DEVELOPMENT AND ACCEPTABILITY OF ELECTRICAL MULTI-PURPOSE TABLE

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ABSTRACT

This study used the developmental-descriptive research method approach, in which the finished product was subjected to evaluation through survey-questionnaires. A purposive sampling method was used in this study, wherein the development and acceptability of the Electrical Multi-Purpose Table were evaluated by EIM teachers and students in Sorsogon City and Sorsogon Province Division. The developed product is generally made up of plywood, metal frames such as angle, flat and tubular bars, and electrical and electronic materials, which come up to a total material cost of Php 28,145.00

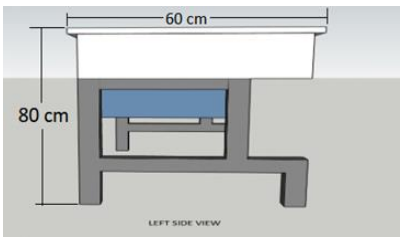
Using the 35 % as a general rule and standard in computing the total labor cost of the product, the total labor cost is amounting to Php.9,850.75. The total cost of one-unit Electrical multi-purpose table is amounting to Php. 37,995.75.

The study also showed that there are four steps and procedures in the development of the Electrical Multi-Purpose table which include analysis, design, development, and evaluation.

Furthermore, the developed Electrical Multi-purpose table was strongly agreed by the teachers and students in terms of Functionality, Usability, Applicability, Portability, Safety; and Efficiency. The weighted mean of the six variables shows slight difference of 4.84- 4.98, which means that the Electrical multi-purpose table has high acceptability rating to both respondents of the study.

The developed electrical multi-purpose table can be subject to any modification for the betterment of the product. The study recommended that a better and more effective design can be applied to the product. Any innovative design that could help to improve its usability to end user will be highly regarded. In terms of product appearance, the electrical multi- purpose table is open for improvement to address the possible inconvenience of the end user. The product can be customized to give costumer's satisfaction (e.g. color, height, dimension etc. It was also concluded that the teachers and student respondents strongly agree on the acceptability of the developed product along with its functionality, usability, mobility, and safety, therefore it is recommended to use this in EIM laboratory room in all DEPED and TVI schools in the country.

Based from the generated data in this study, the following findings are given: 1. The process and development of the Electrical multi-purpose table applied the ADDIE model. It has five phases: Analysis, design, development, implementation, and evaluation. The materials used in developing the electrical multi-purpose table are plywood, metal frames such as angle, flat and tubular bars, and electrical and electronic materials. The Electrical Multi-Purpose Table has two main assembly, the table top and the leg stand frame. The construction started from the first part of the Electrical Multi-Purpose table which is the Table top. The Table top is almost the same as compared to an ordinary classroom table and other furniture table seen at home and in the market. The only difference in this tabletop design is that the bottom part of this is purposely designed as a wiring board and holds electrical wiring equipment and circuitry including CCTV module that EIM learners will be using during their laboratory activities.



The leg stand frame is the second stage and another assembly part of the electrical Multi-Purpose table and are responsible in carrying the weight of the entire product. The Leg stand frame of the table composed is of a fabricated tubular bar welded together according to its unique design and measurements to fit the mobility of the user. It has 6 sub parts namely, Rear leg, Front leg with adjuster, Leg Frame, stretcher, drawer with lock.
The third stages of the construction are the painting of the Electrical Multi-purpose table. This is done to give the table additional protection against corrosion, wear and tear and outdoor elements specially that the top of the table is made of plywood. The importance of this is that it will not only make the product look presentable and unique but this are intended to perform and last longer because of paint that provide a protective layer to the entire part of the product.Electrical Installation is the last stage of the construction process, this are installed after the paints are dry. The Face B of the Table top is where the electrical installation is made. This comprised of the main control unit, the electrical rough-in assembly, and the CCTV module assembly. 2. The electrical Multi-Purpose table has many features that could provide end user to value this product. This product features are attributes that can be seen by the end user and considered as a condition or strategy to satisfy costumer of the product. This product features can be seen along the different variables including, Functionality, Usability, Applicability, Portability, Safety, and Efficiency. The features of the Electrical multi-purpose table along a) functionality reveals that the developed product is operational, easy to open and electrical circuitry are safely installed. b) usability was defined in this product as user's friendly.

The product can be easily set to stand fit in the ground by adjusting the adjuster (bolt) at the edge of the table leg. And, can be smoothly open if to be used as demonstration or laboratory table by either teacher or student. In c) applicability, the usefulness of the product was also discussed. The table can be a regular classroom table usable by either student or teacher. The product must also be a perfect demonstration table for the three core competencies in EIM, and also the leg stand frame is designed to accommodate the table tops with different core competency. Moreover, in d) portability, the researcher chooses a material which is lesser in weight in order to reduce the total maximum weight and fit to the desired size of the unit. The Electrical multi-purpose table weighed a maximum of 27 kgs. Easy assembling and disassembling of the leg stand and the table top was also considered during the assembly. There is also an adjuster on each edge of the two front table legs, where the table can flat fit to the ground. Additionally, the weight of the product is manageable for transporting in any part of the room or transported to other rooms. Next feature is e) safety, in this study, it pertains to the overall compliance of the product or device to prevent inadvertent or hazardous operation. The electrical multi-purpose table is equipped with safety devices, such as circuit breaker and light indicators. The electrical circuitry all adheres to the provisions of the Philippine Electrical Code and all materials used are of approved type and compliant with the provisions of the Philippine Electrical Code and other standards. Finally, f) efficiency which is in a more general sense, it is the ability to do things well, successfully, and without waste. The researcher give emphasis to the security of tools, materials and

equipment. Materials used is economical but of good quality and available in the local market and can save more electrical consumable materials due to its reduced size and design.

3. The acceptability level of the developed Electrical Multipurpose Table was evaluated by teachers and students in six identified areas: functionality, usability, applicability, portability, efficiency, and safety. This section presents the differences in the perceptions of both respondents. The analysis was done using the Wilcoxon Rank Sum Test.
4. There is no significant difference in the perceptions of the respondents on the level of acceptability of the developed Electrical multi-purpose table. As reflected in Table 13, all the computed values in the four areas are less than the critical value of -1.96 at a 0.05 level of significance. Therefore, the null hypothesis is not rejected. It indicates that both teachers and students have the same perceptions of the level of acceptability in the identified areas.

Based from the findings of the study, the following conclusion can be hereby given:1. The processes in developing the electrical multi-purpose table are outlined from the ADDIE model which includes analysis, design, development, and evaluation. There are four stages in the development of the product a) table top assembly, b) leg stand frame assembly, c) painting works, and d) Electrical installation. 2. The features of the developed electrical multi-purpose table along the six identified variables shows consistency to the product prototype.3. The developed electrical multi-purpose table is highly acceptable along the six identified areas such as functionality, usability, applicability, portability, efficiency, and safety. 4. There is no significant difference between the level of perception between the teachers and students along the identified variables. Both the teachers and the students have the same perceptions on the level of acceptability of the develop electrical multi-purpose table.

Based from the findings and conclusions generated in this study, the following recommendation can be given:1. The developed electrical multi-purpose table can be subject to any modification for the betterment of the product. Any innovative design that could help to improve its usability to end user will be highly regarded.2. In terms of product appearance, the electrical multi- purpose table is open for improvement to address the possible inconvenience of the end user. The product can be customized to give costumer's satisfaction (e.g. color, height, dimension etc. 3. The product can add other competency skills related to electrical installation and maintenance through a set of modules such as Fire alarm system, Solar Power, A/C and D/C circuits etc.4. The table top is designed to be replaceable, and can be replaced by another set of new EIM competencies or module. 5. The developed electrical multi- purpose table may be utilized in TVL-EIM track in all DEPED school and Technical-Vocational Institution with the same offer. 6. The head of the school offering TVL-EIM may recommend to his/her teachers the use of the developed Electrical multi-purpose table.7. Further studies on the impacts and applications of the developed Electrical multi-purpose table may be conducted.

KEYWORDS: - *Development, Acceptability, Electrical Multi-Purpose Table*

INTRODUCTION

Teaching is communicating information, sharing experiences and imparting knowledge, skills, and expertise. They help pave the future of the children so they have bigger chance in coping with the rapid changes brought out by the globalization. Switzerland is a world leader in vocational education implementation. It is one of the few countries in the world where vocational education and training (VET) is held in equal esteem to academic education according to Hoffman and Schwartz (2015). They discussed that in the international comparative study of vocational education system, it was recognized that the Swiss Vocational Education system produces highly skilled,

ready-to-work new employees for its businesses, serving as a real important economic incentive for business to participate.

Moreover, it can be said that the huge contribution of Switzerland's educational prowess to the nation's economic success, is widely cited as the standard for a successful vocational and technical education and skills system in the world.

On the other hand, the Philippine Education System implemented the R.A. 10533 known as the k-12 Program in the development of the vocational and technical skills of the student's as one of thew program's main objective. The K-12 program aimed to meet international standards and expected that its graduates will have better employment opportunities in and out of the country.

One important aspect in teacher education that is getting a lot of attention is related to the utilization of instructional materials. Instructional materials or also known as the teaching/learning materials used by a teacher to simplify their teaching. They include both visual and audio-visual aids and could either be concrete or non-concrete. These instructional materials bring life to learning by stimulating students to learn. The use of instructional materials in the classroom has the potential to help the teacher explain new concepts clearly, resulting in better student understanding of the concepts being taught. However, they are not ends in themselves but they are means to an end.

It is held that good teaching resources can never replace the teacher but the teacher uses them to achieve their teaching and learning objectives. Some of the instructional materials necessary for effective teaching and learning include the chalkboard, models, graphs, charts, maps, pictures, diagrams, cartoons, slides, filmstrips, radio, and television. The importance of the use of these materials cannot be underscored.

Moreover, Instructional materials are essential since they help the teacher and learners avoid overemphasis on recitation and rote learning that can easily dominate a lesson. Resource materials allow learners to have practical experiences which help them to develop skills and concepts and to work in a variety of ways.

Instructional materials, as defined by Janovsky (2022), are the tools used in educational lessons which include active learning and assessment. On the other hand, Aramide and Bolarinwa (2010) defined instructional material as ways and means of making the teaching and learning process meaningful and understandable. Basically, instructional materials are tools for teachers at all levels of educational process for effective instructional delivery and promote learner's academic achievement and enable the achievement of the stated objective of the lesson (Sale, 2016). The basic instructional materials used by the teachers in day-to-day lesson include: traditional resources (books and workbooks); graphic organizer (graph, charts, etc); and Teacher-made resources (handouts, projects, assessment, etc). These IMs are utilized by the teacher according to the objective of the lesson.

According to Hwa (2020) the quality of instructional material is important in effective lesson delivery. In order to facilitates learning gains, instructional materials must suit the particular challenges and circumstances facing their users, both students and teachers. The k-12 program aimed to meet international standards and expected that its graduates will have better employment opportunities in or out of the country. For an effective implementation of the program, there must be well-established workshop and functional instructional materials (DepEd, 2022).

However, despite the noble objective of the program, its implementation is met with several challenges, especially in senior high school. Consequently, SHS program in the Philippines is ill-equipped not only with appropriate instructors but with instructional materials to be used for skill mastery of the learners (Punongbayan, 2019). Basilan (2018) vie that inadequacy of the instructional materials hinders the teaching-learning process. Although, there some books being supplied as the prime references, they are not aligned with the curriculum guides of the Department of Education.

Similarly, scarcity of instructional materials and classroom space are significant challenges that confront most teachers in the province of Sorsogon, these issues can negatively impact the quality of education and the overall learning experience for students, especially in Abuyog National High School where the researcher is teaching Electrical Installation and Maintenance TVL-track in senior high school, experiencing difficulty in teaching in the competencies offered in EIM. As a teacher teaching, TVL - Electrical Installation and Maintenance in Senior High School, the researcher is confronted by a series of problems regarding the unavailability of instructional materials solely for EIM specialization/area.

In this view, those problems encountered above by teachers teaching TVL track make the researcher decided to conduct innovative research on developing an instructional material. The researcher is aiming to Develop an Electrical Multi-purpose table with an application of 50% innovation from those trainer kits available in the market.

OBJECTIVES

This study aims to develop and determine the acceptability of the Electrical Multi- purpose Table for Technical Vocational Livelihood Track students specializing in Electrical Installation and Maintenance (EIM) in selected Secondary Schools in the province of Sorsogon for the School Year 2023-2024.

Specifically, it sought answer to the following questions:

1. What are the processes in developing Electrical Multi-Purpose Table?
2. What are the distinctive features of the developed Electrical Multi-Purpose Table?
3. What is level of acceptability of the developed Electrical Multi-Purpose Table as perceived by teachers and students along the identified variables?
    a. Functionality;
    b. Usability;
    c. Applicability;
    d. Portability;
    e. Safety; and
    f. Efficiency?
4. Is there a significant difference in perception of the level of acceptability of the teachers and students along the identified variables?

METHODOLOGY

This study aimed to develop an Electrical Multi-Purpose table and determine its acceptability as an instructional material that can be used in Senior high school TVL track specializing in Electrical Installation and Maintenance. The Descriptive Developmental Research method was utilized in this research because it involves design, developing, and careful evaluation of instructional program, processes, and products that must meet the standard or criteria.The study involved teachers and students as respondents who were selected using the purposive sampling method. A survey questionnaire was used to gather the necessary data. The data was treated using frequency count, percentage, weighted mean, and Wilcoxon Rank Sum Test/Mann Whitney U Test.

Using the Purposive sampling, the researcher selects the proposed number of respondents to participate in surveys to obtain meaningful and supportive results. The respondents of this study were ten (10) TVL-EIM teachers from Sorsogon City and Provinces along with ten (10) students from each teacher. They are the ones who teach and enroll in senior high school specifically in Deped Sorsogon City and Province Division who take the Electrical Installation and Maintenance Track in TVL.

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RESULT AND DISCUSSION

FINDINGS:

Based from the generated data in this study, the following findings are given:

1. The process and development of the Electrical multi-purpose table applied the ADDIE model. It has five phases: Analysis, design, development, implementation, and evaluation. The materials used in developing the electrical multi-purpose table are plywood, metal frames such as angle, flat and tubular bars, and electrical and electronic materials. The Electrical Multi-Purpose Table has two main assembly, the table top and the leg stand frame. The construction started from the first part of the Electrical Multi-Purpose table which is the Table top. The Table top is almost the same as compared to an ordinary classroom table and other furniture table seen at home and in the market. The only difference in this tabletop design is that the bottom part of this is purposely designed as a wiring board and holds electrical wiring equipment and circuitry including CCTV module that EIM learners will be using during their laboratory activities. The leg stand frame is the second stage and another assembly part of the electrical Multi-Purpose table and are responsible in carrying the weight of the entire product. The Leg stand frame of the table composed is of a fabricated tubular bar welded together according to its unique design and measurements to fit the mobility of the user. It has 6 sub parts namely, Rear leg, Front leg with adjuster, Leg Frame, stretcher, drawer with lock.The third stages of the construction are the painting of the Electrical Multi-purpose table. This is done to give the table additional protection against corrosion, wear and tear and outdoor elements specially that the top of the table is made of plywood. The importance of this is that it will not only make the product look presentable and unique but this are intended to perform and last longer because of paint that provide a

protective layer to the entire part of the product.Electrical Installation is the last stage of the construction process, this are installed after the paints are dry. The Face B of the Table top is where the electrical installation is made. This comprised of the main control unit, the electrical rough-in assembly, and the CCTV module assembly.

2. The electrical Multi-purpose table has many features that could provide end user to value this product. This product features are attributes that can be seen by the end user and considered as a condition or strategy to satisfy costumer of the product. This product features can be seen along the different variables including, Functionality, Usability, Applicability, Portability, Safety, and Efficiency. The features of the Electrical multi-purpose table along a) functionality reveals that the developed product is operational, easy to open and electrical circuitry are safely installed. b) usability was defined in this product as user's friendly. The product can be easily set to stand fit in the ground by adjusting the adjuster (bolt) at the edge of the table leg. And, can be smoothly open if to be used as demonstration or laboratory table by either teacher or student. In c) applicability, the usefulness of the product was also discussed. The table can be a regular classroom table usable by either student or teacher. The product must also be a perfect demonstration table for the three core competencies in EIM, and also the leg stand frame is designed to accommodate the table tops with different core competency. Moreover, in d) portability, the researcher chooses a material which is lesser in weight in order to reduce the total maximum weight and fit to the desired size of the unit. The Electrical multi-purpose table weighed a maximum of 27 kgs. Easy assembling and disassembling of the leg stand and the table top was also considered during the assembly. There is also an adjuster on each edge of the two front table legs, where the table can flat fit to the ground. Additionally, the weight of the product is manageable for transporting in any part of the room or transported to other rooms. Next feature is e) safety, in this study, it pertains to the overall compliance of the product or device to prevent inadvertent or hazardous operation. The electrical multi-purpose table is equipped with safety devices, such as circuit breaker and light indicators. The electrical circuitry all adheres to the provisions of the Philippine Electrical Code and all materials used are of approved type and compliant with the provisions of the Philippine Electrical Code and other standards. Finally, f) efficiency which is in a more general sense, it is the ability to do things well, successfully, and without waste. The researcher give emphasis to the security of tools, materials and equipment. Materials used is economical but of good quality and available in the local market and can save more electrical consumable materials due to its reduced size and design.
3. The acceptability level of the developed Electrical Multipurpose Table was evaluated by teachers and students in six identified areas: functionality, usability, applicability, portability, efficiency, and safety. This section presents the differences in the perceptions of both respondents. The analysis was done using the Wilcoxon Rank Sum Test.
4. There is no significant difference in the perceptions of the respondents on the level of acceptability of the developed Electrical multi-purpose table. As reflected in Table 13, all the computed values in the four areas are less than the critical value of -1.96 at a 0.05 level of significance. Therefore, the null hypothesis is not rejected. It indicates that both teachers and students have the same perceptions of the level of acceptability in the identified areas.

CONCLUSIONS:

Based from the findings of the study, the following conclusion can be hereby given:

1. The processes in developing the electrical multi-purpose table are outlined from the ADDIE model which includes analysis, design, development, and evaluation. There are four stages in the development of the product a) table top assembly, b) leg stand frame assembly, c) painting works, and d) Electrical installation.
2. The features of the developed electrical multi-purpose table along the six identified variables shows consistency to the product prototype.
3. The developed electrical multi-purpose table is highly acceptable along the six identified areas such as functionality, usability, applicability, portability, efficiency, and safety.
4. There is no significant difference between the level of perception between the teachers and students along the identified variables. Both the teachers and the students have the same perceptions on the level of acceptability of the develop electrical multi-purpose table.

RECOMMENDATIONS:

Based from the findings and conclusions generated in this study, the following recommendation can be given:.

1. The developed electrical multi-purpose table can be subject to any modification for the betterment of the product. Any innovative design that could help to improve its usability to end user will be highly regarded.
2. In terms of product appearance, the electrical multi- purpose table is open for improvement to address the possible inconvenience of the end user. The product can be customized to give costumer's satisfaction (e.g. color, height, dimension etc.
3. The product can add other competency skills related to electrical installation and maintenance through a set of modules such as Fire alarm system, Solar Power, A/C and D/C circuits etc.
4. The table top is designed to be replaceable, and can be replaced by another set of new EIM competencies or module.
5. The developed electrical multi- purpose table may be utilized in TVL-EIM track in all DEPED school and Technical-Vocational Institution with the same offer.
6. The head of the school offering TVL-EIM may recommend to his/her teachers the use of the developed Electrical multi-purpose table.
7. Further studies on the impacts and applications of the developed Electrical multi-purpose table may be conducted.

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