

DEVELOPING LOW VOLTAGE ELECTRICAL INSTALLATION SIMULATOR: UTILITY MODEL

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**Abstract** – This study was an electrical wiring installation device innovation. The research was conducted at Surigao city. Its objectives were to produce a safe and easy to operate electrical wiring installation device suitable to the needs of electrical student to increase their performance. There were two respondent groups involved in the study, the faculty of 6 professors and 5 instructors and 40 students. It used the descriptive method of research. Both respondent groups examined the effectiveness in terms of functionality, efficiency and usability and also on the device acceptability in terms of its reliability, influence, dependability and cost. It is also examined to the effect on the performance of the students in terms of using the traditional way in comparison of using the device. Based on the findings, it is concluded that the innovated device for electrical technology has a great effect to the performance of the students. It is thereby recommended that the innovated Device be adopted.

**Keywords:** Technology Management; Innovated electrical wiring installation device; Descriptive method; Surigao City, Philippines

INTRODUCTION

Technology is the collection of techniques, skills, methods and processes used in the production of goods or services or in the accomplishment of objectives, such as scientific investigation. This can be the knowledge of techniques, processes, etc. or it can be embedded in machines, computers, devices and factories, which can be operated by individuals without detailed knowledge of the workings of such things. It has many effects to help, develop more advanced economies (including today's global economy) and has allowed the rise of a leisure class. Many technological processes produce unwanted by-products, known as pollution, and deplete natural resources, to the detriment of Earth's environment. Various implementations of technology influence the values of a society and new technology often raises new ethical questions. Examples include the rise of the notion of efficiency in terms of human productivity, a term originally applied only to machines, and the challenge of traditional norms. Moreover, it is defined as the entities, both material and immaterial, created by the application of mental and physical effort in order to achieve some value. This is the current state of humanity's knowledge, either in a particular field or in general, of how to combine resources to produce desired products, solve problems, fulfill needs, or satisfy wants. Usually, it refers to tools, devices and machineries that may be used to solve real-world problems.

The Commission on Higher Education (CHED) and the Department of Education (DepEd) are encouraging teachers to develop instructional materials. Instructional materials and resources shall be provided in a variety of formats that are appropriate, timely, and essential to the attainment of specified educational objectives and are free of bias, stereotypes, distortions, and prejudices. Adequate instructional materials, means a sufficient number of student or site licenses or sets of materials and have intellectual content that by design serve as the major tool for assisting in the instruction of a subject or course. These items may be provided in a variety of forms, bound, unbound, kit, or package form and may consist of hard backed or soft backed textbooks, electronic content, consumables, learning laboratories, manipulative, electronic media, and computer courseware or software. The concept cited in the aforementioned statement has triggered the researcher to design and develop new innovative product, a Low Voltage Electrical Installation Simulator. This design is used to simulate an electrical activity to more safety in the sense that it is low voltage (from 220 VAC to 12 VDC) and handy to use. It is an experience in a shop room where students performing electrical circuit connection activity, the risk is always there that extended sometimes, students will be electrocuted and the supply voltage used is high enough that sometime it can spare the life of any student. This device is very affordable that all materials are available in the local market. The device is not costly, unlike the normal way of performing the electrical circuit connection activity where some of the

material used can no longer be used for the next activity. This study is anchored on the Electrons Flow and Current Flow theory (Georg Simon Ohm, 1854). Electron flow is what we think of as electrical current. We are familiar with two types of electron flow, Direct Current (DC) and Alternating Current (AC). Direct Current is the kind of electrical flow we get from batteries and solar cells, when electrons travel in only one direction.

On the other hand, AC is the kind of electrical flow we get from a typical electrical outlet in a home. AC is when the electrons flow in two directions, from the positive to the negative terminal and from the negative to the positive terminal, 'alternating' between the two directions. (Your lights will light up regardless of the direction of

The electron flow.) A lot of people think of electron flow as electrons moving along a wire freely like cars go down a highway. Actually, it works a little different. Any conductor (thing that electricity can go through) is made of atoms. Each atom has electrons in it. If you put new electrons in a conductor, they will join atoms, and each atom will spit out an electron to the next atom. This next atom takes in the electron and spits out another one on the other side.

Innovation is about the introduction of new ideas or products. This human activity has been going on since time immemorial and this will continue as long as human being exists. Man never stops creating something that makes his life comfortable and this only happens through innovation. Refusing to adopt it leads to stagnancy and unproductivity. There are many evidences to it which prove that innovation is the lifeblood of a business success. Many companies fail to do it and some of them are Motorola, Nokia, Sony and others. They are overtaken by startup companies that create innovative products.

Henderson, Rebecca et al (1990). The research is based on incremental innovation. It concentrated solely on modifying an existing idea or product. Modification on the product of the researches on electrical circuits.

A basic book on electric circuits (David A. Bell, 2009), that has understandable explanations with clear illustrations to make the theory interesting and easy to understand. As a result, it is the perfect introduction to the field for readers with no previous exposure to electrical studies, and an excellent refresher for those with electrical knowledge. Beginning with fundamental concepts, the full spectrum of electric circuit topics is covered in non-intimidating fashion, from simple dc circuits to complex ac network analysis.

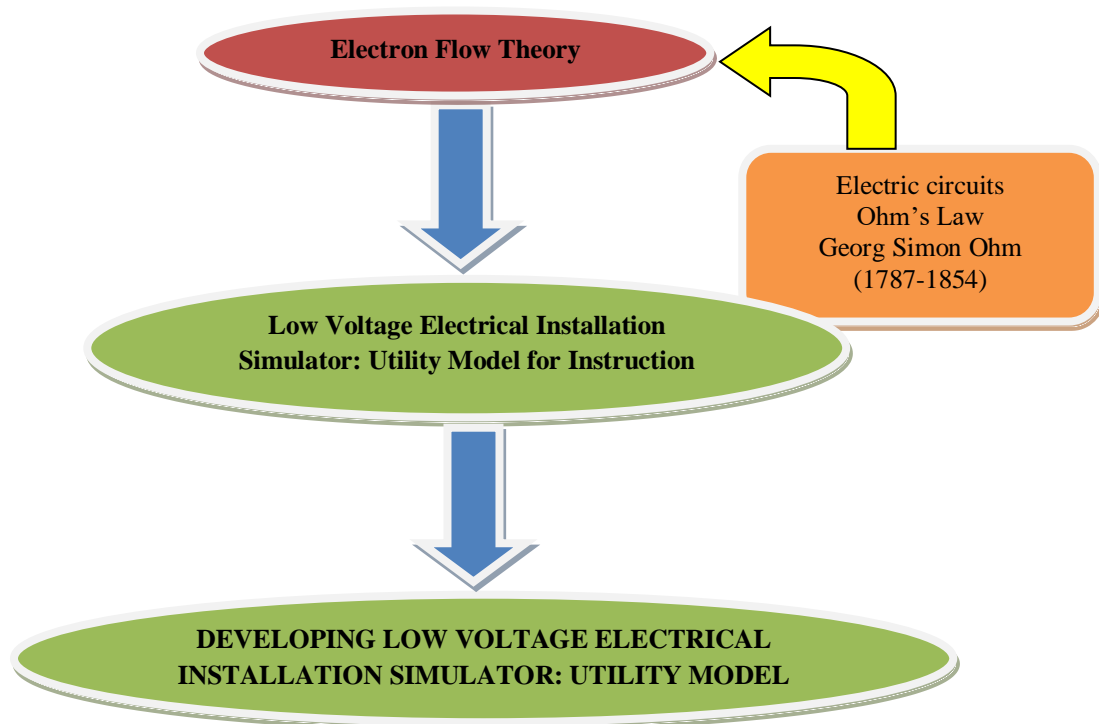


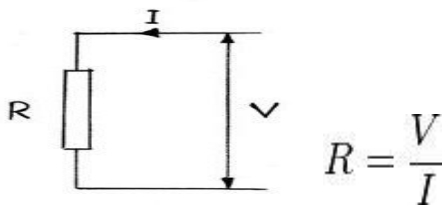
Figure 1. A Theoretical Framework of the Study Support of the Theory

An electric circuit is a path which electrons from a voltage or current source flow. Electric current flows in a closed path called an electric circuit. The point where those electrons enter an electrical circuit is called the "source" of electrons. The point where the electrons leave an electrical circuit is called the "return" or "earth ground". The exit point is called the "return" because electrons always end up at the source when they complete the path of an electrical circuit.

Load is a part of electrical circuit in between the electrons' starting point and the point where they return to the source as referred to <https://simple.wikipedia.org/wiki> (September 2016). The load of an electrical circuit may be as simple as those that power electrical appliances like refrigerators, televisions, or lamps or more complicated, such as the load on the output of a hydroelectric power generating station. Circuits use two forms of electrical power: alternating current (AC) and direct current (DC). AC often powers large appliances and motors and is generated by power stations. DC powers battery operated vehicles and other machines and electronics. Converters can change AC to DC and vice versa. High-voltage direct current transmission uses very big converters.

Ohm's law, the work of Georg Simon Ohm, it appear in the famous book Die galvanische Kette, mathematisch bearbeitet (The Galvanic Circuit Investigated Mathematically) (1827) in which he gave his complete theory of electricity. In this work, he stated his law for electromotive force acting between the extremities of any part of a circuit is the product of the strength of the current, and the resistance of that part of the circuit.

Ohm's law, states that the potential difference **V** between the ends of a conductor or resistor **R** and the current **I** flowing through **R** are proportional at a given temperature:



In other words, where **V** is the voltage and **I** is the current; the above equation yields the proportionality constant **R**, which is the electrical resistance of the device.

The law is strictly true only for resistor whose resistance does not depend on the applied voltage, which are called ohmic or ideal resistor or ohmic devices. Ohm's law is never completely accurate, if **R** is assumed to be constant, for "real world" device, because no real device is an ohmic device for every voltage and current – at some level, the device will open or short, for example, by burning up or arcing. Moreover, temperature is an important factor determining the accuracy of Ohm's law. When the temperature of the metal increases, the collisions between electrons and atoms increase, so that when a substance heats up because of electricity flowing through it (or by whatever heating process), the resistance will increase.

The relation  $V / I = R$  even holds also for non-ohmic device, but then the resistance **R** depends on **V** and is no longer a constant. To check whether a given device is ohmic or not, one plots **V** versus **I** and compares the graph to a straight line through the origin.

### Developing Low Voltage Electrical Installation Simulator: Utility Model

Technology is created to accomplish a particular purpose and to meet the needs of the Institution especially in the classroom situation. In this connection the researcher decided to design and develop a device to simulate an electrical circuit connection activity.

Caroline Milyard (2014), introduces her more advance and more efficient light emitting diodes in simulating the electrical activity, the flow of electrons is represented by light emitting diode that blinks alternately in a direction as the electron flow.

The device is very safe to use for there is no occurrence of short circuit. Since the control devices or the switches are connected on only one power line, it will not cause short circuit and even the connection of the switches are

made wrong. It follows the safety standards (Electrical Safety) which is published by the Department of Health and Human Services.

The switches that are used are of different types that can control a lamp in a single or more position. The device is easy to use for the things that will be done to do the activity is by simply connecting the switches by connectors to the circuit.

The device is easy to assemble for the materials are available in the local market. The circuit of the device is designed easily for the researcher has the basic knowledge in electronic and electrical circuit.

This study aimed to develop a utility model for electrical technology at Surigao State College of Technology in Surigao City during Academic year 2016-2017. Specifically, this answers the following questions:

1. What is the profile of the respondent groups as to:
  - 1.1 Electrical Technology Instructors/professors
    - 1.1.1 age and gender;
    - 1.1.2 highest educational attainment;
    - 1.1.3 National TVET Trainer Certificate;
    - 1.1.4 number of relevant training attended;
    - 1.1.5 years of experience;
  - 1.2 Electrical technology Students
    - 1.2.1 age and gender;
    - 1.2.2 on-the-job training;
    - 1.2.3 relevant work experience
2. What is the respondent groups perceived level of:
  - 2.1 effectiveness of the model in terms of:
    - 2.2.1 functionality;
    - 2.2.2 efficiency;
    - 2.2.3 usability; .
  - 2.2 Acceptability of the model, in terms of:
    - 2.2.1 reliability;
    - 2.2.2 influence;
    - 2.2.3 dependability;
    - 2.2.4 cost;
3. What is the effect of the electrical technology device to the student's performance?
4. Based on findings what electrical technology utility model can be developed?

### Significance of the Study

The proposed design of electrical technology utility model would be beneficial to the following:

**Administrators.** This device can be considered by Administrators as investment to the institution if it will be successfully reproduced accurately. Accurate reproduction means the capacity of the design to assure the safety of life and property of the shop room which these devices are being used.

**Electrical Instructors/Professor.** The device will be of big help in the instruction. An electrical activity can be demonstrated easily. The task to be performed by the students has its new face because it can be done on the top of a table unlike the normal way on the board.

**Electrical Students.** The students are comfortable in doing the task for the device is handy and easy to manipulate. They learn easily to do any electrical activity for the device is safe for it has a low voltage power supply. They are also very confident that the task will be done at a shorter time.

**Community.** It is beneficial this device to the community in the sense it will help the people who operate technological institution in terms of economic reason. Their electrical students can be assured of their safety in using the device.

### **METHODS AND MATERIALS**

The study used the combination of design and development, experimental and descriptive method. Design and development was used since the study dealt with the process of circuit design and the fabrication of the device. Experimental method was also used since the circuit of the light emitting diode (LED) is done for it will illustrate how electrons flow in a circuit.

The descriptive method is used because it involved the collection of data concerning the respondents' perception on the design of the device.

The gathered data and information will be organized and interpreted with the application of possible statistical tools to determine the frequency of the respondents and the weighted mean for analyzing the data collected.

### **Flow of the Study**

The INPUT involves to the gathering of materials. Part of the distribution system are: Process and Circuit Designing and Fabrication. The device will be carefully designed, and specified in terms of requirement, condition, plan, arrangement, measurement and pattern. The materials necessary for the project will be identified and evaluated in terms of safety, quality, durability and availability. The materials will also be accurately put in detail including the individual price of the materials. In the fabrication of the project, the researcher will select, one (1) master electrician, one (1) electronics technician to realize the undertakings. In this field, the researcher will install the parts and components, connect, and test the accuracy of the project.

The THROUGHPUT includes the assessment of the current parts distribution system through the researcher-made questionnaire. The device will be tested according to its ability to simulate electrical circuit activity.

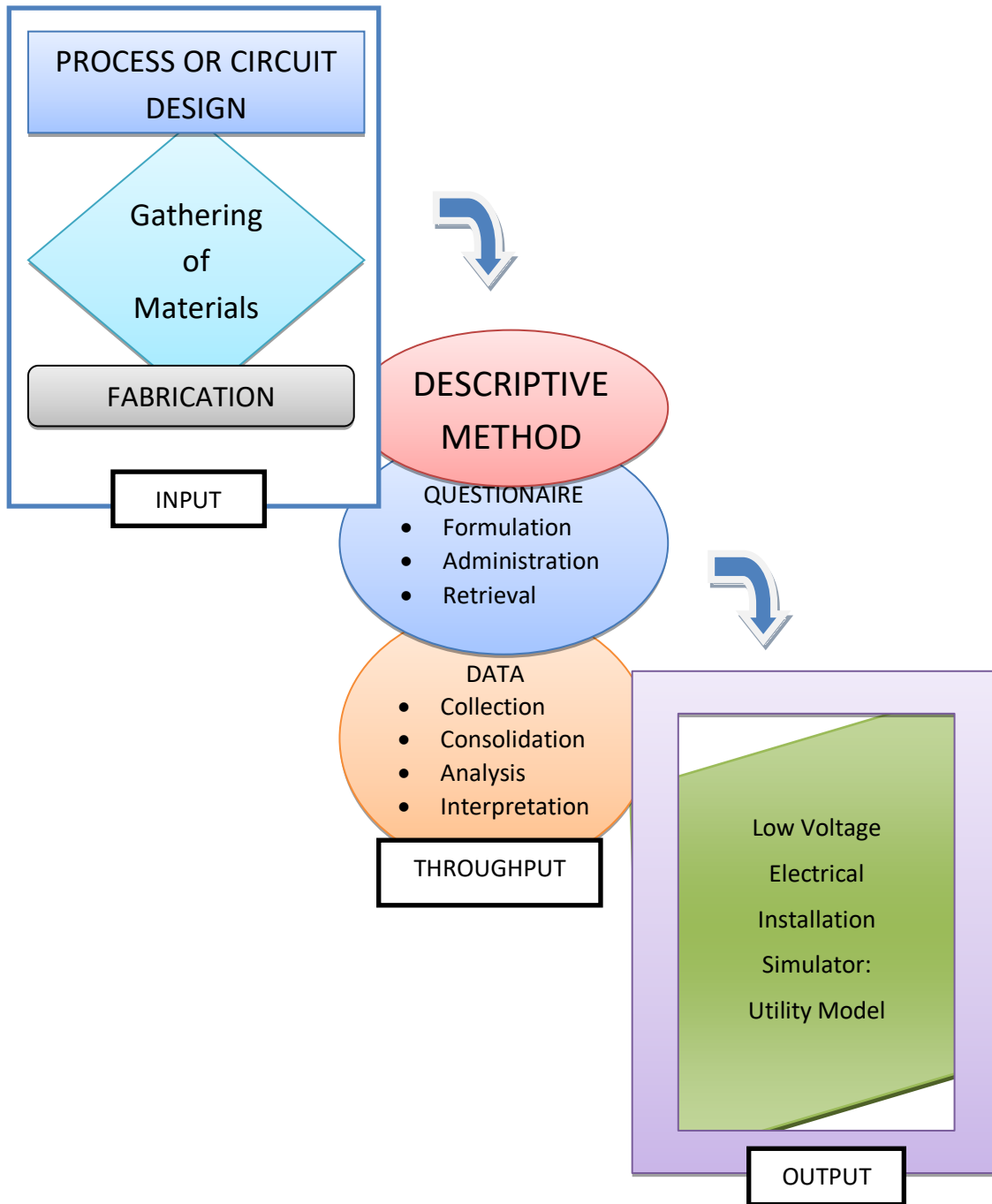


Figure 2. Flow of the Research

In the assessment, the project was evaluated by a group of teachers, professor and students for the improvement of the project. The team has evaluated the device in terms of their perception of the device on level of effectiveness and level of acceptability.

The OUTPUT presents the proposed model of the device. Under this stage, the proposed model was introduced, the features, parts of the device, the care and maintenance instruction and operation guide.

### Environment

The actual fabrication of the device and the conduct of the research was primarily done at the electrical shop of the Surigao State College of Technology, City Campus, located at Narciso Street, Surigao City in the Province of

Surigao del Norte. The school is in the heart of the city where students from all over the nearby provinces has the access to avail the learning technology courses. The following courses offered by the college:

**GRADUATE PROGRAMS**

Doctor of Philosophy in Education with specialization in Technology Management

Master in Industrial Education (MIE)

Major: Automotive Technology, Civil Technology, Electrical Technology, Mechanical Technology, Electronics Technology, Architectural, Drafting Technology, Foods Technology and Industrial Arts

Master of Arts in Mathematics Education

Master of Arts in Education

Major: General Science, English, and Filipino

Master in Information Technology

**POST-GRADUATE PROGRAM**

Teacher Certificate Curriculum (TCC)

**UNDERGRADUATE PROGRAMS**

Degree Programs

Bachelor of Science in Civil Engineering (BSCE)

Bachelor of Science in Electronics Engineering (BSECE)

Bachelor of Science in Electrical Engineering (BSEE)

Bachelor of Science in Computer Engineering (BSCoE)

Bachelor in Automotive Engineering Technology

Bachelor in Electrical Engineering Technology

Bachelor in Electronics Engineering Technology

Bachelor in Architectural Engineering Technology

Bachelor in Mechanical Engineering Technology

With Concentration in:

Mechanical Technology

Refrigeration and Air-Conditioning Technology

Welding and Fabrication Technology

Bachelor of Science in Hotel and Restaurant Management (BSHRM)

Bachelor of Science in Information System (BSIS)

Bachelor of Science in Information Technology (BSInfoTech)

Bachelor of Science in Computer Science (BSCS)

Bachelor of Technical Teacher Education (BTTE)

Major: Architectural Drafting Technology, Automotive Technology, Electrical Technology, Electronics Technology, Food & Services Management, Mechanical technology, Refrigeration and Air-conditioning Technology, Welding and Fabrication Technology

Bachelor of Secondary Education (BSED)

Major: English, Filipino, Physical Science, Biological Science, Mathematics

Bachelor of Elementary Education (BEED)

Bachelor of Science in Environmental Science (BSES)

Bachelor of Science in Mathematics (BS Math)

Bachelor of Arts in English Language & Literature (AB-ELL)

The college has full force of two hundred two (202) faculty where one hundred one (101) are of permanent status and one hundred thirty one (131) Guest lecturer. This academic year 2016-2017, on the first semester the college has an enrollment of eight thousand six hundred seventy seven (8,677) and on the second semester it has an enrollment of eight thousand four hundred fifty (8,450) students. There was a decrease in the enrollment of the second semester due to drop outs and congressional scholarship were stopped due to no availability of funds.



Figure 3. Location Map of Surigao State College of technology, City Campus

The projected time for the design and development was ten (10) months; one (1) month for specification analysis, one (1) month for designing, one (1) month for budgetary cost analysis, one (1) month for verification and testing, two (2) month for result analysis for fabrication, one (1) month allotted for fabrication, one (1) month for testing and two (2) month for documentation of the research work.



The materials used in the study were collected from local market establishment at different places where the materials are available.

**Respondents**

The respondents of the study are Electrical Professors, Electrical Instructors and on-the Job-Training (OJT) Students of the institution, Surigao State College of Technology.

**Table 1. Frequency Distribution of Respondents, N=50**

<b>Respondents</b>	<b>Total Sample Population</b>	<b>%</b>
Electrical Professor	6	12
Electrical Instructors	4	8
Students ( On-the Job- Training)	40	80
<b>Total</b>	<b>50</b>	<b>100</b>

The above table shows the distribution of the respondents. The stratified random sampling technique was used in which the population was divided into non-overlapping sub population called strata and the percentage of every group. The total of 50 were the only groups of respondent who were qualified to rate the project.

**Instrument**

The researcher-made questionnaire was used to gather the necessary data and information of the study. The questionnaire contained, (1) the profile of the respondent, (2) the perception of the respondents as to; (a) level of effectiveness and (b) level of acceptability, (3) What is the effect of the electrical technology utility model to the student’s performance? (4) Based on the findings what low voltage electrical installation simulator: utility model can be developed? The respondents have answered and selected their best choices as to their perception on the project (Low Voltage Electrical Installation Simulator: Utility Model). There are two sets of questionnaire on the third problem for comparison of the two methods used in electrical installation.

**Data Gathering Procedure**

Permission to conduct the questionnaires was sought through a request letter to the President of Surigao State College of Technology. Given the permit, the researcher has showed the performance of the device and conducted the questionnaire to the targeted respondents.

**Statistical Treatment**

The data gathered in the course of the study are analyzed and interpreted. In determining the profile of respondents; percentage would be used. Weighted mean would be used for the acceptability and effectiveness of the Utility Model. T-test would be used for the test of significance effect of the students’ performance. Also, these means were interpreted and verbally described using the following Nominal Scale, For the acceptability of the aforementioned utility model:

<b>Range of Mean</b>	<b>Verbal Description</b>
3.26 - 4.00	Highly Acceptable
2.56 - 3.25	Acceptable
1.76 - 2.50	Less Acceptable
1.00 - 1.75	Not Acceptable

For the effectiveness of the aforementioned device:

<b>Range of Mean</b>	<b>Verbal Description</b>
3.26 - 4.00	Highly Acceptable
2.56 - 3.25	Acceptable

1.76	-	2.50	Less Acceptable
1.00	-	1.75	Not Acceptable

The weight categories were scored using the following Qualitative Interpretation, For the acceptability of the Utility Model:

Weight point	Qualitative Interpretation
4	Highly Acceptable. If the item being asked is in very good and very feasible that considers safety for human, financial, and material resources.
3	Acceptable. If the item being asked is in good and feasible that considers safety for human and material resources.
2	Less Acceptable. If the item being asked is in good and not feasible that considers safety for human and material resources.
1	Not Acceptable. If the item being asked is not good and not feasible that can harm to human, financial, and material resources.

For the effectiveness of the aforementioned device:

Weight point	Qualitative Interpretation
4	Highly Effective. If the item being asked is very good and very functional that can produce maximum volume of biodiesel and minimizes waste.
3	Effective. If the item being asked is very good and very functional that can produce minimum volume of biodiesel and maximizes waste.
2	Less Effective. If the item being asked is very good and not functional that can produce minimum volume of biodiesel and maximizes waste.
1	Not Effective. If the item being asked is not good and not functional that cannot produce biodiesel fuel and the raw materials becomes waste. For the test of Significance, "t-test" were being used.

## DEFINITION OF TERMS

The following terms are defined as they are used in the study in order to understand the research work. The operational definitions are as follows:

**Availability of Materials.** This refers to the materials availability in the local market of the place. If not available locally, Metro Manila or in Cebu City could be considered the alternative source.

**Cost.** This refers to the easy maintenance of the device and the availability of the materials at low cost.

**Dependability.** This refers to the stability of the model and certainty of its performance.

**Employment Status.** This refers to the respondents' employment status whether appointed or permanent, contractual or just practitioner.

**Functionality.** This refers to the ability of the model to perform any electrical activity.

**Efficiency.** This refer to model's quality performance and adaptability to any activity.

**Highest Educational Attainment.** This refers to the graduates specialize in Electrical courses.

**Influence.** This refers to the model great impact on the user and the importance of it to the user.

**Level of Acceptance.** This refers to the acceptance of the model for its usefulness and of great importance.

**Level of Effectiveness.** This refers to the effectiveness of the model for its functionality and efficiency.

**Light Emitting Diode.** This refers to the light Emitting diode that will be connected in a circuit to perform running light function in one direction.

**NTTC.** A certificate given by TESDA to trainers and assessors who had passed the Training Methodology I. (National TVET Trainer Certificate).

**OJT.** On-the-Job Training, the student are given time to undergo practicum on their field of specialization as part of the course.

**Reliability.** This refers to that the model is consistent and accurate in performing the activity.

**TVET.** National Vocational Education Training

**TESDA.** Technical Education Skills Development Authority

**Usability.** This refers to that the model is easy to operate and maintain its functionality.

## RESULTS AND DISCUSSIONS

This chapter presents, analyzes and interprets the data gathered in the study. It includes information of the profile of the teachers as to age and gender, highest educational attainment, National TVET trainers' certificate, number of years relevant training attended, number of years teaching electrical, and profile of the students as to age and gender, and On the Job Training; the perception of the respondent groups as to effectiveness of the model in terms of functionality, efficiency, and usability. Acceptability of the model in terms of reliability, influence, dependability, and cost; the effect of the electrical technology device to the student's performance.

### PROFILE OF THE TEACHER RESPONDENTS

The profile of the Teacher respondents is categorized into age and gender, highest educational attainment, National TVET trainers certificate, number of years relevant training attended, number of years teaching electrical, while student respondents is categorized into to age and gender, and On the Job Training.

#### Teachers Profile

**Age and Gender.** The age and gender profile of the teacher is group according to their present year of age from 21 to 30 years old, 31 to 40 years old, 41 to 50 years old, and 51 years old and above while the gender is categorized into two (2) the male and female. Table 2 shows the age profile of the teacher respondents.

**Table 2.** Age and Gender Profile of the Teacher Respondents

AGE	FREQUENCY (f)	PERCENTAGE (%)	GENDER	FREQUENCY (f)	PERCENTAGE (%)
51 Years old and Above	3	30	Male	10	100
41 - 50 Years old	2	20			
31 - 40 Years old	3	30			
21 - 30 Years old	2	20	Female	0	0
<b>TOTAL</b>	<b>10</b>	<b>100</b>			

As shown in Table 2, the age bracket of the respondents that has highest frequency are 51years old and above, and 31 to 40 years old with **30 percent**, followed by the age bracket of 21 to 30 years old, and 41 to 50 years old with the frequency of **2 or 20 percent**, while the gender profile of the teacher respondents with the frequency of **10 or 100 percent** are **Male**.

**Highest Educational Attainment.** The highest educational attainment of the teacher respondents are Doctorate degree, Master’s degree, and Bachelor in Industrial Education. Table 3 presents the highest educational attainment profile of the teacher respondents.

**Table 3.** Highest Educational Attainment Profile of the Teacher Respondents

Highest Educational Attainment	FREQUENCY (f)	PERCENTAGE (%)
Doctorate Degree	2	20
Master's Degree	5	50
BSIE	3	30
<b>TOTAL</b>	<b>10</b>	<b>100</b>

As presented in Table 3, the highest educational attainment profile of the teacher respondents “Master’s degree has the highest frequency of 5 or 50 percent, followed by “Bachelor of Science in Industrial Education: has a frequency of 3 or 30 percent, and “Doctorate Degree” has a frequency of 2 or 20 percent. The highest frequency is Master’s Degree.

This implies that the teacher respondents are very much qualified to teach the higher education institution.

**National TVET Trainers Certificate.** The national TVET trainers’ certificate is the TESDA issued National Certificate in the different Skills competencies.

Table 4 displays the national TVET trainers’ certificate of the teacher respondents.

**Table 4.** National TVET Trainers Certificate Profile of the Teacher Respondents

National TVET Trainers Certificate	FREQUENCY (f)	PERCENTAGE (%)
NC Holder	5	50
None	5	50
<b>TOTAL</b>	<b>10</b>	<b>100</b>

As displayed in Table 4, the national TVET trainers' certificate of the teacher respondents "NC holder" has a frequency of **5 or 50 percent**. And the "None NC Holder" also **50 percent**. This means that the teacher respondents are need to undergo skills assessment of TESDA.

**Number of Relevant Training Attended.** The number of relevant training attended is the upgrading of the teachers handling electrical technology. Table 5 shows the number of relevant training attended of the teacher respondents.

**Table 5.** Number of Relevant Training Attended Profile of the Teacher Respondents

Relevant Training Attended	FREQUENCY (f)	PERCENTAGE (%)
5 and above	7	70
4	1	10
3	2	20
<b>TOTAL</b>	<b>10</b>	<b>100</b>

As shown in Table 5, the number of relevant training attended of the teacher respondents "five (5) trainings attended and Above" has a frequency of **7 or 70 percent**, followed by "Three (3) trainings attended" has a frequency of **2 or 20 percent**, and the last is "four (4) trainings attended" has a frequency of **1 or 10 percent**. This means that the teacher respondents are upgraded in their field of specialization.

**Number of Teaching Experienced in Electrical.** The number of teaching experienced in electrical is the services rendered by teacher respondents in their field of expertise. Table 6 reveals the number of teaching experienced in electrical of the teacher respondents.

**Table 6.** Number of Teaching Experienced in Electrical Profile of the Teacher Respondents

Number of years Teaching Electrical	FREQUENCY (f)	PERCENTAGE (%)
25 and Above	4	40
16 - 20	1	10
11 - 15	1	10
6 - 10	1	10
1 - 5	3	30
<b>TOTAL</b>	<b>10</b>	<b>100</b>

As revealed in Table 6, the number of teaching experienced in electrical of the teacher respondents four (4) or **40 percent** have 25 years and above experienced followed by "1 to 5 years teaching experience" with a frequency of **3 or 30 percent**, and the rest is one or **10 percent** had 6 to 20 years experienced. This means that the teacher respondents were expert in their field of specialization.

**Students Profile**

**Age and Gender.** The age and gender profile of the students are group according to their present year of age from 18 to 20 years old, and 21 years old and above while the gender is categorized into two (2) the male and female. Table 7 shows the age and gender profile of the student respondents.

**Table 7.** Age and Gender Profile of the Student Respondents

AGE	FREQUENCY (f)	PERCENTAGE (%)	GENDER	FREQUENCY (f)	PERCENTAGE (%)
21 Years old and Above	21	53	Male	37	92
18 - 20 Years old	19	48			
15 - 17 Years old	0	0	Female	3	8
<b>TOTAL</b>	<b>40</b>	<b>100</b>	<b>TOTAL</b>	<b>40</b>	<b>100</b>

As shown in Table 8, the age bracket of the respondents that has highest frequency are 21years old and above has a frequency of **21 or 53 percent**, and 18 to 20 years old with the frequency of **19 or 48 percent**, while the gender profile of the student respondents the frequency of **37 or 92 percent** are Male while eight (8) percent are female.

**On the Job Training.** The on the job training of the student respondents is the Industry based training of the students that has a real job or skills application. Table 8 presents the on the job training of the student respondents.

**Table 8.** On the Job Training Profile of the Student Respondents

On the Job Training	FREQUENCY (f)	PERCENTAGE (%)
Yes	24	60
No	16	40
<b>TOTAL</b>	<b>40</b>	<b>100</b>

As presented in Table 9, the on the job training of the student respondents “YES” has the highest frequency of **24 or 60 percent**, while **40 percent** of the student respondents does not undergo the on the job training. This implies that the student respondents undergo the real job scenario.

**PERCEPTION OF THE RESPONDENT GROUPS ON THE EFFECTIVENESS AND ACCEPTABILITY OF THE DEVICE**

The perception of the respondent groups as to effectiveness of the model in terms of functionality, efficiency, and usability; and .acceptability of the model in terms of reliability, influence, dependability, and cost.

**Effectiveness of the Model**

Table 9 shows the perception of the respondent groups on the effectiveness of the model in terms of functionality.

**Table 9.** Effectiveness of the Model in terms of Functionality

Effectiveness of the Model in terms of Functionality	Professors n=10						Students n=40					
	4	3	2	1	X	VD	4	3	2	1	X	VD
	VE	E	LE	NE			VE	E	LE	NE		
The model has the ability to perform the activity	8	2	0	0	3.82	VE	26	14	0	0	3.65	VE
Potential of performing the activity	8	2	0	0	3.82	VE	27	13	0	0	3.68	VE
<b>Average Weighted Mean</b>	<b>3.82</b>						<b>3.66</b>					
<b>Interpretation</b>	<b>Very Effective</b>						<b>Very Effective</b>					

Legend: VE is Very Effective    LE is Less Effective    E is Effective    NE is Not Effective  
 X is weighted mean    VDis Verbal Description

As shown in the Table, the perception of the respondent groups on the effectiveness of the model in terms of functionality “The model has the ability to perform the activity” has a weighted mean of **3.82** and **3.65** as rated by the teacher and student respondents which is described as **Very Effective**; “Potential of performing the activity” has a weighted mean of **3.82** and **3.68** as rated by the teacher and student respondents which is described as **Very Effective**.

The average weighted mean is **3.82** and **3.66** which was described as **Very Effective**. This means that the respondent groups conforms the effectiveness of the model in terms functionality. Table 10 shows the perception of the respondent groups on the effectiveness of the model in terms of Efficiency.

**Table 10.** Effectiveness of the Model in terms of Efficiency

Effectiveness of the Model in terms of Efficiency	Professors n=10						Students n=40					
	4	3	2	1	X	VD	4	3	2	1	X	VD
	VE	E	LE	NE			VE	E	LE	NE		
The model has a quality performance	7	3	0	0	<b>3.64</b>	VE	27	13	0	0	<b>3.68</b>	VE
The Model is adaptable to any activity	8	2	0	0	<b>3.73</b>	VE	28	12	0	0	<b>3.70</b>	VE
<b>Average Weighted Mean</b>	<b>3.68</b>						<b>3.69</b>					
<b>Interpretation</b>	<b>Very Effective</b>						<b>Very Effective</b>					

As shown in the Table, the perception of the respondent groups on the effectiveness of the model in terms of Efficiency “The model has a quality performance” has a weighted mean of **3.64** and **3.68** as rated by the teacher and student respondents which is described as **Very Effective**; “The Model is adaptable to any activity” has a weighted mean of **3.73** and **3.70** as rated by the teacher and student respondents which is described as **Very Effective**.

The average weighted mean is 3.68 and 3.69 which was described as **Very Effective**. This means that the respondent groups conforms the effectiveness of the model in terms of Efficiency. Table 11 shows the perception of the respondent groups on the effectiveness of the model in terms of Usability.

**Table 11.** Effectiveness of the Model in terms of Usability

Effectiveness of the Model in terms of Usability	Professors n=10						Students n=40					
	4 VE	3 E	2 LE	1 NE	X	VD	4 VE	3 E	2 LE	1 NE	X	VD
Ease to handle	9	1	0	0	<b>3.91</b>	VE	38	2	0	0	<b>3.95</b>	VE
Beneficial to the user	8	2	0	0	<b>3.82</b>	VE	38	2	0	0	<b>3.95</b>	VE
Easy to operate and maintain its functionality	9	1	0	0	<b>3.91</b>	VE	39	1	0	0	<b>3.98</b>	VE
<b>Average Weighted Mean</b>	<b>3.88</b>						<b>3.96</b>					
<b>Interpretation</b>	<b>Very Effective</b>						<b>Very Effective</b>					

As shown in the Table, the perception of the respondent groups on the effectiveness of the model in terms of Usability “Ease to handle” has a weighted mean of 3.91 and 3.95 as rated by the teacher and student respondents which is described as **Very Effective**; “Beneficial to the user” has a weighted mean of 3.82 and 3.95 as rated by the teacher and student respondents which is described as **Very Effective**; and “Easy to operate and maintain its functionality” has a weighted mean of 3.91 and 3.98 as rated by the teacher and student respondents which is described as **Very Effective**.

The average weighted mean is 3.88 and 3.96 which was described as **Very Effective**. This means that the respondent groups conforms the effectiveness of the model in terms of Usability.

**Acceptability of the Model**

Table 12 shows the perception of the respondent groups on the acceptability of the model in terms of reliability.

**Table 12.** Acceptability of the Model in terms of Reliability

Acceptability of the Model in terms of Reliability	Professors n=10						Students n=40					
	4 HA	3 A	2 LA	1 NA	X	VD	4 HA	3 A	2 LA	1 NA	X	VD
The model is consistent in performing the activity	9	1	0	0	<b>3.91</b>	VA	30	10	0	0	<b>3.75</b>	VA
Accuracy in performing the activity	9	1	0	0	<b>3.91</b>	VA	30	10	0	0	<b>3.75</b>	VA
The model is safe to work on	10	0	0	0	<b>4.00</b>	VA	36	4	0	0	<b>3.90</b>	VA
<b>Average Weighted Mean</b>	<b>3.94</b>						<b>3.80</b>					
<b>Interpretation</b>	<b>Highly Acceptable</b>						<b>Highly Acceptable</b>					



Legend: **HA** is Highly Acceptable  
**NE** is Not Acceptable

**LE** is Less Acceptable  
**X** is weighted mean

**A** is Acceptable  
**VD** is Verbal Description

As shown in the Table, the perception of the respondent groups on the acceptability of the model in terms of reliability “The model is consistent in performing the activity” has a weighted mean of **3.91** and **3.75** as rated by the teacher and student respondents which is described as **Highly Acceptable**; “Accuracy in performing the activity” has a weighted mean of **3.91** and **3.75** as rated by the teacher and student respondents which is described as **Highly Acceptable**; and “The model is safe to work on” has a weighted mean of **4.00** and **3.90** as rated by the teacher and student respondents which is described as **Highly Acceptable**.

The average weighted mean is **3.94** and **3.80** which was described as **highly acceptable**. This means that the respondent groups conforms the acceptability of the model in terms of reliability. Table 13 shows the perception of the respondent groups on the acceptability of the model in terms of influence.

As shown in the Table, the perception of the respondent groups on the acceptability of the model in terms of influence “The model is consistent in performing the activity” has a weighted mean of **3.91** and **3.78**

as rated by the teacher and student respondents which is described as **Highly Acceptable**; “Accuracy in performing the activity” has a weighted mean of **3.91** and **3.78** as rated by the teacher and student respondents which is described as **Highly Acceptable**; and “The model is safe to work on” has a weighted mean of

**Table 13.** Acceptability of the Model in terms of Influence

Acceptability of the Model in terms of Influence	Professors n=10					Students n=40						
	4	3	2	1	X	VD	4	3	2	1	X	VD
	HA	A	LA	NA			HA	A	LA	NA		
The model is consistent in performing the activity	9	1	0	0	<b>3.91</b>	HA	31	9	0	0	<b>3.78</b>	HA
Accuracy in performing the activity	9	1	0	0	<b>3.91</b>	HA	31	9	0	0	<b>3.78</b>	HA
The model is safe to work on	9	1	0	0	<b>3.91</b>	HA	31	9	0	0	<b>3.78</b>	HA
<b>Average Weighted Mean</b>	<b>3.91</b>						<b>3.78</b>					
<b>Interpretation</b>	<b>Highly Acceptable</b>						<b>Highly Acceptable</b>					

**3.91** and **3.78** as rated by the teacher and student respondents which is described as **Highly Acceptable**.

The average weighted mean is **3.91** and **3.78** which was described as **highly acceptable**. This means that the respondent groups conforms the acceptability of the model in terms of influence. Table 14 shows the perception of the respondent groups on the effectiveness of the model in terms of Dependability.

As shown in the Table, the perception of the respondent groups on the acceptability of the model in terms of dependability “Stability of the model” has a weighted mean of **3.91** and **3.80** as rated by the teacher and student respondents which is described as **Highly Acceptable**; “Certainty of the Table 14.

Table 14. Acceptability of the Model in terms of Dependability

Acceptability of the Model in terms of Dependability	Professors n=10						Students n=40					
	4	3	2	1	X	VD	4	3	2	1	X	VD
	HA	A	LA	NA			HA	A	LA	NA		
Stability of the model	9	1	0	0	3.91	VA	32	8	0	0	3.80	VA
Certainty of the Performance	9	1	0	0	3.91	VA	32	8	0	0	3.80	VA
<b>Average Weighted Mean</b>	<b>3.91</b>						<b>3.80</b>					
<b>Interpretation</b>	<b>Highly Acceptable</b>						<b>Highly Acceptable</b>					

Performance has a weighted mean of 3.91 and 3.80 as rated by the teacher and student respondents which is described as **Highly Acceptable**.

The average weighted mean is 3.91 and 3.80 which was described as **highly acceptable**. This means that the respondent groups conforms the acceptability of the model in terms of dependability.

Table 15 shows the perception of the respondent groups on the effectiveness of the model in terms of Cost.

As shown in the Table, the perception of the respondent groups on the acceptability of the model in terms of cost “Cheaper in maintenance” has a weighted mean of 3.91 and 3.95 as rated by the teacher and student respondents which is described as **Highly Acceptable**; “Availability of the materials at low cost” has a weighted mean of 3.91 and 3.98 as rated by the teacher and student respondents which is described as **Highly Acceptable**.

Table 15. Acceptability of the Model in terms of Cost

Acceptability of the Model in terms of Cost	Professors n=10						Students n=40					
	4	3	2	1	X	VD	4	3	2	1	X	VD
	HA	A	LA	NA			HA	A	LA	NA		
Cheaper in maintenance	9	1	0	0	3.91	HA	38	2	0	0	3.95	HA
Availability of the materials at low cost	9	1	0	0	3.91	HA	39	1	0	0	3.98	HA
<b>Average Weighted Mean</b>	<b>3.91</b>						<b>3.96</b>					
<b>Interpretation</b>	<b>Highly Acceptable</b>						<b>Highly Acceptable</b>					

The average weighted mean is 3.91 and 3.96 which was described as **Highly Acceptable**. This means that the respondent groups conforms the acceptability of the model in terms of cost.

### EFFECT OF THE ELECTRICAL TECHNOLOGY DEVICE TO THE STUDENT’S PERFORMANCE

The effect of the electrical technology device to the students’ performance was determined through the comparative rating of the students using the old Wiring Board and the new Innovated Device in the five (5) competencies in the Electrical Installation and Maintenance (EIM) set in the training regulation of TESDA such

as Competency one (1) Connect a Single Switch to the Circuit to control a Lamp in One Location, Competency two (2) Connect a Three-way Switch to the Circuit to control a Lamp in One Location, Competency Three (3) Connect a Four-way Switch to the Circuit to control a Lamp in One Location, Competency Four (4) Connect a control switches to the Circuit to control a Lamp in two Locations, and Competency Five (5) Connect a control switches to the Circuit to control a Lamp in three Locations.

**Performance of the Students in Competency 1**

The performance of students is the descriptive rating of the students using the old Wiring Board and the new Innovated Device in competency one (1), Connect a Single Switch to the Circuit to control a Lamp in One Location. Table 16 shows the performance of students using the old Wiring Board and the new Innovated Device in competency one on how to Connect a Single Switch to the Circuit to control a Lamp in One Location.

**Table 16.** Performance of the Students in Competency 1

Performance Level of the Students into Competency 1	Using Wiring Board		Using Model		
	Frequency (f)	Percentage (%)	Frequency (f)	Percentage (%)	(%)
Outstanding	0	0	40	100	
Very Satisfactory	25	62	0	0	
Satisfactory	15	38	0	0	
Fair	0	0	0	0	
Poor	0	0	0	0	
<b>Total</b>	<b>40</b>	<b>100</b>	<b>40</b>	<b>100</b>	
<b>Mean Score</b>	<b>25.15</b>		<b>38.43</b>		
<b>Interpretation</b>	<b>Very Satisfactory</b>		<b>Outstanding</b>		

Legend: f is Frequency                      % is Percentage

As shown in the Table, shows the performance of students using the old Wiring Board and the new Innovated Device in competency one on how to Connect a Single Switch to the Circuit to control a Lamp in One Location, **25** or **62 percent** of the students got a rating of **Very Satisfactory** and **15** or **38 percent** got a rating of **Satisfactory** in using the Wiring Board but **100 percent** of the students got a rating of **Outstanding** in using the Innovated Device..

The mean score of the performance of students in using the Wiring Board is **25.15** out of **40** which is described as **Very Satisfactory** while in using the Innovated Device is **38.43** which is described as **Outstanding**. This means that the innovated device has a great effect to the performance of the students.

**Performance of the Students in Competency 2**

The performance of students is the descriptive rating of the students using the old Wiring Board and the new Innovated Device in competency two (2), Connect a Three-way Switch to the Circuit to control a Lamp in One Location. Table 17 displays the performance of students using the old Wiring Board and the new Innovated Device in competency one on how to Connect a Three-way Switch to the Circuit to control a Lamp in One Location.

As displayed in the Table, shows the performance of students using the old Wiring Board and the new Innovated Device in competency one on how to Connect a Three-way Switch to the Circuit to control a Lamp in One Location, **22** or **55 percent** of the students got a rating of **Very Satisfactory** and **18** or **45**.

**Table 17.** Performance of the Students in Competency 2

Performance Level of the Students into Competency 2	Using Wiring Board		Using Model		
	Frequency (f)	Percentage (%)	Frequency (f)	Percentage (%)	(%)
Outstanding	0	0	40	100	
Very Satisfactory	22	55	0	0	
Satisfactory	18	45	0	0	
Fair	0	0	0	0	
Poor	0	0	0	0	
<b>Total</b>	<b>40</b>	<b>100</b>	<b>40</b>	<b>100</b>	
<b>Mean Score</b>	<b>24.40</b>		<b>38.28</b>		
<b>Interpretation</b>	<b>Satisfactory</b>		<b>Outstanding</b>		

**Percent** got a rating of **Satisfactory** in using the Wiring Board but **100 percent** of the students got a rating of **Outstanding** in using the Innovated Device.

The mean score of the performance of students in using the Wiring Board is **24.40** out of **40** which is described as **satisfactory** while in using the Innovated Device is **38.28** which is described as **Outstanding**. This means that the innovated device has a great effect to the performance of the students.

**Performance of the Students in Competency 3**

The performance of students is the descriptive rating of the students using the old Wiring Board and the new Innovated Device in competency three (3), Connect a Four-way Switch to the Circuit to control a Lamp in One Location. Table 18 displays the performance of students using the old Wiring Board and the new Innovated Device in competency three (3) on how to Connect a Four-way Switch to the Circuit to control a Lamp in One Location.

**Table 18.** Performance of the Students in Competency 3

Performance Level of the Students into Competency 3	Using Wiring Board		Using Model		
	Frequency (f)	Percentage (%)	Frequency (f)	Percentage (%)	(%)
Outstanding	0	0	40	100	
Very Satisfactory	17	42	0	0	
Satisfactory	23	58	0	0	
Fair	0	0	0	0	

Poor	0	0	0	0
<b>Total</b>	<b>40</b>	<b>100</b>	<b>40</b>	<b>100</b>
<b>Mean Score</b>	<b>24.03</b>		<b>38.33</b>	
<b>Interpretation</b>	<b>Satisfactory</b>		<b>Outstanding</b>	

As displayed in the Table, shows the performance of students using the old Wiring Board and the new Innovated Device in competency three on how to Connect a Four-way Switch to the Circuit to control a Lamp in One Location, **17** or **42 percent** of the students got a rating of **Very Satisfactory** and **23** or **58 percent** got a rating of **Satisfactory** in using the Wiring Board but **100 percent** of the students got a rating of **Outstanding** in using the Innovated Device. The mean score of the performance of students in using the Wiring Board is **24.03** out of **40** which is described as **Satisfactory** while in using the Innovated Device is **38.33** which is described as **Outstanding**. This means that the innovated device has a great effect to the performance of the students.

**Performance of the Students in Competency 4**

The performance of students is the descriptive rating of the students using the old Wiring Board and the new Innovated Device in competency four (4), Connect a control switches to the Circuit to control a Lamp in two Locations. Table 19 displays the performance of students using the old Wiring Board and the new Innovated Device in competency four (4) on how to connect a control switches to the Circuit to control a Lamp in two Locations.

As displayed in the Table, shows the performance of students using the old Wiring Board and the new Innovated Device in competency four on how to Connect a control switches to the Circuit to control a Lamp in two Locations, **11** or **27 percent** of the students got a rating of **Satisfactory** and **29** or **73 percent** got a rating of **Very Satisfactory** in using the Wiring Board but **100 percent** of the students got a rating of **Outstanding** in using the Innovated Device.

**Table 19.** Performance of the Students in Competency 4

Performance Level of the Students into Competency 4	Using Wiring Board		Using Model	
	Frequency (f)	Percentage (%)	Frequency (f)	Percentage (%)
Outstanding	0	0	40	100
Very Satisfactory	11	27	0	0
Satisfactory	29	73	0	0
Fair	0	0	0	0
Poor	0	0	0	0
<b>Total</b>	<b>40</b>	<b>100</b>	<b>40</b>	<b>100</b>
<b>Mean Score</b>	<b>23.38</b>		<b>37.40</b>	
<b>Interpretation</b>	<b>Satisfactory</b>		<b>Outstanding</b>	

The mean score of the performance of students in using the Wiring Board is **23.38** out of **40** which is described as **satisfactory** while in using the Innovated Device is **37.40** which is described as **Outstanding**. This means that the innovated device has a great effect to the performance of the students.

**Performance of the Students in Competency 5**

The performance of students is the descriptive rating of the students using the old Wiring Board and the new Innovated Device in competency five (5), Connect a control switches to the Circuit to control a Lamp in three Locations. table 20 displays the performance of students using the old Wiring Board and the new Innovated Device in competency five (5), Connect a control switches to the Circuit to control a Lamp in three Locations.

**Table 20.** Performance of the Students in Competency 5

Performance Level of the Students into Competency 5	Using Wiring Board		Using Model	
	Frequency (f)	Percentage (%)	Frequency (f)	Percentage (%)
Outstanding	0	0	40	100
Very Satisfactory	12	30	0	0
Satisfactory	28	70	0	0
Fair	0	0	0	0
Poor	0	0	0	0
<b>Total</b>	<b>40</b>	<b>100</b>	<b>40</b>	<b>100</b>
<b>Mean Score</b>	<b>23.35</b>		<b>37.40</b>	
<b>Interpretation</b>	<b>Satisfactory</b>		<b>Outstanding</b>	

As displayed in the Table,shows the performance of students using the old Wiring Board and the new Innovated Device in competency five (5), Connect a control switches to the Circuit to control a Lamp in three Locations, **12** or **30 percent** of the students got a rating of **Very Satisfactory** and **28** or **70 percent** got a rating of **Satisfactory** in using the Wiring Board but **100 percent** of the students got a rating of **Outstanding** in using the Innovated Device.The mean score of the performance of students in using the Wiring Board is **23.35** out of **40** which is described as **Satisfactory** while in using the Innovated Device is **37.40** which is described as **Outstanding**. This means that the innovated device has a great effect to the performance of the students.Table 21 reveals the average performance of students using the old Wiring Board and the new Innovated Device in all competencies.

**Table 21.**Performance of students using the old Wiring Board and the new Innovated Device in all competencies

Average Performance Level of the Students into all Competencies	Using Wiring Board		Using Model	
	Frequency (f)	Percentage (%)	Frequency (f)	Percentage (%)
Outstanding	0	0	40	100
Very Satisfactory	17	42	0	0
Satisfactory	23	58	0	0
Fair	0	0	0	0
Poor	0	0	0	0

Total	40	100	40	100
Mean Score	24.03		38.33	
Interpretation	Satisfactory		Outstanding	

As revealed in the Table, shows the average performance of students using the old Wiring Board and the new Innovated Device in all competencies, **17 or 42 percent** of the students got a rating of **Very Satisfactory** and **23 or 58 percent** got a rating of **Satisfactory** in using the Wiring Board but **100 percent** of the students got a rating of **Outstanding** in using the Innovated Device. The mean score of the performance of students in using the Wiring Board is **24.03** out of **40** which is described as **Satisfactory** while in using the Innovated Device is **38.33** which is described as **Outstanding**. This means that the innovated device has a great effect to the performance of the students. Table 22 reveals the significant effect of the electrical technology devices to the student's performance.

**Table 22.** Significant Effect of the Electrical Technology Devices to the Student's Performance

Indicators	Using Wiring Board		Using the Model		t	p-value	Interpretation	
	X	SD	X	SD				
Competency 1	21.15	2.05	38.43	1.26	1.223	<.001	<b>Very Significant</b>	<b>High</b>
Competency 2	24.40	2.01	38.28	1.20	1.406	<.001	<b>Very Significant</b>	<b>High</b>
Competency 3	24.03	2.48	38.33	1.12	1.109	<.001	<b>Very Significant</b>	<b>High</b>
Competency 4	23.38	1.61	37.40	1.22	1.930	<.001	<b>Very Significant</b>	<b>High</b>
Competency 5	23.35	1.92	37.40	1.28	1.490	<.001	<b>Very Significant</b>	<b>High</b>

As revealed in the Table the significant effect of the electrical technology devices to the student's performance; Competency 1 in Using the Wiring Board has a weighted mean of 21.15 with standard deviation of 2.05 while in Using the Model has a weighted mean of 38.43 with standard deviation of 1.26, the computed p-value is less than 0.001 which is describe as **Very High Significant**; Competency 2 in Using the Wiring Board has a weighted mean of 24.40 with standard deviation of 2.01 while in Using the Model has a weighted mean of 38.28 with standard deviation of 1.20, the computed p-value is less than 0.001 which is describe as **Very High Significant**; Competency 3 in Using the Wiring Board has a weighted mean of 24.03 with standard deviation of 2.48 while in Using the Model has a weighted mean of 38.33 with standard deviation of 1.12, the computed p-value is less than 0.001 which is describe as **Very High Significant**; Competency 4 in Using the Wiring Board has a weighted mean of 23.38 with standard deviation of 1.61 while in Using the Model has a weighted mean of 37.40 with standard deviation of 1.22, the computed p-value is less than 0.001 which is describe as **Very High Significant**; Competency 5 in Using the Wiring Board has a weighted mean of 23.35 with standard deviation of 1.92 while in Using the Model has a weighted mean of 37.40 with standard deviation of 1.28, the computed p-value is less than 0.001 which is describe as **Very High Significant**;

The significant effect of the electrical technology devices to the student's performance in all of the competencies are **Very High Significant**. Therefore it is proven that the electrical technology devices can improved the performance of the students.

## FINDINGS AND CONCLUSIONS

Based on the findings, it is concluded that the innovated device for electrical technology has great effect to the performance of the students. Thereby this study shows also conclusive results on:

### Profile.

The teacher respondents have of the same frequency in the age bracket of 51 years old and above, and 31 to 40 years old with **30 percent**; **100% percent** were **male**; their highest educational attainment is **Masters Degree**, they were **50 percent** “NC holder”, upgraded in their field of specialization, and expert in their field of specialization while the students profile, the highest were 21 years old and above has a frequency of **21 or 53 percent**, **92 percent** were **male**, and **60 percent** of them had On the Job Training (OJT).

### Perception of the Respondent Groups on the Effectiveness And Acceptability of The Device.

**Effectiveness of the Model in terms of Functionality.** The average weighted mean is **3.82** and **3.66** which was described as **Very Effective**.

**Effectiveness of the Model in terms of Efficiency.** The average weighted mean is **3.68** and **3.69** which was described as **Very Effective**.

**Effectiveness of the Model in terms of Usability.** The average weighted mean is **3.88** and **3.96** which was described as **Very Effective**.

**Acceptability of the Model in terms of Reliability.** The average weighted mean is **3.94** and **3.80** which was described as **Highly Acceptable**.

**Acceptability of the Model in terms of Influence.** The average weighted mean is **3.91** and **3.78** which was described as **Highly Acceptable**.

**Acceptability of the Model in terms of Dependability.** The average weighted mean is **3.91** and **3.80** which was described as **Highly Acceptable**.

**Acceptability of the Model in terms of Cost.** The average weighted mean is **3.91** and **3.96** which was described as **Highly Acceptable**.

### Effect of The Electrical Technology Device to the Student's Performance

**Performance of the Students in Competency 1.** The mean score of the performance of students in using the Wiring Board is **25.15** out of **40** which is described as **Very Satisfactory** while in using the Innovated Device is **38.43** which is described as **Outstanding**.

**Performance of the Students in Competency 2.** The mean score of the performance of students in using the Wiring Board is **24.40** out of **40** which is described as **Satisfactory** while in using the Innovated Device is **38.28** which is described as **Outstanding**.

**Performance of the Students in Competency 3.** The mean score of the performance of students in using the Wiring Board is **24.03** out of **40** which is described as **Satisfactory** while in using the Innovated Device is **38.33** which is described as **Outstanding**.

**Performance of the Students in Competency 4.** The mean score of the performance of students in using the Wiring Board is **23.38** out of **40** which is described as **Satisfactory** while in using the Innovated Device is **37.40** which is described as **Outstanding**.



**Performance of the Students in Competency 5.** The mean score of the performance of students in using the Wiring Board is **23.35** out of **40** which is described as **Satisfactory** while in using the Innovated Device is **37.40** which is described as **Outstanding**.

**Average Performance Level of the Students into all Competencies.** The mean score of the performance of students in using the Wiring Board is **24.03** out of **40** which is described as **Satisfactory** while in using the Innovated Device is **38.33** which is described as **Outstanding**.

**Significant Effect of the Electrical Technology Devices to the Student's Performance.** The significant effect of the electrical technology devices to the student's performance in all of the competencies are **Very High Significant**. Therefore it is proven that the electrical technology devices can improved the performance of the students.

## RECOMMENDATION

It is recommended that the Innovated Device be adapted.

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