INFLUENCE OF GENDER ON ENROLLMENT ATTITUDE AND SKILL ACQUISITION OF ELECTRICAL AND ELECTRONIC STUDENTS IN TECHNICAL COLLEGES IN NIGER STATE

BY

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DECLARATION

I ADAMU OBED KOLO **Matric No**: 2016/1/62431TI 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

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ADAMU OBED KOLO 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, Scool of Science and Technology Technology Education, Federal University of Technology, Minna.

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DEDICATION

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

Abstract

This study examined the Influence of gender on enrollment attitude and skill acquisition of electrical and electronics students in technical colleges in niger state. The study made use of descriptive research design method. A self-structured questionnaire was the main instrument of data collection. The study makes use of one hundred respondents. The finding of the study shows thatgender of students significantly affect their enrollment into electrical and electronic courses. This is because electrical and electronic course is generally considered as field of specialty of a specific gender, such that other gender that endeavor into the field is lowly considered. The study also indicates that attitude could make or mar the outcome of students learning process more productive particularly in acquisition of electrical and electronic skills. The positive influence of attitude on performance in electrical and electronic skill acquisition could be traced to the adoption of practical approach in teaching the students. Based on the findings of the study it was recommended that Government and NGO should work hand in hand to ensure equal gender representation in electrical and electronic field in the country tertiary institution, Government and NGOs should build and equip demonstration technical workshops within the premises of all technical colleges in Nigeria. This will enhance the teaching of electrical and electronic related course and foster students interest in the course and that Professional bodies and government should organize workshops, seminars and short courses whereby well informed science educators will be educated on the need for gender balance in choice of science subjects.

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TABLE OF CONTENTS

Content

CHAPTER TWO: LITERATURE REVIEW

2.1 Conceptual Framework

CHAPTER THREE: RESEARCH METHODOLOGY

LIST OF TABLES

of gender on students skill acquisition in electrical and electronics students in technical colleges in Niger state.

CHAPTER ONE

INTRODUCTION

Background of the Study

According to the Organization for Economic Co-operation and Development (OECD), the education level of populations across the world has been rising considerably during the last decades and since the 1970s this is mainly due to the increasing percentage of women that complete a tertiary qualification (bachelor degree or higher) (OECD, 2015).

In 2013, from 55-64 years old, the average values from the OECD countries for the percentages of men and women with a tertiary qualification were 25% and 22%, respectively. But, for 25-34 years old, those percentages were 35% and 46%. For the case of Portugal, this phenomenon is still more evident, with 10% and 12% (men and women) for the older generation and 22% and 37% (men and women) for the younger group. For that same year, in 19 of the 36 countries the percentage of young women (25-34 year old) with tertiary degree approached or was higher than 50%. In 33 countries the percentage of those women holding a tertiary qualification was already higher than that of men (Vincent-Lancrin, 2008).

In spite of this impressing movement, gender differences still exist in educational and employment issues, mainly in certain specific fields. Men traditionally dominate Science, computing and engineering whereas education, social sciences and health care typically attract more women. Given this discrepancy between the different fields of knowledge, many studies have been presented during the last decades in order to assess the tendencies of boys and girls in the different cognitive domains, but also to understand the factors that may be responsible for some of those genders based differences. The studies may be focused in high school or in higher education, in all

fields or in specific fields. Many times, the gender factor is one of the various factors that are analyzed. Since education and specifically higher education is deeply related to a future professional career, in some studies the relationships between the educational factors and the professional outcomes are also assessed (Sonnert and Fox 2012; Kim and Sax, 2009)

Pomales-Garcia and Barreto (2014) present a study based on the reflections of students in two different engineering design courses that use project-based-learning (PBL). The courses make part of the curriculum of Industrial Engineering (Puerto Rico) and the global aim of this study was to understand the Pomales-Garcia and Barreto present a study based on the reflections of students in two different engineering design courses that use project-based-learning (PBL). The courses make part of the curriculum of Industrial Engineering (Puerto Rico) and the global aim of this study was to understand the impact of those projects from the students' point of view. One of the specific objectives was to identify possible gender differences in those reflections. A total of 161 undergraduate students have been considered (66 males and 95 females), covering a period of four academic years (2006/7 to 2010/11).

The importance of PBL as an integrating tool was confirmed in this study. The results showed no significant differences between the experiences, skills and values highlighted by the students of the two genders. It is important to notice that the percentage of female students in the sample was atypically high, when compared to the majority of engineering programs. A lot of diverse issues looking for gender differences in engineering fields may be found in research literature but no specific patterns seem to have been found yet. The dynamics and specificity of environmental conditions and programs across different countries and institutions suggest that further research in this area is still of great relevance.

Several researchers found that attitudes toward technology differ significantly between males and females, with males indicating greater interest and knowledge (Hale, 2002). Other researchers found that female students perceive technology as more difficult and less interesting than male students. The difference in gender attitudes and uses can be traced back to the placement and use of computers in education, where they were mainly used in research and administrative offices by white males. females were introduced to computers in word processing and secretarial classes, while males used computers in advanced math classes (Linn, 2019).

A study conducted by Silverman and Pritchard's (2016) supports this gender difference. In their attitude study, females' attitudes toward technology went from enjoyment of technology education and confidence in technological abilities at the beginning of the study, to negative attitudes by the end of the study that resulted from monopolization of equipment by males and the males making fun of the females. Sacks and Bellisimo (2013) found that female attitudes toward computers became more positive when they spent more time on computers.

Other studies showed differences in gender perceptions, where females viewed the computer as a tool, while males viewed the computer as more of a toy for fun (American Association of University Women Educational Foundation, 2020). In this light, males generally spend more than half of their time playing games and females spend the majority of their computer time sending e-mails and working on assignments (Teasdale & Lupart, 2011). Of interest is that the Kaiser family foundation (2019) did not find a difference in the amount of time spent on computers when computer games were removed from the equation.

Statement of the Problem

The issue of gender influence on technical education has generated a lot of concern in enrollment attitude and skill acquisition of electrical and electronics students in technical colleges in Niger State, Nigeria. There has been report on gender imbalance in technical studies which has been found to account for the negative attitude of girls in Sciences and Technology. Some of the contributing factors are and not limited to: individual cognitive, home and family, educational, socio-cultural and attitudinal factors. There is therefore, the need to look into this study on the Influence of gender on enrollment attitude and skill acquisition of electrical and electronics students in technical colleges in Niger State

Purpose of the Research

The main purpose of this study is to determine the Influence of gender on enrollment attitude and skill acquisition of electrical and electronics students in technical colleges in Niger State. Specifically, the study sought to:

- ★ The enrollment pattern of students;
- ★ Attitude of students towards enrollment pattern;
- ★ Level of skill acquisition;
- ★ Influence of gender on enrollment;
- ★ Influence of gender on attitude
- ★ Influence of gender on skill acquisition

Significance of the Study

It is intended that the findings will be important to the stakeholders and government of Kenya, who will focus the limited resources available to major issues which have a great impact on gender enrolment in Technical College. The policy makers are expected to use the information to review policies in Technical Colleg and make informed decisions that will guide the growth of the sub-sector. In addition, it is hoped that the curriculum implementers will use the finding to develop strategies that would encourage both genders to equally participate in the Technical College courses.

It is also expected that the implementation of the study findings will result in an improvement of gender parity in technological and engineering courses at secondary level. This is important since it is globally accepted that education and training play a significant role in national development. According to UNESCO and NBTE (2002) the engines of economic growth and social development are Knowledge and skills and therefore, it is imperative for opening up ITF systems to all people irrespective of their gender. Women in particular, being underprivileged, should be given the equal opportunity in the communities to be equipped with skills not only for their prosperity but also the well-being of the community. Increased enrolment of women in the technological and engineering programmes will enhance the goal of equitable furnishing the future manpower with requisite knowledge and skills Significance of the Study.

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the growth of the sub-sector. In addition, it is hoped that the curriculum implementers will use the finding to develop strategies that would encourage both genders to equally participate in skill acquisition of electrical and electronics courses.

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Scope of the Study

The scope of this research work is centered on the Influence of gender on enrollment attitude and skill acquisition of electrical and electronics students in technical colleges in Niger State.

Research Questions

The study was guided by the following research questions

- What are factors responsible for the enrollment patterns of students in electrical and electronic courses based on gender?
- What is the attitude and influence of students towards enrollment pattern?
- What is the level of skill acquisition and influence of gender in skill acquisition?

Hypothesis

- ★ There is no significance difference in electrical and electronic enrollment pattern between male and female students;
- ★ There is no significance influence of gender on students enrollment attitude in electrical and electronics students in technical colleges in Niger state;
- ★ There is no significance influence of gender on students skill acquisition in electrical and electronics students in technical colleges in Niger state

Basic Assumptions of the Study

In this study, it was assumed that:

a) Both male and female trainees had equal enrolment opportunities in technical training institutes in Niger State, Nigeria;

b) The respondents would respond honestly;

c) Documents available were accurate and could therefore be used as secondary data.

d) The measures used to assess interests and attitudes were reliable (Reliability was also tested as part of the study).

CHAPTER TWO

LITERATURE REVIEW

CONCEPTUAL FRAMEWORK

Skill

There are several concepts which play a key role in this theory. One such concept is skill. The definition of skill is vague. As defined by Vanpatten & Benati (2010, p. 39) "Skill refers to ability to do rather than underlying competence or mental representation". To clarify this concept, Cornford (1996) has mentioned nine separate defining attributes of "skill" and "skilled performance" from a psychological perspective, argued to be the most valid in accounting for skill acquisition and performance by individuals. These defining attributes are:

- ★ skill is learned;
- ★ skill involves motivation, purpose and goals;
- ★ Schemas are prerequisite for skilled performance;
- ★ Skills require content and context knowledge;
- ★ Skills are performed and transferred in the presence of specific stimuli;
- ★ Skills involve problem solving relevant to the context;
- ★ Skill involves relative judgments with individual differences in skilled performance evident;
- ★ Standards of excellence are important;
- ★ Skill involves comparable replication;
- ★ Considerable periods of time are required to reach high levels of skill.

Priming

The other important concept in Skill Acquisition Theory is "priming" which, according to Trofimovich & McDonough (2013, p. 505), "refers to a cognitive repetition phenomenon in which prior exposure to specific language forms or meaning facilitates speaker's subsequent language processing". For example, a words or structure used by a speaker will influence the comprehension and production of that word or structure by the interlocutor. Therefore, it "may underlie the interactive, communicative use of language" (Trofimovich & McDonough, p. 505). At the same time, it can be categorized under the implicit learning since it often happens with little awareness and conscious effort on the part of language user (Trofimovich & McDonough).

Gender Perception

Gender refers to the sexual classification of humans into male and female. There has been conflicting reports on effects of teaching methods on student's achievement and retention across gender. Most studies show that on the average, girls do better in school than boys which implies that female academic achievement is higher compared to boys. In calculative or more practical subjects or courses, boys tend to perform better than girls. In a study conducted by Eze, Ezenwafor and Molokwu (2015) on effects of meta-learning teaching approach on the academic achievement of building trade students, the findings revealed that there is a significant difference in the achievement of male and female students taught building trades using meta-learning teaching approach. Also, the finding of the study carried out by Emeli (2012) revealed that male students taught with AUTOCAD performed better than female students taught with the same method.

However, in a study carried out by Eze, Ezenwafor and Obidile (2016), the finding revealed that there was no significant interaction effect of teaching methods and gender on students' retention

in financial accounting. Also, Gana (2015) reported in a study that there was no significant interaction effect of teaching methods and gender on students' academic achievement and retention of quantum physics. Research study carried out by Emelikwu (2011) on the relative effectiveness of three teaching methods in the measurements of students' achievement in mathematics showed that conventional teaching method (teacher-centered) often rely heavily on the sense of hearing which is the least in instructional media. Emelikwu further stated that teacher-centered approach seldom allows the learner the privilege of experience, practice or application of knowledge. The major problem faced by most students is inability to remember what they have learnt which could result to students performing poorly in achievement test. Retention in basic electricity is not acquired by mere memorization rather through student participation rooted in appropriate teaching method.

Concept of Electrical Electronics Engineering Studies

Electrical engineering is an engineering discipline concerned with the study, design, and application of equipment, devices, and systems which use electricity, electronics, and electromagnetism. It emerged as an identifiable occupation in the latter half of the 19th century after commercialization of the electric telegraph, the telephone, and electrical power generation, distribution, and use. Electrical engineering is now divided into a wide range of different fields, including computer engineering, systems engineering, power engineering, telecommunications, radio-frequency engineering, signal processing, instrumentation, photovoltaic cells, electronics, and optics and photonics. Many of these disciplines overlap with other engineering branches, spanning a huge number of specializations including hardware engineering, power electronics, electromagnetics and waves, microwave engineering, nanotechnology, electrochemistry, renewable energies, mechatronics/control, and electrical materials science (Sale, 2012).

Electrical engineers work in a very wide range of industries and the skills required are likewise variable. These range from circuit theory to the management skills of a project manager. The tools and equipment that an individual engineer may need are similarly variable, ranging from a simple voltmeter to sophisticated design and manufacturing software. One of the properties of electricity is that it is very useful for energy transmission as well as for information transmission. These were also the first areas in which electrical engineering was developed. Today electrical engineering has many subdisciplines, the most common of which are listed below. Although there are electrical engineers who focus exclusively on one of these subdisciplines, many deal with a combination of them. Sometimes certain fields, such as electronic engineering and computer engineering, are considered disciplines in their own right (Moskowitz, 2016).

Electronic engineering involves the design and testing of electronic circuits that use the properties of components such as resistors, capacitors, inductors, diodes, and transistors to achieve a particular functionality.[61] The tuned circuit, which allows the user of a radio to filter out all but a single station, is just one example of such a circuit. Another example to research is a pneumatic signal conditioner. Prior to the Second World War, the subject was commonly known as radio engineering and basically was restricted to aspects of communications and radar, commercial radio, and early television. Later, in post-war years, as consumer devices began to be developed, the field grew to include modern television, audio systems, computers, and microprocessors. In the mid-to-late 1950s, the term radio engineering gradually gave way to the name electronic engineering (Saxena, 2009).

Before the invention of the integrated circuit in 1959, electronic circuits were constructed from discrete components that could be manipulated by humans. These discrete circuits consumed much space and power and were limited in speed, although they are still common in some applications.

By contrast, integrated circuits packed a large number—often millions—of tiny electrical components, mainly transistors,[71] into a small chip around the size of a coin. This allowed for the powerful computers and other electronic devices we see today (Golio and Golio, 2018).

Professional and Practices of Electrical Electronics Engineering

In most countries, a bachelor's degree in engineering represents the first step towards professional certification and the degree program itself is certified by a professional body. After completing a certified degree program the engineer must satisfy a range of requirements (including work experience requirements) before being certified. Once certified the engineer is designated the title of Professional Engineer (in the United States, Canada and South Africa), Chartered engineer or Incorporated Engineer (in India, Pakistan, the United Kingdom, Ireland and Zimbabwe), Chartered Professional Engineer (in Australia and New Zealand) or European Engineer (in much of the European Union).

The advantages of licensure vary depending upon location. For example, in the United States and Canada "only a licensed engineer may seal engineering work for public and private clients". This requirement is enforced by state and provincial legislation such as Quebec's Engineers Act. In other countries, no such legislation exists. Practically all certifying bodies maintain a code of ethics that they expect all members to abide by or risk expulsion. In this way these organizations play an important role in maintaining ethical standards for the profession. Even in jurisdictions where certification has little or no legal bearing on work, engineers are subject to contract law. In cases where an engineer's work fails he or she may be subject to the tort of negligence and, in extreme cases, the charge of criminal negligence. An engineer's work must also comply with numerous other rules and regulations, such as building codes and legislation pertaining to environmental law.

Professional bodies of note for electrical engineers include the Institute of Electrical and Electronics Engineers (IEEE) and the Institution of Engineering and Technology (IET). The IEEE claims to produce 30% of the world's literature in electrical engineering, has over 360,000 members worldwide and holds over 3,000 conferences annually.[100] The IET publishes 21 journals, has a worldwide membership of over 150,000, and claims to be the largest professional engineering society in Europe. Obsolescence of technical skills is a serious concern for electrical engineers. Membership and participation in technical societies, regular reviews of periodicals in the field and a habit of continued learning are therefore essential to maintaining proficiency. An MIET(Member of the Institution of Engineering and Technology) is recognised in Europe as an Electrical and computer (technology) engineer. In Australia, Canada, and the United States electrical engineers make up around 0.25% of the labor force (Franco et al., 2013).

Tools and Work

From the Global Positioning System to electric power generation, electrical engineers have contributed to the development of a wide range of technologies. They design, develop, test, and supervise the deployment of electrical systems and electronic devices. For example, they may work on the design of telecommunication systems, the operation of electric power stations, the lighting and wiring of buildings, the design of household appliances, or the electrical control of industrial machinery (Collinge and Greer, 2016).

Fundamental to the discipline are the sciences of physics and mathematics as these help to obtain both a qualitative and quantitative description of how such systems will work. Today most engineering work involves the use of computers and it is commonplace to use computer-aided

design programs when designing electrical systems. Nevertheless, the ability to sketch ideas is still invaluable for quickly communicating with others.

Although most electrical engineers will understand basic circuit theory (that is the interactions of elements such as resistors, capacitors, diodes, transistors, and inductors in a circuit), the theories employed by engineers generally depend upon the work they do. For example, quantum mechanics and solid state physics might be relevant to an engineer working on VLSI (the design of integrated circuits), but are largely irrelevant to engineers working with macroscopic electrical systems. Even circuit theory may not be relevant to a person designing telecommunication systems that use off-the-shelf components. Perhaps the most important technical skills for electrical engineers are reflected in university programs, which emphasize strong numerical skills, computer literacy, and the ability to understand the technical language and concepts that relate to electrical engineering (Astron and Murray, 2021).

A wide range of instrumentation is used by electrical engineers. For simple control circuits and alarms, a basic multimeter measuring voltage, current, and resistance may suffice. Where time-varying signals need to be studied, the oscilloscope is also an ubiquitous instrument. In RF engineering and high frequency telecommunications, spectrum analyzers and network analyzers are used. In some disciplines, safety can be a particular concern with instrumentation. For instance, medical electronics designers must take into account that much lower voltages than normal can be dangerous when electrodes are directly in contact with internal body fluids. Power transmission engineering also has great safety concerns due to the high voltages used; although voltmeters may in principle be similar to their low voltage equivalents, safety and calibration issues make them very different. Many disciplines of electrical engineering use tests specific to their discipline. Audio electronics engineers use audio test sets consisting of a signal generator and a meter,

principally to measure level but also other parameters such as harmonic distortion and noise. Likewise, information technology have their own test sets, often specific to a particular data format, and the same is true of television broadcasting (Dodds et al., 2014).

For many engineers, technical work accounts for only a fraction of the work they do. A lot of time may also be spent on tasks such as discussing proposals with clients, preparing budgets and determining project schedules. Many senior engineers manage a team of technicians or other engineers and for this reason project management skills are important. Most engineering projects involve some form of documentation and strong written communication skills are therefore very important. The workplaces of engineers are just as varied as the types of work they do. Electrical engineers may be found in the pristine lab environment of a fabrication plant, on board a Naval ship, the offices of a consulting firm or on site at a mine. During their working life, electrical engineers may find themselves supervising a wide range of individuals including scientists, electricians, computer programmers, and other engineers (Astron and Murray, 2021).

Electrical engineering has an intimate relationship with the physical sciences. For instance, the physicist Lord Kelvin played a major role in the engineering of the first transatlantic telegraph cable. Conversely, the engineer Oliver Heaviside produced major work on the mathematics of transmission on telegraph cables. Electrical engineers are often required on major science projects. For instance, large particle accelerators such as CERN need electrical engineers to deal with many aspects of the project including the power distribution, the instrumentation, and the manufacture and installation of the superconducting electromagnets.

Theory of Skill Acquisition

The scientific roots of Skill Acquisition Theory can be found in different branches of psychology, which ranges from behaviorism to cognitivism and connectionism (Dekeyser & Criado, 2013). This theory draws on Anderson's Adaptive Control of Thought (ACT) model which itself is a kind of cognitive stimulus-response theory (Ellis & Shintani, 2013). As mentioned by Parziale & Fischer (2009), it is a neo-Piagetian theory that amalgamates elements of both cognitive and behavioristic theories. In SLA there are a number of theories which have been devised based on models of skill acquisition in cognitive psychology. According to Chapelle (2009), this theory falls under the category of general human learning, i.e., it focuses "on language learning as a process of human learning". In other words, learning a second language in view of such theories is considered to be like learning any other skill, e.g., playing a musical instrument. Advocates of such theories consider practice to play the key role in learning.

The basic claim of Skill Acquisition Theory, according to Dekeyser (2007b), "is that the learning of a wide variety of skills shows a remarkable similarity in development from initial representation of knowledge through initial changes in behavior to eventual fluent, spontaneous, largely effortless, and highly skilled behavior, and that this set of phenomena can be accounted for by a set of basic principles common to acquisition of all skills" (p. 97). In sum, as mentioned by Speelman (2005), skill acquisition can be considered as a specific form of learning, where learning has been defined as "the representation of information in memory concerning some environmental or cognitive event" (p. 26). Therefore, according to him, skill acquisition is a form of learning where "skilled behaviors can become routinized and even automatic under some conditions".

Education is acknowledged as a vital instrument for achieving national development. It is through education that ignorance is eliminated and skills for productivity acquired. Imogie (2014) affirmed that no nation can develop to its fullest without effective and efficient educational system. The

value and functionality of any educational system lie in its ability to actualize the goals of education. Federal Republic of Nigeria (FRN), (2014) stated that one of the aims and objectives of education in Nigeria is to help the child acquire appropriate skills, abilities and competencies both mental and physical as equipment for the individual to live in and contribute to the development of the society. Such knowledge, skills and abilities are acquired through the training provided in the school.

The achievement of this objective rests squarely on the learner, the environment and the teaching method employed by the teacher. Teaching method is defined as a way by which the teacher presents materials to learners and engages them in the task of learning the curriculum content (Ogwo & Oranu, 2006). It involves the interaction of the teacher, learners and the subject matter. Teaching method is basically geared towards ensuring that learners learn well and understand the logics inherent in what is being taught, (Okeke in Oboh & Umeh, 2013).

CHAPTER THREE

METHODOLOGY

This chapter presents the methodology to be used in carrying out the study under the following sub-headings: Design of the Study, Area of the Study, Population for the Study, Sample and Sampling Technique, Instrument for Data Collection, Validation of Instrument, and Reliability of the Instrument, Method of Data Collection, and Method of Data Analysis.

3.1 Design of the Study

A survey research design was adopted for the study. According to Gall, Gall and Borg (2007), survey research is a method of data collection using questionnaire or interviews to collect data from a sample that has been selected to represent a population to which the findings of the data analysis can be generalized. This design is appropriate for this study because it allowed the respondents to put down their views and opinions on Influence of gender on enrollment attitude and skill acquisition of electrical and electronics students in technical colleges in Niger State using questionnaire.

3.2 Area of the Study

This study was carried out in Niger State. Niger State was used for the study because it has many tertiary institutions. The tertiary institutions also have well number of male and female genders from different backgrounds of ethnicity and religious beliefs, with different mindset and attitude towards skill acquisition, especially in the area of electrical electronics engineering.

3.3 Population of the Study

The population for the study made up of 100 students of electrical and electronic related courses in selected tertiary institutions. The 100-population sample was evenly distributed to the various selected institutions in Nigeria.

3.4 Sample and Sampling Technique

The entire population was studied. This is because the population size is manageable. No sampling technique was used for the study.

3.5 Instrument for Data Collection

The instrument for data collection will be a structured questionnaire developed by the researcher from extensive review off related literature. The questionnaire will consist items which are divided into four sections, A-D. Section A will consist of instruction and personal data of respondents. Section B; will deals with the factors influencing enrollment patterns of students electrical and electronics. Section C; will deal with attitude towards enrollment in electrical and electronics course (enrollment attitude). Section D, will deal with electrical and electronics skill acquisition.

3.6 Reliability of the Instrument

To establish the reliability of the instrument, the validated instrument was trial tested on five Electrical trade staff. The data from the trial testing was analysed using Cronbach Alpha (α) reliability coefficient to establish internal consistency of the instrument for the study. The reliability coefficient (α) of 0.77 indicated that the instrument is reliable for the study.

3.7 Method of Data Collection

The instrument was administered on the respondents by the researcher, with help of three assistants. The assistants were briefed by researcher on how to distribute and retrieved the instrument from

the respondents. The respondents were given a week to respond to the instrument, after which the researcher and the assistants collected the instrument for analysis.

3.8 Method of Data Analysis

The data collected from the respondents were analysed using mean to answer the research questions. Each item was accepted as required skill improvement needs, when the calculated mean of any item is greater or equal to 3.50; while mean of any item below 3.50 was considered as skill not required.

The three hypotheses were tested using T-test at 0.05 level of significance. Null hypothesis was accepted when the computed value is less than the table value. On the other hand, when the computed value is equal or greater than the table value, the null hypothesis was rejected.

CHAPTER FOUR

RESULT AND DISCUSSION

This chapter shows the results of the data obtained from the administration of the instrument for this study in relation to the research questions proposed in this research work.

4.1 Research Question 1

What are factors responsible for the enrollment patterns of students in electrical and electronic courses based on gender

Table 4.1: Mean Responses on factors responsible for enrollment patterns of students in electrical and electronic courses based on gender

S/No	Items	X	SD	Remark
1.	Poor provision of infrastructural facilities	3.64	.563	Agreed
2.	Lack of incentive because of students gender	3.76	.657	Agreed
3.	Absence of role models/mentors	3.68	.653	Agreed
4.	Peer pressure/intimidation	3.46	.613	Agreed
5.	Discriminatory labour market practices	3.20	1.178	Agreed
6.	Discrimination against technical college graduate	3.22	.708	Agreed
7.	Poor societal attitude base on electrical/electronic students gender	3.76	.555	Agreed
8.	Societal perception that electrical/electronic is for specific gender	2.86	1.195	Agreed
9.	Inferior status accorded to female electrical/electronic graduates	3.52	.646	Agreed
10.	Poor provision of infrastructural facilities	3.60	.535	Agreed

Table I showed that both the contractors and builders agreed on all items from 1 to 15. This is because none of the mean response was below 2.50 which was the beach mark of agreed on the 4-points response options. The standard deviation score ranged between 0.513 and 1.195. This showed that the responses of the students on the items were not divergent. This indicates that poor provision of infrastructural facilities, lack of incentive because of students gender, absence of role models/mentors, peer pressure/intimidation, discriminatory labour market practices, discrimination against technical college graduate, poor societal attitude base on electrical/electronic students gender, societal perception that electrical/electronic is for specific gender and inferior status accorded to female electrical/electronic graduates are considered factors affect enrollment patterns of students in electrical and electronic courses based on gender.

4.2 Research Question II

What is the attitude and influence of students towards enrollment pattern?

Table 4.2: Mean Responses on attitude and influence of students towards enrollment pattern

S/N	Item	$\bar{x}$	SD	Remark
1.	Enjoy electrical and electronics subjects	3.66	.557	Agreed
2.	The task in electrical and electronics subjects are easy	3.70	.580	Agreed
3.	Self-competence in handling electrical and electronics subjects	3.72	.536	Agreed
4.	Understand meaning of concepts and terms used in electrical and electronics subjects	3.48	.580	Agreed
5.	Happy with my results in electrical and electronics subjects	3.70	.647	Agreed
6.	Studying electrical and electronics subjects more than any other subject	3.54	.503	Agreed
7.	I hate technical skill acquisition subjects	3.72	.607	Agreed
8.	Technicality in electrical and electronics subject	3.02	1.253	Agreed

	is difficult to understand			
9.	I cannot understand electrical and electronics subject	3.32	.794	Agreed
10.	I try to do the very best in technical skill acquisition subjects	3.56	.541	Agreed
11.	I can do without electrical and electronics subjects	3.54	.813	Agreed
12.	Electrical and electronics subjects periods are boring	3.48	.886	Agreed
13.	Desire to do better in technical skill acquisition subjects	3.72	.497	Agreed
14.	Like electrical and electronics subjects tests, assignments and homework	3.60	.535	Agreed
15.	I will continue career in electrical and electronics related profession	3.36	.827	Agreed

Table II showed that both the respondents agreed on all items from 1 to 15. This is because none of the mean response was below 2.50 which was the beach mark of agreed on the 4-points response options. The standard deviation score ranged between 0.497 and 1.253. This showed that the responses of the respondents have a positive attitude enrollment toward electrical and electronic course.

4.3 Research Question III

What is the level of skill acquisition and influence of gender in skill acquisition?

Table 4.3: Mean responses on skill acquisition and influence of gender in electrical and electronics.

S/N	ITEMS	$\bar{X}$	**SD**	Remark
1	Radio and television maintenance and repair	3.82	.629	Agreed
2	Electronic circuit troubleshooting skills	3.70	.647	Agreed
3	Electrical workshop safety skills	3.48	.614	Agreed
4	Electronic circuit design skills	2.92	1.322	Agreed

5	Electronic components building skills	3.06	.767	Agreed
6	Electrical fault detection skills.	3.78	.545	Agreed
7	Diagnosing faults in single telecommunication system	2.76	1.135	Agreed
8	Interpret accurately sectional architectural drawing	3.54	.646	Agreed
9	Use digital instrument to measure current, voltage and power in electrical circuits	3.58	.538	Agreed
10	Use appropriate instrument to perform test and measurement on electrical/electronic equipment.	3.76	.625	Agreed

The data presented in Table III revealed both gender of respondents agreed on all items from 1 to 15. This is because none of the mean response was below 2.50 which was the beach mark of agreed on the 4-points response options. The standard deviation score ranged between 0.538 and 1.322. This showed that the responses of the respondents on the items were not divergent.

4.4 Hypothesis 1

There is no significance difference in electrical and electronic enrollment pattern between male and female students;

Table 4.4 T-test Analysis of electrical and electronic enrolment pattern between male and female students.

Respondents	N	X	SD	Df	Tcal	P-value	Remark
Male	88	3.84	.554	48	2.665	0.062	NS
Female	12	1.44	.207				

Table 4.4 showed that there was significant difference in the responses of male and female students on electrical and electronic enrollment pattern between male and female students. Therefore the null hypothesis of no significant difference is rejected at 0.05 level of significance. This implies that there is significance difference in electrical and electronic enrollment pattern between male and female students.

4.5 Hypothesis 2

There is no significance influence of gender on students enrollment attitude in electrical and electronics students in technical colleges in Niger state;

Table 4.5 T-test on gender influence on enrolment attitude of electrical and electronic students in technical colleges in Niger state.

Respondents	N	X	SD	Df	Tcal	P-value	Remark
Male	88	3.60	.816	48	1.095	0.017	NS
Female	12	3.80	.408				

Table 4.5 showed that there was no significant difference in the responses of male and female respondents on influence on enrolment attitude of electrical and electronic students in technical colleges in niger state; therefore the null hypothesis of no significant difference was upheld at 0.05 level of significance. This implies that gender does not have significant influence on the attitude electrical and electronic students attitude in technical colleges in Niger state.

4.6 Hypothesis 3

There is no significance influence of gender on students skill acquisition in electrical and electronics students in technical colleges in Niger state

Table 4.4 T-test Analysis of the respondent influence of gender on students skill acquisition in electrical and electronics students in technical colleges in Niger state.

Respondents	N	X	SD	Df	Tcal	P-value	Remark
Male	88	3.54	.563	48	2.665	0.04	NS
Female	12	3.44	.506				

Table 4.4 showed that there was no significant difference in the responses of male and female students on electrical and electronic skill acquisition of students; therefore, the null hypothesis of no significant difference was upheld at 0.05 level of significance.

4.7 Findings of the Study

The following are the main findings of the study. They are prepared based on the research question and hypothesis tested.

Factors responsible for the enrollment patterns of students in electrical and electronic courses based on gender include the following

- Poor provision of infrastructural facilities
- Lack of incentive because of students gender
- Absence of role models/mentors
- Peer pressure/intimidation
- Discriminatory labour market practices
- Discrimination against technical college graduate
- Poor societal attitude base on electrical/electronic students gender
- Societal perception that electrical/electronic is for specific gender
- Inferior status accorded to female electrical/electronic graduates
- Poor provision of infrastructural facilities

The influence of attitude towards students towards enrollment pattern in electrical and electronic reveals that students have positive attitude towards electrical and electronic course, this include

- Enjoying electrical and electronics subjects
- Having self-competence in handling electrical and electronics subjects
- Understand meaning of concepts and terms used in electrical and electronics subjects
- Beign happy with results in electrical and electronics subjects
- Studying electrical and electronics subjects more than any other subject

- Technicality in electrical and electronics subject is difficult to understand
- Desiring to do better in technical skill acquisition subjects
- Liking electrical and electronics subjects tests, assignments and homework
- Desiring to continue career in electrical and electronics related profession

The level of skill acquisition and influence of gender in skill acquisition include:

- Radio and television maintenance and repair
- Electronic circuit troubleshooting skills
- Electrical workshop safety skills
- Electrical fault detection skills.
- Diagnosing faults in single telecommunication system
- Interpret accurately sectional architectural drawing
- Use digital instrument to measure current, voltage and power in electrical circuits
- Use appropriate instrument to perform test and measurement on electrical/electronic equipment.

4.8 Discussion of Findings

The result from table 4.1 shows the findings on factors responsible for the enrollment patterns of students in electrical and electronic courses based on gender. The findings of the study among others reveal that poor provision of infrastructural facilities, lack of incentive because of students gender, absence of role models/mentors, peer pressure/intimidation, discriminatory labour market practices, discrimination against technical college graduate, poor societal attitude base on electrical/electronic students gender, societal perception that electrical/electronic is for specific gender, and inferior status accorded to female electrical/electronic graduates constitute hindrance

to equality in gender enrollment in electrical and electronic courses. This findings is inline with Lagoke, Jegede and Oyebanji (2015) who six factors have been found to be responsible for the gender imbalance and negative attitude towards electrical and electronic course. These are: individual cognitive, home and family, educational, sociocultural and attitudinal factors. There is therefore a need for intervention programme to be mounted with a view to demasculinize and demystify electrical and electronic courses, develop their skills of doing electrical and electronic course and improve gender equality, confidence and attitude towards electrical and electronic related courses.

The result of the hypothesis on electrical and electronic enrolment pattern between male and female students shows that there was significant difference in the responses of male and female students on electrical and electronic enrollment pattern between male and female students. This implies that there is significance difference in electrical and electronic enrollment pattern between male and female students.

Table 4.2 shows the result of the findings on the influence of attitude towards students towards enrollment pattern in electrical and electronic. It was reveals that students have positive attitude towards electrical and electronic course, this include enjoying electrical and electronics subjects, having self-competence in handling electrical and electronics subjects, understand meaning of concepts and terms used in electrical and electronics subjects, beign happy with results in electrical and electronics subjects, studying electrical and electronics subjects more than any other subject, technicality in electrical and electronics subject is difficult to understand, desiring to do better in technical skill acquisition subjects, liking electrical and electronics subjects tests, assignments and homework and desiring to continue career in electrical and electronics related profession. This findings corroborates Onwuka, (2011) who states that attitudes affect learning

through their influence on perception which leads the student to see tasks to be learned as pleasant and important, or as unpleasant and useless. The way students think is directed by an organic interaction of the cognitive and affective processes and are inter-related.

The result of the hypothesis on influence on enrolment attitude of electrical and electronic students in technical colleges in Niger state, shows that there was no significant difference in the responses of male and female respondents on influence on enrolment attitude of electrical and electronic students in technical colleges in niger state, this implies that gender does not have significant influence on the attitude electrical and electronic students attitude in technical colleges in Niger state. Hence both gender have good positive attitude toward electrical and electronic students in technical colleges.

The result from table 4.3 reveal the findings the level of skill acquisition and influence of gender in skill acquisition. The findings of the study revealed students are able to acquire radio and television maintenance and repair skill, electronic circuit troubleshooting skills, electrical workshop safety skills, electrical fault detection skills, diagnosing faults in single telecommunication system, interpret accurately sectional architectural drawing, use digital instrument to measure current, voltage and power in electrical circuits, use appropriate instrument to perform test and measurement on electrical/electronic equipment.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Summary of the Study

The main focus of this research study was to find out Influence of gender on enrollment attitude and skill acquisition of electrical and electronics students in technical colleges in Niger state.

Chapter 1 of the study discussed the background of the study, the statement of problem, purpose, significance, scope and the research questions were all stated and discussed for the conduct of this research.

The review of related literature looked into concept of skill, concept of priming, gender perception, concept of electrical electronics engineering studies, professional and practices of electrical electronics engineering, tools and work and theory of skill acquisition. Various views of different authors concerning the topic were harmonized in a comprehensive literature review and empirical studies.

A survey approach was used to developed instrument for the study; the respondents identified as the population of the study were the male and female students in technical colleges in Niger state. A number of 100 questionnaires were administered. The instrument used was analysed using frequency count, and mean scores. The research questions were discussed base on the findings from the responses and results of the instrument used.

Implication of the study and conclusions were also drawn from the findings discussed. Recommendations and suggestions for further study were formulated and stated according to the findings of the study.

5.2 Conclusion

Based on the findings of the study, the study concludes that gender of students significantly affect their enrollment into electrical and electronic courses. This is because electrical and electronic course is generally considered as field of specialty of a specific gender, such that other gender that endeavor into the field is lowly considered. This societal perception affects the gender equality in electrical and electronic course. The study also concluded that both gender (male and female) who took part in the study have a positive attitude and moral towards electrical and electronic study.

This study revealed that attitude plays a very vital role in the production of highly skilled, competent and self-reliant middle level manpower capable of responding to economic and labour force changes in the society. The study indicates that attitude could make or mar the outcome of students learning process more productive particularly in acquisition of electrical and electronic skills. The positive influence of attitude on performance in electrical and electronic skill acquisition could be traced to the adoption of practical approach in teaching the students which allowed the students to handle the tools/equipment by themselves, quick intervention of the instructors in the face of challenges and continuous engagement of tools/equipment which made them conversant with the concepts and the terms used in technical works.

5.3 Recommendations

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

1. Government and NGO should work hand in hand to ensure equal gender representation in electrical and electronic field in the country tertiary institution.

2. Government and NGOs should build and equip demonstration technical workshops within the premises of all technical colleges in Nigeria. This will enhance the teaching of electrical and electronic related course and foster students interest in the course.

3. Well-equipped vocational skills acquisition centres should be cited in every local government in Nigeria for youth empowerment.

4. Open Apprenticeship should be supported by all levels of government to enable it train technical students on the relevant skills.

5. Professional bodies and government should organize workshops, seminars and short courses whereby well informed science educators will be educated on the need for gender balance in choice of science subjects.

6. Teachers should endeavour to boost positive attitude to both male and female students while teaching (science) in schools.

5.4 Suggestion for Further Study

The following are suggested for further studies:

1. This study is limited to Minna metropolis, hence this study should be carried out in other part of Niger state and Nigeria as whole in order to have a holistic view of influence of gender on attitude enrollment and skills acquisition in electrical and electronic courses in country as a whole.

2. Further study can be carried out on factors mitigating effective electrical and electronic course in the nations technical colleges, polytechnics and Universities.

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APPENDIX

INDUSTRIAL TECHNOLOGY EDUCATION DEPARTMENT

SCHOOL OF SCIENCE AND TECHNOLOGY EDUCATION

FEDERAL UNIVERSITY OF TECHNOLOGY

PMB 65, MINNA, NIGER STATE

QUESTIONNAIRE

Dear Sir/Madam,

This questionnaire is designed to obtain information on the Influence of gender on enrollment attitude and skill acquisition of electrical and electronics students in technical colleges in niger state. The main purpose is to enable the researcher to achieve the objectives of the research as required in the fulfillment for the award of Bachelor of Technology in Industrial Technology Education.

Any information obtained is purely for academic research and shall be so treated. The outcome of this research will be of immense important to the upliftment of academic research and to the general public. Based on this, it would be appreciated if you provided information demand of you with utmost sincerity.

Thank you

SECTION A: DEMOGRAPHIC DATA

***Gender**: Male ( ) Female ( )*
***Level**: 100( ) 200 ( )300 ( ) 400( ) 500( )*

SECTION B

In the table below, please indicate the perceived factors influencing enrollment patterns of students electrical and electronics course in your opinion.

S/N	ITEMS	SA	A	SD	D
	Poor provision of infrastructural facilities				
	Lack of incentive because of students gender				
	Absence of role models/mentors				
	Peer pressure/intimidation				
	Discriminatory labour market practices				
	Discrimination against technical college graduate				
	Poor societal attitude base on electrical/electronic students gender				
	Societal perception that electrical/electronic is for specific gender				
	Inferior status accorded to female electrical/electronic graduates				
	Poor provision of infrastructural facilities				

SECTION C

In the table below, please indicate your attitude towards enrollment in electrical and electronics course (enrollment attitude).

S/N	ITEMS	SA	A	SD	D
1.	Enjoy electrical and electronics subjects				
2.	The task in electrical and electronics subjects are easy				
3.	Self-competence in handling electrical and electronics subjects				
4.	Understand meaning of concepts and terms used in electrical and electronics subjects				
5.	Happy with my results in electrical and electronics subjects				
6.	Studying electrical and electronics subjects more than any other subject				
7.	I hate technical skill acquisition subjects				
8.	Technicality in electrical and electronics subject is difficult to understand				
9.	I cannot understand electrical and electronics subject				
10.	I try to do the very best in technical skill acquisition subjects				
11.	I can do without electrical and electronics subjects				
12.	Electrical and electronics subjects periods are boring				
13.	Desire to do better in technical skill acquisition subjects				
14.	Like electrical and electronics subjects tests, assignments and homework				
15.	I will continue career in electrical and electronics related profession				

SECTION D

In the table below, please tick level of your electrical and electronics skill acquisition.

Where: VG – very good; G – good; A – average; F –fairly;

S/N	ITEMS	VG	G	A	F
1.	Radio and television maintenance and repair				
2.	Electronic circuit troubleshooting skills				
3.	Electrical workshop safety skills				
4.	Electronic circuit design skills				
5.	Electronic components building skills				
6.	Electrical fault detection skills.				
7.	Diagnosing faults in single telecommunication system				
8.	Interpret accurately sectional architectural drawing				
9.	Use digital instrument to measure current, voltage and power in electrical circuits				
10.	Use appropriate instrument to perform test and measurement on electrical/electronic equipment.				