

# Utilization of S-MEIM (Supplementary Materials in Electrical Installation and Maintenance) on Technical Skills and Performance for Pre-Work Immersion Students

Alexis Buhay Caro

Laguna State Polytechnic University Sta. Cruz Laguna 4009 PHILIPPINES

Email address: julierosemendoza002@gmail.com

**Abstract**— The main purpose of the study is to determine the effect of Supplementary Materials in Electrical, Installation and Maintenance (S-MEIM) in improving the technical skills and performance of Grade 12 EIM students. This study aims to assess the extent of Supplementary Materials in Electrical, Installation and Maintenance (S-MEIM) relative to its components; characteristics; students' technical skills and performance in Electrical, Installation and Maintenance (EIM). The research also explores into investigating the relationship between the S-MEIM and students' technical skills. Furthermore, the study also finds the effect of S-MEIM on students' performance in EIM. This study utilized experimental research design, and the respondents were the forty (40) Grade 12 EIM students at Southville 1 Integrated National High School in City Schools Division of Cabuyao. Hence, purposive sampling was utilized in selecting the respondents of the study. The research instrument used in this study were supplementary material and a modified research instrument questionnaire. The level of S-MEIM components in terms of objectives, content, activities, and key takeaways was "High" among the respondents. Moreover, the level of S-MEIM characteristics in terms of suitability, adequacy, usefulness and design was also "High". On the other hand, the level of technical skills of the respondents of knowledge proficiency, safety awareness, flexibility and creativity and innovation were "Very High". And for the level of students' performance in terms of written test, it is "Excellent" while in terms of performance task, is "Outstanding". The findings reveal that there is no significant effect on the S-MEIM as supplementary materials to the students' technical skills and performance across all areas. This means that there is no significant effect on the utilization of S-MEIM as supplementary materials and students' technical skills and performance, resulting in acceptance of all null hypotheses. This implies that the S-MEIM as supplementary material did not influence in enhancing the technical skills and performance of Grade 12 students in EIM. Based on the results, it is recommended to enhance the quality of S-MEIM as supplementary materials, focusing on strength by integrating more hands-on experiences and real-world applications into the curriculum, and developing a digital interactive version like tutorial videos and engaging activities to maximize the effectiveness of the S-MEIM on students' technical skills and performance in EIM.

**Keywords**— Supplementary materials, pre-work immersion, effect, technical skills, performance.

## I. INTRODUCTION

The K-12 program was created by the Enhanced Basic Education Act of 2013, often referred to as Republic Act

10533. Its goal is to give Philippine education a more all-encompassing and comprehensive approach. To give students an extra year of senior high school where they can specialize in several tracks, such as academic, sports, arts and design, or technical-vocational livelihood, this act demands the addition of two years to the basic education curriculum. The significance of providing students with competences in line with industry standards and market expectations is emphasized by RA 10533. The statute specifies the requirements for a curriculum that develops theoretical knowledge and practical abilities, guaranteeing graduates' ability to apply their learning in real-world situations and their academic competency.

The government entity in charge of overseeing technical education and skills development in the Philippines is the Technical Education and Skills Development Authority (TESDA). TESDA and DepEd have formed a Joint Working Group on Technical-Vocational Education and Training (TVET), which will be mainly responsible for the harmonization and complementarity of strategies, policies, and programs; consistency and quality assurance of Training Regulations (TRs) and standards; and discussion and resolution of issues as may be raised by either party regarding TVET.

Among the important components of the TVL track is the Electrical Installation and Maintenance (EIM) program, which is meant to prepare students for employment in the electrical industry, which is defined by technical improvements and a need for more experts. Work immersion programs are an essential aspect of the K-12 curriculum, especially for TVL track students. Through opportunities for hands-on learning in their chosen professions, these programs enable students to apply their theoretical knowledge and practical abilities in real-world professional settings. Preparing students for these experiences and giving them the skills and self-assurance they need to thrive in the workplace are the goals of the pre-work immersion program.

The EIM curriculum emphasizes academic understanding as well as practical, hands-on instruction. With the support of this approach, students may apply what they have learned in practical situations, better equipping them to handle obstacles at work. Through the incorporation of experiential learning into the curriculum, the EIM program is in line with the

objectives of RA 10533, which aims to improve graduates' employability and guarantee that they have the skills that businesses need.

In response, supplementary material in teaching Electrical Installation and Maintenance was developed to equip the students with the necessary skills and knowledge to succeed in their careers in the electrical field.

This study on the usage of S-MEIM (Supplementary Materials in Electrical Installation and Maintenance) on technical skills and performance for pre-work immersion students seeks to ascertain the impact of the supplementary materials on the technical skills and performance of the Grade 12 EIM students at Southville 1 Integrated National High School for the academic year 2024-2025. Moreover, to discover the knowledge and skill gaps by evaluating the academic performance and competence levels of EIM students. The results drives the researcher to a training program that focuses on student preparation for their work immersion.

### 1.1 Statement of the Problem

#### Problem/s which were addressed by the research

The objective of this research was to evaluate the effectiveness of S-MEIM in enhancing the technical proficiency and performance of Grade 12 EIM students at Southville 1 Integrated National High School for the academic year 2024–2025.

It sought to answer the following questions:

1. What is the level of S-MEIM as supplementary materials components for Electrical Installation and Maintenance in terms of:
  - 1.1 objectives;
  - 1.2 content;
  - 1.3 activity; and
  - 1.4 takeaways?
2. What is the level of S-MEIM as supplementary materials characteristics in terms of
  - 2.1 suitability;
  - 2.2 adequacy;
  - 2.3 usefulness; and
  - 2.4 design?
3. What is the level of students' technical skills in terms of:
  - 3.1 Knowledge Proficiency
  - 3.2 Safety Awareness;
  - 3.3 Adaptability and Flexibility; and
  - 3.4 Innovation and Creativity?
4. What is the level of student performance in terms of:
  - 4.1 Written test' and
  - 4.2 Performance Tasks?
5. Is there a significant effect on the utilization of S-MEIM as supplementary materials and students' technical skills?
6. Is there a significant effect on the utilization of S-MEIM as supplementary materials and students' performance?

## II. METHODOLOGY

This study utilized experimental research design, and the respondents were the forty (40) Grade 12 EIM students at Southville 1 Integrated National High School in City Schools

Division of Cabuyao. Hence, purposive sampling was utilized in selecting the respondents of the study. The research instrument used in this study were supplementary material and a modified research instrument questionnaire. The level of S-MEIM components in terms of objectives, content, activities, and key takeaways was “High” among the respondents. Moreover, the level of S-MEIM characteristics in terms of suitability, adequacy, usefulness and design was also “High”. On the other hand, the level of technical skills of the respondents of knowledge proficiency, safety awareness, flexibility and creativity and innovation were “Very High”. And for the level of students' performance in terms of written test, it is “Excellent” while in terms of performance task, is “Outstanding”.

## III. RESULTS AND DISCUSSION

It explores the relationships and patterns that emerge from the data. By carefully analyzing these findings, the researcher aimed to draw meaningful conclusions that contribute to the broader understanding of the research topic, ultimately addressing the core objectives of the study.

### Level of S-MEIM as Supplementary Materials Components for Electrical Installation and Maintenance

In this study, the level of S-MEIM, which is short for Supplementary Materials Components for Electrical Installation and Maintenance, was defined in terms of aims, content, activity, and key takeaways. The mean and standard deviation were used to establish the level of S-MEIM.

### Level of S-MEIM as Supplementary Materials Components in terms of Objectives

Table 1 exhibits the level of S-MEIM as Supplementary Materials Components for Electrical Installation and Maintenance in terms of Objectives was High gaining a grand (M=3.12, SD=0.84). This indicates respondents' agreement that the objectives of the supplementary material are well aligned with the learners' need.

TABLE 1. Level of S-MEIM as Supplementary Materials Components for Electrical Installation and Maintenance in terms of Objectives

STATEMENT	Mean	SD	Remarks
The Objectives ...			
cover the specific component of the individual topic.	3.18	0.78	Agree
provide the student with a way to connect the lesson to real life.	3.05	0.88	Agree
are measurable, attainable, and time bounded.	3.10	0.84	Agree
focus on the development of technical skills among the students.	3.13	0.85	Agree
are relevant to the field and specialization.	3.15	0.86	Agree
Grand Mean			3.12
SD			0.84
Verbal Interpretation			High

The respondents agreed that the S-MEIM objectives covered the specific component of the individual topic and obtained the highest mean (M=3.18, SD=0.78), indicating a strong agreement that the objectives are well-defined and focused. Also, respondents agreed that the objectives provided them with a way to connect the lesson to real life which obtained the lowest mean (M=3.05, SD=0.88), which is crucial for practical application in their field.

The development of learners' intellectual capacities and the accomplishment of educational goals are both significantly aided by the utilization of instructional resources. Teaching that included the use of educational resources resulted in considerably greater accomplishment scores for students than teaching that did not include the use of such materials (Olayinka, 2016). The fact that there is a high degree of agreement about the objectives is evidence that the S-MEIM is well-organized and aligns with educational goals in the field of electrical installation and maintenance.

#### Level of S-MEIM as Supplementary Materials Components in terms of Content

Table 2 indicates that the level of S-MEIM as Supplementary Materials Components for Electrical Installation and Maintenance in terms of Content was High, with a mean of 3.17 and a standard deviation of 0.84. This signifies respondents' concurrence that the contents deliver the quality and adequacy of the offered items.

TABLE 2. Level of S-MEIM as Supplementary Materials Components for Electrical Installation and Maintenance in terms of Content

STATEMENT	Mean	SD	Remarks
The content ...			
has adequate information given on the topics presented.	3.20	0.79	Agree
comprises necessary knowledge and technical skills.	3.20	0.82	Agree
is accurate and updated.	3.15	0.83	Agree
includes topics arranged from basic to complex.	3.18	0.84	Agree
permits the completion of the topics according to their coverage.	3.10	0.93	Agree
Grand Mean	3.17		
SD	0.84		
Verbal Interpretation			High

Based on the responses of the respondents, they agreed that the content had adequate information given on the topics presented and comprises necessary knowledge and technical skills which garnered the same mean ( $M=3.20$ ,  $SD=0.79$ ,  $0.82$ ), which demonstrates that the content about the sufficiency of provided information and highlights the relevance of knowledge and technical skills. However, the respondents also agreed that the content permits the completion of the topics according to its coverage, which obtained the lowest mean ( $M=3.10$ ,  $SD=0.93$ ), suggesting that respondents feel the content allows for comprehensive coverage of the subject matter.

Content-based instruction, commonly referred to as CBI, has been an influential pedagogical approach in the field of education since its emergence in the mid-1980s. The technique has gained increasing traction as an effective educational strategy, particularly in language acquisition and subject matter learning. CBI focuses on the integration of language learning with content instruction, allowing students to develop their language skills while engaging with topics that are relevant and meaningful to them.

The S-MEIM (Specialized Model for Emergency Information Management) exemplifies the effectiveness of content-based education in a specific field. The material curated for the S-MEIM is comprehensive and relevant, targeting the essential knowledge and skills required for

students who aspire to work in emergency information management. The curriculum is designed to ensure that students are well-versed in critical concepts, practices, and procedures that are vital for effective crisis response and management.

#### Level of S-MEIM as Supplementary Materials Components in terms of Activities

Table 3 indicates that the level of S-MEIM as Supplementary Materials Components for Electrical Installation and Maintenance, in terms of Activities, was High, with a mean of 3.11 and a standard deviation of 0.91. This reflects the respondents' agreement about the involvement levels of the activities included in the materials.

TABLE 3. Level of S-MEIM as Supplementary Materials Components for Electrical Installation and Maintenance in terms of Activities

STATEMENT	Mean	SD	Remarks
The activities			
provide a variety of tasks	3.13	0.88	Agree
stimulate students' interest to participate actively.	3.18	0.84	Agree
are aligned with the expected outcomes.	3.08	0.97	Agree
give opportunities for the improvement of students' technical skills.	3.13	0.88	Agree
cater to the individual needs of the students.	3.05	0.99	Agree
Grand Mean			3.11
SD			0.91
Verbal Interpretation			High

The activities in the S-MEIM stimulated the respondents' interest to participate actively as evident in the computed highest mean ( $M=3.18$ ,  $SD=0.84$ ), which is critical for effective learning. While respondents also agreed that the activities catered their individual needs, which gained the least mean ( $M=3.05$ ,  $SD=0.99$ ), suggesting a slight agreement that activities are designed to accommodate different learning styles and paces.

Moreover, supplemental activities differ greatly. Instructors should review the activities for each section and determine which ones are appropriate for their students. The activity manuals include instructions on how to carry out each Supplemental Activity.

In addition to worksheets and other student materials, an Instructor Page is frequently included. Supplemental exercises - This material includes a variety of exercises meant to reinforce and provide more "hands-on" application of the Core Lesson topic. (PART 3: A Closer Look at Supplemental Activities, n.d.) In educational resources, particularly those designed for specialized fields such as electrical installation and maintenance, the inclusion of an Instructor Page is a common practice. This page serves as a valuable tool for instructors, providing guidance on how to effectively deliver the curriculum and utilize accompanying materials. It often includes tips for facilitating discussions, strategies for addressing diverse learning styles, and suggestions for assessing student progress. By offering these resources, the Instructor Page enhances the overall teaching experience, enabling educators to create a more structured and supportive learning environment.



The activities embedded within the S-MEIM curriculum are specifically designed to be effective and beneficial in fostering student engagement. By focusing on skill development through interactive and practical exercises, the S-MEIM curriculum ensures that students are not merely passive recipients of information but active participants in their learning journey. This hands-on approach is particularly vital in the field of electrical installation and maintenance, where practical skills are as important as theoretical understanding.

Rost (2022) mentioned that keeping students engaged is a key difficulty in classes. Supplementary content can help your class content stay current, relevant, and fascinating. Therefore, the activities within the S-MEIM are seen as effective and beneficial, fostering student engagement and skill development, which are essential for success in the field of electrical installation and maintenance.

#### *Level of S-MEIM as Supplementary Materials Components in terms of Activities*

Table 4 shows the level of S-MEIM as Supplementary Materials Components for Electrical Installation and Maintenance in terms of Key Takeaways was High gaining a grand (M=3.13, SD=0.90). This reveals respondents' perceptions of how effectively these components enhance learning outcomes.

TABLE 4. Level of S-MEIM as Supplementary Materials Components for Electrical Installation and Maintenance in terms of Key Takeaways

STATEMENT	Mean	SD	Remarks
The key takeaways....			
provide an understanding of the importance of the concepts learned.	3.13	0.91	Agree
can lead to the formulation of conclusions from what has been studied.	3.08	1.00	Agree
can boost retention knowledge.	3.15	0.83	Agree
emphasize the key points in the lesson.	3.13	0.94	Agree
give opportunities for acquiring knowledge and skills to develop their full potential.	3.18	0.84	Agree
Grand Mean	3.13		
SD	0.90		
Verbal Interpretation	High		

As computed by the highest mean (M=3.18, 0.84), the respondents agreed that key takeaways gave them opportunities to acquired knowledge and developed their skills in full potential, reflecting strong agreement that these key takeaways support broader personal and professional development. While they also agreed that the key takeaways led them to formulate a conclusion from what has been they studied though garnered the lowest mean (M=3.08, SD=1.00), which helps the students synthesize learning.

A takeaway is a conclusion drawn from the facts supplied or information. It is a main point or important message that can be learnt or comprehended from an event or observation. ("Takeaway," 2025) The conclusion might serve as a bridge to enable readers to return to their daily lives. It also gives everyone the opportunity to make a nice final impression and end on a positive note. (UNC-Chapel Hill Writing Center, 2025) It implies that the key takeaways within the S-MEIM are viewed as essential components that enhance comprehension, retention, and overall student development in

electrical installation and maintenance, contributing significantly to educational experiences.

#### *Level of S-MEIM as Supplementary Materials Characteristics.*

In this study, the level of S-MEIM as Supplementary Materials Characteristics was described in terms of suitability, adequacy, usefulness and design and was determined by the mean and standard deviation.

#### *Level of S-MEIM as Supplementary Materials Characteristics in terms of Suitability*

Table 5 shows the level of S-MEIM as Supplementary Materials Characteristics for Electrical Installation and Maintenance in terms of Suitability was High gaining a grand (M=3.21, SD=0.75). This reveals respondents' agreement that educational needs have met.

TABLE 5. Level of S-MEIM as Supplementary Materials Characteristics in terms of Suitability

STATEMENT	Mean	SD	Remarks
The number of lessons is substantial enough to be completed in each allotted time.	3.20	0.82	Agree
Fits to the age, maturity and experience of the user.	3.28	0.72	Strongly Agree
There are enough numbers of exercises expected to be completed in one sitting.	3.25	0.71	Strongly Agree
The lessons are chosen and arranged according to the sequential progression of pre-determined topics.	3.20	0.72	Agree
The language or terms used are within the level of knowledge and understanding of the learners.	3.10	0.78	Agree
Grand Mean	3.21		
SD	0.75		
Verbal Interpretation	High		

The respondents strongly agreed that the S-MEIM fitted to their age, maturity and experiences and was obtained the highest mean (M=3.28, SD=0.72), showing an agreement that the lessons are logically arranged to facilitate learning. On the other hand, respondents also agreed that the language or terms used are within their level of knowledge and understanding, which obtained the lowest mean (M=3.10, SD=0.78), suggests agreement that the language and terms used in the materials are accessible and within the comprehension level of the learners.

#### *Level of S-MEIM as Supplementary Materials Characteristics in terms of Adequacy*

Table 6 shows the level of S-MEIM as Supplementary Materials Characteristics for Electrical Installation and Maintenance in terms of Adequacy was High gaining a grand (M=3.15, SD=0.79). This reveals perceptions of respondents about the effectiveness and sufficiency of the materials.

The respondents agreed that the presentation of the lessons in the materials motivated them to go to the next activity, the activities presented were sufficient to obtain the objective of the material, and the number of examples presented was adequate to serve as supplementary material which obtained the highest mean (M=3.18, SD= 0.78, 0.75, 0.78), indicating agreement that the materials are engaging and encourage continued participation, the activities well-aligned with the intended learning outcomes and there are enough examples provided to support the supplementary materials effectively. Moreover, they also agreed that the exercises in each topic

showed the required variety to urge them to continuously work with, which obtained the lowest mean them ( $M=3.08$ ,  $SD=0.86$ ), the respondents agree that the exercises encourage continuous engagement, there may be room for improvement in this area.

TABLE 6. Level of S-MEIM as Supplementary Materials Characteristics in terms of Adequacy

STATEMENT	Mean	SD	Remarks
The presentation of lessons in the materials motivates the students to go to the next activity.	3.18	0.78	Agree
The activities presented are sufficient to obtain the objective of the material.	3.18	0.75	Agree
The number of examples presented is adequate to serve as supplementary material.	3.18	0.78	Agree
The information shared by each topic reflects the salient idea required for a thorough understanding of the lesson.	3.13	0.79	Agree
Exercises in each topic showed the required variety to urge the learner to continuously work with them	3.08	0.86	Agree
Grand Mean	3.15		
SD	0.79		
Verbal Interpretation	High		

#### Level of S-MEIM as Supplementary Materials Characteristics in terms of Usefulness

Table 7 shows the level of S-MEIM as Supplementary Materials Characteristics for Electrical Installation and Maintenance in terms of Usefulness was High gaining a grand ( $M=3.14$ ,  $SD=0.82$ ). This reveals the perceptions of respondents on how the materials provide insights into how effectively these materials serve their intended purpose.

TABLE 7. Level of S-MEIM as Supplementary Materials Characteristics in terms of Usefulness

STATEMENT	Mean	SD	Remarks
This serves as supplementary material.	3.13	0.79	Agree
The material is useful for both students and teachers.	3.05	0.93	Agree
It can provide a self-assessment to improve students' technical skills.	3.08	0.97	Agree
The material offers discussions and activities to enhance students' skills and abilities.	3.18	0.75	Agree
It illustrates practical and real-life experiences.	3.28	0.64	Strongly Agree
Grand Mean	3.14		
SD	0.82		
Verbal Interpretation	High		

Based on the computed highest mean ( $M=3.28$ ,  $SD=0.64$ ), the respondents strongly agreed that the S-MEIM illustrated practical and real-life experiences, which indicates a strong belief in the relevance of the materials to real-world applications. However, they agreed that the material was useful for both students and teachers, with a lowest mean ( $M=3.05$ ,  $SD=0.93$ ), suggesting that they support teaching and learning processes.

Acedillo et al. (2022) examined how chosen science students and teachers viewed Strategic Intervention Material (SIM). Strategic Intervention Material clarifies, develops underperforming capabilities, and improves academic achievement. Students and lecturers in electrical installation and maintenance value the S-MEIM. The products were

praised for their ability to augment learning, improve skills, and provide self-assessment and practical applications.

#### Level of S-MEIM as Supplementary Materials Characteristics in terms of Design

Table 8 shows the level of S-MEIM as Supplementary Materials Characteristics for Electrical Installation and Maintenance in terms of Design was High gaining a grand ( $M=3.14$ ,  $SD=0.82$ ). This shows the respondents' perceptions of the visual and structural aspects of the materials.

TABLE 8. Level of S-MEIM as Supplementary Materials Characteristics in terms of Design

STATEMENT	Mean	SD	Remarks
The supplementary materials are visually pleasing and with easily understood icons/illustrations.	3.18	0.81	Agree
These contain illustrations appropriate for every lesson.	3.23	0.77	Agree
The materials use appropriate text font, size, and type.	3.38	0.59	Strongly Agree
Made in bold and clear graphic designs.	3.20	0.88	Agree
These contain templates and layouts to enhance understanding of learning contents.	3.20	0.88	Agree
Grand Mean	3.24		
SD	0.79		
Verbal Interpretation	High		

The respondents strongly agreed that the materials used appropriate text font, size, and type which gained the highest mean ( $M=3.38$ ,  $SD=0.59$ ), which reflects a strong agreement that the textual elements enhance readability and comprehension. However, the respondents also agreed that the supplementary materials were visually pleasing and with easily understood icons/illustrations, with lowest mean ( $M=3.18$ ,  $SD=0.81$ ) which also indicates an agreement that the design is attractive and accessible

#### Level of Students' Technical Skills

In this study, the level of Students' Technical Skills was described in terms of knowledge proficiency, safety awareness, adaptability and flexibility, and creativity and innovation and was determined by the mean and standard deviation.

TABLE 9. Level of Students' Technical Skills in terms of Knowledge Proficiency

STATEMENT	Mean	SD	Remarks
I can...			
explain the function of different electrical tools and equipment.	3.60	0.50	Strongly Agree
determine the type of wiring diagrams used when performing electrical installations.	3.68	0.47	Strongly Agree
describe the difference between electrical tools and equipment.	3.55	0.55	Strongly Agree
work with both hand tools and power tools in maintenance task.	3.58	0.55	Strongly Agree
identify electrical tools materials, equipment in line with the job requirement.	3.58	0.55	Strongly Agree
Grand Mean	3.60		
SD	0.52		
Verbal Interpretation	Very High		

With a mean score of 3.60 and a standard deviation of 0.52, Table 9 demonstrates that the level of students' technical

skills in terms of knowledge proficiency was quite high. This demonstrates the perspective of the respondents on their level of self-assurance and expertise in a variety of technical abilities.

The highest mean ( $M=3.68$ ,  $SD=0.47$ ) of respondents highly agreed that the S-MEIM helped them identify electrical installation wiring diagrams, demonstrating the students' ability in this crucial skill. The respondents also firmly agreed that they can define the difference between electrical tools and equipment, with the least mean ( $M=3.55$ ,  $SD=0.55$ ), indicating that students understand the subject well. An organizational safety atmosphere shapes safety awareness.

TABLE 10. Level of Students' Technical Skills in terms of Safety Awareness

STATEMENT	Mean	SD	Remarks
I can...			
identify what personal protective equipment (PPE) will wear when working on electrical circuit.	3.75	0.44	Strongly Agree
identify hazardous equipment and materials in field of work.	3.65	0.62	Strongly Agree
elaborate the steps in performing safety cleaning tools	3.70	0.46	Strongly Agree
regularly maintain servicing of power tools and electrical tools.	3.70	0.46	Strongly Agree
ensure that the tools and equipment are safe for use in electrical work.	3.75	0.44	Strongly Agree
Grand Mean	3.71		
SD	0.49		
Verbal Interpretation			Very High

As shown in Table 10, the degree of students' technical skills in terms of safety awareness was Very High, obtaining a grand total of 3.71 in terms of mean and 0.49 in terms of standard deviation. This demonstrates the opinions of the respondents on their level of self-assurance and capability in a variety of technical abilities.

It was found that the respondents strongly agreed that they are able to identify what personal protective equipment (PPE) will be worn when working on electrical circuits and ensure that the tools and equipment were safe for use in electrical work. The fact that they gained the highest mean ( $M=3.75$ ,  $SD=0.44$ ) indicates that students are highly aware of the necessary safety gear, which reflects their readiness to work safely and the safety protocols that are necessary for effective and secure operation. Furthermore, they were in agreement that they are able to recognize hazardous equipment and materials in the workplace, with the lowest mean ( $M=3.65$ ,  $SD=0.62$ ), which demonstrates that they have a grasp of the possible risks that may be found in electrical settings.

An organization's safety atmosphere is another factor that contributes to the formation of safety awareness. According to the findings of the evaluation of the degree of students' technical skills in terms of safety awareness, it can be concluded that students have a very high level of self-assurance and competence in relation to the safety of electrical work. The findings suggest that the educational program is successful in preparing pupils to understand and apply critical safety measures. The overall grand mean score for the program is 3.71.

TABLE 11. Level of Students' Technical Skills in terms of Adaptability and Flexibility

STATEMENT	Mean	SD	Remarks
I can...			
1. quickly adjust to new techniques and procedures for maintaining electrical tools	3.60	0.55	Strongly Agree
2. explore different ways to fix malfunctioning tools.	3.58	0.59	Strongly Agree
3. effectively troubleshoot problems with electrical tools even when the cause is unfamiliar.	3.73	0.60	Strongly Agree
4. take on different roles in maintaining electrical tools when necessary.	3.55	0.50	Strongly Agree
5. stay focused and adapt when working in a high-pressure environment.	3.68	0.47	Strongly Agree
Grand Mean	3.63		
SD	0.54		
Verbal Interpretation			Very High

As shown in Table 11, the level of Students' Technical skills in terms of Adaptability and Flexibility was Very High gaining a grand ( $M=3.63$ ,  $SD=0.54$ ). This shows the respondents' ability to navigate challenges in electrical work.

The respondents strongly agreed that they can effectively troubleshoot problems with electrical tools even when the cause was unfamiliar, with a greatest mean ( $M=3.73$ ,  $SD=0.60$ ), indicates a strong level of confidence in their diagnostic abilities, even when faced with new challenges. Also, they strongly agreed that they can take on different roles in maintaining electrical tools when necessary, with the least mean ( $M=3.55$ ,  $SD=0.50$ ), demonstrating their willingness to adapt to various responsibilities as needed.

TABLE 12. Level of Students' Technical Skills in terms of Innovation and Creativity

STATEMENT	Mean	SD	Remarks
I can...			
use alternative materials or tools when necessary to complete maintenance tasks	3.70	0.46	Strongly Agree
find new ways to organize and store electrical tools efficiently.	3.65	0.48	Strongly Agree
experiment with different techniques to extend the lifespan of electrical tools.	3.65	0.58	Strongly Agree
suggest innovative solutions when traditional maintenance methods are ineffective.	3.60	0.50	Strongly Agree
develop creative solutions to repair or restore damaged electrical tools.	3.60	0.50	Strongly Agree
Grand Mean	3.64		
SD	0.50		
Verbal Interpretation			Very High

Supplementary materials should be adaptable and flexible to cater to diverse learning needs and changing circumstances, allowing for adjustments in content, format, and delivery methods. In general, the assessment of the Level of Students' Technical Skills in terms of Adaptability and Flexibility reveals that students possess a very high level of confidence and competence in adapting to various challenges in electrical work. These results highlight the importance of continuing to prioritize adaptability and flexibility within the curriculum, ensuring that students are well-equipped to meet the demands of the dynamic electrical industry.



As presented in Table 12, the level of Students' Technical skills in terms of Innovation and Creativity was Very High gaining a grand ( $M=3.64$ ,  $SD=0.50$ ). This shows the respondents' ability to innovate and think creatively in their work

The respondents strongly agreed that they can be able to use alternative materials or tools when necessary to complete maintenance tasks, with the highest mean ( $M=3.70$ ,  $SD=0.46$ ), the respondents are demonstrating flexibility and resourcefulness in completing maintenance tasks. Moreover, they also strongly agreed that they can suggest innovative solutions when traditional maintenance methods are ineffective and develop creative solutions to repair or restore damaged electrical tools, with the lowest mean ( $M=3.60$ ,  $SD=0.50$ ), indicates that students feel equipped to think outside the box when faced with challenge and reinforces students' confidence in their ability to devise effective and innovative repair strategies.

Innovation and Creativity is often linked with critical thinking. Creative individuals are more likely to engage in complex problem-solving tasks that require evaluation, synthesis, and reflection (Paul & Elder, 2014). In conclusion, the assessment of the Level of Students' Technical Skills in terms of Innovation and Creativity reveals that students possess a very high level of confidence in their ability to innovate and think creatively in their work. These results underscore the importance of fostering innovation and creativity within the curriculum, ensuring that students are well-prepared to address challenges in the field. By prioritizing these abilities, educators can prepare students for future needs and help them succeed in the electrical sector.

**Level of Students' Performance**

For the purpose of this study, the performance of the students was evaluated based on their performance on a written exam and a performance task. Results were analyzed using frequency, percentage, mean score/grade, and standard deviation.

Level of Students' Performance in terms of Written Test

The data presented in Table 13 summarizes the Level of Students' Performance in terms of Use of Written Test scores. The mean score of 34.38 ( $SD=3.70$ ) interpreted as Excellent, show a strong performance among the students, with a significant majority achieving excellent and proficient scores.

TABLE 13. Level of Students' Performance in terms of Use of Written Test

Score	Frequency	Percentage	Descriptive Value
33 – 40	26	65%	Excellent
25 – 32	14	35%	Proficient
17 – 24	0	0	Satisfactory
9 – 16	0	0	Needs Improvement
8. Below	0	0	Poor
Mean Score	34.38		
SD	3.70		
Descriptive Value	Excellent		

A total of 26 students (65%) scored between 33 – 40, which is classified as Excellent. This indicates that a substantial portion of the student population demonstrates a high level of understanding and mastery of the material assessed. While 14 students (35%) scored between 25 – 32,

categorized as Proficient. This suggests that these students possess a solid grasp of the subject matter, even if they have not reached the highest performance level.

In general, the assessment of the Level of Students' Performance in terms of Use of Written Test indicates that students are performing exceptionally well. These findings suggest that the educational program is effective in promoting student learning and mastery of the material. Moving forward, educators should maintain their current successful strategies while exploring opportunities for further enrichment and support to ensure that all students continue to thrive academically.

**Level of Students' Performance in terms of Performance Tasks**

The data presented in Table 14, the Level of Students' Performance in terms of Use of Performance Task. The grand mean grade ( $M=91.91$ ,  $SD=5.32$ ) indicates that students have consistently excelled in their performance tasks across all assessed activities. Each performance task received high mean grades, reflecting an exceptional level of skill and understanding in the subject matter.

TABLE 14. Level of Students' Performance in terms of Use of Performance Task

Performance Tasks	Mean Grade	SD	Descriptive Value
Performance Tasks 1	90.88	5.35	Outstanding
Performance Tasks 2	92.75	4.87	Outstanding
Performance Tasks 3	92.00	6.20	Outstanding
Performance Tasks 4	92.00	4.85	Outstanding
Grand Mean Grade	91.91		
SD	5.32		
Descriptive Value	Outstanding		

Every performance task was graded with different rubrics. Rubric is an essential measuring tool for performance tasks. It provides clear, objective, and consistent criteria to evaluate student work.

The criteria used in performance tasks 1 are correct assembly of the circuit (30%), safe use and handling of tools (25%), proper trouble shooting and testing (15%), neatness and organization of work area (10%), reflection and report (20%) with a total of 100%. The mean grade of 90.88 with a standard deviation of 5.35 is classified as Outstanding, suggesting that students demonstrated a high level of competence and mastery of the task requirements.

The criteria used in performance tasks 2 are identified correct tools and materials (20%), prepared tools safely and properly (20%), organized tools and materials neatly (10%), checklist completeness and accuracy (20%), purpose of each item clearly explained (10%), reflection quality and relevance (10%), and observed safety procedures (10%), with a total of 100%. The mean grade in performance task 2 is 92.75 and a standard deviation of 4.87, students again achieved an Outstanding performance, indicating strong execution and understanding of the material.

The criteria used in performance tasks 3 are correct interpretation of sample diagram (15%), complete and accurate labeling (10%), clear explanation of current flow and components (10%), accuracy of student-created diagram (25%), use of proper symbols and labeling (10%), logical

layout and organization of diagram (10%), reflection clarity and insight (10%) and observed safety and technical standards (10%), with a total of 100%. The performance tasks 3 mean grade is 92.00 and a standard deviation of 6.20 continues to reflect Outstanding performance, showcasing consistent student engagement and capability.

Lastly, the criteria used in performance tasks 4 are Proper inspection of tools (15%), correct cleaning and maintenance procedures (25%), organized and safe tool storage (10%), complete and clear maintenance log (20%), reflective paragraph (20%) and observance of safety protocols during activity (10%), with a total of 100%. The performance task 4, similarly, a mean grade of 92.00 and a lower standard deviation of 4.85 also falls within the Outstanding category, reinforcing the trend of high achievement across the tasks.

In conclusion, the assessment of the Level of Students' Performance in terms of Use of Performance Task reveals that students consistently achieve Outstanding results across all evaluated tasks. These findings highlight the importance of continuing to implement successful teaching strategies and assessment methods that promote student engagement and mastery of skills. By maintaining a focus on excellence and adapting to the diverse needs of students, educators can ensure ongoing academic success and prepare students for future challenges in their educational journeys.

Zabala (2023) noted that Strategic Intervention Material (SIM) serves as a specialized instructional resource designed to effectively support students facing challenges with specific concepts or skills. SIM designs typically include various exercises and resources to support students in learning and understanding the subject matter.

#### Significant Effect of the Utilization of S-MEIM as Supplementary Materials on Students' Technical Skills

To test the effect of the utilization of S-MEIM as supplementary materials on students' technical skills, data were treated statistically in Minitab 14 using Regression Analysis. The major findings were presented in the following table.

For objectives, the t-values range from 1.58 to 0.31 with p-values ranging from 0.122 to 0.759, indicating no statistically significant effects on students' technical skills in any of the components as the p-values exceed the 0.05 threshold. Similar results are observed for content, with t-values from 1.03 to 0.04 and p-values from 0.312 to 0.967. Again, none of the components show significant effects on technical skills. In activities, the t-values range from 1.23 to 0.08 with corresponding p-values from 0.228 to 0.940, indicating a lack of significant effect of the activities on the students' skills. The results in key takeaways show t-values between 1.21 and 0.10 and p-values from 0.235 to 0.919, confirming no significant effects.

The suitability, adequacy, usefulness, and design characteristics all have t-values below 1.0 and p-values above 0.05, suggesting that these factors do not significantly influence students' technical skills.

TABLE 15. Significant Effect of the Utilization of S-MEIM as Supplementary Materials on Students' Technical Skills

(IV)	(DV)	value	value
Components			
Objectives	Knowledge Proficiency	1.58	0.122
	Safety Awareness	0.76	0.450
	Adaptability and Flexibility	0.29	0.722
	Innovation and Creativity	0.31	0.756
Content	Knowledge Proficiency	1.03	0.312
	Safety Awareness	0.34	0.738
	Adaptability and Flexibility	0.08	0.933
	Innovation and Creativity	0.04	0.967
Activities	Knowledge Proficiency	1.23	0.228
	Safety Awareness	0.54	0.592
	Adaptability and Flexibility	0.08	0.940
	Innovation and Creativity	0.13	0.893
Key Takeaways	Knowledge Proficiency	1.21	0.235
	Safety Awareness	0.52	0.605
	Adaptability and Flexibility	0.04	0.971
	Innovation and Creativity	0.10	0.919
Characteristics			
Suitability	Knowledge Proficiency	0.87	0.392
	Safety Awareness	0.23	0.820
	Adaptability and Flexibility	0.19	0.850
	Innovation and Creativity	0.09	0.926
Adequacy	Knowledge Proficiency	0.63	0.531
	Safety Awareness	0.15	0.884
	Adaptability and Flexibility	0.51	0.615
	Innovation and Creativity	0.43	0.667
Usefulness	Knowledge Proficiency	0.92	0.364
	Safety Awareness	0.11	0.913
	Adaptability and Flexibility	0.39	0.701
	Innovation and Creativity	0.30	0.767
Design	Knowledge Proficiency	0.89	0.318
	Safety Awareness	0.21	0.837
	Adaptability and Flexibility	0.41	0.682
	Innovation and Creativity	0.29	0.771

Note: \*  $p < .05$

The data above indicates that the components or characteristics of S-MEIM (Supplementary Materials for Electrical Installation and Maintenance) did not show a significant effect on students' technical skills across all four measured areas, as evidenced by p-values all greater than 0.05. This means further that while the materials components and characteristics may contribute to learning, they do not meaningfully influence students on improving their technical skills. However, adjustments and refinements may be done to maximize its effect on students' development of technical skills. These results underscore the necessity for educators to critically evaluate the supplementary materials used in instruction and consider alternative strategies that may better support student learning and skill development. By focusing on effective teaching practices and continuously assessing the impact of learning materials, educators can improve student outcomes in technical skills.



Furthermore, the study conducted by Reganon (2022) indicated that after the intervention, students' practical performance levels improved significantly from Average to Closely Approximating Mastery. Also, the study conducted by Cayanong (2025) reveals that supplemental learning materials can improve comprehension and proficiency in sessions. These products have proven effective in enhancing students' academic performance and learning outcomes. Therefore, the supporting studies concluded that utilization of supplementary materials can improve students' performance.

According to the study of Acuna et al. (2015), the findings indicate that the objectives of the interventions align closely with the provided content, underscoring the necessity for tailored materials that target specific health behaviors. Conversely, deficiencies in intervention content might hinder effectiveness. Nonetheless, it is crucial to acknowledge that not every study conveys a consistently favorable perspective. Certain studies demonstrate minimal to no impact of supplemental resources on student performance, indicating that factors such as material quality, usage context, and individual learning styles may substantially affect its efficacy. This discrepancy in results emphasizes the intricacy of educational interventions and shows the desire for more research into the circumstances that maximize the efficacy of supplemental resources.

**Significant Effect of the Utilization of S-MEIM as Supplementary Materials on Students' Performance**  
To test the effect the utilization of S-MEIM as supplementary materials on students' performance, data were treated statistically in Minitab 14 using Regression Analysis. The major findings were presented in the following table.

TABLE 16. Significant Effect of the Utilization of S-MEIM as Supplementary Materials on Students' Performance

Utilization of S-MEIM (IV)	Students' Performance (DV)	t- value	p- value
<b>Components</b>			
Objectives	Written Test	0.80	0.430
	Performance Task	0.65	0.522
Content	Written Test	0.24	0.881
	Performance Task	0.06	0.954
Activities	Written Test	0.43	0.669
	Performance Task	0.29	0.772
Key Takeaways	Written Test	0.45	0.655
	Performance Task	0.28	0.779
<b>Characteristics</b>			
Suitability	Written Test	0.08	0.937
	Performance Task	0.12	0.904
Adequacy	Written Test	0.15	0.881
	Performance Task	0.61	0.616
Usefulness	Written Test	0.16	0.871
	Performance Task	0.16	0.872
Design	Written Test	0.44	0.661
	Performance Task	0.01	0.995

Note: \*  $p < .05$

The data in Table 16 examines the Significant Effect of the Utilization of S-MEIM as Supplementary Materials on Students' Performance in two areas: Written Test and Performance Task. The results are presented through t-values

and p-values for various components, including objectives, content, activities, key takeaways, and characteristics.

In terms of objectives, the t-values of 0.80 for written tests and 0.65 for performance tasks, with p-values of 0.430 and 0.522 respectively, indicate no significant effect of the objectives on students' performance, as both p-values exceed the 0.05 threshold. While the t-values for content are 0.24 for written tests and 0.06 for performance tasks, with p-values of 0.881 and 0.954. These results further confirm that the content of the S-MEIM does not significantly impact student performance. For activities, the t-values of 0.43 for written tests and 0.29 for performance tasks, with p-values of 0.669 and 0.772, indicate a lack of significant effect from the activities included in the S-MEIM. Lastly for key takeaways, The t-values of 0.45 for written tests and 0.28 for performance tasks, with p-values of 0.655 and 0.779, suggest that the key takeaways from the S-MEIM do not significantly influence student performance.

The suitability, adequacy, usefulness, and design characteristics all show t-values below 1.0 and p-values above 0.05, indicating that these factors do not significantly affect students' performance in either assessment type.

The data above indicates that none of the components or characteristics of S-MEIM (Supplementary Materials for Electrical Installation and Maintenance) showed a significant effect on students' performance in terms of written tests and performance tasks, as evidenced by p-values all greater than 0.05. Similarly, the study conducted by Acuna et.al (2015), the developed SIMs was strongly agreed to its content. However, the gaps hinder its effectiveness. These results underscore the necessity for educators to critically evaluate the supplementary materials used in instruction and consider alternative strategies that may better support student learning and performance. By focusing on effective teaching practices and continuously assessing the effect of learning materials, educators can improve student outcomes and foster a more effective learning environment.

#### IV. CONCLUSION AND RECOMMENDATIONS

The conclusions were derived from the data and results of the study presented, analyzed and interpreted.

There is no significant effect on the utilization of S-MEIM as supplementary materials and students' technical skills, resulting in acceptance of all null hypotheses. This implies that the S-MEIM as supplementary material did not influence in enhancing the technical skills Grade 12 students in EIM.

There is no significant effect on the utilization of S-MEIM as supplementary materials and students' performance, resulting in acceptance of all null hypotheses. This implies that the S-MEIM as supplementary material did not influence in enhancing the performance Grade 12 students in EIM.

Based on the data presented and interpreted in Chapter 4, the following recommendations are proposed:

For TVL teachers, enhancement of supplementary materials should be undertaken. This includes updating content to ensure relevance and incorporating diverse instructional strategies to engage students effectively.

For the school leaders, to continue focusing on technical skills development and build on this strength by integrating more hands-on experiences and real-world applications into the curriculum. This could help reinforce technical skills and further prepare students for industry demands.

For the division, maximizing the effectiveness of the S-MEIM, it is recommended that educators engage in ongoing professional development. Training focused on the integration of supplementary materials and innovative teaching techniques can enhance instructional effectiveness and student engagement.

For future researchers, conduct further studies in exploring other factors that may influence student outcomes. This could involve qualitative studies or exploring different teaching methodologies that may yield better results.

#### REFERENCE

- [1]. Acedillo, R., Lagahit, J., Macusang, A. J., & Bacatan, J. (2022). Students and teacher's perception on the effectiveness of using strategic intervention material in science. *International Journal of Research and Innovation in Social Science*, 06(03), 60–68. <https://doi.org/10.47772/ijriss.2022.6304>
- [2]. Acuna, Levy & Gutierrez, Merry & Areta, Gerry. (2015). Content Area Reading-Based Strategic Intervention Materials (CARB-SIMs) in Science VI. *The Normal Lights*. 9. 10.56278/tnl.v9i2.132.
- [3]. Cayanong, M (2025). Supplementary Learning Materials and its Contribution on Reading Comprehension Retrieved from [https://www.researchgate.net/publication/388219536\\_Supplementary\\_Learning\\_Materials\\_and\\_its\\_Contribution\\_on\\_Reading\\_Comprehension](https://www.researchgate.net/publication/388219536_Supplementary_Learning_Materials_and_its_Contribution_on_Reading_Comprehension)
- [4]. Olayinka, A.R.B. (2016). Effects of Instructional Materials on Secondary Schools Students' Academic Achievement in Social Studies in Ekiti State, Nigeria. *World Journal of Education*, p. 32
- [5]. Paul, R., & Elder, L. (2014). *Critical Thinking: Tools for Taking Charge of Your Professional and Personal Life*. Pearson.
- [6]. Reganon, Algie. (2022). In-House Enhancement Training Employing Competency-based Training (CBT) Approach on Grade 12 TVL-ICT-CSS Practical Performance. 1. 65-72.
- [7]. Rost, M. (2022, December 2). Supplementary activities for online classes. *Lateral Communications*. <https://latcomm.com/supplementary-activities-for-online-classes/>
- [8]. UNC-Chapel Hill Writing Center. (2025, February 4). Conclusions – The Writing Center • University of North Carolina at Chapel Hill. The Writing Center • University of North Carolina at Chapel Hill. <https://writingcenter.unc.edu/tips-and-tools/conclusions/>
- [9]. Zabala, O. I. E. (2023). Strategic Intervention Material (SIM) on Senior High School Student Learning in stocks and bonds. *American Journal of Education and Technology*, 2(4), 24–29. <https://doi.org/10.54536/ajet.v2i4.2182>.