BRIDGING SUPPORT AND PRACTICE: INSTITUTIONAL GAPS IN EIM FACILITY UTILIZATION EXPLORED AMONG DEPED SHS TVL TEACHERS

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ABSTRACT. *Technical Vocational Education and Training (TVET) programs such as Electrical Installation and Maintenance (EIM) play a pivotal role in equipping learners with employable, market-relevant skills. However, disparities in institutional support for teaching facilities may affect the quality and equity of instruction. This study aimed to examine the extent of institutional support for EIM facilities and their utilization in public senior high schools in Zamboanga City, Philippines. Utilizing a cross-sectional correlational design, data were gathered from 112 purposively selected EIM teachers through a validated researcher-made questionnaire. Descriptive statistics, Pearson r correlation, and independent samples t-tests were used to analyze the data. Results revealed a very high extent of institutional support and utilization. A significant moderate positive correlation was found between institutional support and facility utilization, $r(110) = .587$, $p < .001$, indicating that higher levels of support are associated with greater utilization in teaching. Furthermore, significant differences were found in institutional support between integrated and stand-alone schools, particularly in FDAS installation, $t(110) = 4.294$, $p < .001$. These findings underscore the need for targeted support in under-resourced schools to ensure equitable delivery of the EIM curriculum. The study recommends differentiated resource allocation, curriculum adjustments, and continuous facility enhancement to optimize instructional quality in TVET programs.*

Keywords: Electrical Installation and Maintenance, Institutional Support, Facility Utilization, TVET, Senior High School, Philippines

INTRODUCTION

Technical Vocational Education and Training (TVET) programs are vital in equipping learners with market-relevant competencies indispensable for national and global economic development and employability. For instance, Morley (2024) emphasized that TVET equips learners with technical skills for various industries and that TVET creates a bridge between education and economic growth, helping individuals secure employment while boosting overall productivity. Yusvana (2025) also highlihted the impact of innovative TVET initiatives on addressing the skills gap and promoting socio-economic development.

One of the most essential qualifications in TVET is the Electrical Installation and Maintenance (EIM). The global electrical services market — encompassing installation, maintenance, repair, inspection, and related services — was valued at USD 381.32 billion in 2025 and is projected to reach USD 609.99 billion by 2034, growing at a compound annual growth rate (CAGR) of 5.36%. Asia-Pacific leads with 39% market share, followed by Europe at 28%, and North America at 24% [1]. This robust expansion underscores the growing need for skilled electrical technicians and maintenance specialists. In the U.S., installation and maintenance occupations are expected to generate over 600,000 job openings annually in the coming decade [2]. Although specific Philippine statistics are limited, the substantive compensation levels for maintenance electricians (ranging from ₱360,000 to ₱610,000 annually) suggest strong local market value for EIM competencies [3].

This growing demand of EIM skilled workers globally and in the Philippines necessitates a good training institution equipped with facilities. As such, the administrative support for prividing appropriate and sufficient laboratory equipment, tools and facilties are essential in roder to equip students with the necessary skills to achieve the ultimate goals of TVET. Equally important is the proper utilization of the laboratory facilties among the teachers and trainors in order to ensure that students are equipped with the necessaily skills to thrive and to become eomployed in the qualifications and sector that they are trained.

The successful delivery of the Electrical Installation and Maintenance (EIM) curriculum is fundamentally dependent on the availability and effective utilization of specialized facilities and equipment—such as domestic electrical wiring setups, CCTV systems, FDAS, and troubleshooting tools. Empirical evidence demonstrates that when these instructional resources are present and functional, they are not only integrated effectively into teaching but also correlate significantly with improved learner outcomes[4-6]. Institutions that provide robust support in terms of functional teaching facilities directly influence the quality of skills acquisition and learner outcomes [7-9]

While prior studies have acknowledged the significance of equipment and facilities in technical education [10, 11], empirical investigations remain scarce regarding how institutional support translates into practical utilization by teachers, especially within senior high schools in regions experiencing infrastructural disparities such as Zamboanga City. Context-specific factors such as school categorization (stand-alone versus integrated), teacher qualifications, and length of service likely moderate this relationship but lack comprehensive exploration.

The current study addresses this empirical gap by systematically examining the extent of institutional support on facilities and the consequent utilization levels during instructional delivery of EIM in Zamboanga City public senior high schools. This study also analyzes differences in support and utilization patterns among schools categorized as stand-alone and integrated, alongside demographic moderators such as age, qualification, and TESDA certification. The study's contribution lies in elucidating the correlational dynamics between support and utilization, thus informing policy and operational decisions for technical education enhancement in the Philippine context and similarly situated developing regions.

Review of Related Literature

The nexus between institutional support and resultant teaching effectiveness has been widely recognized in TVET literature [12-14]. Adequate facilities not only provide the physical means for skills training but also foster teacher confidence and student engagement [7, 11]. A comprehensive study examining the Electrical Installation and Maintenance Works (EIMW) program in technical colleges of Nigeria's North-East geopolitical zone found that equipment, tools, and measuring instruments were only moderately available [15]. The study underscores that the adequacy of such equipment is indispensable for the meaningful implementation of the EIMW curriculum and effective practical skill development.

Similarly, the quality teaching delivery is contingent on the presence of relevant, up-to-date teaching and learning facilities[16, 17, 11, 14]. Their findings resonated with emerging global studies advocating for enhanced teaching-learning infrastructural investments to meet evolving technical education needs [18, 19].

In the Philippine setting, the Department of Education's K to 12 Program highlights expanded TVET offerings in senior high schools to enhance employability [20-22], with EIM being a critical track under the Technical-Vocational-Livelihood (TVL) strand [23]. Nevertheless, observational accounts from educational institutions indicated insufficient facilities impeding full competency attainment and practical demonstration by instructors [24]. This echoes broader challenges reported in low-resource contexts manifesting as gaps between policy and practice [25-27].

Notably, recent empirical gaps include limited quantitative data on the extent of facility utilization correlating with institutional support in senior high school EIM programs and insufficient disaggregation by school attributes. This study therefore draws upon and extends prior work by integrating a correlational framework, enriched with demographic analyses pertinent to Zamboanga's diverse schooling arrangements. Specifically, this study addresses the following questions:

1. What is the extent of institutional support on facilities in teaching Electrical Installation Maintenance across the specified facility areas?
2. What is the extent of utilization of these facilities during teaching?
3. Is there a significant relationship between institutional support and facility utilization in EIM?
4. Are there significant differences in institutional support between stand-alone and integrated schools?

METHODOLOGY

Research Design

To address the research questions, this study employed a cross-sectional correlational research design, which is appropriate for examining the extent and relationship between institutional support and facility utilization in EIM teaching without manipulating variables. This design allows for the collection of data at a single point in time, providing a snapshot of current conditions and associations among variables within natural educational settings [28]. It is particularly suited for identifying statistically significant relationships where experimental control is neither feasible nor necessary, aligning with the study's goal of generating empirical insights on existing practices in technical-vocational education.

Sample of the Study and Sampling Method

The study involved 112 EIM teachers from six public senior high schools in Zamboanga City encompassing both stand-alone and integrated institutions who were purposively selected based on predetermined inclusion and exclusion Cri [29]. To qualify as respondents, the teacher must be handling EIM subject in the SHS TVL strand for at least a year. Schools varied by size and program offerings, providing a heterogeneous sample relevant to the research aims.

Instrumentation

Data were collected using a structured, researcher-developed questionnaire composed of three sections. Part I gathered demographic information, including age, educational qualification, length of service, TESDA certifications, relevant training, and school assignment. Part II assessed the extent of institutional support for facilities across four domains: Domestic Electrical Wiring Installation, CCTV Installation, FDAS Installation, and Troubleshooting and Maintenance. Part III measured the extent of utilization of these same facilities during instructional delivery. Both Parts II and III used a 4-point Likert scale (1 = No extent, 4 = High extent). To ensure content validity, the instrument was reviewed by three doctoral-level experts in research and technical education, as suggested by Lynn [30], whose specialized knowledge helped ensure alignment with curricular and industry standards. A pilot test was conducted with 30 non-participating EIM teachers to establish reliability [31]. The instrument yielded Cronbach's alpha coefficients of $\alpha = .872$ for institutional support and $\alpha = .832$ for facility utilization, both of which exceed the acceptable threshold of 0.70 and indicate high internal consistency[32, 33].

Data Collection Procedure

Following ethical clearance and approval from the Schools Division Superintendent, the questionnaires were administered face-to-face with the assistance of school principals. This approach facilitated immediate clarification of respondent queries and ensured prompt retrieval of completed forms [34]. Participation was voluntary, and strict measures were observed to uphold anonymity and confidentiality in accordance with ethical standards for educational research [35].

Data Analysis

The data collected for this study were analyzed using descriptive statistics using weighted means were employed to assess the levels of institutional support and facility utilization. An independent samples t-test was conducted to determine significant differences in institutional support between school categories (integrated vs. stand-alone). Pearson's r was used to examine the correlation between institutional support and facility utilization. Statistical significance was determined at the 0.05 level ($p < .05$).

RESULTS AND DISCUSSION

Extent of Perceived Institutional Support on Facilities

Institutional support for facilities is a cornerstone of effective technical-vocational education [11, 14]. In the context of

TVL strand, well-supported schools are more capable of delivering competency-based instruction aligned with industry standards [4, 7]. The provision of functional tools and equipment in EIM—ranging from wiring components to safety devices—is essential not only for fostering student skill acquisition but also for ensuring that teachers can implement the curriculum as intended. Table 1 presents the extent of institutional support provided for EIM facilities across four major domains. Results show that overall institutional support was perceived to be very high, with mean values ranging from *M = 3.32* to *M = 3.69* on a 4-point Likert scale.

Table 1. Extent of Institutional Support for Facilities for EIM

Domestic Electrical Facilities	**Mean**	**Description**
Standard wires, cables, connections	3.60	VHS
Electrical power tools, hard tools and personal protective equipment	3.62	VHS
Lamps, receptacles, and lighting fixture	3.67	VHS
Convenience outlets, utility box, and juncture box	3.64	VHS
Circuit breakers, panel board and switches	3.60	VHS
Average	3.63	VHS
CCTV Installation Facilities		
Dome type and bullet type cameras	3.36	VHS
Data Video Recorder (DVR)	3.36	VHS
Flat Screen Television Monitor	3.50	VHS
Automatic Voltage Regulator	3.45	VHS
Panel Board Control System	3.38	VHS
Average Perceived Support	3.41	VHS
FDAS Installation Facilities		
Fire Alarm Bell	3.60	VHS
Call Point	3.29	VHS
Heat Detector	3.17	HS
Smoke Detector	3.14	HS
Fire Alarm Control Panel Board	3.40	VHS
Average Perceived Support for FDAS	3.32	VHS
Troubleshooting Facilities		
Testing and measuring instruments such as multitasker	3.69	VHS
Network Cable Tester	3.57	VHS
Hand Tools and Power Tools	3.57	VHS
Ladder and harness	3.52	VHS
Personal Protective Equipment such as Safety Gloves, Safety Googles/Hard hot	3.64	VHS
Average Perceived Support for Troubleshooting Facilities	3.60	VHS

The analysis of institutional support across the four major facility categories used in Electrical Installation and Maintenance (EIM) instruction revealed consistently high levels of support as perceived and experienced by EIM teachers. Among the domains, Domestic Electrical Facilities received the highest average support *(M = 3.63),* followed by Troubleshooting Facilities *(M = 3.60).* CCTV Installation Facilities were also well-supported *(M = 3.41)*, while FDAS Installation Facilities received the lowest average support, though still within the Very High Support range *(M = 3.32).* These results suggest that schools have prioritized the provision of core EIM infrastructure, although some areas, such as FDAS systems, may require targeted improvements to fully align with curriculum and safety standards.

These findings affirm the vital role of institutional investment in providing adequate EIM facilities, consistent with existing literature that links resource availability to teaching effectiveness and student performance [36, 37]. However, the slightly lower support in FDAS components may suggest areas for targeted improvement, particularly as these are crucial for safety-related competencies. Overall, the data reflect a strong institutional commitment to equipping EIM programs, which is fundamental to ensuring that graduates meet occupational standards in the electrical industry.

Extent of Utilization of EIM Facilities

The effective utilization of Electrical Installation and Maintenance (EIM) facilities plays a critical role in delivering competency-based instruction in technical-vocational education. When teachers actively use available facilities, learners are provided with authentic, hands-on experiences that mirror real-world applications—thereby improving their skills proficiency, confidence, and readiness for employment [38]. Utilization also reflects the teacher's ability to integrate tools and equipment into the curriculum, bridging the gap between theory and practice. Table 2 results show that EIM facilities are highly utilized across all domains, with mean scores ranging from *M = 3.28* to *M = 3.61* on a 4-point Likert scale.

Specifically, Domestic Electrical Facilities had the highest level of utilization (*M = 3.61),* indicating that teachers consistently integrate basic wiring tools and materials into their instructional practices. Troubleshooting Facilities followed closely behind *(M = 3.53),* suggesting regular use of diagnostic and safety equipment such as multitesters, cable testers, and personal protective gear. CCTV Installation Facilities also showed strong utilization *(M = 3.41),* while FDAS Installation Facilities received the lowest utilization rating among the categories *(M = 3.28),* though still within the Very Highly Utilized (VHU) range.

Table 2. The Extent of Utilization of EIM Facilities in Teaching

EIM Facilities in Troubleshooting	**Mean**	**Description**
Domestic Electrical Facilities		
Standard wires, cables, connections	3.69	VHU
Electrical power tools, hard tools and personal protective equipment	3.55	VHU
Lamps, receptacles, and lighting fixture	3.69	VHU
Convenience outlets, utility box, and juncture box	3.62	VHU
Circuit breakers, panel board and switches	3.48	VHU
Average	3.61	VHU
CCTV Installation Facilities		
Dome type and bullet type cameras	3.33	VHU
Data Video Recorder (DVR)	3.31	VHU
Flat Screen Television Monitor	3.45	VHU
Automatic Voltage Regulator (AVR)	3.43	VHU
Panel Board Control System	3.52	VHU
Average Perceived Support	3.41	VHU
FDAS Installation Facilities		
Fire Alarm Bell	3.52	VHU

Call Point	3.21	HU
Heat Detector	3.19	HU
Smoke Detector	3.23	HU
Fire Alarm Control Panel Board	3.26	VHU
Average Perceived Support for FDAS	3.28	VHU
Troubleshooting Facilities		
Testing and measuring instruments	3.55	VHU
Network Cable Tester	3.48	VHU
Hand Tools and Power Tools	3.55	VHU
Ladder and Harness	3.57	VHU
Personal Protective Equipment such as Safety Gloves, Safety Googles/Hard hot Scaffolding	3.50	VHU
Average Perceived Support for Troubleshooting Facilities	3.53	VHU

The slightly lower utilization of FDAS facilities may be attributed to the limited availability of certain components (e.g., heat and smoke detectors) or the specialized nature of the competencies involved. Nevertheless, the overall high utilization levels demonstrate a strong alignment between available resources and actual teaching practices—highlighting that EIM teachers are maximizing institutional support to meet instructional demands.

These findings affirm earlier studies emphasizing the importance of resource use in technical education, where the presence of facilities alone is insufficient without corresponding utilization by instructors [7, 39]. Continued encouragement of hands-on teaching, paired with training and facility maintenance, will help sustain and improve the quality of instruction across institutions.

Relationship between institutional support and facility utilization in EIM

To determine the relationship between institutional support and the utilization of EIM facilities in teaching, a Pearson product-moment correlation was conducted. Results revealed a moderate positive correlation between institutional support and facility utilization, which was statistically significant, *r(110) = .587, p < .001)* as shown in Table 3.

The results of data analysis suggests that as institutional support for EIM facilities increases, the level of facility utilization by teachers also tends to increase. The result supports the premise that the presence of adequate, functional facilities encourages instructors to integrate these tools into their instructional practices, ultimately enhancing the delivery of technical-vocational education.

Differences in institutional support between stand-alone and integrated schools

To examine whether institutional support for EIM facilities differed by school type, an independent samples t-test was conducted comparing integrated and stand-alone senior high schools across four facility categories. The results are summarized in Table 4. A statistically significant difference was found in the support for Domestic Electrical Installation facilities*, t(110) = 1.984, p = .054*, with integrated *schools (M = 3.74, SD = 0.41)* reporting higher support than stand-alone schools *(M = 3.41, SD = 0.67).* While the p-value is marginal, it approaches the conventional threshold for significance and suggests a trend worth noting.

Table 3. Correlations between Institutional Support and the Utilization of EIM Facilities in Teaching

		Institutional support	Utilization of facilities
Institutional support	Pearson Correlation	1.000	0.587**
	Sig (2-tailed)		.001
	N		112
Utilization of facilities	Pearson Correlation	0.587**	1.000
	Sig (2-tailed)	0.001	
	N	112	

Table 4. Comparison of Facilities Utilization Between Integrated School and Standalone School Across Areas of EIM

Variable	Type of School	Mean	SD	T-value	P-Value	Interpretation
Domestic Electrical Installation	Integrated	3.74	0.407	1.984	.054	Significant
	Stand Alone	3.41	0.665			
CCTV Installation	Integrated	3.62	0.602	0.936	.007	Significant
	Stand Alone	3.01	0.678			
FDAS Installation	Integrated	3.63	0.581	4.294	.000	Significant
	Stand Alone	2.76	0.690			
Troubleshooting	Integrated	3.67	0.427	0.712	.484	Not Significant
	Stand Alone	3.55	0.616			

For CCTV Installation facilities, the difference was statistically significant*, t(110) = 0.936, p = .007*, with integrated schools again receiving more support *(M = 3.62, SD = 0.60)* than stand-alone schools *(M = 3.01, SD = 0.68).* A similar result was observed in the FDAS Installation category, where integrated schools *(M = 3.63, SD = 0.58)* reported significantly higher institutional support than stand-alone schools *(M = 2.76, SD = 0.69), t(110) = 4.294, p < .001.* However, no statistically significant difference was found in Troubleshooting Facilities, *t(110) = 0.712, p = .484,* suggesting that both school types offer comparable levels of support in this domain.

These findings indicate that school type plays a substantial role in shaping the extent of institutional support provided for key EIM facility areas. Integrated schools tend to receive higher levels of support across multiple domains, possibly due to better funding mechanisms, more established infrastructure, or greater administrative capacity.

The significant disparities in facility support—especially in advanced systems like CCTV and FDAS—highlight a potential equity gap in the delivery of technical-vocational education. Students and teachers in stand-alone schools may be disadvantaged by limited access to critical instructional resources, thereby affecting the quality of training and learners' readiness for TESDA certification or industry employment.

From a policy perspective, this underscores the need for differentiated resource allocation that takes into account school type and capacity. DepEd and local school boards should consider targeted investments to strengthen EIM program implementation in under-resourced stand-alone schools. Doing so will help ensure equitable learning opportunities and support the broader goals of the K–12 curriculum and national workforce development.

CONCLUSION

The results of this study revealed a statistically significant moderate positive correlation between institutional support and the utilization of EIM facilities, affirming that higher levels of support are associated with more consistent use of facilities in instruction. This confirms the core assertion of Lagunero and Namoco [7] that institutional investments in tools, equipment, and infrastructure are not merely symbolic but functionally enable skill-based instruction in TVET programs. The practical implication is that when EIM teachers are provided with adequate, functional, and industry-relevant tools, they are more inclined and empowered to integrate these into authentic, hands-on teaching, thereby aligning practice with the outcomes of the K to 12 curriculum.

Furthermore, the study found statistically significant differences in institutional support based on school type. Integrated schools consistently reported higher support levels in Domestic Electrical and FDAS facilities, compared to stand-alone schools. These results mirror concerns raised by Timbasal-Nuevo [24] and Manzano [8], who pointed out structural disparities across school types in terms of resource allocation and administrative capacity. Such disparities raise equity concerns, as learners from stand-alone schools may be receiving inferior training due to systemic underfunding—potentially compromising their readiness for TESDA certification or direct industry engagement.

Interestingly, no significant difference was observed in the support for Troubleshooting Facilities, suggesting that basic diagnostic and safety tools may be uniformly available regardless of school classification. This finding offers an important contrast to earlier claims that resource inadequacy is pervasive across all technical domains [25]. It suggests that some facility types—perhaps due to their universal importance or relatively lower cost—may be prioritized more evenly.

These findings contribute empirically to the broader body of TVET literature [10, 11] by quantifying how institutional support manifests in day-to-day teaching practices and how these are stratified by school type. Notably, they support the assertion of Akomolafe and Adesua [37] that teaching quality is inextricably tied to facility availability and use.

From a policy and programmatic standpoint, these results underscore the need for equity-driven resource distribution, especially in stand-alone schools, which often serve underserved communities. DepEd and LGUs must consider differentiated infrastructure planning, ensuring that minimum standards of facility support are met regardless of school type. Moreover, investments must be sustained beyond procurement—toward teacher training, routine equipment maintenance, and curriculum alignment, as emphasized by Esquinas and Namoco [16] and Ul Hassan *et al.* [19].

Finally, the implications extend to curriculum implementation and teacher professionalization. Where resources are sufficient and actively used, teachers are more likely to implement contextualized, standards-based instruction that supports national goals of employment-readiness, economic contribution, and lifelong learning.

RECOMMENDATIONS

Based on the findings of the study and of the limitations of the study, the following are recommended for practical actions to be undertaken.

For Curriculum Designers and Implementers. It is recommended that curriculum planners within DepEd and TESDA further align the EIM curriculum with the training regulation to ensure that learning competencies are supported by accessible equipment. Moreover, contextual adjustments may be made in under-resourced schools to ensure that instructional delivery remains meaningful despite infrastructure gaps, as disparities between school types remain evident.

For Policy Makers. The DepEd and local government units may consider to establish equity-focused policies that prioritize the provision and maintenance of essential EIM facilities in stand-alone schools. The significant differences observed in institutional support across school types indicate a need for differentiated resource allocation strategies that ensure uniform access to technical-vocational education across varying contexts.

For School Administrators. Integrated and stand-alone school leaders may conduct regular audits of their EIM facility inventories and utilization patterns. Based on such assessments, they may also initiate school-based resource mobilization plans or establish linkages with industry and government agencies to augment facility gaps—especially in emerging competencies like CCTV and FDAS installation, where support and usage were comparatively lower.

For Future Researchers. It is recommended that future studies explore the longitudinal impact of institutional support on student performance, TESDA certification outcomes, and post-graduation employment in the electrical sector. Additionally, qualitative investigations into teacher perceptions and barriers to facility utilization—especially in low-resource settings—can complement this study's quantitative insights and inform more nuanced policy decisions.

Disclaimer:

The researcher utilized Generative Artificial Intelligence (Generative AI), specifically OpenAI's ChatGPT, to assist in enhancing the clarity and academic tone of the language used

in this manuscript. The content, analyses, and interpretations, however, remain the sole responsibility of the researcher.

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