Navigating the Technical-Vocational Gap: A Qualitative Case Study of Work Immersion Challenges in Electrical Installation and Maintenance in Surigao del Sur

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ABSTRACT

The transition from school-based laboratories to industrial workplace environments remains a critical phase in the technical-vocational-livelihood (TVL) curriculum. This study evaluated the work immersion process of Grade 12 Electrical Installation and Maintenance (EIM) students in Surigao del Sur, Philippines, by identifying the challenges encountered by both learners and industry partners. Employing a qualitative case study design, semi-structured interviews were conducted with twenty (20) students and thirteen (13) industry mentors. Data were analyzed using thematic analysis to identify recurring patterns and divergent perspectives. Findings revealed five primary challenges: technical-pedagogical disparity stemming from unfamiliarity with equipment; difficulties in socio-professional transition and workplace acculturation; instructional misalignment caused by rapid communication; temporal constraints due to insufficient immersion duration; and a mentorship-workload paradox among industrial staff. A notable divergence was observed where students emphasized a need for extended practice to achieve technical confidence, while industry partners prioritized professional adaptability and communicative initiative. The study concludes that the efficacy of work immersion is shaped not only by the student's technical aptitude but also by the instructional synchronization between academic institutions and industry providers. These findings emphasize the need for context-aware teaching practices, toolset alignment, and structured mentorship frameworks to ensure the development of industry-ready TVL graduates.

Keywords: ***Work Immersion, TVL-EIM, Industry Partners, Technical Challenges, Vocational Pedagogy, Instructional Synchronization, Vocational Acculturation***

1. INTRODUCTION

The intensifying demand for a technically proficient workforce in the global industrial sector has placed unprecedented pressure on vocational education systems to produce graduates who are industry-ready (Aguilar et al., 2017; Gupta & Zheng, 2020). In the Philippines, the Department of Education (DepEd) addressed this demand through the implementation of the Technical-Vocational-Livelihood (TVL) track, with the Work Immersion program serving as its primary pedagogical strategy for skill application (Bustillo & Aguilos, 2022; Macaspac et al., 2025; Sumaoy et al., 2026). For students specializing in Electrical Installation and Maintenance (EIM), work immersion is a critical phase of vocational acculturation, where theoretical classroom principles are tested against the rigorous, high-stakes realities of the industrial workplace (Watson, 2016; Abou Hashish et al., 2023).

Despite the structured intent of the program, the transition from school-based laboratories to industrial environments is often marked by significant technical and psychological hurdles (Siqi-Liu et al., 2020; Khurshid et al., 2025). Research indicates that the "theory-practice gap"—the disparity between simulated training and actual industrial application—remains a primary barrier to technical mastery among learners (Faber et al., 2024; Wu et al., 2024). When students encounter specialized machinery and fast-paced operational protocols for the first time, they frequently experience cognitive overload, which can lead to reduced confidence and safety risks (Stockinger et al., 2021; Almarzouki, 2024). Furthermore, while the role of the industry mentor is pivotal, the instructional bandwidth of these staff members is often constrained by their primary professional responsibilities, creating a tension between operational productivity and pedagogical support (Collie & Martin, 2016; Shao et al., 2023).

While existing literature has extensively explored the general challenges of work immersion in the Philippines, there remains a specific empirical gap concerning the technical demands of the Electrical Installation and Maintenance (EIM) sector in localized, industrial provinces like Surigao del Sur (Al Nuaimi, 2024; Jaramillo Gomez et al., 2025). This study contributes to the field by moving beyond generalized TVL assessments to provide a focused examination of the EIM-specific transition. The study's significance lies in its dyadic approach, which simultaneously analyzes the experiences of the immersionists and the industry partners to identify misalignments in expectations (Mbua, 2023; Passanisi et al., 2022). By contrasting student readiness with industrial operational constraints, the research provides a multi-dimensional understanding of the immersion ecosystem that is often absent in single-perspective studies (Hidayat et al., 2025; Torres-Peña et al., 2025).

The absence of industry-specific evidence in the Surigao del Sur Division constitutes a research void that may lead to misaligned instructional decisions (Saka et al., 2023; Rosairo, 2023). When institutional expectations do not align with workplace realities, students may experience an adaptive breakdown that limits their ability to maximize learning opportunities (Sosnowski & Brosnan, 2023; Zeitlhofer et al., 2024). Therefore, this study sought to evaluate the work immersion process by identifying the specific challenges encountered by TVL-EIM students and their partner industries. By documenting these divergent perspectives, the research aims to inform context-aware pedagogical adjustments and improve the instructional synchronization between schools and industries in the region (Ceneciro, 2025; Wouters-Soomers et al., 2022).

2. LITERATURE REVIEW

2.1. The Landscape of Technical-Vocational Work Immersion

Foreign and local literature consistently emphasize that work immersion is a critical component of technical-vocational education, serving as a bridge between theoretical classroom instruction and practical industrial application (Gupta & Zheng, 2020). In the Philippine context, the K-12 Technical-Vocational-Livelihood (TVL) track is designed to develop "industry-ready" graduates through sustained exposure to actual workplace environments (Bustillo & Aguilos, 2022; Dela Calzada et. al, 2026). However, scholars have noted that the effectiveness of these programs is often influenced by the quality of school-industry partnerships and the degree of alignment between the curriculum and current market demands (Aguilar et al., 2017). Research suggests that for immersion to be successful, it must move beyond basic observation and provide students with opportunities for "active participation" in technical tasks (Mbua, 2023).

2.2. The Theory-Practice Gap and Technical Challenges

A recurring theme in vocational research is the "theory-practice gap," where students struggle to apply academic concepts to complex industrial machinery. Khurshid et al. (2025) argued that in technical disciplines like Electrical Installation and Maintenance (EIM), students frequently encounter "cognitive overload" when faced with high-stakes, multi-step assignments that were not fully simulated in school laboratories. This disparity in resources is a documented barrier; many educational institutions lack the funding to maintain updated, industry-standard equipment, leading to an "instructional lag" during the first weeks of immersion (Passanisi et al., 2022). Literature indicates that when students are exposed to unfamiliar technology without sufficient prior scaffolding, their technical confidence and task performance are significantly reduced (Faber et al., 2024).

2.3. Socio-Professional Transitioning and Workplace Adaptation

Beyond technical skills, the literature identifies "workplace acculturation" as a significant factor in student success. Transitioning from a guided classroom environment to a high-pressure professional setting involves an "identity shift" that many learners find challenging (Watson, 2016). Jaramillo Gomez et al. (2025) demonstrated that a student's ability to navigate professional hierarchies and social cues is a strong predictor of their overall adaptability in a work setting. Challenges such as "introversion," "communication barriers," and "shyness" are frequently cited as hurdles that prevent students from asking clarifying questions or taking initiative (Frenzel et al., 2021). Scholars emphasize that "soft-skill integration" is just as essential as technical proficiency for ensuring a smooth transition into the professional workforce (Al Nuaimi, 2024).

2.4. Mentorship Dynamics and Instructional Bandwidth

The role of the industry mentor is identified as a pivotal factor in shaping the quality of the immersion experience. Effective mentorship involves more than just supervision; it requires "instructional scaffolding" and the provision of real-time feedback (Shao et al., 2023). However, research highlights a persistent challenge termed the "mentorship-workload conflict," where industry staff find it difficult to balance their primary professional duties with their mentoring responsibilities (Collie & Martin, 2016). When mentors face high operational demands, the instructional support given to students often becomes "fragmented" or "delayed," which can lead to safety risks and mastery deficits (Wouters-Soomers et al., 2022). This underscores the need for a structured framework that supports both the mentor and the learner during the immersion period (Zeitlhofer et al., 2024).

2.5. Temporal Factors in Vocational Mastery

Finally, literature addresses the importance of "time-on-task" in achieving vocational proficiency. Mastering specialized skills, particularly in fields like Electrical Installation and Maintenance, requires "longitudinal engagement" and repetitive practice (Abou Hashish et al., 2023). Short-term immersion programs are often criticized for providing only an "introductory" experience rather than true technical mastery. Research suggests that a "temporal squeeze"—where students are given limited hours to complete complex tasks—can lead to "adaptive breakdown" and a sense of unreadiness for employment (Sosnowski & Brosnan, 2023). Consequently, there is an ongoing discussion in educational policy regarding the need for more flexible or extended immersion schedules to better facilitate skill acquisition (Ceneciro, 2025).

3. METHODOLOGY

3.1. Research Design

This study employed a qualitative case study research design to examine the work immersion experiences of TVL-EIM students and the perspectives of their industry partners. This approach is appropriate for investigating complex human experiences that require depth, contextual understanding, and interpretive analysis (Saka et al., 2023). By focusing on a specific case—the work immersion program in Surigao del Sur—the research gathered detailed insights into the operational and pedagogical challenges encountered during the process. This design allowed the researcher to capture the nuanced perceptions of both learners and industry supervisors through in-depth, semi-structured interaction, ensuring that the findings are grounded in authentic workplace realities.

3.2. Participants

The participants of this study consisted of two distinct groups selected through purposive sampling to ensure they possessed firsthand knowledge of the immersion process. The first group comprised twenty (20) Grade 12 TVL-EIM students from various schools within the DepEd Surigao del Sur Division, Philippines, all of whom had completed their required work immersion. The second group consisted of thirteen (13) industry partners who had directly supervised and mentored the students during their training. These participants were selected based on their active involvement in the mentoring process and their ability to provide experience-based perspectives on student performance and institutional challenges.

3.3. Research Locale

The study was conducted in the province of Surigao del Sur, Philippines. This locale was chosen due to its diverse industrial landscape, which provides various immersion sites for Electrical Installation and Maintenance (EIM) students. The schools involved are under the jurisdiction of the DepEd Surigao del Sur Division, representing a mix of rural and semi-urban educational settings.

3.4. Research Instrument

The primary research instrument used in this study was a semi-structured interview guide, designed to gather in-depth insights into the challenges faced by both students and mentors. The guide consisted of open-ended questions categorized into specific objectives: identifying difficulties in technical tasks, workplace adjustment, resource limitations, and communication barriers. This format provided the flexibility for probing questions, enabling richer and more comprehensive responses than fixed-response tools. The instrument was aligned with the study's research questions to ensure the validity and relevance of the gathered data.

3.5. Data Gathering Procedure

Data collection was conducted through semi-structured interviews. Participants were briefed on the study’s purpose, their rights, and the voluntary nature of their participation. With the participants' informed consent, interviews were audio-recorded to ensure accurate transcription. Each session lasted approximately 30 to 60 minutes, allowing for a detailed exploration of the participants' experiences. Immediately following each interview, the researcher prepared verbatim transcripts to maintain the integrity of the raw data. Ethical protocols were strictly observed, ensuring the anonymity of participants through the use of coded identifiers.

3.6. Data Analysis

The data were analyzed using thematic analysis, following a systematic procedure of reading and re-reading transcripts to achieve deep familiarization (Rosairo, 2023). Initial codes were generated to identify meaningful segments related to technical challenges, environmental adjustments, and mentorship constraints. These codes were then organized into broader categories that reflected recurring patterns across the participants' responses. The process involved reviewing and refining these themes to ensure they accurately represented the core findings. Cross-verification of themes across student and industry partner groups was conducted to highlight divergences.

Now

4. RESULTS

Objective 1. Identify the challenges encountered by the TVL-EIM immersionists.

Question 1. What are the challenges encountered by the immersionists during their work immersion?

1.1. Technical-Pedagogical Disparity and Equipment Unfamiliarity

A primary theme emerging from the data is the significant gap between the instructional tools available in the school laboratory and the specialized equipment utilized in the industrial workplace. Participants emphasized that their primary struggle was not a lack of theoretical knowledge, but a lack of hands-on familiarity with industry-grade machinery. This technological disparity created an instructional lag where students had to undergo basic orientation mid-task, which hindered their overall operational efficiency. One immersionist reflected on this environmental contrast, stating:

> *"Yes, every task was difficult. Because we were already in the real industry, not just a school work-lab."*

The lack of access to specialized tools in the school setting resulted in a measurable deficit in technical confidence. As another participant admitted:

> *"Yes, I did face difficulties in performing tasks. Especially on how to use specific equipment properly. Since I don't have the confidence to use equipment, especially the unfamiliar ones."*

This sentiment was echoed by those who found that the workplace required the use of technologies entirely absent from their academic training, with one student noting:

> *"Yes, because in our school we do not have those kinds of equipment that are present in the workplace. Like unfamiliar tools."*

1.2. Socio-Professional Transitioning and Workplace Acculturation

The data suggests that the "culture shock" of the workplace—characterized by high-stakes safety protocols and the need for immediate initiative—served as a significant psychological hurdle. Participants identified the transition from a "student" identity to a "professional worker" identity as a challenging process of acculturation. The first week of immersion was often marked by a sense of intimidation as students recalibrated their behavior to meet corporate expectations. One student shared the difficulty of this adjustment:

> *"Facing a lot of challenges during our work immersion was not really easy to handle. I just go with them, and it helped me adjust to the work environment."*

For many, the challenge lay in the sudden shift from the guided structure of a classroom to the autonomous demands of the industry. This was described as a transformation in role and responsibility:

> *"Yes, because I'm just a student, and then suddenly I somewhat become a worker in a company. But then, I adjusted from time to time."*

Furthermore, the need to take initiative in a professional setting proved difficult for those accustomed to the passive learning environment of a school, as one participant explained:

> *"I found it difficult to know when to take initiative, especially that I am new to the work environment."*

1.3. Instructional Misalignment and Communication Barriers

The findings revealed that "Instructional Pace" was a recurring barrier to learning.

Participants noted that communication with industry mentors was often hindered by the rapid delivery of instructions or the technical complexity of the language used. This created a comprehension gap where students were hesitant to ask for clarification, often due to shyness or a fear of appearing incompetent. Regarding the speed of training, one immersionist noted:

> *"Yes, sometimes, when the given instructions were too fast, and I cannot get it immediately."*

In other instances, the lack of detailed guidance led to uncertainty regarding performance standards. As one participant reflected:

> *"Yes, I encountered some misunderstandings... I was assigned to a task, but the details provided were limited, and it leads me to wonder whether I will meet my mentor's expectations."*

This barrier was often compounded by the student's internal hesitation to engage in professional dialogue, with one student admitting:

> *"Yes, a little bit because I am shy."*

1.4. Temporal Constraints and Mastery Deficits

A critical finding involves the perceived sufficiency of the immersion duration. The majority of participants explicitly stated that the current timeline was insufficient for achieving technical mastery. While the period allowed for an introduction to industry tasks, it did not provide the repetitive practice necessary to build professional-level confidence. One student highlighted the need for more time to master learned skills:

> *"In order to learn new skills, I think it was enough. But to apply it in an industry setting, I think I need more time to master the skills that I've learned."*

Others emphasized that true technical proficiency in Electrical Installation and Maintenance requires a longer period of sustained exposure:

> *"No, because I wanted it to be longer, for me to learn more and to efficiently master the skills that I've learned."*

The desire for a higher level of professional readiness was a common theme, with a participant noting that the short duration limited their ability to work without supervision:

> *"No. I need to face a higher level of practice in order to master the skills that I've learned."*

1.5. Perceived Mentorship Scarcity and Operational Pressure

Finally, students recognized that their learning was frequently influenced by the operational demands of the host company. Many participants felt that their mentors were under significant workload pressure, which constrained the time available for dedicated guidance. This led to a "mentorship-workload conflict," where industrial tasks took precedence over instructional support. One student observed:

> *"Yes, because they were also busy and have their own tasks to do."*

This operational pressure often resulted in a lack of focused instruction during peak working hours, as another participant shared:

> *"Yes, especially that they also have their own work and tasks to do. They find it challenging to mentor with focus due to time constraints."*

Objective 2. Determine the challenges encountered by the industry partners.

Question 1. What are the challenges encountered by the partner industries in mentoring the immersionists?

2.1. Perceived Readiness Gaps and Cognitive Load in Technical Execution

A dominant theme among industry partners was the observation of significant gaps in the students' technical readiness, particularly when faced with multi-step or complex electrical tasks. Mentors noted that while students possessed basic knowledge, they struggled with "troubleshooting" and the "analytical application" of skills. This suggests that the cognitive load of transitioning from classroom theory to industrial problem-solving was a major barrier. One industry partner described the difficulty students faced with complex assignments:

> *"Yes, lots of students encountered difficulties. Especially if it involves understanding complex instructions or multi-step assignments or multi-tasking. Another thing is technical know-how or technical proficiency, particularly when using unfamiliar tools or software."*

This sentiment was reinforced by another mentor who observed that students often required a "refinement phase" even after being given clear instructions, indicating a struggle with independent execution:

> *"Yes, especially when I expected that they could perform the tasks I instructed them to do so. But sometimes, in actual performance, there were still things need to be guided and refined."*

2.2. The Mentorship-Workload Paradox

Many industry partners reported a conflict between their primary professional responsibilities and their secondary role as mentors. This "mentorship-workload paradox" occurred when high-priority company projects limited the "instructional bandwidth" of the staff. Mentors expressed that while they wanted to provide consistent feedback, the pace of the industry often made one-on-one guidance impossible. As one partner explained:

> *"Yes, our company did face some challenges in mentoring the students due to the workload and other constraints. There were times when the demands of ongoing projects made it harder to allocate enough time for proper guidance. This occasionally slowed down the mentoring process."*

Another mentor highlighted that this lack of dedicated time occasionally impacted the students' ability to grasp real-time technical concepts, leading to delays in addressing their questions:

> *"Yes, sometimes the lack of dedicated mentoring time occasionally resulted in delays in addressing students' questions or helping them troubleshoot challenges. This impacted the students' ability to fully grasp certain concepts."*

2.3. Socio-Emotional Barriers and Communication Strains

Beyond technical skills, industry partners identified "soft skill" deficits as a challenge. Specifically, the students' introversion and hesitation to communicate fluently served as a barrier to effective workplace integration. Mentors noted that students were often "intimidated" by the formal tone of professional meetings or struggled to convey their ideas clearly due to language diversity. One mentor observed the impact of student personality on performance:

> *"Yes, they found it challenging to adapt to the formal tone of professional communication or feel intimidated when expressing opinions during meetings."*

Language barriers and a lack of fluency in the professional "lingua franca" also hindered the instructional process. As one partner reflected on the communication gap:

> *“Yes, there were misunderstandings sometimes. Especially the language of the students was diverse, and they cannot communicate in English fluently.”*

2.4. Environmental Risks and Critical Facility Complexity

Several partners emphasized that the "high-stakes" nature of the electrical industry presented a challenge for student integration. In facilities where errors could lead to significant safety risks or equipment damage, mentors were forced to be overly cautious, which sometimes limited the students' hands-on opportunities. One partner explained the critical nature of the plant environment:

> *“I think the work environment is critical. So, they must study the system first due to so many risks to encounter inside the Plant facility.”*

This environmental complexity often meant that students were relegated to "observational" roles for longer than anticipated, simply to ensure workplace safety.

2.5. Resource Limitations and Technical Constraints

Finally, the findings revealed that industry partners also faced internal logistical challenges, such as a lack of specialized software or updated tools for student use. In some cases, the reliance on trial-version software or outdated equipment limited the "practical exposure" of the immersionists. One mentor admitted to these institutional shortcomings:

> *“Yes, there were lots of limitations in tools and resources... In particular, limited access to certain software or platforms used by the company posed challenges. They suffer from trial versions or outdated tools, which affect in completing their tasks.”*

Even when tools were available, the students’ lack of prior exposure to them necessitated a "re-teaching" phase that further strained the mentors' time:

> *“In the workplace, there’s none. But to the students, they have lapses in using some tools and resources. Especially that they were not used to it in the first place, or it was unfamiliar to them.”*

5. DISCUSSION

The findings of this study indicate that the work immersion process for TVL-EIM students is characterized by several specific operational challenges. The data show that student performance is influenced by the degree of alignment between school-based training and the technical requirements of the industry. These results support the observation that transitions from simulated school settings to industrial environments involve a practical adjustment period for the learner (Watson, 2016; Siqi-Liu et al., 2020).

Alignment of Training Resources and Equipment

A primary finding is the lack of alignment between school laboratory tools and industry-grade equipment. This gap suggests that school-based instruction may not always reflect the current technical standards of the workplace. When students are required to use unfamiliar machinery, they face difficulties in task execution, which reduces their overall productivity (Khurshid et al., 2025). This identifies a need for better synchronization of technical resources between educational institutions and industry partners to ensure that the immersion period is used for skill application rather than basic orientation (Bustillo & Aguilos, 2022). Without this alignment, students remain limited in their ability to perform independently during the training period (Faber et al., 2024).

Adjustment to Workplace Culture and Expectations

The results also show that students face challenges in adjusting to the workplace environment. This adjustment involves moving from a highly structured classroom setting to an environment with different professional expectations and safety protocols. These behavioral adjustments are a standard part of vocational training but are often secondary to technical instruction in the curriculum (Frenzel et al., 2021). The difficulties reported by participants suggest that further preparation in workplace ethics and professional communication could facilitate a smoother transition (Al Nuaimi, 2024). This is consistent with findings by Jaramillo Gomez et al. (2025), who noted that a student's ability to respond to professional cues is a factor in their overall success in industry-based learning.

Mentorship Constraints and Workload Demands

The perspective of industry partners highlights a conflict between professional duties and mentoring responsibilities. Industry mentors must manage their primary project workloads while providing guidance to students, which often limits the time available for one-on-one instruction (Collie & Martin, 2016). This situation suggests that the quality of the mentoring process is dependent on the staff's operational capacity. When workload demands are high, instructional support is often delayed, which can affect the students' ability to complete tasks accurately (Shao et al., 2023). Effective mentoring, therefore, requires a structured approach that accounts for the time constraints of the industry staff (Wouters-Soomers et al., 2022).

Duration of the Immersion Period

Finally, the data indicate that the duration of the work immersion program is a factor in skill acquisition. Both students and industry partners agreed that the current timeframe is not sufficient for students to achieve full proficiency in Electrical Installation and Maintenance tasks (Passanisi et al., 2022). Technical skills in this field require repetitive practice over an extended period to ensure safety and accuracy. The short duration of the current program limits the opportunity for students to move beyond basic observation into more complex, independent work (Zeitlhofer et al., 2024). This suggests that a more extended or flexible schedule might better support the development of industry-ready skills (Mbua, 2023).

Divergent Perceptions of Competence and Instructional Quality

A notable divergence in perception was observed regarding the sufficiency of the immersion duration and the causes of technical difficulty. While the majority of student participants emphasized a need for extended practice to achieve technical mastery, several industry partners indicated that the current timeframe was adequate for reaching basic operational benchmarks. This discrepancy suggests a misalignment between student expectations of "professional readiness" and industrial expectations of "preparatory competence" (Mbua, 2023; Passanisi et al., 2022). From the industry perspective, the immersion is viewed as an introduction to workplace systems, whereas students perceive it as a terminal phase for skill perfection. This gap in expectations can lead to a sense of "readiness anxiety" among learners, even when their objective performance meets industry standards (Jaramillo Gomez et al., 2025).

Similarly, the results revealed conflicting views on the root causes of equipment-related challenges. Student participants largely attributed their technical struggles to a lack of resources in school laboratories, framing the issue as one of "resource scarcity." Conversely, industry partners often identified these challenges as "procedural lapses" or a lack of student familiarity with existing tools (Khurshid et al., 2025). This suggests that even when equipment is available, the transition from simulated tasks to "live" industrial applications requires a higher level of cognitive flexibility that students may not yet possess (Siqi-Liu et al., 2020).

Finally, a contradiction exists in the evaluation of workplace communication. Student participants identified "rapid instructional delivery" as a barrier to their learning, suggesting that mentors were often too fast or vague in their directions. However, industry partners attributed communication strains to the "communicative passivity" or shyness of the students (Frenzel et al., 2021). This illustrates a breakdown in the "instructional feedback loop," where the mentor's pace and the learner's hesitation create a barrier to effective knowledge transfer (Al Nuaimi, 2024). Addressing these divergent views is essential for creating a more synchronized immersion framework that accounts for the different perceptions of both the learner and the industry provider (Wouters-Soomers et al., 2022).

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