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Assessment of Students' Acceptance and Learning Experiences on Electrical Trainer Media in Electrical Installation and Maintenance

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Abstract

This study examined students' acceptance and learning experiences in using Electrical Trainer Media in Electrical Installation and Maintenance (EIM) within the Technical-Vocational-Livelihood (TVL) track. Anchored on the Technology Acceptance Model (TAM), the study investigated perceived usefulness, perceived ease of use, behavioral intention to use, and users' willingness. A mixed-methods research design was employed involving 40 Grade 11 students selected through purposive sampling. Quantitative data were collected through a structured questionnaire adapted from validated TAM instruments and analyzed using descriptive statistics and Pearson product-moment correlation. Qualitative data were gathered through open-ended responses and analyzed using thematic analysis. Results revealed that students demonstrated very high levels of perceived usefulness, perceived ease of use, behavioral intention, and willingness to use the Electrical Trainer Media. A statistically significant moderate positive relationship was found between perceived usefulness and perceived ease of use, partially supporting the TAM framework. However, other relationships among TAM constructs were weak and not statistically significant, which may be attributed to the homogeneity of responses. Thematic analysis identified four key themes: ease of use, efficiency in task performance, enhanced understanding and skill development, and challenges in task execution. Students reported improved efficiency, better conceptual understanding, and increased confidence in performing electrical tasks, although some difficulties related to procedural clarity and prior knowledge were noted. Overall, the study concludes that Electrical Trainer Media is an effective instructional tool that enhances experiential learning and skill development. The findings highlight the importance of usability, instructional support, and learner readiness in optimizing technology integration in technical-vocational education.

Keywords: *Electrical Trainer Media; Technology Acceptance Model; Technical-Vocational Education; Hands-on Learning; Student Learning Experiences*

Introduction

The Philippine education system operates under a trifocal structure involving the Department of Education (DepEd), the Commission on Higher Education (CHED), and the Technical Education and Skills Development Authority (TESDA), with the latter playing a central role in technical-vocational education and training (TVET). In recent years, there has been a strong policy push to align basic education with labor market demands through the Technical-Vocational-Livelihood (TVL) track in senior high school. Collaborative initiatives between DepEd and TESDA aim to strengthen the integration of national competency standards into secondary education, thereby enhancing workforce readiness among graduates (DepEd, 2024; TESDA, 2024). Empirical evidence highlights the importance of TVET in improving employment outcomes, as graduates tend to have higher employability and wage advantages compared to those with only secondary education, although outcomes vary depending on program quality and implementation (Generalao et al., 2025; Vandenberg & Laranjo, 2021). Despite these advancements, systemic challenges persist, particularly in ensuring the quality, accessibility, and effectiveness of skills-based training programs across diverse educational contexts in the Philippines (Limlingan, 2024; TESDA, 2024).

Electrical Installation and Maintenance (EIM) is a core specialization under the TVL track that requires the development of both theoretical understanding and practical competencies aligned with TESDA National Certification standards. However, challenges persist in delivering effective hands-on instruction due to limited laboratory resources, safety risks, and variability in instructional quality (C. Grustan & C. Buniel, 2022; Navarez & Tabernilla, 2024). Studies in Philippine TVET contexts indicate that inadequate training facilities and insufficient access to equipment significantly affect students' skill acquisition and performance in competency-based programs (Orbeta et al., 2021; Francisco & Jasmin, 2023). Recent evaluations further emphasize the need to enhance training delivery mechanisms, including assessment systems and instructional resources, to ensure alignment with industry demands (Francisco & Jasmin, 2023; Eviota & Gabawa, 2025). These constraints highlight the need for innovative instructional tools that can simulate real-world electrical tasks in a safe and controlled environment while enhancing learning efficiency (Yakit & Amoyan, 2026).

The integration of instructional technologies and trainer-based media has become increasingly important in addressing these challenges. In the Philippine context, empirical studies demonstrate that technology-enhanced learning environments significantly improve student engagement and facilitate experiential learning. For instance, a study found that the use of an innovative lighting system trainer significantly influenced students' behavioral intention to use training technology, supporting its role in enhancing technical instruction (Sumaoy & Archival, 2025). Similarly, research on technology integration in TVET and higher education indicates that educators exhibit high levels of technological, pedagogical, and content knowledge (TPACK), which are positively associated with the adoption of innovative teaching practices (Varga & Napoles, 2025). Moreover, Sahusilawane et al. (2024) and Arifin et al. (2025) highlighted that technology acceptance plays a crucial role in determining the effectiveness of digital learning tools in educational settings. Likewise, Lucero et al. (2022) emphasized that students' readiness and positive attitudes toward technology are essential factors in facilitating meaningful learning experiences in higher education institutions.

Beyond acceptance, learning experiences in TVET are inherently multidimensional, encompassing cognitive, psychomotor, and affective domains. Experiential learning theory, particularly that of David Kolb (1984), posits that learners achieve deeper understanding when they actively engage in concrete experiences, reflect on these experiences, conceptualize insights, and apply them in new situations. In skills-based disciplines such as EIM, hands-on activities are essential in developing procedural knowledge and technical proficiency (Omar et al., 2022; Winberg, 2021). Understanding students' lived experiences while using instructional technologies is, therefore, critical in evaluating their instructional effectiveness and alignment with TESDA competency standards (Saro et al., 2022).

Despite the growing integration of instructional technologies in EIM programs, there remains a limited number of empirical studies examining the combined relationship between students' technology acceptance and their learning experiences. Most existing studies focus either on technology adoption or learning outcomes independently, with limited attention to how acceptance influences experiential learning in hands-on environments. Hence, this study aims to assess students' acceptance of Electrical Trainer Media using the Technology Acceptance Model (TAM), determine its relationship, and describe these experiences during hands-on activities. The findings are expected to contribute to strengthening TVET instructional practices, informing curriculum development, and supporting the production of industry-ready graduates.

2. Methodology

2.1 Research Design

A mixed-method research design was employed for this study. The quantitative phase utilized a descriptive-correlational design to assess the level of students' acceptance based on the Technology Acceptance Model (TAM). It also examined the relationships among these variables in the context of students' learning experiences. For the qualitative component, open-ended questions were administered to explore and describe students' lived experiences during hands-on activities using the Electrical Trainer Media.

2.2 Research Participants

The participants of the study consisted of 40 Grade 11 students enrolled in Electrical Installation and Maintenance (EIM) under the Technical- Vocational – Livelihood (TVL) Track. These students were selected using purposive sampling, as they had direct exposure to and experience using the Electrical Trainer Media during their hands-on laboratory activities. This sample size is considered adequate for preliminary correlational analysis and qualitative exploration within a classroom-based educational setting.

2.3 Research Instruments

The quantitative data were collected using a structured survey questionnaire adapted from established instruments based on the Technology Acceptance Model (TAM). The questionnaire consisted of four main constructs: Perceived Usefulness, Perceived Ease of Use, Behavioral Intention to Use, and User's Willingness. Items for each construct were adapted from previously validated instruments to ensure reliability and validity. All items were contextualized and specifically tailored to reflect the integrated instructional approach used in the study. The reliability coefficients (Cronbach's α) for each construct are as follows: Perceived Usefulness = .729, Perceived Ease of Use = .795, Behavioral Intention to Use = .822, and User's Willingness = .893. Each construct included multiple items measured using a 5-point Likert scale ranging from 1 (Strongly Disagree) to 5 (Strongly Agree).

To complement the quantitative data, a set of open-ended questions was utilized to capture students' learning experiences during the use of the Electrical Trainer Media. The questions were designed to elicit responses related to students' perceptions of the learning process, challenges encountered during hands-on activities, skills and knowledge gained, and suggestions for improving the trainer media. These open-ended responses allowed participants to express their experiences in their own words, providing deeper insights into the cognitive, psychomotor, and affective dimensions of learning.

2.4 Data Gathering Procedure

The data-gathering procedure for this study followed a systematic approach consistent with the mixed-methods research design. Before data collection, necessary permissions and approvals were secured from the school administration and relevant authorities. Informed consent was obtained from all

participants, ensuring that they were fully aware of the purpose of the study, their voluntary participation, and their right to withdraw at any time without penalty.

An orientation on the use of the Electrical Trainer Media was conducted before the implementation of the hands-on activities. During this session, students were introduced to the features, functions, and proper handling of the trainer media to ensure safe and effective utilization. This orientation aimed to establish a uniform level of familiarity among participants and to minimize variability in their initial exposure to the instructional tool.

Data collection was carried out after the completion of the hands-on activities involving the Electrical Trainer Media. The quantitative data were gathered through the administration of a structured survey questionnaire in a controlled classroom setting. Subsequently, qualitative data were collected using open-ended questions to capture students' learning experiences, perceptions, and insights regarding the use of the trainer media. Throughout the process, ethical standards were strictly observed, including the assurance of anonymity, confidentiality of responses, and the use of data solely for research purposes.

2.6 Data Analysis

Quantitative data were analyzed using descriptive statistics (mean and standard deviation) to determine the level of students' acceptance, and Pearson product-moment correlation to examine the relationship between TAM variables. The quantitative data collected through this study were coded and analyzed using the Statistical Package for the Social Sciences (SPSS) version 26 software.

For the qualitative data, students' responses to the open-ended questions were collected and compiled for analysis. A thematic analysis approach, guided by the framework of Braun and Clarke (2006), was employed to systematically examine the data.

3. Results and Discussions

This study aims to assess students' acceptance of Electrical Trainer Media using the Technology Acceptance Model (TAM), examine the relationship between technology acceptance, and describe students' learning experiences during hands-on activities.

1. *What are the levels of Perceived Usefulness, Perceived Eased of Use, Behavioral Intention to Use, and Users' Willingness among students towards the Electrical Trainer Media?*

Table 1: Students' Perceived Usefulness of the Electrical Trainer Media

Statements	**Mean±SD**	**Description**	**Interpretation**
1. Using the electrical trainer media activities would help me complete tasks more efficiently in the laboratory, hands-on.	5.00±0.000	Strongly Agree	Perceived Highly Useful
2. Using electrical trainer media can help me improve my performance.	5.00±0.000	Strongly Agree	Perceived Highly Useful
3. Using the electrical trainer media can increase my productivity in performing electrical installation activities	5.00±0.000	Strongly Agree	Perceived Highly Useful
4. Using the electrical trainer can enhance my effectiveness in performing electrical activities	5.00±0.000	Strongly Agree	Perceived Highly Useful
5. Using the electrical trainer media would make it easier to do the job	5.00±0.000	Strongly Agree	Perceived Highly Useful
6. I would find the electrical trainer media useful in laboratory activities	4.95±0.223	Strongly Agree	Perceived Highly Useful
Overall mean	**4.99±0.037**	**Strongly Agree**	**Perceived Highly Useful**

The data presented in Table 1 indicate that students consistently perceived the Electrical Trainer Media as highly useful in supporting their learning during Electrical Installation and Maintenance laboratory activities. Mean scores across the six indicators ranged from 4.95 to 5.00, reflecting strong agreement that the trainer media enhanced task efficiency, performance, productivity, and effectiveness. Notably, five of the six items obtained a perfect mean score of 5.00 (SD = 0.00), while one item recorded a mean of 4.95 (SD = 0.22), indicating a uniformly positive evaluation among the respondents.

The overall mean of 4.99 (SD = 0.04) indicates that the electrical trainer media was perceived as highly useful by the respondents. These findings suggest that the electrical trainer media effectively enhance students' laboratory performance and practical skill development. Its perceived usefulness indicates that it serves as a valuable instructional tool, facilitating hands-on learning, improving productivity in laboratory tasks, and supporting the mastery of electrical installation and maintenance competencies.

These results are consistent with the Technology Acceptance Model (TAM), which posits that perceived usefulness significantly influences users' acceptance and continued use of technology (Fred Davis, 1989). In the context of technical-vocational education, studies have shown that instructional tools perceived as useful contribute to improved learning outcomes and student performance. For instance, Sumaoy and Archival (2025) found that the use of trainer-based instructional media significantly enhanced students' engagement and intention to use the technology in electrical training. Similarly, Linus et al. (2025) emphasized that perceived usefulness is a critical determinant of technology adoption in educational settings, as students are more likely to utilize tools that they believe enhance their academic performance.

Table 2: Students' Perceived Ease of Use of the Electrical Trainer Media

Statements	**Mean±SD**	**Description**	**Interpretation**
1. Learning the electrical trainer media in performing the activity would be easy for me.	5.00±0.000	Strongly Agree	Perceived Highly Eased of Use
2. I would find it easy to install using the electrical trainer media.	5.00±0.000	Strongly Agree	Perceived Highly Eased of Use
3. My interaction with the electrical trainer media would be clear and understandable.	4.90±0.307	Strongly Agree	Perceived Highly Eased of Use
4. I would find the electrical trainer media to be flexible to interact with.	5.00±0.000	Strongly Agree	Perceived Highly Eased of Use
5. It would be easy for me to become skillful using the electrical trainer media.	5.00±0.000	Strongly Agree	Perceived Highly Eased of Use
6. I would find the electrical trainer media easy to use,	4.95±0.223	Strongly Agree	Perceived Highly Eased of Use
Overall mean	**4.97±0.061**	**Strongly Agree**	**Perceived Highly Eased of Use**

The data presented in Table 2 indicate that students perceived the Electrical Trainer Media as highly easy to use in performing laboratory activities. Mean scores across the six indicators ranged from 4.90 to 5.00, reflecting strong agreement that the trainer media was user-friendly, clear, and flexible to interact with. Four of the six items obtained a perfect mean score of 5.00 (SD = 0.00), while the remaining items recorded mean scores of 4.90 (SD = 0.31) and 4.95 (SD = 0.22), respectively.

The overall mean of 4.97 (SD = 0.06) indicates that the Electrical Trainer Media was perceived as highly easy to use by the respondents. This suggests that students experienced minimal difficulty in learning, operating, and interacting with the trainer media. The findings imply that the design and functionality of the tool support ease of learning and skill acquisition, which are essential in hands-on, competency-based instruction.

In educational contexts, technologies that are easy to use reduce cognitive load and allow learners to focus more on task performance rather than tool operation. Supporting this, Sayaf et al. (2022) found

that ease of use is a critical factor influencing students' adoption of learning technologies, as systems perceived as simple and understandable are more likely to be utilized effectively. Granić and Marangunić (2019) emphasized that ease of use contributes to positive learning experiences, particularly when students can interact with the technology without confusion or difficulty. In the context of Electrical Installation and Maintenance, the high perceived ease of use suggests that the Electrical Trainer Media facilitates smoother execution of tasks, promotes confidence, and supports the development of technical skills in a structured and accessible manner.

Table 3: Students' Behavioral Intention to Use of the Electrical Trainer Media

Statements	Mean±SD	Description	Interpretation
1. I intend to use the electrical trainer media.	5.00±0.000	Strongly Agree	Strong Intention to Use
2. I predict that I would use the electrical trainer media in the future.	5.00±0.000	Strongly Agree	Strong Intention to Use
3. I plan to use the electrical trainer media.	4.95±0.223	Strongly Agree	Strong Intention to Use
4. I would recommend the use of electrical trainer media.	5.00±0.000	Strongly Agree	Strong Intention to Use
Overall mean	**4.98±0.055**	**Strongly Agree**	**Strong Intention to Use**

The data presented in Table 3 indicate that students demonstrated a very strong behavioral intention to use the Electrical Trainer Media in their learning activities. Mean scores across the four indicators ranged from 4.95 to 5.00, reflecting strong agreement regarding their intention, willingness, and plans to continue using the trainer media. Three of the four items obtained a perfect mean score of 5.00 (SD = 0.00), while one item recorded a mean of 4.95 (SD = 0.22), suggesting a consistently high level of intention among the respondents.

The overall mean of 4.98 (SD = 0.06) further confirms that students have a strong intention to use the Electrical Trainer Media in future activities. This implies that students not only recognize the value of the trainer media but are also highly motivated to adopt and recommend its continued use in Electrical Installation and Maintenance instruction. Such findings indicate a positive disposition toward integrating the trainer media into regular laboratory practices.

When users perceive a technology as both useful and easy to use, they are more likely to develop a strong intention to utilize it. Supporting this, Ying et al. (2025) found that behavioral intention is significantly influenced by users' perceptions of usefulness and ease of use, ultimately affecting technology adoption in educational settings. Dmello et al. (2023) emphasized that students who demonstrate a strong intention to use technology are more likely to actively engage in learning tasks and achieve better outcomes. In the context of EIM, the high behavioral intention observed in this study suggests that the Electrical Trainer Media is not only accepted but also valued as a sustainable instructional tool that supports continuous learning and skill development.

Table 4: Students' Willingness to Use the Electrical Trainer Media

Statements	Mean±SD	Description	Interpretation
1. I plan to use the electrical trainer media.	5.00±0.000	Strongly Agree	Strong Willingness
2. I will use the electrical trainer media with another colleague.	4.95±0.223	Strongly Agree	Strong Willingness
3. I will use this electrical trainer media independently and will have no difficulty using it.	4.95±0.223	Strongly Agree	Strong Willingness
Overall mean	**4.96±0.102**	**Strongly Agree**	**Strong Willingness**

The data presented in Table 4 indicate that students exhibited a very high level of willingness to use the Electrical Trainer Media in their learning activities. Mean scores across the three indicators ranged from 4.95 to 5.00, reflecting strong agreement regarding their readiness to use the trainer media both collaboratively and independently. One item obtained a perfect mean score of 5.00 (SD = 0.00), while the

remaining two items recorded mean scores of 4.95 (SD = 0.22), indicating consistently positive responses among the participants.

The overall mean of 4.96 (SD = 0.10) suggests a strong willingness among students to adopt the Electrical Trainer Media as part of their learning process. This implies that students are not only inclined to use the trainer media but are also confident in their ability to utilize it effectively in both individual and group settings. Such willingness reflects a high level of acceptance and readiness to integrate the tool into their regular laboratory activities.

Willingness to use technology is often associated with users' confidence and perceived competence, which are critical factors in sustained technology utilization. Supporting this, Sangeeta and Tandon (2021) emphasized that users who perceive educational technologies as beneficial and manageable are more likely to demonstrate a strong willingness to adopt them. Huang and Wu (2022) reported that students who exhibit high levels of willingness are more likely to actively participate in learning activities and demonstrate increased confidence in performing academic tasks. In the context of Electrical Installation and Maintenance, the strong willingness observed in this study suggests that the Electrical Trainer Media effectively fosters students' confidence, independence, and collaborative learning, thereby supporting the development of essential technical competencies.

2. *How do PU, PEU, BIU, and UW interrelate among students in the context of Electrical Trainer Media, and to what extent do these relationships align with the Technology Acceptance Model (TAM)?*

Table 5: Intercorrelation Matrix of TAM Constructs

Perceived Usefulness (PU)			
Perceived Ease of Use (PEU)	546**		
Behavioral Intention to Use (BIU)	-.053	.013	
Users Willingness (UW)	-.076	.327	-.076

**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).

The data presented in Table 5 illustrate the interrelationships among the key constructs of the Technology Acceptance Model (TAM), namely perceived usefulness (PU), perceived ease of use (PEU), behavioral intention to use (BIU), and users' willingness (UW).

A moderate positive and statistically significant relationship was found between perceived usefulness and perceived ease of use ($r = .546$, $p < .01$). This indicates that students who perceived the Electrical Trainer Media as easy to use were also more likely to consider it useful. This finding is consistent with the TAM framework, which posits that perceived ease of use positively influences perceived usefulness (Al-Maatouk et al., 2020; Sukendro et al., 2020). This relationship has been widely supported in empirical studies, where ease of use enhances users' perceptions of a system's effectiveness and utility (Abdullah et al., 2022). Scherer et al. (2023) similarly found that systems perceived as user-friendly tend to be regarded as more beneficial for learning, reinforcing the importance of usability in technology adoption.

In contrast, the relationships between perceived usefulness and behavioral intention to use ($r = -.053$), as well as between perceived ease of use and behavioral intention to use ($r = .013$), were negligible and not statistically significant. Similarly, users' willingness showed weak negative

correlations with perceived usefulness (r = −.076) and behavioral intention to use (r = −.076), indicating no meaningful association among these variables. These findings diverge from the traditional TAM structure, which suggests that perceived usefulness and perceived ease of use significantly influence behavioral intention (Venkatesh et al., 2022; Han et al., 2021). However, previous studies have noted that such relationships may weaken in cases where respondents exhibit uniformly high ratings, limiting variability in the data (Venkatesh et al., 2003). In educational settings, this phenomenon is often attributed to ceiling effects, where students' overwhelmingly positive perceptions reduce the statistical strength of correlations despite favorable evaluations.

However, a low positive correlation was observed between perceived ease of use and users' willingness (r = .327), suggesting that students who found the Electrical Trainer Media easy to use were somewhat more willing to adopt it in their learning activities. Although this relationship is not strong, it indicates a potential influence of usability on students' readiness to engage with the trainer media. This finding is supported by studies indicating that ease of use contributes to users' confidence and willingness to engage with technology, particularly in learning environments where usability reduces cognitive effort (Gunasinghe et al., 2021; Al-Adwan et al., 2022).

Overall, the findings partially support the Technology Acceptance Model, particularly in the significant relationship between perceived ease of use and perceived usefulness. However, the absence of significant relationships involving behavioral intention to use suggests a deviation from the expected TAM structure. The weak correlations observed among some variables may be explained by the limited variability in responses, as reflected in the consistently high mean scores across all constructs. When responses are highly homogeneous, correlation coefficients tend to be attenuated, potentially obscuring underlying relationships (Counsell, 2022; Revelle, 2024). These results highlight the importance of considering both statistical outcomes and contextual factors when interpreting technology acceptance in small, homogeneous samples.

3. *How do students describe their learning experiences in using the Electrical Installation Trainer Media during hands-on activities?*

Students' Learning Experiences using the Electrical Installation Trainer Media

The students shared their learning experiences in using the Electrical Installation Trainer Media during hands-on activities, highlighting several aspects related to usability, efficiency, understanding, skill development, and overall learning engagement:

Theme 1: Ease of Use

Students consistently emphasized the ease of use of the Electrical Trainer Media, describing it as simple, user-friendly, and easy to understand. Many students expressed that they were able to operate the trainer without difficulty, even with minimal guidance from the teacher. One student shared:

> *"…The electrical trainer media is easy to use and easy to understand, especially for beginners like us. Even if it is our first time using it, we can already follow the steps because the parts are labeled and organized. We do not find it too difficult, so we can focus more on doing the activity properly." (S1)*

Another student noted:

> *"…The trainer is very user-friendly. I did not find it difficult to follow the procedures because everything is arranged properly. Compared to doing it manually before, it is much easier now*

because we already have a guide. Even if you are not very experienced, you can still perform the activity." (S5)

Similarly, a student mentioned:

"…It is easy to install the components because everything is clear and organized. You will not get confused about where to place the wires because there is already a guide. It really helps us who are still learning the basics of electrical installation." (S9)

Another student expressed:

"…It is easy to use even without too much instruction from the teacher. I can easily understand how to do the connections, so I do not spend too much time figuring out how to start. It helps me feel less overwhelmed during the activity." (S12)

These responses indicate that the trainer media supports accessibility and usability, particularly for students with limited prior knowledge in electrical installation. The simplicity and clarity of the trainer allow students to focus more on performing the tasks rather than struggling with the tool itself. This aligns with the principle of usability in instructional design, where simplified interfaces reduce cognitive load and promote better learning engagement.

These findings are consistent with prior research. Yanti and Srisudarso (2024) found that students are more likely to accept and use instructional technologies when they perceive them as simple and easy to navigate. Furthermore, Emiroğlu et al. (2022) reported that ease of use enhances students' learning experiences by minimizing confusion and enabling smoother interaction with learning tools. These studies support the present findings, suggesting that the user-friendly design of the Electrical Trainer Media plays a crucial role in facilitating effective and engaging hands-on learning.

Theme 2: Efficiency in Task Performance

Students also highlighted the efficiency of the Electrical Trainer Media in completing laboratory tasks. Many reported that the trainer enabled them to perform activities faster, with greater accuracy, and with less effort. One student stated:

"…I was able to finish the installation faster compared to manual methods. Before, it would take more time because we had to figure out the connections on our own, but with the trainer, the steps are already organized so it is easier to follow." (S3)

Another student shared:

"…The trainer helps me complete the activity quickly and correctly. I do not have to repeat the process many times because I can already see the proper way of connecting the wires, which saves time." (S10)

Additionally, a student remarked:

"…The installation process is faster because the trainer simplifies the steps. It is easier to understand what to do next, so I do not get confused or delayed while doing the task." (S16)

Another student expressed:

"…Using the trainer makes the activity more efficient because everything is already prepared. I can focus more on doing the task instead of thinking too much about what to do first." (S18)

Similarly, one student noted:

"…It helps me avoid mistakes, so I do not need to repeat the work again. Because of that, I can finish the activity on time and with better output." (S21)

These responses suggest that the trainer media enhances productivity and streamlines the learning process. By reducing unnecessary steps and minimizing errors, the Electrical Trainer Media allows students to complete tasks more efficiently, which is essential in developing competence in hands-on technical activities. In the context of technical-vocational education, studies have shown that instructional tools that enhance efficiency contribute to better learning outcomes and skill acquisition. Vongkulluksn et al. (2020) highlighted that students are more inclined to use learning technologies that improve their task performance and reduce effort. Similarly, Ahamad et al. (2021) found that efficient and well-structured learning tools enable students to complete tasks more effectively, leading to improved engagement and performance. These findings support the present results, indicating that the Electrical Trainer Media serves as an effective instructional tool in enhancing efficiency during hands-on activities.

Theme 3: Enhanced Understanding and Skill Development

A major theme that emerged from the data was the role of the Electrical Trainer Media in improving students' understanding and technical skills. Students reported that the trainer helped them visualize electrical connections more clearly and apply theoretical knowledge in practical contexts. One student expressed:

"…I understand wiring better because I can see the connections clearly. Before, it was difficult to imagine how the circuit works, but now I can actually see how everything is connected, so it is easier to understand the lesson." (S7)

Another student noted:

"…The trainer helps me understand the process step by step. It guides me on what to do first until the last step, so I do not get confused while doing the activity." (S10)

In terms of skill development, a student shared:

"…It improves my skills because I can practice without difficulty. I can repeat the activity if needed, and that helps me become more familiar with the proper installation." (S6)

Similarly, another student mentioned:

"… There are fewer mistakes when using the trainer because it guides us. I can correct myself immediately if something is wrong, so I learn faster." (S11)

Another student expressed:

"…The trainer helps me apply what we learned in class. It is easier to connect the theory to actual practice because I am doing it myself." (S14)

Additionally, one student shared:

"…I became more confident in doing electrical connections because I already understand the process and I have practiced it several times using the trainer." (S17)

These findings suggest that the trainer media effectively supports both cognitive and psychomotor learning by enabling students to practice, apply, and refine their skills in a structured and guided environment. The ability to visualize connections and perform repeated practice enhances both conceptual understanding and technical competence.

These results are supported by experiential learning principles, particularly the Experiential Learning Theory, which emphasizes that learning occurs through active engagement, reflection, and application of knowledge in real-world contexts (David Kolb, 1984). Hands-on activities, such as those facilitated by the trainer media, enable learners to transform abstract concepts into meaningful experiences. Al-Ansi et al. (2023) highlighted that technology-supported learning environments improve students' conceptual understanding and practical skills. Similarly, Zhang et al. (2023) emphasized that interactive and hands-on learning tools enhance both knowledge acquisition and skill development by allowing students to actively participate in the learning process. These studies support the present findings, demonstrating that the Electrical Trainer Media is an effective instructional tool in fostering both understanding and technical competency.

Theme 4: Challenges Encountered in Understanding and Task Execution

Despite the generally positive experiences, students also reported several challenges encountered while using the Electrical Trainer Media during hands-on activities. These difficulties were mainly related to understanding certain procedures, making correct connections, and managing time during task completion. One student shared:

"…There are times when I get confused with the steps, especially when I do not fully understand the instructions. I need to ask for help before I can continue the activity." (S4)

Another student noted:

"…I had difficulty with the connections at first because I was afraid of making mistakes. I was not sure if what I was doing was correct, so I became hesitant." (S15)

Similarly, a student expressed:

"…Some parts of the activity are still hard to understand, especially if you do not have enough background knowledge. It takes time before I can figure out what to do." (S19)

Another student mentioned:

"…I sometimes connect the wires incorrectly, and I have to repeat the process. It slows me down, especially when I am not sure where the correct connection should be." (S22)

In terms of time constraints, a student shared:

"…There are times when the activity feels rushed, and it becomes difficult to complete everything properly. I need more time to fully understand and finish the task." (S25)

These responses indicate that while the Electrical Trainer Media supports learning, students still encounter challenges related to procedural understanding, confidence in execution, and time management. These difficulties may affect their performance and slow down the completion of tasks, particularly for

those with limited prior knowledge or experience in electrical installation. These findings are supported by studies in technical-vocational education, which highlight that learners often experience initial difficulties when engaging with hands-on tasks, particularly when instructions are unclear or when foundational knowledge is insufficient (Billett, 2020; ILO, 2021).

Furthermore, research on instructional design emphasizes the importance of clear instructions and scaffolding to support learners in complex tasks. Mokoena and Mesuwini (2024) noted that insufficient guidance and unclear procedures can lead to confusion and reduced learning efficiency in technology-supported environments. Similarly, DepEd (2022) highlighted that while educational technologies enhance learning, their effectiveness depends on proper implementation, including adequate support, time allocation, and learner readiness.

These findings suggest that addressing students' challenges through clearer instructions, additional guidance, and sufficient practice time can further enhance the effectiveness of the Electrical Trainer Media and improve students' overall learning experience.

Conclusion

This study examined students' acceptance of the Electrical Trainer Media using the Technology Acceptance Model (TAM) and explored their learning experiences during hands-on electrical installation activities. Quantitative findings revealed a statistically significant moderate positive relationship between perceived ease of use and perceived usefulness, indicating that students who found the trainer easy to use were more likely to perceive it as useful for learning electrical installation tasks. However, other relationships among TAM constructs, including behavioral intention to use and users' willingness, were weak and not statistically significant, suggesting partial alignment with the traditional TAM structure.

Qualitative findings further supported these results by revealing four major themes: ease of use, efficiency in task performance, enhanced understanding and skill development, and challenges encountered in execution. Overall, Students generally perceived the Electrical Trainer Media as user-friendly and effective in facilitating faster task completion, improved conceptual understanding, and skill acquisition. Nevertheless, some learners experienced difficulties related to procedural clarity, limited prior knowledge, and confidence in execution.

Integrating both quantitative and qualitative results, the study concludes that the Electrical Trainer Media is an effective instructional innovation that enhances usability, learning efficiency, and skill development in electrical installation. Nevertheless, its impact on behavioral intention and willingness to use is influenced by contextual factors such as learner readiness, clarity of instruction, and prior experience. These findings indicate a partial but meaningful support for the Technology Acceptance Model in the context of technical-vocational education.

Recommendations

Based on the findings of this study, the following recommendations are proposed to enhance the effective implementation of the Electrical Trainer Media in technical-vocational education, as well as to guide institutional practice and future research directions.

For Teachers

Teachers are encouraged to integrate the Electrical Trainer Media as a structured instructional tool in electrical installation lessons. Clear procedural demonstrations, scaffolded instruction, and continuous formative feedback should be emphasized to support learner comprehension and reduce execution errors. Differentiated instruction may also be applied to accommodate varying learner readiness levels.

For School Administrators

School administrators should support the sustainable integration of trainer-based instructional technologies by ensuring adequate resources, maintenance systems, and capacity-building programs for teachers. Investment in instructional innovation is recommended to enhance the quality of technical-vocational education delivery.

For Future Researchers

Longitudinal and multi-site studies are recommended to validate the findings and enhance the generalizability of the results. Future research may also consider comparative analyses between traditional instructional approaches and trainer-assisted learning to generate deeper insights into their relative effectiveness in improving student learning outcomes in technical-vocational education.

Limitations

This study is limited by its focus on a single institutional context involving students exposed to the Electrical Trainer Media, which may restrict the generalizability of the findings to other TVET settings. It focuses only on the assessment of students' acceptance of the Electrical Trainer Media rather than measuring actual learning outcomes or academic performance gains. The qualitative data relied on self-reported student experiences, which may be influenced by response bias. Furthermore, the study did not fully account for other potential influencing factors such as prior experience, instructor differences, and learning environment conditions, which may have affected students' perceptions and responses.

Ethical Procedures

This study adhered to established ethical research standards to ensure the protection of participants and the integrity of the research process. Prior to data collection, permission was secured from the concerned institution, and informed consent was obtained from all student participants, who were clearly informed about the purpose of the study, their voluntary participation, and their right to withdraw at any time without penalty. Confidentiality and anonymity were strictly observed by assigning codes to participants and ensuring that no identifying information was disclosed in the reporting of findings. All collected data were used solely for research purposes and were securely stored and handled with strict confidentiality throughout the study.

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