STRATEGIES FOR IMPROVING SCHOOL-INDUSTRY COLLABORATION BETWEEN TECHNICAL COLLEGES AND INDUSTRIES FOR ENHANCING SKILLS ACQUISITION IN ELECTRICAL INSTALLATION AND MAINTAINCE WORK TRADE IN NIGER STATE

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2016/1/63758TI

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FEDERAL UNIVERSITY OF TECHNOOGY, MINNA

MARCH, 2023

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A RESEARCH PROJECT SUBMITTED TO THE
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DECLARATION

I YISA, James Mamman Matric No: 2016/1/63758TI an undergraduate student of the Department of Industrial and Technology Education certify that the work embodied in this project is original and has not been submitted in part or full for any other diploma or degree of this or any other university.

_____ _____

YISA JAMES MAMMAN **Signature & Date**
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CERTIFICATION

This project has been read and approved as meeting the requirements for the award of B. Tech degree in Industrial and Technology Education, School of Science and Technology Education, Federal University of Technology, Minna.

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Mr. ABUTU FRANCIS Date
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Head of Department

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External Examiner Sign & Date

DEDICATION

The researcher hereby dedicate this project work to his family, for their support and prayers.

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ABSTRACT

The research was design on strategies for improving school-industry collaboration between technical colleges and industries for enhancing skill acquisition in electrical installation and maintaince trade in Niger state. Five research question were answered and five hypotheses tested at 0.05 level of significance were formulated for the study. improving school-industry collaboration for skill acquisition in electrical installation and maintenance work, Technical College-based activities for improving collaboration for skill acquisition in electrical installation and maintenance work, Administrative strategies for improving school-industry collaboration for skill acquisition in electrical installation and maintenance, Administrative strategies for improving school-industry collaboration for skill acquisition in electrical installation and maintenance. The literature was reviewed in line with the five research questions, and the null hypotheses were formulated to guide the study, in which several sub-headings were discussed as regard to this study. Descriptive survey research method with the use of a structured questionnaire in which sample questionnaire was formulated to solicited information from the respondents. The targeted population for this study comprises of 50 technical college teachers in 7 technical colleges and 25 factory supervisors in 5 factories or industries in minna, Niger State making it the total of 75. Data obtained was analyzed using mean, standard deviation, and t-test statistics. The study concluded the following: Based on the findings of the study, the following conclusions were drawn: students of technical colleges can only acquire skills for employment and to be self-employed after graduation when there is collaboration between industries and technical colleges and also recommended that; Industry base job skill should be included in the curriculum of technical colleges for skill acquisition. Technical teachers/instructors should visit industrial enterprises to familiarize themselves with the current technologies, sharing of facilities between technical colleges should be encouraged and Training equipment, machines, laboratories workshops, ICT library and classrooms should be provided to technical colleges by government and philanthropies in the society for effective training.

TABLE OF CONTENTS

CHAPTER FOUR

CHAPTER FIVE

LIST OF TABLES

Table **Page**

CHAPTER ONE

1.0 INTRODUCTION

1.1 Background to the Study

A mutually agreed-upon training partnership, school-industry collaboration combines classroom learning (knowledge and practical skills) with on-the-job training in an industry. (Buligina, 2019) It is a method of teaching in which real-world hands-on experience with real industrial tools, machines, and equipment is used to update, improve, and strengthen practical skills and knowledge learned in the classroom, school laboratories, and workshops. School - industry joint effort is the plan between two source gatherings, in particular an instructive establishment and industry, to help students foster practical abilities for the universe of work (Menashy, 2020). Collaboration between schools and industries is also known as transition from school to work. School-to-work transition is a locally based education initiative that helps young people smoothly transition from school to work (Buligina, 2019). It brings together teachers, students, businesses, and industry. Technical Colleges are the schools in Nigeria that are responsible for skill acquisition training.

Technical colleges are post-primary institutions where students take vocational courses to learn practical skills. According to Okorie (2018), technical colleges in Nigeria are established to train students to acquire practical technical skills and fundamental scientific knowledge. As a result, technical colleges are tasked with providing, imparting, or teaching practical skills, attitudes, comprehension, and knowledge regarding occupations in various economic and social sectors. It is anticipated that graduates of technical colleges will acquire valuable skills in a variety of specializations, including electrical installation and maintenance work.

One-way people can make a living is by working in the electrical installation and maintenance trade. It broadens the scholarly skyline of the person in the field of power as well as outfits them with creative soul and abilities which are important for information move in the realm of work (Ogbuanya, 2018). According to the Electric Installation Inspection Act of 2019, "electrical installation" also includes the wires, machinery, apparatus, appliances, devices, materials, and equipment that are utilized or intended for use by an individual or group of people in an establishment. The process of positioning an apparatus, device, appliance, or structure for use is known as installation. Due to wear and tear, maintenance is required for all types of installations. The work done to keep or restore an asset to a reasonable standard at a reasonable cost is called maintenance. According to Ahamed (2021), the term "maintenance" refers to the specific measures and precautions that an individual takes to take care of machinery, equipment, or a facility in order to guarantee that the item will continue to serve its intended purpose and have a long lifespan. According to Kroons and Weigel (2017), industrial plants, equipment, control devices, and measuring instruments all undergo regular maintenance to maintain their optimal performance. The worker's specific skills greatly influence the quality of the installation and maintenance.

While acquisition is the process of acquiring something like knowledge and skills, skill is the ability to do something well. According to Nwoji (2019), skills are the capacity to perform an act with skill. It refers to the expertise, ability, or proficiency demonstrated while completing a task. According to Hadroma (2018), technical skills can be defined as the ability to handle or solve problems as well as the procedures, methods, and techniques for operating technical equipment. Function, mode of operation, operational technique, maintenance technique, storage technique, calibration technique, and repairing potential

damage with the appropriate competency skills are all examples of technical skills. Technical expertise is a requirement for carrying out various kinds of work in business or industry. Skill acquisition is the process of learning and practicing a specific skill until the learner is proficient in it and able to perform it when needed. Students in electrical installation must demonstrate the following technical and theoretical abilities: measuring accurately, marking the location of outlets and tapping holes on control panels, installing and troubleshooting, installing conduit and tubing, raceway measuring, bending of conduit, assembly components, and identifying conductors, as well as measuring and marking dimensions on a work surface using scale plans and drawings based on the imperial measuring system (Kevin, 2019). Therefore, technical college electricians need to be skilled in order to function effectively. because advancements in global technology have resulted in the use of electricity in numerous human endeavors, including homes, offices, institutions, and industries. The Federal Republic of Nigeria (FRN, 2020) emphasized that graduates of technical colleges who have received training in electrical installation and maintenance are expected to acquire skills for manufacturing and servicing in industrial, power generation, utilization, and goal achievement.

In most states, including Niger state, technical colleges appear to have achieved these objectives far below expectations. This could be because students aren't getting enough exposure to training in practical skills in school workshops, laboratories, and computer rooms, as well as a lack of books, teachers, and curriculum content (Akhuemonkhan & Raimi, 2021). In many industries where new graduates are being trained, the issue of technical graduates lacking the necessary skills prompted the costly venture of opening training schools (EII, 2019). It also suggests that technical students have received a lot of theoretical instruction. The mismatch between the labor market's theory and demand is

another issue (Haromi, 2018). As a result, graduates avoid positions in which they may be required to demonstrate their skills. This is as a result of the students' lack of exposure to work-based skills during school activities. Graduates who fell short of expectations as a result have remained unemployed. As a result, graduates of technical schools require the necessary skills and knowledge to produce goods and services in industries.

An industry is where individuals are engaged with creating a specific decent or offering a specific support. The industry could be a place where goods and services are organized by technical experts with the necessary technical and vocational skills (Adebayo, 2020), or it could be a manufacturing, distributing, and distribution facility. Further, according to EII (2019), technical students have received a lot of theoretical instruction. Graduates who were ill-equipped and have remained unemployed as a result of these lapses Therefore, what could be to blame for this? It's possible that Nigeria's technical institutions have not taken advantage of what is available in other nations. Nations have found a successful approach to preparing their labor supply in new advances through participation among ventures and specialized organizations (UNESCO, 2019). Working together, schools and businesses share resources and develop trust. Innovative educational concepts that are relevant to their respective workforces will also be put into action. According to Christensen (2018), co-produced educational programs thus generate genuine and direct value for both industry and schools, with students serving as the ultimate beneficiaries. Particularly noteworthy is the possibility that industry grants access to resources that schools cannot afford. In contrast to the basic options found in school laboratories and workshops, these resources include personnel who are experts in their fields as well as industry-standard equipment (Watters, 2018). This could provide graduates with the skills they need to find work or start their own business. However, the situation regarding school-

industry collaboration appears to be lacking at the Technical College level in Plateau State. It would appear that students only receive instruction in the courses without any kind of collaboration. However, through the Students Supervise Industrial Training/Work Experiences Scheme (SIWES), efforts to collaborate with industries have been made in the past. After their promotion examinations, it was only done while they were on long vacation for a month without supervision. Students are not even required to value this SIWES in order for them to earn a credit unit or a mark. To enable students to apply what they have learned in class to real-world situations, it is necessary to harmonize school and industry activities. Students should be taught practical skills through a variety of based activities offered by both schools and businesses.

School based learning exercises are those exercises that are given by the school to successful creation of labor supply. According to Verger (2019), school-based learning activities should include the provision of appropriate classroom facilities, instructional materials, and qualified technical teachers. Schools are responsible for the following: planning in conjunction with the industries in which training should be provided, evaluating students to determine the extent to which they have acquired the necessary skills, and supervising students while training in an industry-based setting (Christensen, 2018). The school - based exercises ought to be normally supplemented with the business based exercises.

A planned work experience, workplace mentoring, and instruction in industries are all examples of industry-based learning. According to Verger (2019), businesses and educational institutions ought to offer work-based learning opportunities for students to learn about new technologies through internships, on-the-job training, mentoring, and cooperation education (industrial attachment). Industries perform the following functions:

assessment of the institution's training resources to determine whether the institution is capable of providing students with adequate training and background on the jobs required by industries (Christensen, 2018). Teachers and educators can use high-tech laboratories and work on industrial machinery to update their skills and knowledge and stay up to date on emerging technologies, which also helps them with their research. In order to better match the requirements of industry with the needs of future employees, industries have the opportunity to influence school curriculum. Industries are also expected to make special arrangements for technical college graduates to get jobs. It is evident that schools and businesses need to intensify their efforts to train students in electrical fields if they want electrical students to have the necessary skills. The issue at hand is who is to blame. Are it the pupils? or the qualifications and experience of the teachers (Ogbuanya, 2018). This could be because they were unable to acquire the necessary skills during their education to enter the workforce. In light of this, technical colleges and industries in Niger State need to work together to improve electrical installation and maintenance work students' skill acquisition.

1.2 Statement of the Problem

Electrical installation graduates from technical colleges need skills to succeed in industries, institutions, and many other fields. It is anticipated that those who receive training will acquire skills for industries, manufacturing, and power generation and use. However, it appears that skill development in such as Niger state is inadequate and subpar (Abu, 2017). This could be because students aren't getting enough training in practical skills in the school workshops and laboratories, there are too many students in the class, teachers aren't good enough, the learning environment is bad, the workshops and laboratories aren't well-equipped for training, there aren't enough tools and training materials, or there aren't

enough classroom facilities. Technical College-Industry Collaboration is therefore necessary to help the learner develop functional skills for the workplace in order to bridge this gap between theory and practice. As a result, it is necessary to identify technical college- and industry-based activities that will enhance collaboration and expose students to more practical and skill-acquisition opportunities in industries employing cutting-edge technologies (Bala, 2018).

1.3 Purpose of the Study

The purpose of this study was to identify ways for improving skill acquisition of electrical installation and maintenance work students through collaboration between technical colleges and industries in Niger state. Specifically, this study determined:

1. School-based activities for improving school-industry collaboration for skill acquisition in electrical installation and maintenance work in Niger state.

2. Technical College-based activities for improving collaboration for skill acquisition in electrical installation and maintenance work in Niger state.
3. Administrative strategies for improving school-industry collaboration for skill acquisition in electrical installation and maintenance in Niger state.
4. Industry-based activities for improving school-industry collaboration for skill acquisition in electrical installation and maintenance in Niger state.

1.4 Significance of the Study

Policy makers would also benefit from this study because it would help them develop policies that are in the best interests of skilled workers. The review could likewise help strategy creators to enhance the approach on training that would reinforce the relationship of specialized schools and ventures for human resources advancement. The information on

how to use collaboration to improve collaboration between technical colleges and industries to acquire skills would be helpful to the National Board for Technical Education (NBTE), which is a regulatory body for all technical programs offered by technical institutions. And would use it to instruct the nation's technical colleges on how to implement collaboration in their institutions. The data might be used as a basis for making suggestions to the NBTE regarding possible areas of curriculum modification at the technical colleges. This is to meet the demand that comes from using collaboration to help students in technical colleges learn new skills. Curriculum planners would benefit because it would make it easier for them to think about all the things that need to be done to plan and create a technical education curriculum that will produce the kind of people society needs.

The study would be beneficial to electrical installation students/craftsmen because collaboration between schools and industries must have exposed students to real-world situations involving industrial tools, machines, and equipment to improve their technical skills in line with current technological advancement. In addition, it would enhance students' on-the-job school-industry experience by providing them with step-by-step industry training and systematic exposure to the most recent technological advancements. In turn, the students would gain knowledge and skills in electrical installation, maintenance, and troubleshooting using the most recent technological equipment. In this global technological advancement, a skilled electrical craftsman would effectively design, construct, install, operate, and maintain electrical machinery, tools, and other related appliances. The electrical craftsmen's entrepreneurial skills would rise as a result, raising society's socioeconomic status.

By being self-sufficient, skilled electrical installation and maintenance craftsmen would confidently expand their services. In addition, skilled artisans could establish their own electrical workshops in various regions of the plateau state and the nation. Due to their exposure to industrial experience during their training, this could also serve as training centers for prospective craftsmen.

Collaboration between schools and industries could increase students' exposure to real-world experience during their training, which could benefit industries and other economic sectors. For efficient performance and productivity, the students would properly handle, operate, manage, and maintain industrial electrical tools, machines, and equipment. When electrical equipment is in working order and is handled by skilled craftsmen, many industries would benefit greatly. Without joint effort, numerous businesses and different areas of the work market experience laments because of terrible showing of specialized school items. Since preparing would be coordinated for them on ability preparing to address the issue of the ventures before they work on and with machines. This could prove to be a waste of time and resources, leading to low productivity in the face of high demands. After graduation, industries would also be encouraged to accept and use technical college products because the student would have received required training. Because the students had previously received training from them during their course of study through SIWES and cooperative education, it would also reduce the cost of retraining the craftsmen after they were employed.

Since there are no guidelines for how collaborative training could be done, technical colleges and other centers for vocational training would benefit. It would be used in the training to equip the student's trainee with sufficient skills to handle the electrical equipment and machinery of industries in this global technological advancement if the

guidelines are identified and included in their training program or curriculum. When businesses participate in the training of technical teachers through workshops and seminars, there will be staff development. Sharing of thoughts would increment as specialized educators would be exceptional to prepare and confer fundamental abilities to understudies. To come up with some guidelines on how to use and improve collaboration between technical colleges and industries for skill acquisition among technical college students, technical colleges could host conferences with industries on topics related to school-industry collaboration.

2.5 Scope of the Study

This research focuses on ways to improve school-industry collaboration in Niger State in order to increase skill acquisition in the electrical installation and maintenance trade. Administrative strategies that could improve school-industry collaboration for skill acquisition in electrical installation and maintenance trade in Niger State, School base activities that could improve school-industry collaboration for skill acquisition in electrical installation and maintenance trade in Niger State, and Industry base activities that could improve school-industry collaboration for skill acquisition in electrical installation and maintenance trade in Niger State are also covered in the study.

Because some technical colleges and industries were scattered throughout Niger State, the researcher needed a lot of time to visit and collect data for the study, which reduced the research processes. Another limitation of this study was the time factor. The study also found that it was hard to find technical teachers and industrial supervisors working in the workshop to see how they worked together. To obtain permission to carry out a study, some of the technical colleges and industries in Niger State had extremely stringent regulations

and lengthy procedures; As a result, the researcher had to spend a lot of time and money to obtain permission to collect data.

1.6 Research Questions

The following research questions will guild the study: -

2 What are the school base activities for improving school-industry collaboration for skill acquisition in electrical installation and maintenance trade in Niger State?

3 What are the technical college-based activities for improving school-industry collaboration for skill acquisition in electrical installation and maintenance trade in Niger State?

4 What are the administrative strategies for improving school-industry collaboration for skill acquisition in electrical installation and maintenance trade in Niger state?

5 What are the industry-based activities for improving school-industry collaboration for skill acquisition in electrical installation and maintenance trade in Niger state?

1.7 Hypotheses

The following null hypothesis was formulated and will be tested at 0.05 level of significance.

3 There will be no significant difference in the mean responses of industrial supervisors and technical teachers on the school base activities for improving school-industry collaboration or skill acquisition in electrical installation and maintenance in technical colleges in Niger State.

4 There will be no significant difference in the mean responses of industrial supervisors and technical teachers on the technical college-based activities for

improving school-industry collaboration for skill acquisition in electrical installation and maintenance in technical colleges in Niger State.

5 There will be no significant difference in the mean responses of industrial supervisors and technical teachers on those industries based activities for improving school–industry collaboration in electrical installation and maintenance in technical colleges in Niger State.

CHAPTER TWO

2.0 REVIEW OF RELATED LITERATURE

The related literature was reviewed under the following sub-heading

2.1 Conceptual Framework of the study

- 2.1.1 Concept of collaboration and skill acquisition
- 2.1.2 School –industry collaboration for technology growth
- 2.1.3 Administrative strategies for improving school-industry collaboration in electrical installation and maintenance in technical colleges in plateau state.
- 2.1.4 School-based activities that will improve school-industry collaboration.
- 2.1.5 Industry-based activities that can improve school-industry collaboration in electrical installation.
- 2.1.6 Electrical Installation and maintenance work industry based skills.

2.2 Theoretical Framework

- 2.2.1 Theory of Skill Development

2.3 Related Empirical Studies

2.4 Summary of Review of Related Literature

2.1 Conceptual Framework of the study

According to Abu (2017) defines concept as a means of categorizing information and organizing world knowledge. According to Eboh (2019), stated that a concept is an abstract system of thought that science uses to investigate, interpret, and comprehend particular aspects of reality or phenomena. Eboh goes on to say that a concept is the method by which a researcher manipulates studies, organizes, isolates, and gives names to the properties of

objects or phenomena. An image or symbolic representation of an abstract idea is called a concept. For the purpose of providing the study with direction, concepts can be represented on a framework. Conceptual framework is a term used to describe this representation. The researcher's own perspective on the issue is referred to as a conceptual framework. It is made up of a set of ideas, presumptions, beliefs, and theories that support and guide the study. It also shows how the various constructions he wants to look into are related to one another. This can be depicted in a visual (schema) or written product to graphically or narratively explain the primary concepts to be studied (Robson, 2002). A model of the subject the researcher wants to study might be represented by the conceptual framework. According to Buligina (2019), the conceptual framework provides a graphical representation of the causal mechanisms and relationships derived from the research problem. The diagram below can be used to represent the study's conceptual framework.

2.1.1 Concept of Collaboration

No Nation Can Forget About Training Young People; Their technical abilities are required to boost formal and non-formal sector productivity and contribute to economic expansion. A number of donors, particularly the World Bank, began to emphasize the necessity of expanding Private Technical Vocational Education at the beginning of the 1990s for a number of reasons; to increase the efficiency and innovativeness of the government's limited financing capacity, broaden access to technical and vocational education, and respond more quickly to the training requirements of high-growth markets (FRN, 2020).

Because they enable regular communication between employers (industries) and VET providers (technical institutions), public-private partnerships and cooperation are essential to the development of high-quality vocational education and training (VET). Employers

can also contribute to the VET curriculum through this communication, which frequently serves as a recruiting tool for skilled workers (Raimi, 2020).

New ways of thinking are needed for industry-technical institution cooperation. To share the problems and needs, a substantial formal, flexible education system is required. issues, as well as the program's strengths and weaknesses. Teachers and administrators in technical institutions must also discuss the inner workings of technology education with representatives from industry when working together. Leaders from both the education sector and the business world can benefit from mutual respect and trust when they work together to solve problems and accomplish common objectives. Educational leaders may benefit from these outcomes by expanding access to technical education for employment programs, enhancing their quality, and increasing their effectiveness.

Academics working in the field of vocational and technical education have pressed for a stronger connection between technical institutions and the industries they serve ever since. In addition, there was a demand for interaction between the business sector and technical institutions in order to produce the appropriate engineers, technologists, technicians, and artisans to serve the nation. Because the primary institution's training facilities are out-of-date and inadequate, it is difficult to provide practical training that meets current industry needs (Abu, 2017). Therefore, a shift in direction is required to close the gap that is growing between graduates of technical vocational education TVE (technical colleges) and the industry in terms of the skills they need to work in industry. As a result, the government must pass a law that requires industry and technical institutions to work together to develop a program for the overall educational development of young Nigerians.

When it comes to collaborating with educational institutions and businesses, the United States of America's experience is relevant. Sherman (2021) recalled that the idea of working together with industry and educational institutions is not new. He made the observation that the United States of America's industries and educational institutions have been working together to educate children and adults for more than a century, and that the value of industries' contributions to education is rising to new heights. Sherman says that this collaboration is seen as one way to give future schools innovation and quality.

In his own contribution, Adebayo (2020) outlined the following four ways collaboration can benefit schools and industries:

1 Giving other people and institutions the chance to gain insight into the perspective of another organization as well as the chance to win and become allies

2 assisting in the development of the kind of understanding that generates support and expanding the capacities of participating institutions to deal with the challenges that each entity must face in its line of operation.

3 assisting in the development of high-quality educational programs.

4 facilitating greater access to information, time, human resources, and financial assistance from other community sectors and lowering the costs and risks associated with conducting business for each participant.

Adebayo pointed out that in order for industry involvement to be more than just voluntary or advisory vocational education, it must be expanded and developed. He observed the need for advocates who can assist vocational education in maintaining up-to-date materials and instruction. One of the nine stated goals of the Carl D. Perkins vocational education Act of

1984 was to promote greater cooperation between public agencies and the public sector in preparing individuals for employment, in promoting the quality of vocational education in the United States, and in making the vocational system more responsive to the labor in the state. This was mentioned in his article. The congress of the United States of America recognized the critical importance of industry and educational institution partnership.

In PL 98-524, Congress emphasized the importance of industry and educational partnership. For instance, Felix (2018) extracted more than fifty passages from the PL 98-524 implementation conference, which was sponsored by the American Vocation Association. These passages dealt with the collaboration between the public and private sectors in the United States' economic development.

According to Hadromi (2020), a new partnership and cooperation effort between industry and technical institutions was one of the 1980s' education and training thrusts. "These partnership and cooperation efforts can work to work to the benefit of both education and industry program," he asserts. Also, the US office of Innovation Evaluation (2010 as refered to in Kroon 2018) revealed that as the pace of mechanical change speeds up, the two businesses and instructive organizations are confronted with expanding and changing requests for innovative related guidelines. However, unlike industrialization in developing nations, our technological institutions in Nigeria lack industry involvement in training, funding, and curriculum development (Ashoolu, 2018). According to Audu (2021), there is no connection or interaction between industries and technological institutions in manufacturing and research. As a result, industry and business ought to become more involved in education and training. The supervised Work Experience (SIWES) program, which was started in 1973 by the Industrial Training Fund (ITF), is one way that students in vocational technical programs have gained work experience over time. Obanor (2020)

claims that it was established to address the issue of graduates of Nigerian tertiary institutions lacking sufficient practical skills necessary for industry employment. Students will gain the skills they need to successfully transition from the classroom to the real world of work through this program. It bears the cost of understudies of tertiary establishments the chance of being acclimated and presented to the required of involvement with taking care of apparatus and hardware which are typically not accessible in the instructive organizations. However, such open doors were not made accessible to understudies of specialized universities. However, the SIWES program has undoubtedly failed, particularly in light of the objectives for which it was created (Obanor, 2020). The majority of students leave school to attend the industrial training program. Some people are fortunate enough to find a suitable location of their choice, while others are dissatisfied enough to remain at home during this time because they have been rejected by a large number of businesses because of funding or a population limit in a particular industry.

Some will assert that it is now necessary to have a "connection" in order to find a suitable workplace. Additionally, there are students who complete an industrial training placement that is unrelated to their academic program. This could be because they were dissatisfied with the high stipend they would receive or because they were unable to find a suitable placement. This plan seems to have run into a lot of the problems mentioned above when it comes to technical colleges in Nigeria. Yabani (2018) identified the lack of industries in the area where the majority of technical colleges are located as one of these obstacles. As is the case in other parts of the world for the acquisition of relevant skills, this may have prompted the need for appropriate collaboration between industries and technical colleges.

2.1.2 Concept of Skill Acquisition

In order to adapt to the ever-changing environment of various industries, individuals working in the fields of electrical engineering required specialized technical and knowledge. To be able to function effectively in the workplace, you need the fundamental skills. The terms "technical competence" and "technical skills" both refer to the theoretical knowledge and practical skills that students in technical institutions must possess. It also refers to providing graduates with all of the fundamental skills and information they require to succeed in the workplace (0zioko, 2018). Specialized capability is additionally alluded to, as the specialized abilities or industry based abilities implanted in the school educational plan (Ominabo, 2018). Technical skills, in the words of Obwoge (2019), are "the ability to do or perform an activity in relation to some meaningful work." He also emphasized that integrating practical work, theoretical knowledge, common sense, ability to observe, and encouragement in an occupation presents difficulties for the student. According to Okorie (2018), the application of mental and physical activities is required for technical skill. Additionally, he defined it as the capacity for skillful object handling.

As per him it likewise empowers a person to foster physical, social, scholarly, monetary and close to home abilities. Okorie went on to say that a person who wants to learn technical skills must have interests, abilities, aptitude, practice, personality traits, and physical characteristics. In vocational technical education, the acquisition of psychomotor skills plays a crucial role. As a result, technology teachers are not only expected to have relevant production skills, but they are also expected to understand how psychomotor skills are developed and to focus on them when teaching their own students. The teachers will be able to set up the right training methods so they can teach their students the best way possible.

An understanding of how psychomotor skills are learned is a fundamental requirement for successful vocational education training. Numerous scientists have provided various descriptions of this process (Gofwen, 2021). What are now known as the six levels of steps of psychomotor skill acquisition are the results of these authors' research into skills acquisition theories: seeing, inspiring, performing, adjusting and advancement. Lamar (2021) emphasized that teachers should instill in students a strong desire to have the ability to manipulate when teaching psychomotor skills in vocational education. Their skillful performance ought to truly pique his interest. Students may want to see a product that has been made by a skilled person or, in some cases, witness their skill performance while it is being made. This might not only inspire the students, but it might also instill in them a ideal. If the student wishes to possess the skill, they must understand why it is required and feel the need for it. A strong motivation will not come from simply stating to them, as is frequently done in theory classes, that they should already be familiar with the procedure. The authors then came to the conclusion that, for motivation, the teacher should ensure that the students have a correct and precise picture (or perception) of what needs to be accomplished; Otherwise, there won't be much improvement. Gofwen, 2021), in describing the acquisition of psychomotor skills, stated that the learner or trainee must be motivated first by setting goals and/or solving problems. Satisfaction, needs, rewards, and/or punishment are all components of motivation.

It appears that the initial arousal of an intention serves as a trigger for subsequent action. Only when the learner exhibits the appropriate sign of motivation can there be indications that participating in an activity and practicing are meaningful. According to Padelford (2019), in the process of acquiring a psychomotor skill, motivation or incentive appears to be the activator and sustainer of action or thought. In the process of developing

psychomotor skills, goals are an essential component. They may be internally directed, externally directed, or a combination of the two. Many psychomotor skills appear to be acquired because the learner wants to or because it feels good. A high level of achievement in psychomotor skills is made possible by various kinds of external stimulation and positive internal feedback, it was mentioned. Both internal and external sources of motivation should be utilized throughout the teaching and learning process. Without viable inspiration or motivating force which might prompt impersonation, psychomotor abilities wouldn't be gained or might be inadequately achieved, best case scenario. The stage of imitation involves the learner mentally manipulating a form, pattern, or sequence as well as mimicking a series of patterns or procedures. Therefore, before attempting to perform a function, the learner of a psychomotor skill receives the necessary cues, mentally manipulates them, and arranges them into a series of set.

Nwoji (2019) suggested that teachers should ask students to name the important steps in doing what they are now ready to learn as a practical way to help students imitate. If the procedure is difficult for the students to comprehend, the instructor should also demonstrate it. When students learn from a demonstration, they typically observe and then attempt to perform the activity. Each procedure should be demonstrated and explained in detail by the instructor. The process should be taught to the students, with each student trying his or her hand at it. Performing activity is important to getting the expertise; A manipulative skill cannot be learned through knowledge and imitation alone. According to the same authors, performing is a necessary pre-requisite for learning a task and the learning process with increased practice. Understudies in professional specialized schooling should be offered an adequate number of chances to rehearse what they are by and large however in principle examples. Before using operation on a large scale or on a valuable piece of work, students

typically need to develop a significant amount of skill. According to Olaitan (2019), work experience will be effective in proportion to the specific experience for training habits of doing and thinking through repetitive performance. Repeated practice exercises can be used to develop this level of skill. Students may be able to adapt well when this is done. The ability to perform expertly toward the end goal of most psychomotor skill training is adaptation, but it should ideally go beyond that. Padelford (2019) suggested that some psychomotor skills should be adapted to new circumstances—a kind of learning transfer. According to Padelford, adapting necessitates creative thinking in addition to diagnosing and solving issues. Although it may be simpler to evaluate automatic action, vocational technical educators ought to place equal emphasis on adaptive learning. This is because, in the productive or service industries, problem-solving situations frequently necessitate the transfer of knowledge. Innovation may result from adoption.

The highest level of psychomotor skill acquisition is innovation, which places an emphasis on the capacity to experiment with and develop novel forms of the learned skill. Adebayo (2020) emphasized that the innovative act provides the opportunity to express feelings and experience self-actualization. Development presents a test and a chance for satisfaction and positive self-idea. Symbolizing and expressing oneself need not be limited to the other endeavors; they can be used in any industry. Indeed, according to Eboh (2019), "creative activity is characterized by that uniqueness and variation from standard forms." Development requires every one of the areas of learning and imagination, and much input. Vocational and technical educators have emphasized a variety of times how important it is to expose students enrolled in vocational technical programs to practical skill areas while they are still in school. For instance, Olaitan (2019) noted that vocational technical education is an education for work. As a result, technical instructors ought to provide

trainees with exposure to learning in models that are related to jobs and in an environment that resembles actual work environments. Ndinechi (2020) focused on the need to reinforce the connections between learning in school and the act of work fully intent on working with the change from school to business. In Olaitan (2019), Ali made the observation that, despite the fact that many subjects may be more theoretical than practical, vocational technical education is more theoretical than practical. As a result, it is essential to make every effort to expose students to situations in which skills and knowledge can be learned simultaneously. In point of fact, any instructional arrangement established in a vocational technical institution to facilitate the process of skill acquisition is a commendable innovation and a significant step in the right direction. Doing is the only way to acquire practical skills. Since a definitive objective of professional specialized instruction is planning on person for work, any learning circumstance that advances the gathering of hypothetical information just to the detriment of useful connection with the items and gear isn't simply working in opposition to the standards of professional specialized training yet risks working an unessential educational program (Gowon, 2018).

2.1.3 School – Industry Collaboration for Technological Growth

In some developed nations, technological advancement is increasing on a daily basis to the point where a piece of equipment eventually becomes obsolete. The industrial sector in developing nations like Nigeria, which is profit-oriented, is on the lookout for technological advancements that could increase their profit margin in less time and with greater efficiency because the world of today is a world of technology. According to the Netherlands Organization for International Cooperation in Higher Education (NICHE, 2010), TVE graduates face a number of difficulties in acquiring practical skills. In most developing nations, particularly Nigeria, TVE is limited in scope, quality, and relevance. The

curriculum and syllabi are out of date, the programs don't meet the needs of the local labor market, and the institutions don't have the tools and equipment needed to learn practical skills. Where it is present, the equipment in workshops and laboratories is frequently out of date and does not resemble the technologies that are currently utilized by industry (EII, 2019). During practical lessons, trainee overcrowding results from a lack of equipment, and the majority of students are forced to watch the demonstration instead of getting some hands-on practice. The education and training provided by these institutions are largely theoretical, and the job market does not view graduates as having a higher level of skill than their academic counterparts. As a result, the schools develop a bad reputation and produce graduates who are less employable (EII, 2010). Olaitan, (2019) commented that, preparing foundations in Nigeria as is normal for discouraged financial matters are not really ready to audit their offices to stay up with mechanical advancement like in the other created nations, the resultant impact of this present circumstance is that the learners from those establishments enter the universe of work just to find that the hardware with which they were prepared have been adjusted or have radically strayed from those wherein they were prepared with.

According to Okorie (2018), private employers frequently praised the lack of practical work content at universities and technical institutions. Okorie suggested that training institutions and private employers should work together more to improve the practical work content in training institutions as a solution to this issue. Remarking on a similar subject, Olaitan (2019) commented that answer for low quality of graduates rest with producing nearer connections and participation among enterprises and preparing establishments. He also emphasized that employers of technical workers would be more committed to promoting the quality of training in technical institutions through job training and financial support if

they had a stake in the quality of the workers they hired. This employer claims that he made a significant contribution; would be more proactive in providing trainees participating in industrial attachment with valuable work experiences that would help them acquire skills and knowledge in the most recent technologies and assist in evaluating their performance on the job.

In a similar vein, Okorie (2018) made the observation that the relationship between schools and industries has not received sufficient attention in Nigeria. He confirmed this observation by stating that, "despite efforts so far made, the level of cooperation between industries and technical institutions still fall short of what is envisaged in the policy." However, a way to contribute high-quality technical education is through collaboration between businesses and technical institutions of higher learning. In addition, technical college education requires such high levels of interaction. The industry has established a closed working relationship with the vocational education system for the additional reason that VTE exists to serve the industry. A skilled workforce that is willing to learn, develop, and adapt to shifting technologies and markets is essential for industry to succeed in a global market that is becoming increasingly competitive. It is evident that the survival of the industry depends on the quality of the technical education provided. Collaboration projects between technical institutions and industries come in many forms. The following six patterns of collaboration are identified by Greenberg (1984).

I. Interval training

II. Third cooperative work study

IV: the conventional pattern

V. Shared facility and continuing education

VI. The advisor design.

The majority of these patterns, according to Audu (2021), overlap: For instance, a community college might share facilities while training trainees from both educational institutions and the business world. He defined the traditional pattern as a model in which a community college, typically, provides some or all of a business or industry's training. This often overlaps with the adult and continuing education pattern, in which a student may earn a degree or certificate while also receiving specific training related to a job. According to as, the cooperative work study program, which made it possible for students to receive part of their education on the job where they can gain skill that are best learned within all the problems and constraints that are part of a private sector operation, is the oldest and most common collaborative effort between industry and educational institutions in the United States. Greenberg claims that this is a collaborative program that makes use of personnel, facilities, and curriculum from both the business world and educational establishments. Through cross-training initiatives, educational institutions and businesses can pool their resources for student training. Greenberg emphasized that higher education institutions are excellent candidates for the consultant collaboration model. The experience of the United States of America demonstrates that students can acquire the necessary skills and that the relationship between colleges and industries is very cordial. According to a recent study that was carried out by UNESCO (2019), the majority of nations' technical and vocational education systems either have established productive connections with businesses and industries or are more or less moving in this direction. In addition, UNESCO (2019) emphasized that, in most industrialized nations, training in new technologies is

provided in the workplace (in some large-scale enterprises) or at the facilities of technical and vocational education institutions, which are well-equipped to provide such training.

Some large corporations provide the funds or the necessary equipment and facilities for cooperative industry/institutional training in the use of new technologies in cases where technical and vocational education institutions lack sufficient equipment, machinery, hard, and software to provide such training. In vocational education, Germany implemented the "Dual System Qualification" (Kevin, 2019). Vocational schools and industry training in the Dual System begin at the secondary II level. Rather than in schools, the majority of learning occurs in the production sector. China also participated in skill acquisition; Before attending higher education, her students receive this kind of education at factories, farms, and mines (Ahamed, 2021).

In light of the results obtained in these developed nations, institutions and industries must work together to train our workforce for Nigeria, particularly in Niger state.

2.1.4 Administrative Strategies that can improve School-Industry Collaboration

Scholars, organizations, and concerned Nigerians have proposed a number of approaches to enhance school-industry collaboration. Raimi (2020) observed that the introduction of the Students Industrial Work Experience Scheme (SIWES), which was initiated by the Industrial Training Fund (ITF), is an encouraging step toward establishing relationships between technical institutions and industries. ITF was laid out in 1977 by Central Legislature of Nigeria under the empowering order No. 47, to efficiently manage all of SIWES's activities and to offer short courses to businesses and other organizations that are related. According to Nwoji (2019), the plan is a cooperative skill development program or the first step toward collaboration between technical institutions and industries. Its purpose

is to expose students to real-world work situations that they will likely encounter in their field of specialization after graduation. The understudies who obtained work experience are all the more promptly to travel from school to the universe of work and squeezed into it. According to Obwoge (2019), the following are some common advantages of SIWES:

I. provides an opportunity to develop the activities necessary for technical programming proficiency

II. It inspires students to become interested in technical programming

III serves as a desirable form of motivation.

IV. It creates creativity, drive, fearlessness and administrative capacity in understudies.

V. It helps students develop the right attitude toward work by fostering desirable relationships with employers and the ability to work with others.

Obwoge added that the SIWES program also served as a laboratory where students put the knowledge and skills they've learned in school into practice. SIWES gives students the chance to learn job skills in a real-world setting. Ominabo (2018), on the other hand, was dissatisfied with the plan when he said that the program doesn't meet the needs of employees in the industry because institutions and industries don't work together well. As a direct consequence of this, the majority of the nation's industries actually begin retraining the graduates of the nation's technical institutions. According to Olaitan (2019), technical programmers' inability to earn the respect of employers is partly to blame for poor placement. He went on to say that the SIWES program faces challenges in technical education in the country due to poor planning, inadequate funding, students' negative

attitudes toward the program, a lack of recognition of SIWES as a course, and a lack of evaluation. Additionally, in the Electrical Installation and Maintenance Work Curriculum and Course Specifications of the Federal Republic of Nigeria by the National Board for Technical Education (NBTE) (FRN, 2020).

Supervised Industrial Training/Work Experience (SIWES) only accounts for about 5% of the total hours required for the Advance National Technical Certificate (ANTC) in Technical Colleges, which is only for advanced craft programs. Full-time students must complete this course component, which can be taken in the industry or in the college production unit. However, students currently enrolled in SSI-3 of the National Technical Certificate (NTC) do not have this opportunity. Their own SIWES test is optional and typically takes place in the second year of their education over a prolonged one-month period with no grade or supervision. It should be noted that it is not included in the curriculum at the technical college level, which is the level of production for industries by craftsmen. According to Bala (2018), school curriculum programming and structure must be compatible with emerging technologies. The author also stated that SIWES ought to be regarded as an extension of classroom and laboratory instruction and an essential component of the entire school curriculum. Bala (2018) noted that the academic curricular of educational institutions is an important area that necessitates cooperation between industries and these institutions because the acquisition of the skills expected from a particular training program depends on the relevance of the course contents to the skills required in industries. According to Abu (2017), in order for our technological institutions' graduates to be relevant to the requirements of the industry, the curriculum must most essentially address the current industrial demands. According to Hadromi (2020), educational institutions that provide Technical and Vocational Education (TVE) need to

reorganize their curriculum in order to meet the requirements of the job market, particularly the industry. The TVE curricula must focus on outcomes in terms of the skills, knowledge, and attitudes required by industry in order to accomplish this objective.

According to Abu (2017), the establishment of an industrial committee, similar to an academic advisory committee, by institutions is necessary to bring about this revolution. When there is an industrial advisory committee, it should do more than just approve the institution's courses; it should also keep an eye on how those courses are carried out. It is essential to discuss the institution's various curriculum and syllabus with as many employers as possible. This exercise ought to be on a proceeding with premise in the event that the showing in the foundation is to stay up with quick headway in innovation and the changing necessities of the ventures. As a result, the relationship between industry and technical institution will improve. Gowon (2018) said that establishing an advisory committee was a good idea because it makes sense that career programs are bound to fail without input from people who work in the relevant fields. It has been recognized that practitioners in career option for which training programs are conceived and designed properly and constituted into programmed Advisory Boards are of crucial importance because they provide information that can be used to improve programmed performance and, as a result, public support. Gowon wrote that the number and structure of the advisory committee are determined by the training areas the school offers. This view is supported by the Oregon guide, which says that each curriculum must be served by a separate committee or subcommittee made up of the following members:

i. Employees and/or employers' association

ii. Experienced qualified workers in the occupation concerned.

iii. Existing post-secondary programmed involving the same or similar occupational education area.

iv. Labour organization where appropriate.

He goes on to describe the Advisory Committee's role by stating, "It is evident that one of its principal functions is to provide input relating to the manpower situation in occupational field." This further outlines the committee's role. The relationship between supply and demand for labor, labor mobility, the rate of attrition, and interest in prospective students are all essential for accurately projecting demand. The curriculum's success was found to depend on accurately assessing potential students' interest. He asserts that the committee will continue to be of tremendous assistance to curriculum planners, which is another function of the committee. In addition, they will assist in establishing a programmed trainee entry behavior, locating access to community resources, and carrying out a follow-up study of graduates. In addition, the industrial coordinating units should be well-established, according to Eboh (2019). These units could be used to strengthen connections between educational institutions and businesses. They ought to be developed and put to use for the purpose of gathering data on industries' issues in order to send it to the right departments. The real-world case study should be easily accessible to both teachers and students through the activities of these units. The coordinating units ought to be able to conduct surveys regarding the skills that are required by industries in the vicinity of the educational institutions and to provide advice to the appropriate arms of the educational institutions regarding the areas in which skill-updating courses ought to be held. The units by excellence of their position are modern contact office and ought to be properly diverted for directing understudies in profession/work arrangement amazing open doors. Despite the fact that technical institutions and universities have established this industrial liaison office, it has not been well coordinated to foster effective collaboration between institutions and

industries. To make it easier for Nigerian businesses and institutions to work together, the various industrial liaison offices in technical institutions need to be properly constituted and coordinated.

According to a study that was carried out in 2019 by UNESCO, a variety of administrative links have been deemed to be effective all over the world for facilitating cooperation between schools and businesses. The study's report noted that a government-and-local-level advisory committee provides permanent joint consultation in Bostwana. The creation of training programs is the responsibility of technical commissions in Benin. The report says that Mexico has set up a subdirectory in the Technical Vocational Education Directorate that is in charge of liaising with employers and industry. According to the report, Norway has an Advisory Council for Vocational Education. There are 13 members in this advisory council, 10 of whom are from work organizations and industries. There is a Vocational Training Committee in each of these nations, and the majority of its members are also employed. According to the report, the establishment of the Advisory Council in Norway has resulted in productive collaboration between schools and businesses. Industries provided funding for school courses, particularly those in technical and vocational education. On full-time or part-time basic, refresher courses, basic training, and upgrading adults through training take place in the workplace. In addition, the Norwegian government's Institute of Distance Education is collaborating with the National Broadcasting system on a number of TV and video projects for vocational education.

According to the UNESCO report, the establishment of an Industrial Advisory Committee made up of industrialists, employers of technical labor, and representatives of vocational education facilitates effective cooperation between schools and industry in Zimbabwe. In Zimbabwe, industry and commerce collaborate with institutions to make the following

significant contributions to the growth of technical and vocational education: The vocational training levy is funded by a 1% contribution from each employer to the total wage bill. The funds are used to pay for a variety of technical institution training programs. In addition to institutional training, industries provide on-the-job training (e.g., 20% of practical training is provided in institutions and 80% at workplaces). Nigeria could use one or more of these administrative or collaborative links that are used in some parts of the world to make school-industry relations easier, as presented by UNESCO, to improve the skills of technical college students. For effective skill acquisition, collaboration in curriculum content could improve relations between schools and industries.

According to Kwon (2018), the term "curriculum" refers to "all the intended learning goals," "experiences," "teaching materials," and "evaluation techniques" that evaluators plan and/or use that students engage in, under the direction of the school." In his own contribution, Adebayo (2020) stated that a well-planned curriculum must be balanced and recognize the significance of the society's cultural and occupational needs. Curriculum and goals need to be in sync if schools are to meet society's needs better. Menashy (2020) referred to the technical educational curriculum as a product curriculum and offered the following model of curriculum planning for the development of technical education:

Step 1: Diagnosis of need

Step 2: formation of objectives

Step 3: selection of content

Step 4: Organization of content

Step 5: Selection of learning experiences

Step 6: Organization of learning experiences

Step 7: Determination of what to evaluate and the ways and means of doing it (Evaluation).

He announced the perspective on Finch and Christensen (2018) who brought up that educational plan should be receptive to local area needs. They maintained that community employers are similarly obligated to specify their requirements and to assist the school in meeting these requirements. This help as per them could comprise of bosses serving on educational program warning advisory groups. In conclusion, they emphasized that school-industry collaboration is frequently associated with successful curriculum development. Kevin (2019) as he would like to think noticed that drawing a course happy of any professional subject isn't prerogatory of the school just, yet a cooperative exertion of all areas who straightforwardly or by implication benefit from the results of professional instruction since the job situated educational program serves the requirements of the general public. He says that because they are in a position to know precisely what should be included in the syllabus, industry and the private sector should be able to contribute to the curriculum development for the vocational technical education program. In a similar vein, Olaitan (2019) argued that job identification, task analysis, and job clustering are necessary when selecting content for technical education curricula. They say that these activities should be done with the industry because technical education graduates want to work in the industry. According to Adebayo (2004), education should also be constantly reviewed to meet changing societal needs. Thus perceiving the significance of educational program assessment, to figure out what needs improvement in the educational program and to give a premise to affecting that improvement. As indicated by him assessment is the most common way of making judgment and starting the requirement for alteration of the educational plan content.

According to Okorie (2018), the school's curriculum should always be updated in light of the recommendations provided by the school, industries, and labor employers in the form

of curriculum evaluation results. He went on to say that curriculum revision would involve changing the content of courses, dropping some and adding others, so that the curriculum would fully meet the needs of students and occupational requirements. Ogwo (2006), on the other hand, defined the curriculum for technical and vocational education as the entire set of experiences, knowledge, skills, and activities that are systematically planned to prepare students for gainful employment in any chosen occupation or group of occupations. According to the viewpoint presented above, it is crucial that curriculum produce training that meets the workforce requirements of the industry economy.

In its study on school-industry relations, UNESCO (2019) discovered that some nations have discovered an effective method of training their manpower in new technologies through cooperation between industries and technical institutions. Obwoge (2019) noted that industries and technical institutions have distinct roles to play in the production of technical manpower in Nigeria. School-based activities that can improve school-industry collaboration He explained that the school-based learning activities ought to include the provision of qualified teachers, classroom facilities, and instructional materials that are appropriate for school instruction. According to Watters (2018), schools are responsible for the following: -the provision of the necessary personnel, the allocation of the training timetable and duration, the selection of appropriate and novel learning content and activities for the training, the planning of cooperation with industry where the training should be carried out, the evaluation of the students to determine the extent to which they have acquired the skills they are supposed to acquire, and the supervision of the students during the training.

According to Bala (2018), school-based learning places an emphasis on career exploration and student counseling. choosing a career major is a program of study that is based on a

high standard for academics and skills. Additionally, schools should incorporate career-related activities throughout the curriculum to prepare students for employment after successful completion of vocational training (Raimi, 2020). Verger (2019) also said that the school should help the student get a good first job with a high skill level. According to Raimi (2020), the term "school-to-work transition" refers to the training system and programs that prepare young people for employment after completing vocational education successfully. According to Audu (2021), school-to-work transition is a locally based education initiative that aids young people in transitioning smoothly from school to work. It brings together teachers, students, businesses, and industry. Essentially, school-to-work transition incorporates career-related activities into the entire curriculum rather than providing vocational education as a separate component of the school program. It includes youth apprenticeship and cooperative work.

Audu (2021) says that school-to-work transition programs help students transition from school to a good first job with a high skill level. Audu added that a school-to-work partnership between employers and schools helps students prepare for high-quality jobs that require technical skills or additional education and training. Each student receives a worksite orientation during the school-to-work transition in order to establish a personal connection with employers. On-the-job training apprenticeships, cooperative education agreements, and other programs designed to prepare students for the job market are all examples of the school-to-work transition (Kwon, 2018). In addition, the school ought to be able to offer each student a worksite orientation in order to emphasize that students play a role and perform a function in the workplace. According to Eboh (2019), this orientation ought to include instruction on how to listen and make decisions, observe safety precautions, inquire, seek assistance, behave professionally, and handle interpersonal

conflicts. In order to address the connection between the students, their upcoming work-based experience, and their educational career plans, this preparation can be provided by the school through classroom instruction, workshops, and workplace visits. Through full-time, short-term, and part-time evening or weekend classes, correspondence courses, instructional television programs, and other instructional materials developed by teaching staff at technical and vocational institutions, various businesses benefited from the training facilities provided by these institutions.

2.1.5 Industry-Based Activities that can improve School-Industry Collaboration

Work-based or industry-based activities or learning is a planned program of job training or experience, paid work experiments, workplace mentoring, and instruction in general workplace competencies and all aspects of industries. Industry-based activities or learning can improve school-industry collaboration. In order to expose students to the most recent technological advancements, Olaitan (2019) suggested that industries should provide work-based learning activities like internships, on-the-job training, mentoring, and cooperative education (industrial attachment). Ndinechi (2020) says that collaborative work occurs when technical and vocational schools work with a variety of businesses, industries, farms, and other businesses. He asserts that educational and training establishments ought to profit from the businesses' expenditures on physical facilities, machinery, and equipment. Industries should provide "on the job" training on their premises or assist educational institutions in acquiring useful machinery and equipment. In addition, they offer their specialists' expertise for technical advice on curriculum content, training program design, software development, and other instructional materials. Part-time teaching and assistance with vocational counseling, testing, and evaluation should be provided by specialists. Some technical teachers and instructors should also be able to participate in the research work of

industrial enterprises using their high-tech laboratories, or they should be able to work on industrial machinery during the production process to improve their skills and stay up to date on new technological developments.

Industrial workers in Mauritius serve on the exam board and actively participate in training programs. India and the Republic of Korea have started cooperative education, according to UNESCO (2019). For instance, in India, some car fixes/upkeep studios in the state Andra Pradesh offered their offices for a hands on encounter to the understudies in car professionals' courses gave in three Government/confidential junior schools over the span of preparing. Practical training for technical and vocational students in Poland takes place in factories and school workshops. In Portugal, vocational institutions that share facilities enter into contracts with businesses to establish the rights and responsibilities of both parties as well as the rights and responsibilities of each trainee. The majority of countries, according to the report, collaborate with technical institutions to organize seminars, workshops, and conferences to introduce new technologies to students, teachers, and industrial workers.

In a similar vein, UNESCO (2019) noted that advanced industries and training establishments have collaborated to develop an efficient method for training technical personnel in new technologies.

i. Industrial equipment used by educators and trainers on company property
ii. As new and existing technologies converge, the implementation of a joint, cooperative program for a training management system and research.
iii. Industrial and commercial businesses donating particular pieces of equipment to educational establishments.

Technical and financial support for vocational schools was provided by other nations like Zimbabwe and Thailand. The project required four days a week in the industry and one day a week of training at the college. After the course of study, trainees are accepted.

2.1.6 Electrical Installation and Maintenance Industry Based Skills

Skills relevant to the electrical installation and maintenance industry are required as a result of technology's influence. New devices are used in electrical installation and maintenance work in industries and the workplace as a result of technological advancement. It's gives the central capabilities expected to chip away at assigned electrical circuits and establishments. Pretoria Technical College (PTC 2011) of South Africa, http://www.pretoriatechnical.co.za/electrical/engineering.htm, stated that obtaining a qualification in electrical engineering crafts practice could help with the implementation of national government and industrial development strategies to increase a pool of scarce and related skills in support of long-term economic gro

wth. It was stated that electrical engineering professionals need specialized technical skills and knowledge to meet the demands of the diverse industries' constantly shifting environments.

Since electricity is now used in many places, including homes, offices, businesses, and institutions—as well as in many human endeavors—a skill is necessary for electrical installation students to succeed in technical schools. FRN (2020) emphasized that electrical installation and maintenance workers are expected to specialize in skills that can be used in manufacturing, industrial maintenance, power generation, and use. In traditional electrical establishment any gifted people from specialized school ought to have the option to: employ electrical technology, measuring equipment, and engineering tools. Apply hand

skills to electrical installation and maintenance, read, interpret, and produce electrical engineering drawings and circuits. To install, maintain, repair, overhaul, or recondition designated circuits, electrical machines, and sub-components, you must understand and apply basic electrical installation and assembly techniques. Skills in various aspects of electrical installation are necessary for electrical installation students. According to Kevin (2019), students majoring in electrical engineering must demonstrate the following technical and theoretical skills:

1. Using scale plans and drawings based on the metric or imperial measuring system, measuring and drawing dimensions on the work surface.

2. Making precise measurements and marking the locations of outlets and control panel holes with tape

3. Putting in and fixing cables and wiring for electrical equipment. Conduct, tubing, and covering installation.

4. Debarring, measuring, sawing, drilling, and tapping of metals and plastics \Gathering parts utilizing screws, staples and fasteners

6. Connecting and wiring electrical components, following plans and drawings to identify and mark conductors.

Theoretical abilities were also listed as:

1. Using standards-compliant plans, diagrams, and schemes to read, understand, and carry out reading, understanding, and implementing the technical specifications provided by the manufacturer for the electrical component that will be installed.

2. Knowledge of electrical building materials and the fundamentals of electrical circuitry, familiarity with fundamental electrical equipment and devices. Knowledge of regulations pertaining to occupational health and safety understanding and application of the requirements of the electrical code, as well as installation that complies with the electrical code book.

According to UNESCO (2019), technical college students must possess certain skills in order to succeed in the workplace.

1. Know how to install electrical equipment and installations, select, use, and maintain basic tools, and comprehend the procedures for electrical installation.

2. Be able to perform routine maintenance on electrical installations and equipment.

3. With the ability to read, interpret, and draw basic electrical wiring diagrams, demonstrate a fundamental understanding of mathematical, technological, and theoretical concepts while carrying out tasks.

4. Work safely and effectively in the workplace.

5. Characterized issues connected with working in the electrical designing field with a fundamental comprehension of types of energy, energy proficiency and security and natural mindfulness others are:

3 Identify and tackling issues connected with the establishment and support of electrical hardware, parts and circuits.

4 Working well with other people when you're part of a team, group, organization, or community effectively and responsibly organizing oneself and one's activities: related to the preparation and planning of activities related to installation and maintenance.

5 Adhering to standard operating procedures and practicing best practices in work performance.

6 Zeroing in on housekeeping, safe practices and care and capacity of apparatuses and gear Information gathering, analysis, organization, and critical evaluation:

7 The completion of technical reports concerning the work activity. When carrying out electrical tasks, use the findings to solve common issues. Using visual, mathematical, and/or language skills to communicate effectively

The electrical installation and maintenance work program in technical colleges is a vocational course that teaches students the fundamental skills they need to work on specific electrical installations and circuits. This electrical establishment and upkeep work in specialized universities is shown by specialized educator with electrical capabilities and abilities. When they graduate, craftsmen students with electrical installation skills are expected to work for industries and other economic sectors or start their own business.

However, upon graduation, these students were unable to meet industry and labor market demand. Additionally, the majority of them are turned down for training because they lack the necessary skills. This is on the grounds that they were not presented to down to earth

insight on genuine circumstance in the enterprises. Through collaboration between technical institutions and industries, other nations have discovered an efficient method for training their workforce. This is because industries are the source of new technologies and innovations. Therefore, collaboration between technical colleges and industries through administrative strategies, school-based activities, and industry-based activities is required for Plateau State graduates to be employed and self-employed.

2.2 Theoretical Framework

A theory is a statement or set of postulated ideas designed to explain a concept or phenomenon. A theory, according to Lamar (2021), is a collection of statements or propositions made to explain a phenomenon and provide the guiding principles for learning processes. Lamar goes on to say that learning is governed and explained in two ways by a theory:

- It is a technique for organizing information that is relevant to a field of study and leads to the discovery of previously unknown facts.

- Summarizes information in a way that makes it simple to explain a particular idea.

The relevant theory or theories that serve as the foundation for a given research are known as the theoretical framework. It presents the hypothesis/speculations which make sense of why the issue being concentrated on exists and clarifies the rules that lead for tracking down arrangement.

Concepts, constructions, principles, and prepositions that contribute to a body of knowledge make up a theory. A formal set of ideas called a theory aims to explain why something happens or exists. Microsoft (2008) also defined theory as a subject-specific set

of rules, ideas, principles, and methods; It is a collection of facts and propositions that are compared to one another and analyzed in order to explain phenomena, particularly in science. According to the various definitions of a theory, it appears that its function is to direct practice and facilitate the application of knowledge to solve real-world issues. According to Bala (2018), a theoretical framework is the description of a set of theories that were inferred from other theories' observed phenomena. The theory of skill development serves as the foundation for this study's theoretical framework.

2.2.1 Theory of Skill Development (TSD)

Theory of skill development was propounded by Yabani, (2018) which is a theory of skill acquisition. According to the theory, people tend to develop skills in an occupation through consistent or repetitive practice. In all technical occupations or professions, it is stated that practical skills are essential skills that can be acquired through repetition. Based on this premise, the primary goal of all technical college programs should be to provide graduates with self-sufficiency skills. Therefore, in order to help students acquire skills that can be used in the workplace, vocational education classes at technical colleges should primarily focus on practical skills. As a result, technical colleges cannot be considered successful without the development of practical skills.

Additionally, it is emphasized that skill acquisition can only be demonstrated rather than expressed verbally. The current study is related to theory of skill development in that graduates of electrical installation and maintenance work technology must develop skills in order to perform effectively in their various workplaces or industries. They are able to hold a variety of positions in relevant industries because they have acquired relevant electrical installation skills. Electrical installation and maintenance work engineering craft

graduates will be unemployed without the development of skills. One of the goals of a skills development system is to make sure that the skills acquired match the skills valued in the workplace. Skill development is a key factor in workers' employability and the sustainability of businesses. In order to keep up with climate change, globalization, demographic trends, technological innovation, and/or the financial crisis, skills development systems must also assist workers and businesses in adapting to new conditions and handling them. This is consistent with Gowon's theory of the development of technical and vocational skills (TTVSD). According to TTSD, the development of vocational choices, employability, mobility, and the sustainability of a energy-progressive society are all dependent on skill development. Therefore, this theory is pertinent to this investigation due to the complexity of technological advancements in electrical installation and maintenance, as well as the fact that each subsystem of modern electrical equipment, machines, and tools poses a challenge to Nigerian industries if workers are not available to maintain them for high productivity.

2.3 Empirical Studies

Bala (2018) conducted a study on strategies for improving school industry relations in North –Western Nigeria. The study was designed to identify strategies for improving school-industry relations in North-Western Nigeria. The research design used for the study was descriptive survey design. To achieve the objective of the study, five research questions and two null hypotheses were formulated and questionnaire was used to collect data from 38 wood work technology lecturers/instructors who were currently teaching in 8 tertiary technical institutions and 59 production managers/supervisors who were directly involved in production in the modern woodworking industries. The data collected was analyzed using mean, standard deviation and frequency table. The questionnaire items were

analyzed in relation to the research questions using five-point liker scale. The t- test was used to test the null hypothesis at 0.05 level of significance. Some of the findings revealed that National Board for Technical Education (NBTE) and Industrial Training fund (ITF) should set up school industry advisory committee, industries should be involved in the screening and recommendation of courses or trades for students in technical institutions among others. Although the study was on tertiary institutions in North-western part of Nigeria comprises of six States (Kaduna, Kano, Katsina, Kebbi, Sokoto, and Zanfara and in woodwork technology but the present study is on collaboration between technical colleges and industries for skill acquisition in electrical installation and maintenances. The previous study is similar to the presence because it centred on identifying strategious for improving school – industry relation. The study is also similar in the methodology used. But it differs from the present study on the fact that it is on woodwork technology in north–western Nigeria but this present study is on electrical installation and maintenance work in Plateau State.

Nwoji, (2018) carried out a study on Relevance of technical colleges in electrical/ electronic and mechanical /automobile program to the needs of industries of Anambra, Ebonyi and Enugu State. The study adopted a descriptive survey design. Population of the study was 154 students. Mean standard deviation and t-test were used to answer the research questions while the hypotheses were tested at 0.5 level of significance. The finding revealed that the production of craftsmen in electrical electronic and mechanical/automobile by technical colleges should be based on the need of automobile industries. The study is related to the present in research design, population, mean standard deviation, t-test. And it is also similar for the simple facts that it deals with the issue of skills needed in industries that are relevance. And how can such relevant skills be acquired without collaboration or

relationship between technical colleges and industries even though no word like collaboration was mentioned. Therefore, it made it different from the present study, because the presents study is on improving collaboration between technical colleges and industries for skill acquisition in electrical installation and maintenance work in Enugu State.

Olaitan (2019) conducted a study integration of new technological innovation into the curriculum for Nigerian technical college programs. The study adopted a descriptive survey design. Population of the study was made up of 82. Mean standard deviation and t-test were used to answer the research questions. While the hypotheses were tested at 0.05 level of significant. The findings revealed that industries do not rely on training giving to the graduates of the technical colleges. The study is related to the present because it appears that integration of new technological innovation into curriculum of Nigerian technical colleges will be effective when they have good relationship with industries where new innovations are always found. The study is also similar in methodology. However, it was on automobile. The major conclusion derived from these studies was that technical college programs where not well relevant to the training need of industries and that the present partnership strategies were ineffective; hence, there is need for a closer cooperation between industry and technical institutions. However, it is pertinent to note that none of the studies was on improving school-industry collaboration between technical colleges and industries for skill acquisition in electrical installation and maintenance work particularly with reference to administrative strategies that can improve collaboration, school-based activities that can improve collaboration and industry-based activities that can improve school-industry collaboration. This study therefore is an attempt to identify ways that could

be used to improve school industry collaboration between technical colleges and industries for skill acquisition in electrical installation and maintenance work in Niger State.

Padelford (2019) conducted a study on the potential impact of technology on skills requirement for the future jobs. The study adopted the survey method with a population of 1018 with no sampling in Tokyo Japan. A structure questionnaire was used to collect data. The data was analyzed using frequency and percentage scores. The result revealed that new technological innovations are yielding an increased array of new components which are incorporated into modern machineries including the automobile. Even though the study was on automobile manufacturing industry but it is similar to the present study in research design, instrument for data collection and the subject technological innovations with reference to the array of new skills needed to meet up with industrial challenges. Such new skills could be acquired when technical colleges collaborated with industries. But it differs from this present study because it is on improving collaboration between technical colleges and industries for skill acquisition in electrical installation and maintenance work in Plateau State.

Eboh (2019) on strategies for improving partnership between industries and technical institutions for effective vocational training in Kaduna –State. The research design was a survey research. The study was design to investigate the current training practices carried out between industries and vocational training schools with a view to evolving strategies that will help in promoting the effectiveness of the partnership. To carry out the study, three research questions and one null hypothesis were formulated. A questionnaire was used to collect data from 198 industrial personnel from 42 industries and 221 technical instructors from 8 vocational training centres and 2 technical schools in Kaduna state representing the whole population of the study. Mean statistics was used to analysed the data collected while

the t-test was employed to test the null hypothesis at 0.05 level of significance. The results were analyzed and presented in table and recommendations were made. The findings of the study revealed that partnership strategies were not being utilized and coordination of the existing strategies was poor. The study is similar to the present study in methodology, research design, method of data collection and analysis. It is also related to this study because it investigated the current training practice carried out between industries and vocational institutions for skills acquisition through partnership. But it did not specify which area of vocational training. However, for this present study it is on improving collaboration between technical colleges and industries for skill acquisition in electrical installation and maintenance work in Plateau State.

Audu (2021) carried out a study on industry-college Relationship. A tool for functional technology. The study investigated the relationship between industries and technical colleges and the effect of such relationship on practical ability of students in Edo state technical colleges. To carry out the study four research questions were formulated. The researcher adopted a survey research method with total population of 810. Foremen, supervisors and managers in 70 industries constituted the targeted sample of one group while the principals and teaching staff of all the technical colleges in Edo State constitutes the target sample of the second group of 360. A questionnaire was used to collect data from foremen, supervisors and managers in 70 industries and all the principals and teaching staff of all technical colleges in Edo State. Mean statistics was used to analyzed the data collected while the t-test was employed to test the null hypothesis at 0.05 level of significance. The findings of the study revealed that the factors responsible for non-functionality of technical college students were ranked in the order that technical colleges products are not able to match theory and practical, no equipped workshop for adequate

practical work, must instructors have no practical knowledge and experience, technical college curriculum is not well relevant to the training need of industries, among others.

The study recommended that industrial training attachment be extended to students in technical colleges and should be provided with well-equipped workshop as well as providing instructors who are practically well groomed with a wealth of industrial experience. The previous study is related to the present study which seeks to determine ways that could be adopted for improving school industry collaboration for skill acquisition in electrical installation and maintenance. For the simple fact that many industries are coming up and the increase in technological advancement demands skilled personnel. It is also similar to the resent study in its methodology, research design, population, and instrument for data collection and method of data analysis. The research work is related to this present study because it deals with relationship between industries and technical collages for effective practical ability which is centred on skills training of personnel to be employed in the labour market and to be self-employed. However, the previous study covered a larger population than the present and did not indicate the specific vocation as in the case of the present study on electrical installation and maintenance work.

2.3.1 Critical Review and Research Gap Identification

There is a lot of literature existing in the subject of attitude and learning and most seem to suggest that there is a positive relationship between attitude and performance or learning. However very little literature exists to show the same for vocational and technical education. The study discussed above have shown that industry has a positive influence on performance and learning of technical college students. Several factors for improving the acquisition of electrical installation and maintenance skills have also been investigated

among which are school base activities, industrial base activities and administrative base activities among others.

The study of Eboh (2019) is of significant importance to this study since he investigated the strategies for improving partnership between industries and technical institutions for effective vocational training. The research design was a survey research. The study was design to investigate the current training practices carried out between industries and vocational training schools with a view to evolving strategies that will help in promoting the effectiveness of the partnership. To carry out the study, three research questions and one null hypothesis were formulated. A questionnaire was used to collect data from 198 industrial personnel from 42 industries and 221 technical instructors from 8 vocational training centres and 2 technical schools in Kaduna state representing the whole population of the study. Mean statistics was used to analysed the data collected while the t-test was employed to test the null hypothesis at 0.05 level of significance. The results were analyzed and presented in table and recommendations were made. The findings of the study revealed that partnership strategies were not being utilized and coordination of the existing strategies was poor. The study is similar to the present study in methodology, research design, method of data collection and analysis. It is also related to this study because it investigated the current training practice carried out between industries and vocational institutions for skills acquisition through partnership. But it did not specify which area of vocational training. However, for this present study it is on improving collaboration between technical colleges and industries for skill acquisition in electrical installation and maintenance work in Niger State.

2.4 Summary of Literature Review

The writing audit was under the accompanying: conceptual framework, theoretical framework, and a review of related and related empirical studies are all part of the framework. According to the literature review for this study, some developed nations experience daily technological advancement to the point where a piece of equipment eventually becomes obsolete. Literature also revealed that forging closer connections and cooperation between industries and training institutions is the answer to the problem of low-quality graduates. Additionally, it is emphasized that some collaborative problems are; cross-training, the tradition pattern of cooperative work study (industrial attachment), sharing facilities, and consulting The literature reviews also revealed that most nations have successfully collaborated to train their technical workforce in new technologies. It is necessary to identify methods that could be used to improve school-industry collaboration for the acquisition of skills because new technological innovation is producing an increase in the number of new components, tools, machinery, and equipment—even in the field of electrical installation and maintenance work. Additionally, the review revealed the following order of the factors that contributed to technical college students' inability to function: The products of technical colleges cannot match the practical with the theoretical, there are no workshops equipped to accommodate adequate practical work, and the majority of instructors lack practical experience and knowledge. Additionally, industrial attachment is poorly implemented and the curriculum at technical colleges is not sufficiently relevant to the training requirements of industries. The review also revealed that the existing strategies were poorly coordinated and that partnership strategies were not effectively utilized.

Additionally, it was discovered that industries do not rely on technical college graduates receiving training. Industries may experience a shortage of personnel with the necessary

skills to meet global challenges as a result of technological advancements and the use of cutting-edge equipment. As a result, cooperative efforts are required for productive output. Although there have been a number of studies on the relationship or partnership between schools and industries for the purpose of skill acquisition, none of them have looked at how to improve school-industry collaboration between technical colleges and industries for the purpose of skill acquisition in electrical installation and maintenance work. This includes looking at administrative strategies that could be used to improve school-industry collaboration, as well as activities that are both school- and industry-based and could improve school-industry collaboration, especially in Plateau State. This review, accordingly, tries to figure out the manners in which that could be taken on to further develop school-industry cooperation between specialized universities and enterprises for abilities securing in electrical establishment and support work in Niger State.

CHAPTER THREE

3.0 RESEARCH METHODOLOGY

This chapter describes Research design, Area of study, population of the study, Instrument for data collection, Validation of the instrument, Administration of the instrument, Method of data analysis and Decision rules respectively.

3.1 Research Design

The descriptive survey research method with the use of a structured questionnaire was used to collect the required information from the respondents. The survey research was adopted

because survey design generally can be used to effectively investigate problems in realistic settings. Nwachukwu (2018) described survey research as that which a group of people or items is studied by collecting and analysing data from only a few people or items considered to be representative of the entire group.

3.2 Area of the study

This study will be carried out in Niger State, a state in central Nigeria and the largest state in the country which shares boundaries with Kaduna State (North-East), Federal Capital Territory (South-East), Kebbi State (North-West), and Kwara State (South-West).

This study covers seven government technical colleges in Niger State. The following are the technical colleges: Federal Science and Technical College Shiroro, Government Technical College Eyagi Bida, Government Technical College Kontagora, Government Technical College Minna, Government Technical College New Bussa, Government technical college Suleja, Federal science and technical college Izom. The study will also cover five factories in Niger state. The following are the factories: Dana Pharmaceutical Company Maitubi, Tunechi Group of Company (Metal Fabricator), Madalla, News Engineering NIG. LTD Minna, Ndajiya and Sons Industries Limited (Concrete factory) Minna, Nanha Integrated Company (Concrete Factory), Minna.

3.3 Population of the Study

The targeted population for this study comprises of 50 technical college teachers in 7 technical colleges and 25 factory supervisors in 5 factories or industries in minna, Niger

State making it the total of 75. There was no need of sampling since all the population in their companies were used.

3.4 Instrument for data Collection

The instrument used for data collection is questionnaire. The questionnaire is to determine the opinion of the respondents that comprises of the project managers, site engineers and architects in minna, Niger State. The questionnaire is divided into two parts (i and ii). Part i consist of respondents "personal data", containing information about gender, age, qualification and part ii is grouped into (A,B,C and D) where question A consist of 15 items which sought to elicit information about the school base activities that could improve school-industry collaboration for skill acquisition in electrical installation and maintenance trade in minna Niger State, sub-section B consist of 15 items which sought to elicit information about the technical college-based activities that could improve school-industry collaboration for skill acquisition in electrical installation and maintenance trade in minna Niger State, sub-section C consist of 15 items which sought to elicit information on the administrative strategies that could improve school-industry collaboration for skill acquisition in electrical installation and maintenance trade in Niger State and sub-section D consist of 15 items which sought to elicit information on the the industry-based activities that could improve school-industry collaboration for skill acquisition in electrical installation and maintenance trade in Niger State

3.5 Validation of the Instrument

The instrument for the data collection was designed by the researcher and was validated by three lectures in the Department of Industrial and Technology Education (I.T.E), The validators were requested to check the suitability and clarity of the item who found it appropriate for the study before administering.

3.6 Administration of the Instrument

The instrument use for data collection was administered to the respondent by the researcher and a researcher assistant within the study area selected for this research.

3.7 Method of Data Analysis

The data collected by the researcher was analyzed using mean, standard deviation and t-test as statistical tools. A four-point rating scale was employed with the following response.

Alternative value		Abbreviation	Rating
Strongly Agree	=	“SA"	4
Agree	=	“A”	3
Disagree	=	“D”	2
Strongly Disagree	=	"SD"	1

4+3+2+1 =10 =2.5

4 4

The mean response of each item was obtained by using the following formula

$$\overline{X}_1 \frac{\sum FX}{N}$$

Where

£ = Summation of

X = normal value of option (mean)

N = number of response of an item

F = frequency of response of each option

$\overline{X}_2$= Grand mean of each item

3.8 Decision Rule

To determine the level of acceptance, mean response. 2.50 And above was considered agreed or accepted. While mean response of 2.49 and below was equally considered disagreed or rejected. For testing hypothesis ± 1.68 will be the critical value, any item that has its t- value equal or less than t- critical was considered not significant, and any item that has its calculated t- value above t-critical was considered significant.

CHAPTER FOUR

4.0 PRESENTATION AND DATA ANALYSIS

This chapter deals with the presentation and analysis of data with respect to the research questions formulated for this study, the result of this data analysis for the research questions are presented first, followed by those of the hypotheses tested for the study.

4.1 Result

4.1.1 Research Question 1

What are the school base activities that could improve school-industry collaboration for skill acquisition in electrical installation and maintenance trade in Niger State?

Table 4.1.1: mean response the school base activities that could improve school-industry collaboration for skill acquisition in electrical installation and maintenance trade in Niger State. N1=25 N2=25.

S/N	Items Statement	X1	X2	Xt	Remark
1	Placement of students by technical colleges in industries that are Compatible with their courses of study can improve school industry collaboration	2.7	2.8	2.8	Agreed
2	Keeping comprehensive data of industries that are equipped with modern equipment/facilities by technical colleges	2.5	1.7	2.1	Disagreed
3	Introducing SIWES programme with enough time in technical colleges for those in National Technical Certificate NTC as in the case of advanced National Technical Certificate	2.8	3.3	3.1	Agreed
4	Organizing cooperative work study programmed for electrical Installation and maintenance	2.8	3.0	2.9	Agreed

	engineering craft students by technical colleges can improve school industry collaboration				
5	Award of scholarship to students by the industries for further studies can improve school industry collaboration	3.3	3.2	3.2	Agreed
6	Organizing part time courses for industrial personnel to acquire theoretical knowledge by technical colleges or institutions	3.4	3.1	3.3	Agreed
7	Inviting guest speakers from industry to deliver lectures in technical colleges can improve school industry collaboration	3.1	3.0	3.1	Agreed
8	Engaging electrical engineering professionals in industry in part time teaching in technical colleges can improve school industry collaboration	2.7	3.1	2.9	Agreed
9	Industrial training attachment for students in industries can improve school industry collaboration	2.5	3.0	2.8	Agreed
10	Involving industries in setting and marking of practical examinations in technical colleges can improve school-industry collaboration	2.7	2.8	2.7	Agreed
11	Counselling of students for career exploration in specific vocation relevant to industries can improve school industry collaboration	2.7	3.7	3.2	Agreed
12	Organizing cross training between industries and technical institutions personnel can improve school industry collaboration	3.1	3.8	3.5	Agreed
13	Involvement of industries in evaluating students relevant learning experiences acquired in the technical colleges can improve school-industry collaboration	2.5	3.6	3.1	Agreed
14	Provision of programme of studies based on high academic standard can improve school industry collaboration	2.4	2.7	2.6	Agreed

15	Industries and Technical Colleges sharing of facilities can improve school-industry collaboration	2.3	2.2	2.3	Agreed

KEY:

X1= average mean responses of technical college teachers,

X2= average mean responses of factory supervisors,

N1= number of technical college teachers,

N2= number of factory supervisors.

Table 4.1.1 reviews that the respondents agreed with item1,3,4,5,6,7,8,9,10,11,12,13 and 14 with a mean score above 2.50 respectively. While item 2 and 15 disagreed with a mean score below 2.50. This means that item 1,3,4,5,6,7,8,9,10,11,12,13 and 14 agreed the school base activities that could improve school-industry collaboration for skill acquisition in electrical installation and maintenance trade in Niger State. While item 2 and 15 disagreed.

4.1.2 Research Question 2

What are the technical college-based activities that could improve school-industry collaboration for skill acquisition in electrical installation and maintenance trade in Niger State?

Table 4.1.2: mean response on the technical college-based activities that could improve school-industry collaboration for skill acquisition in electrical installation and maintenance trade in Niger State. N1=25 N2=25.

S/N	Items Statement	X1	X2	Xt	Remark
1	Organizing part time courses for industrial personnel to acquire theoretical knowledge by technical colleges or institutions	2.6	3.4	3.0	Agreed
2	Jointly organizing seminars, workshops by technical colleges and industries can improve technical-industry collaboration	2.3	2.8	2.6	Agreed
3	Evaluation of the students to find out the extent to which they have acquired skills by school and industries can improve school-industry collaboration	3.2	3.4	3.3	Agreed
4	Selection of innovative learning content and activities for training by technical colleges and industries can improve school industry collaboration	3.3	3.4	3.4	Agreed
5	Allocation of training on time table, length of training period and work carried out in cooperation with the industries can improve school industry collaboration	3.4	3.7	3.6	Agreed
6	Relating the practical on the job experience in the SIWES programme to classroom teaching can improve school industry collaboration	2.8	2.9	2.9	Agreed
7	Evaluation of students' progress during training by the school and industry based supervisors can improve school industry collaboration	2.9	3.2	3.1	Agreed
8	Government should establish laws that will encourage industries and technical colleges to develop training programmes that can meet their internal needs	2.8	3.3	3.1	Agreed
9	Government should establish industrial liaison offices/coordinating units in technical colleges	2.4	3.0	2.7	Agreed
10	NBTE, ITF and Industries should set up school industry advisory committee to monitor implementation of approved courses in technical colleges	2.8	2.6	2.7	Agreed

11	Industries should be encouraged to develop training programmes in technical colleges in relation to their internal needs	2.6	3.4	3.0	Agreed
12	Provision of internship training and on –the- job training by industries	2.3	2.8	2.6	Agreed
13	Assessment of training facilities of technical colleges to find out if they are capable of giving the students adequate background in those occupations required in the industry	3.2	3.4	3.3	Agreed
14	Examination of craft curriculum of the training programme of technical colleges to ensure that their occupational interest is covered	3.3	3.4	3.4	Agreed
15	Adequate interaction and liaison between technical colleges and industries can improve school industry collaboration	3.4	3.7	3.6	Agreed

KEY:

X1= average mean responses of technical college teachers,

X2= average mean responses of factory supervisors,

N1= number of technical college teachers,

N2= number of factory supervisors.

Table 4.1.2 shows that both respondents agreed on the technical college-based activities that could improve school-industry collaboration for skill acquisition in electrical installation and maintenance trade in Niger State, item 1,2,3,4,5,6,7,8,910,11,12,13,14 and 15 as reflected by their own mean score greater than 2.50 respectively. While none disagreed.

4.1.3 Research Question 3

What are the administrative strategies that could improve school-industry collaboration for skill acquisition in electrical installation and maintenance trade in Niger state?

Table 4.1.3: mean response on the administrative strategies that could improve school-industry collaboration for skill acquisition in electrical installation and maintenance trade in Niger state. N1=25 N2=25.

S/N	ITEMS STATEMENT	X1	X2	Xt	Remark
1	Industries should give some percentage of their annual profit specifically for refurbishing existing equipment in the technical colleges	3.1	3.0	3.1	Agreed
2	A joint curriculum review evaluation committee on technical college trades should be formed by the government	2.7	2.6	2.7	Agreed
3	Industrial personnel should be involved in the accreditation of technical college programmes	2.9	3.0	3.0	Agreed
4	Technical teachers/instructors should visit business and industrial enterprises to familiarize themselves with the current technologies	2.5	3.5	3.0	Agreed
5	Industrial personnel should be involved in assessing students' practical work in technical colleges	2.6	2.3	2.5	Agreed
6	Curriculum and syllabus of technical colleges should be discussed with many employers as possible on the formation of curriculum objective, selection of curriculum content, organization of the content, selection of learning experiences and organization of learning experiences	3.0	2.1	2.5	Agreed
7	Professional bodies like NATT, NAVTED and NVA in conjunction with the Ministry of Education and ITF should organize national conference on school industry relation	1.9	2.4	2.2	Disagreed
8	Government should involve industry in recruitment of technical teachers in technical colleges	2.8	2.9	2.9	Agreed
9	ITF and NBTE should organize seminars, workshops and for training personnel	2.4	1.9	2.2	Disagreed
10	ITF, on regular basis should organize training programmes aimed at upgrading the knowledge of technical personnel	3.1	3.0	3.1	Agreed

11	ITF, on regular basis should organize training programmes aimed at upgrading the knowledge of technical personnel	2.7	2.6	2.7	Agreed
12	Government should encourage industries to establish vocational and apprentice training centres in their area of operations	2.9	3.0	3.0	Agreed
13	Industries should be involved in screening and recommending courses or trades in technical colleges	2.5	3.5	3.0	Agreed
14	Industrial based job skills should be included in the curriculum of technical colleges for skill acquisition	2.6	2.3	2.5	Agreed
15	Industries should be encouraged to develop training programmes in technical colleges in relation to their internal needs	3.0	2.1	2.5	Agreed

KEY:

X1= average mean responses of technical college teachers,

X2= average mean responses of factory supervisors,

N1= number of technical college teachers,

N2= number of factory supervisors.

Table 4.1.3 shows that both respondents agreed on What are the administrative strategies that could improve school-industry collaboration for skill acquisition in electrical installation and maintenance trade in Niger state, item 1,2,3,4,5,6,8,10,11,12,13,14 and 15 as reflected by their own mean score greater than 2.50 respectively. While item 7 and 9 disagreed with the mean score below 2.50.

4.1.4 Research Question 4

What are the industry-based activities that could improve school-industry collaboration for skill acquisition in electrical installation and maintenance trade in Niger state?

Table 4.1.4: mean response on the industry-based activities that could improve school-industry collaboration for skill acquisition in electrical installation and maintenance trade in Niger state. N1=25 N2=25.

S/N	ITEMS STATEMENT	SA	A	D	SD
1	Financing staff and students' research work by the industries	2.8	2.9	2.9	Agreed
2	Evaluating students' relevant learning experiences acquired in the technical colleges by the industry to meet industrial needs	1.9	2.4	2.2	Disagreed
3	Industries involvement in sponsoring projects and research works in technical colleges	3.0	2.1	2.5	Agreed
4	Giving employment opportunities to graduates of technical college by the industries	2.5	3.5	3.0	Agreed
5	Supervision of students on industrial training attachment by the industry based supervisor	2.6	2.3	2.5	Agreed
6	Setting up short term courses in the industries for updating the skills and knowledge of technical colleges' staff in electrical technology	2.6	3.4	3.0	Agreed
7	Organizing seminars, workshops for exchange of ideas and information for industrial and technical college staff of electrical technology on new innovative Programmes	2.3	2.8	2.6	Agreed
8	Payment of allowances to students on industrial attachment by the industries	3.2	3.4	3.3	Agreed
9	Organizing regional trade fair and exhibition of technical colleges' inventions by the industries	3.3	3.4	3.4	Agreed
10	Purchasing consumable material for students' practical by the industries	3.4	3.7	3.6	Agreed
11	Donating information and communication technology equipment and tools to technical colleges	2.3	2.2	2.3	Disagreed

12	Provision of instructional materials to technical colleges by the industries	2.7	2.8	2.8	Agreed
13	Provision of occupational placement for graduates of technical college programme by the industries	2.5	1.7	2.1	Disagreed
14	Involving technical teachers/instructors working on industrial machinery in the production process so as to upgrade their knowledge and skills to keep abreast with new technological advancement	2.8	3.3	3.1	Agreed
15	Provision of funds for the execution of technical colleges programmes	2.8	3.3	3.1	Agreed

KEY:

X1= average mean responses of technical college teachers,

X2= average mean responses of factory supervisors,

N1= number of technical college teachers,

N2= number of factory supervisors.

Table 4.1.4 shows that both respondents agreed on the industry-based activities that could improve school-industry collaboration for skill acquisition in electrical installation and maintenance trade in Niger state, item 1,3,4,5,6,7,8,910,12,14 and 15 as reflected by their own mean score greater than 2.50 respectively. While item 2,11 and 13 disagreed.

4.2 Testing of Hypotheses

4.2.1 Hypotheses 1

There will be no significant difference in the mean responses of industrial supervisors and technical teachers on the school base activities for improving school-industry collaboration

or skill acquisition in electrical installation and maintenance in technical colleges in Niger State.

Table 4.2.1: t-test analysis of the response of industry supervisor and technical college teachers on the school base activities for improving school-industry collaboration or skill acquisition in electrical installation and maintenance in technical colleges in Niger State.

S/N	Items Statement	SD_1	SD_2	t-test	Remark
1	Placement of students by technical colleges in industries that are Compatible with their courses of study can improve school industry collaboration	1.06	0.93	-2.80	NA
2	Keeping comprehensive data of industries that are equipped with modern equipment/facilities by technical colleges	1.08	0.87	2.34	NA
3	Introducing SIWES programme with enough time in technical colleges for those in National Technical Certificate NTC as in the case of advanced National Technical Certificate	0.99	0.50	-2.13	NA
4	Organizing cooperative work study programmed for electrical Installation and maintenance engineering craft students by technical colleges can improve school industry collaboration	0.88	1.00	-0.55	A
5	Award of scholarship to students by the industries for further studies can improve school industry collaboration	1.01	0.72	0.34	A
6	Organizing part time courses for industrial personnel to acquire theoretical knowledge by technical colleges or institutions	0.74	0.93	0.90	A
7	Inviting guest speakers from industry to deliver lectures in technical colleges can improve school industry collaboration	1.15	0.50	0.39	A

8	Engaging electrical engineering professionals in industry in part time teaching in technical colleges can improve school industry collaboration	1.09	0.60	-1.48	A
9	Industrial training attachment for students in industries can improve school industry collaboration	1.21	0.71	-1.67	A
10	Involving industries in setting and marking of practical examinations in technical colleges can improve school-industry collaboration	1.11	1.13	-0.23	A
11	Counselling of students for career exploration in specific vocation relevant to industries can improve school industry collaboration	1.04	0.50	-4.16	NA
12	Organizing cross training between industries and technical institutions personnel can improve school industry collaboration	0.83	0.44	-3.47	NA
13	Involvement of industries in evaluating students relevant learning experiences acquired in the technical colleges can improve school-industry collaboration	1.08	0.53	-4.36	NA
14	Provision of programme of studies based on high academic standard can improve school industry collaboration	1.21	1.00	-0.77	A
15	Industries and Technical Colleges sharing of facilities can improve school-industry collaboration	1.12	0.97	0.27	A

Key

SD1= Standard deviation of technical college teachers
SD2= Standard deviation of factory supervisors
A= Accepted
NA= Not Accepted

The result shown in table 4.2.1 above indicates the comparism between the technical college teachers and factory supervisor. Data revealed that item 4,5,6,7,8,9,10,14 and 15 has a calculated t-value less than the t-critical ± 1.68, hence hypothesis for these item were

upheld at 0.05 level of significance. Except for item 1,2,3,11,12 and 13 which has a t-calculated value above the t-critical value +1.68, thus HO was not accepted for this items

4.2.2 Hypothesis 2

There will be no significant difference in the mean responses of industrial supervisors and technical teachers on the technical college-based activities for improving school-industry collaboration for skill acquisition in electrical installation and maintenance in technical colleges in Niger State.

Table 4.2.2: t-test analysis of the response of industry supervisor and technical college teachers on the technical college-based activities for improving school-industry collaboration for skill acquisition in electrical installation and maintenance in technical colleges in Niger State.

S/N	ITEMS STATEMENT	SD_1	SD_2	t-test	Remark
1	Organizing part time courses for industrial personnel to acquire theoretical knowledge by technical colleges or institutions	1.07	0.73	-2.65	NA
2	Jointly organizing seminars, workshops by technical colleges and industries can improve technical-industry collaboration	1.16	0.97	-1.33	A
3	Evaluation of the students to find out the extent to which they have acquired skills by school and industries can improve school-industry collaboration	0.62	0.53	-0.99	A
4	Selection of innovative learning content and activities for training by technical colleges and industries can improve school industry collaboration	0.61	0.73	-0.38	A
5	Allocation of training on time table, length of training period and work carried out in cooperation with the industries can improve school industry collaboration	0.50	0.50	-1.61	A
6	Relating the practical on the job experience in the SIWES programme to classroom teaching can improve school industry collaboration	0.99	0.98	-0.27	A
7	Evaluation of students' progress during training by the school and industry based supervisors can improve school industry collaboration	0.99	0.67	-1.08	A
8	Government should establish laws that will encourage industries and technical colleges to develop training programmes that can meet their internal needs	0.88	0.71	-1.80	NA
9	Government should establish industrial liaison offices/coordinating units in technical colleges	0.94	1.32	-1.28	A

10	NBTE, ITF and Industries should set up school industry advisory committee to monitor implementation of approved courses in technical colleges	0.85	1.13	0.50	A
11	Industries should be encouraged to develop training programmes in technical colleges in relation to their internal needs	1.07	0.73	-2.65	NA
12	Provision of internship training and on –the- job training by industries	1.16	0.97	-1.33	A
13	Assessment of training facilities of technical colleges to find out if they are capable of giving the students adequate background in those occupations required in the industry	0.62	0.53	-0.99	A
14	Examination of craft curriculum of the training programme of technical colleges to ensure that their occupational interest is covered	0.61	0.73	-0.38	A
15	Adequate interaction and liaison between technical colleges and industries can improve school industry collaboration	0.50	0.50	-1.61	A

table 4.2.2: presents test of this hypotheses

Key

SD1= Standard deviation of technical college teachers
SD2= Standard deviation of factory supervisors
A= Accepted
NA= Not Accepted

The result shown in table 4.2.2 above indicates the comparism between the technical college in Niger State. Data revealed that item 2,3,4,5,6,7,910,12,13,14 and 15 has a calculated t-value less than the t-critical value of ± 1.68, hence the hypothesis for this items were upheld at 0.05 level of significance. While item 1,8 and 11 has a t-calculated value above the t-critical value of +1.68, thus the null hypothesis for this items were not accepted.

4.2.3 Hypothesis 3

There will be no significant difference in the mean responses of industrial supervisors and technical teachers on the industrial based activities for improving school–industry collaboration in electrical installation and maintenance in technical colleges in Niger State.

Table 4.2.3: t-test analysis of the response of industry supervisor and technical college teachers on the industrial based activities for improving school–industry collaboration in electrical installation and maintenance in technical colleges in Niger State.

S/N	ITEMS STATEMENT	SD_1	SD_2	t-test	Remark
1	Industries should give some percentage of their annual profit specifically for refurbishing existing equipment in the technical colleges	0.71	1.00	0.28	A
2	A joint curriculum review evaluation committee on technical college trades should be formed by the government	0.99	1.23	0.23	A
3	Industrial personnel should be involved in the accreditation of technical college programmes	1.07	0.94	-0.28	A
4	Technical teachers/instructors should visit business and industrial enterprises to familiarize themselves with the current technologies	0.97	0.53	-3.76	NA
5	Industrial personnel should be involved in assessing students' practical work in technical colleges	0.97	1.22	0.69	A
6	Curriculum and syllabus of technical colleges should be discussed with many employers as possible on the formation of curriculum objective, selection of curriculum content, organization of the content, selection of learning experiences and organization of learning experiences	0.65	1.05	2.46	NA
7	Professional bodies like NATT, NAVTED and NVA in conjunction with the Ministry of Education and ITF should organize national conference on school industry relation	0.99	1.33	-1.06	A
8	Government should involve industry in recruitment of technical teachers in technical colleges	1.11	0.93	-0.28	A
9	ITF and NBTE should organize seminars, workshops and for training personnel	0.71	1.00	0.28	A

10	ITF, on regular basis should organize training programmes aimed at upgrading the knowledge of technical personnel	0.99	1.23	0.23	A
11	ITF, on regular basis should organize training programmes aimed at upgrading the knowledge of technical personnel	1.07	0.94	-0.28	A
12	Government should encourage industries to establish vocational and apprentice training centres in their area of operations	0.97	0.53	-3.76	NA
13	Industries should be involved in screening and recommending courses or trades in technical colleges	0.97	1.22	0.69	A
14	Industrial based job skills should be included in the curriculum of technical colleges for skill acquisition	0.65	1.05	2.64	NA
15	Industries should be encouraged to develop training programmes in technical colleges in relation to their internal needs	0.99	1.33	-1.06	A

Key

SD1= Standard deviation of technical college teachers
SD2= Standard deviation of factory supervisors
A= Accepted
NA= Not Accepted

The result shown in table 6 above indicates the comparism between the male and female professionals in construction firms in Minna, Niger State. Data revealed that item 1,2,3,5,7,8,9,10,11,13 and 15 has a calculated t-value less than t-critical value of +1.68, hence the hypothesis for these items were upheld at 0.05 level of significant, except for item 4,6,12 and 14 which has a t-calculated value above the t- critical value of ± 1.68, thus the null hypothesis for these items were not accepted.

4.3 Findings of the Study

the following are the principle findings of the study, they are organized based on the research questions and hypotheses.

The findings related to the school base activities that could improve school-industry collaboration for skill acquisition in electrical installation and maintenance trade in Niger State.

1. Placement of students by technical colleges in industries that are Compatible with their courses of study can improve school industry collaboration.
2. Introducing SIWES programme with enough time in technical colleges for those in National Technical Certificate NTC as in the case of advanced National Technical Certificate
3. Organizing cooperative work study programmed for electrical Installation and maintenance engineering craft students by technical colleges can improve school industry collaboration.
4. Award of scholarship to students by the industries for further studies can improve school industry collaboration
5. Organizing part time courses for industrial personnel to acquire theoretical knowledge by technical colleges or institutions
6. Inviting guest speakers from industry to deliver lectures in technical colleges can improve school industry collaboration
7. Engaging electrical engineering professionals in industry in part time teaching in technical colleges can improve school industry collaboration
8. Industrial training attachment for students in industries can improve school industry collaboration

9. Involving industries in setting and marking of practical examinations in technical colleges can improve school-industry collaboration
10. Provision of programme of studies based on high academic standard can improve school industry collaboration
11. Industries and Technical Colleges sharing of facilities can improve school-industry collaboration

Findings related to the technical college-based activities that could improve school-industry collaboration for skill acquisition in electrical installation and maintenance trade in Niger State.

1. Organizing part time courses for industrial personnel to acquire theoretical knowledge by technical colleges or institutions
2. Jointly organizing seminars, workshops by technical colleges and industries can improve technical-industry collaboration
3. Evaluation of the students to find out the extent to which they have acquired skills by school and industries can improve school-industry collaboration
4. Selection of innovative learning content and activities for training by technical colleges and industries can improve school industry collaboration
5. Allocation of training on time table, length of training period and work carried out in cooperation with the industries can improve school industry collaboration
6. Relating the practical on the job experience in the SIWES programme to classroom teaching can improve school industry collaboration
7. Evaluation of students' progress during training by the school and industry based supervisors can improve school industry collaboration

8. Government should establish laws that will encourage industries and technical colleges to develop training programmes that can meet their internal needs
9. Government should establish industrial liaison offices/coordinating units in technical colleges
10. NBTE, ITF and Industries should set up school industry advisory committee to monitor implementation of approved courses in technical colleges
11. Industries should be encouraged to develop training programmes in technical colleges in relation to their internal needs
12. Provision of internship training and on –the- job training by industries
13. Assessment of training facilities of technical colleges to find out if they are capable of giving the students adequate background in those occupations required in the industry
14. Examination of craft curriculum of the training programme of technical colleges to ensure that their occupational interest is covered
15. Adequate interaction and liaison between technical colleges and industries can improve school industry collaboration

Findings related to the administrative strategies that could improve school-industry collaboration for skill acquisition in electrical installation and maintenance trade in Niger state.

1. Industries should give some percentage of their annual profit specifically for refurbishing existing equipment in the technical colleges
2. A joint curriculum review evaluation committee on technical college trades should be formed by the government

3. Industrial personnel should be involved in the accreditation of technical college programmes
4. Technical teachers/instructors should visit business and industrial enterprises to familiarize themselves with the current technologies
5. Industrial personnel should be involved in assessing students' practical work in technical colleges
6. Curriculum and syllabus of technical colleges should be discussed with many employers as possible on the formation of curriculum objective, selection of curriculum content, organization of the content, selection of learning experiences and organization of learning experiences
7. Government should involve industry in recruitment of technical teachers in technical colleges
8. ITF, on regular basis should organize training programmes aimed at upgrading the knowledge of technical personnel
9. ITF, on regular basis should organize training programmes aimed at upgrading the knowledge of technical personnel
10. Government should encourage industries to establish vocational and apprentice training centres in their area of operations
11. Industries should be involved in screening and recommending courses or trades in technical colleges
12. Industrial based job skills should be included in the curriculum of technical colleges for skill acquisition

13. Industries should be encouraged to develop training programmes in technical colleges in relation to their internal needs.

Findings related to the industry-based activities that could improve school-industry collaboration for skill acquisition in electrical installation and maintenance trade in Niger state.

1. Financing staff and students' research work by the industries
2. Industries involvement in sponsoring projects and research works in technical colleges
3. Giving employment opportunities to graduates of technical college by the industries
4. Supervision of students on industrial training attachment by the industry based supervisor
5. Setting up short term courses in the industries for updating the skills and knowledge of technical colleges' staff in electrical technology
6. Organizing seminars, workshops for exchange of ideas and information for industrial and technical college staff of electrical technology on new innovative Programmes
7. Payment of allowances to students on industrial attachment by the industries
8. Organizing regional trade fair and exhibition of technical colleges' inventions by the industries
9. Purchasing consumable material for students' practical by the industries
10. Provision of instructional materials to technical colleges by the industries

11. Involving technical teachers/instructors working on industrial machinery in the production process so as to upgrade their knowledge and skills to keep abreast with new technological advancement
12. Provision of funds for the execution of technical colleges programmes

4.4 Discussion of the findings

The discussion of findings is based on the research questions posed for the study and the hypothesis. The findings in table 1 related to research question 1 shows the majority of item as regard the school base activities that could improve school industry collaboration for skill acquisition in electrical installation and maintenance trade in Niger state. The findings of this study revealed that industrial supervisors and technical teachers of technical colleges in Niger state agreed on 13 items on school based activities that could improve school-industry collaboration for skill acquisition in electrical installation and maintenance work.

These items identified by the respondents include: - jointly organizing seminars, workshop, by technical colleges and industries, industries and technical colleges sharing of facilities can improve school industry collaboration provision of programmes of studies based on high academic standard can improve school industry collaboration, involvement of industries in evaluating students' relevant learning experiences acquired in the technical colleges can improve collaboration, organizing cross training between industries and technical institutions personnel can improve collaboration .Other are involving industries in setting and making of practical examination in technical colleges can improve collaboration, industrial training attachment for students in industries can improve collaboration, inviting guest speaker from industries to deliver lectures in technical colleges can improve1school industry collaboration, organizing part time courses for industrial

personnel to acquire theoretical knowledge by technical colleges, award of scholarship to students by industries for further studies, organizing cooperative work study programmes for electrical installation and maintenance engineering crafts students. These findings were in agreement with the opinion of Abu (2017) that industries and technical institutions have different roles to play in technical man power production in Nigeria. He explained that school- based activities should involve provision of qualified teachers, classroom facilities, and instructional materials for instruction.

The findings in table 2 related to research question 2 revealed that respondents agreed with the majority of items on the administrative strategies that could improve school-industry collaboration for skill acquisition in electrical installation and maintenance trade in Niger state.

The findings of this study revealed that industrial supervisors and technical teachers in state agreed on all 15 items on administrative strategies that could improve school industry collaboration for skill acquisition in electrical installation and maintenance work. These items identified by the respondents revealed that establishment of industrial liaison offices in technical colleges, establishing laws by government that will encourage industries and technical colleges to develop training programmes that could meet their internal needs. Industries should be encouraged to develop training programmes in technical colleges in relation to their internal needs, industrial based job skills should be included in the curriculum of technical colleges for skill acquisition, industries should be involved in screening and recommending courses or trades in technical colleges. These finding were in agreement with the opinion of Bala (2018), that institutions should set up industrial/institutional advisory committee similar to academic advisory committee to approve courses as well as monitor the implementation of approved courses, and that it is

essential that various curriculum and syllabus of technical institutions be discussed with as many employers as possible.

The findings in table 4 related to research question 4 revealed that respondents agreed with the majority of items on The findings in table 4 related to research question 4 revealed that respondents agreed with the majority of items on the industry-based activities that could improve school-industry collaboration for skill acquisition in electrical installation and maintenance trade in Niger state. The findings of this study revealed that industrial supervisors and technical teachers in state agreed on all 11 items on administrative strategies that could improve school industry collaboration for skill acquisition in electrical installation and maintenance work. These items identified by the respondents revealed that provision of internship training and on- the job training by industries, assessment of training facilities of technical colleges to find out if they are capable of giving the students adequate background in those occupations required in the industries, examination/ evaluation of craft curriculum of the training programme of technical colleges to ensure that their occupational interest is covered. Others are provision of funds for the execution of technical college programmes, involving technical teachers/ instructors working on industrial machineries in production process so as to upgrade their knowledge and skill to keep abreast with new technological advancement, provision of occupational placement for graduates of technical colleges programme by the industries, donating information and communication technology equipment and tools to technical colleges, purchasing consumable materials for students' practical by the industries. These findings were in line with the opinion of Christensen (2021) that industries in collaboration or cooperation with schools should provide worked based learning activities such as internship, on- the job training mentoring and cooperative education to expose students to new technologies. Also that the functions

of industries to include: - assessment of training resources of institutions to find out if the institutions are capable of giving the students adequate training and background on those occupations required in the industries.

CHAPTER FIVE

5.0 SUMMARY, CONCLUSION AND RECOMMENDATIONS

This chapter deals with summary, conclusion and recommendations based on the findings. Suggestions for further studies were also highlighted.

5.1 Summary of the Study

The study is on the strategies for improving school industry collaboration between technical colleges and industry for enhancing skill acquisition in electrical installation and maintenance trade in Niger state. The chapter one of the study discussed a lot of issues concerning school industry collaboration for enhancing skill acquisition in electrical installation and maintenance trade in the background of the study, the statement of the problem was well stated which has to do with students not getting enough training in practical skills in the school workshops and laboratories, inadequate tools and equipment for training and practical works. Purpose of the study, significance of the study, scope of the study, the research questions and hypotheses were all formulated to guide the study.

The review of related literature looked at the concept of collaboration and skill acquisition., school industry collaboration for technology youth, administrative strategies for improving school industry collaboration in electrical installation and maintenance in technical colleges in Niger state., school based and industrial based activities that could improve school industry collaboration, electrical installation and maintenance work industry base skill and review of related empirical study are the sub-headings that were discussed and

different views concerning the topic which was harmonized in a comprehensive literature review.

A survey research design where questionnaire was used as a source for opinions from respondents on the strategies for improving school industry collaboration between technical colleges and industry for enhancing skill acquisition in electrical installation and maintenance trade in Niger state. The targeted population for the study is 75 respondents which are technical college teachers and factory supervisor in Niger state. The instrument was validated by three lecturers from the department of industrial and technology education, federal university of technology Minna. The data collected was analyzed using mean standard deviation and t-test. A mean response of 2.50 was used as cut-off point, t-test however was employed to test the null hypotheses at 0.05 level of significance

5.2 Implication of the Study

The findings of the study had implications for government, industries, technical colleges and students of technical colleges of Niger state. From the outcome of the study, it implies that: If the identified areas where collaboration between technical colleges and industries is improve technical teachers and students would have become acquainted with industrial facilities for training thereby making learning effective both theoretical and practical. If the technical college teachers are well trained and use to industrial equipment, tools and machineries, such knowledge will be transfer to the students. This will make the students more skilful to perform in the industries and labour market and to be self-reliance/employ hence reducing rate of unemployment. On the other hands the nation will be well develop because of the increase in the labour force.

5.3 Conclusion

Based on the findings of the study, the following conclusions were drawn: students of technical colleges can only acquire skills for employment and to be self-employed after graduation when there is collaboration between industries and technical colleges. Because these industries possessed the necessary technological skills, tools, equipment and machineries, that these students can be expose to during their course of training. Therefore, the rate of unemployment could be reduced when these technical colleges students are expose to modern technologies in industries through the administrative strategies, school based activities and industry based activities to be able to serve the industries, the society and to be self-employed after graduation.

5.4 Recommendations

Industry base job skill should be included in the curriculum of technical colleges for skill acquisition. Technical teachers/instructors should visit industrial enterprises to familiarize themselves with the current technologies, sharing of facilities between technical colleges should be encouraged. Curriculum and syllabus of technical colleges be discussed with many employers as possible on the formation of curriculum objective, selection of curriculum content, organization of the content, selection of learning experience and the organization.

Training equipment, machines, laboratories workshops, ICT library and classrooms should be

provided to technical colleges by government and philanthropies in the society for effective training.

5.5 Suggestion for further Study

The following are suggested for further studies:

1. Mechanism for improving quality of management of Technical colleges for skill acquisitions.
2. Similar study should be conducted in other areas such as building technology, woodwork, mechanical technology etc.
3. Professional capacity building needs of technical teachers for effective teaching of electrical installation students of technical colleges in Niger State.

REFERENCE

Abu, R. (2017). Collaboration between TVET Institutions and Industries in Bangladesh to Enhance Employability. *International Journal of Engineering and Technical Research (IJETR)* 2(10),50-5

Adebayo, J. J. (2020). Strategies for improving school –industry Relations for effective work preparation of Auto Mechanics Technology students in the Technical Institutions of Lagos State. *Unpublished Thesis University of Nigeria Nsukka*.

Ahamed, T. O. (2021). Strategies for Enhancing the Employability of Electrical Technology graduates of Technical Institutions in South Eastern states. *Unpublished thesis University of Nigeria Nsukka.*

Akhuemonkhan, I. A. & Raimi, L. (2021). Impact of Quality Assurance on Technical Vocational Education and Training (TVET) in Nigeria, www.iveta.org/Resources/Documents/a bout/.../Akhuemonkhan.pptx

Audu, R. (2021). Technical Vocational Education (TVE) Institutions and industries partnership: Necessity for Graduates Skills Acquisitions. *International Journal of Scientific and Research Publications*. 3, Issue 4, April 2013 www.ijsrp.org.

Ashaolu, E. C. (2018). *Students Industrial Work Experience in Nigeria Concepts, Principles and Practices.* Enugu Cheston Agency Ltd.

Bala E. A. (2018). The extent of Investment of Industries in the Industrial Work Experience of Vocational/Technical Students Nigeria. *Vocational Journal.* (1), 76-80.

Buligina, I. (2019). Strategic partnerships for the development of competitive labour force through vocational education and training. Entrepreneurship Business and Economics, 3 (1), 229–244.

Christensen, S. L. (2021). *Public private partnerships in education: New actors and modes of governance in a globalizing world*. Cheltenham, UK: Edward Elgar.

Electrical Installation and Inspection Act (2019). Technical and Vocational Education and Training in the 21stcentury: *New Roles for Guidance and counselling*. Paris. http://www.unesco.org/retrieved6/12/2004.

Federal Republic of Nigeria (FRN, 2020). Electrical Installation and maintenance work. *Curriculum and Course specification*. National Board for Technical Education (NBTE).

Gofwen, S. (2021). *Electrical Wiring Scope document*. Canada: College of the North Atlantic-seal cove.

Gowon, S. A. (2018). The *status of modular technology education in Virginia.* Journal of industrial Teacher Education, 38(1). Retrieved on 21/03/18 from www.scholar./ib.vt.edu/ejournals/JITE/V38ni/brusic

Hadroma, G.P. (2018). *Occupational Education Institute for Scientific Cooperation.* Tubingen, F.R.G. 49/50, pp.93-102.

Hadromi, (2018). A model for a vocational school-corporate/ industry partnership to improve students' technical skills. *World Transaction of Engineering and Technology Education* 16(1),89-94.

Haromi, C. A. (2018). National Educational Technology Students: *Connecting Curriculum and Technology.* Eugene: International society for Technology in Education.

Kevin, L. (2019). *Development and validation of the school achievement, motivating rating scale educational and psychological measurement*, (57)2 292-305.

Kroons, E. C. & Weigel, C.U. (2017). *Students Industrial Work Experience in Nigeria Concepts, Principles and Practices.* Enugu Cheston Agency Ltd.

Lamar, A. (2021). *Academic performance by community colleges of transfer entry.* Retrieved on September 20th 2021 from www.academicaffars.uscd.edu/offices/planning/reports/TSTF/app2.pdf

Menashy, D. (2020). *Learning domains or bloom's taxonomy*. Retrieved on 10/2/2020 from http://www.nwlink.com/-donclar/hrd/bloom.html

Ndinechi, R. (2020). *Vocational and Practical Arts Education.* www.//142.voc art. U.CR.htm.Retrieved Jan 30,2020.

Nwachukwu, C.E. (2018). Effective laboratory safety practice skills required by automobile technology students of technical college in Ekiti State. *Nigerian Vocational Association Journal*, 16(1): 141-147.

Nwoji, J. (2019). Interest and Effort in Education. In J.A. Boydston, *The Middle works, 1899-1924: Vol. 7: 1912-1914* (pp. 153-197), Carbondale, IL: Southern Illinois University Press (Original work published in 1913).

Obwoge, M. E. (2019). Linking TVET Institutions and Industry in Kenya: Where Are We? *International Journal of Economy, Management and Social Science* 2(4), 91-96.www.waprogramming.com

Ogbuanya, T. C. (2018). Strategies for Enhancing Entrepreneurship Development for Institution-to-work transition of Electrical installation graduates of tertiary institution in northern Nigeria. Faculty of Education 2013 Annual Conference University of Nigeria Nsukka 21st May – 23rd 2013.

Okorie, J. U. (2018). *Vocational Industrial Education Bauchi*. League of Publishers.

Ominabo, I.B. (2010). Entry level skills required by Technical College Electrical Graduates in Electrical Installation Trade. *Nigerian Vocational Association Journal*. 15 (1), 242-253.

Olaitan, S. O. (2019). *Vocational and Technical Education in Nigeria*. Onitsha: Noble Graphic.

Padelford, H.E. (2019). *Acquiring Psychomotor Skills*. Ann Arbor: University Microfilms International, 4(2); 27-37

Raimi, O. (2020). Vocational Training in the Dual system in the Federal Republic of Germany. *Federal Ministry of Education and Science, Bonn- Germany*.

Sherman. M. (2021). *Electrical Wiring Scope document*. Canada: College of the North Atlantic-seal cove.

UNESCO, (2019). Trends and Issues in Technical and Vocational Education, 7, placed Fontenoy, 75700, Parris.

Verger, A. (Eds.). (2019). *Public private partnerships in education: New actors and modes of governance in a globalizing world*. Cheltenham, UK: Edward Elgar.

Watters, E. K. (2018). Functional Vocational and Technical Education curriculum for sustainable Youth empowerment in Nigeria. *British Journal of Education* 1(1) 7-13 September 2018. Published by European Centre for Research Training and Development UK.

Yabani, A. E. (2018). Standards and Criteria for Institutional and Programmed Accreditation Colleges and similar technical institutions in Nigeria *National Board of Technical Education NBTE) Bida Road, Kaduna.*

APPENDIX I

Department of Industrial and Technology Education,
Federal University of Technology,
P.M.B. 65,
Minna,
1th February, 2023.

Dear Respondent,

REQUEST FOR RESPONSE TO QUESTIONNAIRE

I am a final year student of the above mentioned institution, undertaking a study titled: "**strategies for improving school industry collaboration between technical colleges and industry for enhancing skill acquisition in electrical installation and maintenance trade in Niger state".** Your objective responses are highly needed in ascertaining the facts under investigation. Please feel free and open to share your mind objectively, for your responses have great impact on the findings. All collected responses will be used only for this research and treated confidentially.

Thank you

Yours faithfully

APPENDIX III

REQUEST LETTER TO VALIDATORS

Industrial and Technology Education Department
Federal University of Technology,
P.M.B. 65,
Minna,
4th January, 2023.

Dear Sir,

REQUEST FOR FACE VALIDATION OF INSTRUMENT FOR STRATEGIES FOR IMPROVING SCHOOL INDUSTRY COLLABORATION BETWEEN TECHNICAL COLLEGES AND INDUSTRY FOR EHENCING SKILL ACQUISITION IN ELECTRICAL INSTALLATION AND MAINTENANCE TRADE IN NIGER STATE I am an undergraduate student of the above named address currently undertaking a study on the topic: STRATEGIES FOR IMPROVING SCHOOL INDUSTRY COLLABORATION BETWEEN TECHNICAL COLLEGES AND INDUSTRY FOR EHENCING SKILL ACQUISITION IN ELECTRICAL INSTALLATION AND MAINTENANCE TRADE IN NIGER STATE Attached is the draft copy of the instrument. As an expert in this area, your assistance is hereby solicited to enable me accomplish this task. Kindly go through the item to verify their clarity, relevance and appropriateness in the use of language. In addition to this you can also make further suggestions that will improve the status and quality of the instrument. Your contribution to this work is highly appreciated.

Thanks

Yours faithfully,

APPENDIX II

RESEARCH QUESTIONNAIRE

ON

STRATEGIES FOR IMPROVING SCHOOL-INDUSTRY COLLABORATION BETWEEN TECHNICAL COLLEGES AND INDUSTRIES FOR ENHANCING SKILL ACQUISITION IN ELECTRICAL INSTALLATION AND MAINTENANCE TRADE IN NIGER STATE.

PART ONE

Please, complete the questionnaire as faithfully and sincerely as possible by ticking the column that best represent your perception about the above topic: the questionnaire is for research purpose and your view will be treated confidently.

Category: Industrial Supervisor ☐ Technical teacher ☐

Guide on how to respond to the questionnaire: use the following rating scale to indicate your opinion by ticking the phase that best describe your level of agreement to the items

Strongly Agree = SA - 4 points

Agree = A - 3 points

Disagree = D - 2 points

Strongly Disagree = SD - 1 point

PART TWO

SECTION A

RESEARCH QUESTION 1

What are the school based activities that could improve school-industry collaboration for skill acquisition in electrical installation and maintenance trade in Niger State?

S/N	ITEMS STATEMENT	SA 4	A 3	D 2	SD 1
1	Placement of students by technical colleges in industries that are Compatible with their courses of study can improve school industry collaboration				
2	Keeping comprehensive data of industries that are equipped with modern equipment/facilities by technical colleges				
3	Introducing SIWES programme with enough time in technical colleges for those in National Technical Certificate NTC as in the case of advanced National Technical Certificate				
4	Organizing cooperative work study programmed for electrical Installation and maintenance engineering craft students by technical colleges can improve school industry collaboration				
5	Award of scholarship to students by the industries for further studies can improve school industry collaboration				
6	Organizing part time courses for industrial personnel to acquire theoretical knowledge by technical colleges or institutions				
7	Inviting guest speakers from industry to deliver lectures in technical colleges can improve school industry collaboration				
8	Engaging electrical engineering professionals in industry in part time teaching in technical colleges can improve school industry collaboration				
9	Industrial training attachment for students in industries can improve school industry collaboration				
10	Involving industries in setting and marking of practical examinations in technical colleges can improve school-industry collaboration				

11	Counselling of students for career exploration in specific vocation relevant to industries can improve school industry collaboration				
12	Organizing cross training between industries and technical institutions personnel can improve school industry collaboration				
13	Involvement of industries in evaluating students relevant learning experiences acquired in the technical colleges can improve school-industry collaboration				
14	Provision of programme of studies based on high academic standard can improve school industry collaboration				
15	Industries and Technical Colleges sharing of facilities can improve school-industry collaboration				

SECTION B

RESEARCH QUESTION 2

What are the technical college-based activities that could improve school-industry collaboration for skill acquisition in electrical installation and maintenance trade in Niger State?

S/N	ITEMS STATEMENT	SA 4	A 3	D 2	SD 1
1	Organizing part time courses for industrial personnel to acquire theoretical knowledge by technical colleges or institutions				
2	Jointly organizing seminars, workshops by technical colleges and industries can improve technical-industry collaboration				
3	Evaluation of the students to find out the extent to which they have acquired skills by school and industries can improve school-industry collaboration				
4	Selection of innovative learning content and activities for training by technical colleges and industries can improve school industry collaboration				
5	Allocation of training on time table, length of training period and work carried out in cooperation with the industries can improve school industry collaboration				
6	Relating the practical on the job experience in the SIWES programme to classroom teaching can improve school industry collaboration				
7	Evaluation of students' progress during training by the school and industry based supervisors can improve school industry collaboration				
8	Government should establish laws that will encourage industries and technical colleges to develop training programmes that can meet their internal needs				
9	Government should establish industrial liaison offices/coordinating units in technical colleges				
10	NBTE, ITF and Industries should set up school industry advisory committee to monitor implementation of approved courses in technical colleges				

11	Industries should be encouraged to develop training programmes in technical colleges in relation to their internal needs				
12	Provision of internship training and on –the- job training by industries				
13	Assessment of training facilities of technical colleges to find out if they are capable of giving the students adequate background in those occupations required in the industry				
14	Examination of craft curriculum of the training programme of technical colleges to ensure that their occupational interest is covered				
15	Adequate interaction and liaison between technical colleges and industries can improve school industry collaboration				

SECTION C

RESEARCH QUESTION 3

What are the administrative strategies that could improve school-industry collaboration for skill acquisition in electrical installation and maintenance trade in Niger state?

S/N	ITEMS STATEMENT	SA 4	A 3	D 2	SD 1
1	Industries should give some percentage of their annual profit specifically for refurbishing existing equipment in the technical colleges				
2	A joint curriculum review evaluation committee on technical college trades should be formed by the government				
3	Industrial personnel should be involved in the accreditation of technical college programmes				
4	Technical teachers/instructors should visit business and industrial enterprises to familiarize themselves with the current technologies				
5	Industrial personnel should be involved in assessing students' practical work in technical colleges				
6	Curriculum and syllabus of technical colleges should be discussed with many employers as possible on the formation of curriculum objective, selection of curriculum content, organization of the content, selection of learning experiences and organization of learning experiences				
7	Professional bodies like NATT, NAVTED and NVA in conjunction with the Ministry of Education and ITF should organize national conference on school industry relation				
8	Government should involve industry in recruitment of technical teachers in technical colleges				
9	ITF and NBTE should organize seminars, workshops and for training personnel				
10	ITF, on regular basis should organize training programmes aimed at upgrading the knowledge of technical personnel				

11	ITF, on regular basis should organize training programmes aimed at upgrading the knowledge of technical personnel				
12	Government should encourage industries to establish vocational and apprentice training centres in their area of operations				
13	Industries should be involved in screening and recommending courses or trades in technical colleges				
14	Industrial based job skills should be included in the curriculum of technical colleges for skill acquisition				
15	Industries should be encouraged to develop training programmes in technical colleges in relation to their internal needs				

SECTION D

RESEARCH QUESTION 4

What are the industry-based activities that could improve school-industry collaboration for skill acquisition in electrical installation and maintenance trade in Niger state?

S/N	ITEMS STATEMENT	SA 4	A 3	D 2	SD 1
1	Financing staff and students' research work by the industries				
2	Evaluating students' relevant learning experiences acquired in the technical colleges by the industry to meet industrial needs				
3	Industries involvement in sponsoring projects and research works in technical colleges				
4	Giving employment opportunities to graduates of technical college by the industries				
5	Supervision of students on industrial training attachment by the industry based supervisor				
6	Setting up short term courses in the industries for updating the skills and knowledge of technical colleges' staff in electrical technology				
7	Organizing seminars, workshops for exchange of ideas and information for industrial and technical college staff of electrical technology on new innovative Programmes				
8	Payment of allowances to students on industrial attachment by the industries				
9	Organizing regional trade fair and exhibition of technical colleges' inventions by the industries				
10	Purchasing consumable material for students' practical by the industries				
11	Donating information and communication technology equipment and tools to technical colleges				

12	Provision of instructional materials to technical colleges by the industries				
13	Provision of occupational placement for graduates of technical college programme by the industries				
14	Involving technical teachers/instructors working on industrial machinery in the production process so as to upgrade their knowledge and skills to keep abreast with new technological advancement				
15	Provision of funds for the execution of technical colleges programmes				