
	N		146	146	146		146

*. Correlation is significant at the 0.05 level (2-tailed).

From the above table we can see that the correlation between the TRQ3 and gender shows .371, which indicated that no significant relation, for TRQ3 and college it shows .051, this shows that there was a significant relation and for the TRQ3 and department it shows ,038, indicating that there was a significant relation.

4.6 Conclusion

This chapter find all the descriptive statistics of the data collected from the teachers and shows that the data variability is stable, though not perfectly normal. The correlations show that gender does not have any influence on teachers' opinions and attitudes about their skill upgradation. However, colleges have strong influence on their opinions.

CHAPTER FIVE

Discussion, Conclusion and Recommendation

5.1 Introduction

This section described the different aspects of research results related to teachers' skill upgradation and provide further insights through discussion, conclusion and recommendation. It discusses the three research questions which were form and answered by the teachers of technical collages.

5.2 General Discussion

The main objectives of this study were to analyze the need of technical teacher's skill upgradation in practical electrical and electronic courses in technical colleges of Katsina State, Nigeria. The focus of this research was the teachers' attitude, need of skill upgradation, teacher training, teacher professional development, in-service training for teachers, practical training to the teachers and the curriculum designed in the universities of technology in Nigeria. These key concepts also served as a theoretical guide of this research and give an impact to understand the teachers' opinion their professionalization and motivation to get training in technical colleges, in terms of competence (knowledge, understanding, skills, pedagogical expertise, method and selecting adequate teaching, etc) and requirement to TVET education. The study suggest that it is better to encourage the teachers to go for in-service training or to have a retraining program which would help them to upgrade their knowledge, skills and experiences which would make them to be more competent and master of the subject matter.

5.2.1 Discussion on RQ1

Data presented in table 8 (see chapter 4) revealed that, the responses on skill apply and college was significantly related which shows that majority of the respondents' colleges agreed with the statements, but gender and department were insignificantly related which shows that, teachers need a guide for applying skill in schools.

5.2.2 Discussion on RQ2

Result in table 9 (see chapter 4) shows that, professional development has a significant relationship with college which indicated that the in-service training's program can meet the professional development of the teachers. On the other hand, with regard to gender and department, it shows there was no significant relation indicating that teachers are in need of in-service training programs.

5.2.3 Discussion on RQ3

The result in table 10 (see chapter 4) indicated that, skill upgradation has a significant relationship with college and department, this shows that the teachers are ready to go for in-service training. While on the other side with regard to gender it shows that there was no significant relation, where the management should encourage teachers to participate in in-service training.

5.2.4 Linking the findings between RQ1, RQ2 and RQ3

The results of the three research questions showed that all the research question was significantly related with college and insignificantly related with gender and department but RQ3 was found significantly related with department.

The findings revealed that there was no missing value in the participants' response where the valid value of the respondents was 146 and from the mean perspective, we can say that the data is normally distributed and the P-values of TRQ1, TRQ2 and TRQ3 violated to the normality. From the table, both the RQ1 and RQ2 in the questionnaire produced a Cronbach's alpha score above the .7 which shows that the research instrument was reliable for its internal consistency.

The findings from the respondents indicate that in-service training process should be given to the teachers where it reveals that teachers are in needs of another retraining program which would help them to update their knowledge, professional development and be able to deal with the modern equipment and machines.

With regard to research question RQ1, Which the result shows that the research instrument was reliable for its internal consistency. For the research question RQ2, the result shows that the research instrument was reliable for its internal consistency also. From the research question RQ3, the result indicated that .387 where we can understand that the last two items of RQ3 are not internally consistent, as found from the Cronbach's alpha analysis.

Therefore, the study suggests that the technical teachers need skill upgradation, knowledge on practical skill, machine training, facilities and tools usage and workshop management that can equipped them with the ultimate skills that can conduct practical work effectively to the students.

5.3 Recommendation

I would like to recommend that the NGO or other agencies should provide support or initiatives to increase the skill level of the teachers. The government should try to reshape the TVET policy and focus on the quality assurance of TVET. It should also provide additional training on skills that can help teachers to contribute to their professional development. Government should try to provide standard and conducive atmosphere workshop and adequate or sufficient materials, equipment, facilities, tools that would be need in the in workshop for practical purpose.

The government should Provide a scholarship or training program for the TVET teachers where they can get adequate and full trained on TVET. It should also put more effort to see that the universities are well equipped with the necessary equipment and facilities that can help the programs to move successfully and effectively and helped teachers to be in touch with all the latest technology developments and improved their skills.

5.4 Limitations of the Study

There are many public and private technical colleges in Nigeria. The study has been limited to the teachers of the following public technical colleges in Katsina State, Nigeria: Government Technical College Mashi, Government Technical College Ingawa, Government Technical College Funtuwa and Business Apprenticeship Training Centre. (BATC) Katsina.

The study was also limited to the teachers of the aforementioned schools where questionnaires were distributed to the one hundred and sixty teachers and one hundred and forty-six were returned. There were missing of fourteen questionnaires or unreturned. Purposive sampling was used as a sampling technique and validated questionnaire served as an instrument for collecting the data. The limitation of purposive sampling is also the limitation of this study

5.5 Conclusion

Since the study was aimed to study on analyzing the need of technical teacher's skill upgradation in practical electrical and electronic courses in technical colleges of Katsina State, Nigeria. Where the facts revealed that, teacher are in needs of all necessary and mandatory knowledge and skills which can equip them with the technical skills or practical skills that can enable them to effectively and successfully participate in social, economic and technological innovation processes which is very important and essential for the development of any social structure and improving employability to the youngers one since the emphasis was about equipping them the necessary skills to succeed in life. In fact, the issue of in-service training to the teachers would play a vital role in the professional growth of teachers and prepare them to meet the needs of their students.

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Appendix A
Letter to the respondents

Department of Technical and Vocational Education,
Islamic University of Technology (IUT),
Board Bazar, Gaziphur 1704 Bangladesh,
25th June 2019.
Dear Sir/Madam,

LETTER TO THE RESPONDENT

I am MSc TE Electrical and Electronics Engineering student of the aforementioned university, conducting a research on *Analyzing the Need of Technical Teacher's Skill Upgradation in Practical electrical and electronic courses in technical colleges of Katsina State, Nigeria.*

I am requesting you to respond to my questionnaire as possible you can, your response will be highly confidential and also helped to improve the content of this research.

Yours faithfully,

Yusuf Sani Abu
Department of Technical and Vocational Education,
Islamic University of Technology (IUT).

Appendix B

Research instrument

Dear Sir/Madam

I am a student of Master of Science in Technical Education with specialization in Electrical and Electronics Engineering from the Technical and Vocational Education (TVE) department, Faculty of Science and Technical Education (FSTE), Islamic University of Technology (IUT). I am doing a research study in the area of Technical and Vocational Education and Training (TVET). titled **“A Study on Analyzing the Need of Technical Teachers’ Skill upgradation in Practical Courses of Technical Colleges in Katsina State, Nigeria”**. I appreciate your kind participation in my research study.

Your honest response will have a significant impact on this research project.

Personal Information

Collage:

Department:

Sex:

M:

Fema:

Please give a tick to the appropriate cell in the right columns of each item

Strongly Agree = SA

Agree = A

Neutral or No option = N

Disagree = A

Strongly Disagree = SDA

RQ1: To what extent the practical skills and knowledge part of the curriculum in electrical installation are applied by the teachers in the colleges?

S/No	ITEMS	SA	A	N	DA	SDA
1	Teacher of Electrical installation are always guiding students in domestic wiring					
2	The teachers are using all the facilities of the workshop to conduct practical lesson					
3	Teacher are using curriculum content to plan practical and lessons					
4	Teachers are using modern technology to facilitate lesson in the classroom					

5	Teacher are creating a digitally enhanced curriculum that redefines how to deliver instruction in practical work and learner center					
6	Teachers can administer formative and summative assessments aligned with the current curriculum					
7	Electrician training online program prepares teacher for practical work					
8	Teachers are using curriculum to know the topic to be teach to the students					
9	Teachers apply the knowledge and skill to conduct practical work suggested in the curriculum					
10	The teacher encourages students to be creative about the applications of techniques to their challenges during practical session.					
11	The teacher provide the needed materials at the beginning of the practical session					
12	The teachers and students are well dressed during the practical lesson					
13	the teacher should interact with students and ask for their opinions where necessary during the practical activities					
14	The teachers give room for improvisation and seek for alternatives from students when difficulty arises during practical activities					

RQ2: To what extent the in-service training's program meets the professional development of the teachers of technical colleges?

S/N o	ITEMS	SD	A	N	DA	SDA
1	NGO or other agencies provide support or initiatives to increase the skill level of the teachers					
2	Government provide additional training on skills that can help teachers to contribute to their professional development					
3	In-service training's programs meet the professional development of teachers					
4	Nigeria has provided essential funding for teacher's training					
5	TVET sector attracted teachers for skills training					
6	The government has provided adequate supports to technical teachers for increasing their knowledge					
7	The country has introduced training programs for updating teachers' skills					

8	Government's policies are contributing in improving skills level of the teachers					
9	Technical teachers are open to in-service training					
10	Skills improvement programs has always helped the teachers to be in touch with all the latest technology developments					
11	Skills improvement projects have always helped the teachers to be able to see weaknesses and skill gaps					
12	Vocational training projects are improving skills among the technical teachers					
13	Skills improvement projects have always helped to attract new talent among the teachers of technical colleges					

RQ3: To what extent the teachers feel about the needs of skill upgradation

S/No	ITEMS	SA	A	N	DA	SDA
1	Teachers have readiness to go for in-service program					
2	Teachers are always in need of skills training programs					
3	The teachers feel about the needs of skill upgradation					
4	The management encourage teachers to take participate for in-service training					
5	Teacher feel that the strategies for improving knowledge and practical skills are important factor for acquiring high quality and productive students					