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Article

Understanding Work Immersion Challenges in Electrical Installation and Maintenance: A Qualitative Case Study from Surigao del Sur

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Abstract: Preparing technical-vocational learners for industry requires more than classroom-based technical instruction; it depends on how effectively school learning aligns with authentic workplace demands. This study explored the work immersion experiences of Grade 12 Electrical Installation and Maintenance (EIM) students in Surigao del Sur, Philippines, with particular attention to the challenges encountered by students and their industry mentors throughout the immersion process. A qualitative case study approach was employed, involving semi-structured interviews with 20 student participants and 13 workplace mentors from partner industries. Interview data were examined through thematic analysis to identify recurring patterns and points of convergence and divergence across participant groups. The findings generated five interconnected themes that characterized the work immersion experience: disparities between school-based training and workplace technologies, challenges in adjusting to professional workplace culture, communication barriers affecting instructional delivery, limitations imposed by the short duration of immersion, and the competing mentoring and operational responsibilities of industry personnel. While both participant groups acknowledged the importance of practical workplace exposure, their perspectives differed in emphasis. Students primarily associated successful immersion with opportunities to strengthen technical competence through sustained hands-on practice, whereas industry mentors emphasized adaptability, communication, and professional work attitudes as equally essential competencies. The study demonstrates that successful work immersion extends beyond technical skills acquisition and depends on the alignment of curriculum, workplace expectations, and collaborative mentoring practices between schools and industry partners. Strengthening institutional partnerships, synchronizing instructional resources with current industry standards, and establishing structured mentoring mechanisms may enhance the capacity of work immersion programs to prepare graduates for the evolving demands of the technical-vocational workforce.

Keywords: Work Immersion, TVL-EIM, Industry Partners, Technical Challenges, Vocational Pedagogy

1. INTRODUCTION

The rapid transformation of industrial technologies has heightened expectations for vocational education to produce graduates who possess not only technical competence but also the capacity to perform effectively in authentic workplace settings (Aguilar et al., 2017; Gupta & Zheng, 2020). In response to these workforce demands, the Philippine basic education system integrated the Technical-Vocational-Livelihood (TVL) track into the senior high school curriculum, positioning Work Immersion as a key mechanism for bridging classroom instruction with industry practice (Bustillo & Aguilos, 2022; Macaspac et al., 2025; Sumaoy et al., 2026). Within the Electrical Installation and Maintenance (EIM) specialization, this workplace experience represents a defining stage of professional preparation, allowing students to apply technical knowledge while adapting to the operational standards, expectations, and culture of industrial environments (Watson, 2016; Abou Hashish et al., 2023).

Although Work Immersion is intended to ease the transition from school to employment, the shift from simulated laboratory activities to real-world industrial practice remains a complex process. Previous studies consistently report that students struggle to reconcile classroom-based learning with the technical demands of modern workplaces, reflecting a persistent disconnect between educational preparation and industry realities (Siqi-Liu et al., 2020; Faber et al., 2024; Wu et al., 2024; Khurshid et al., 2025). Exposure to unfamiliar equipment, strict workplace procedures, and time-sensitive tasks often challenges learners' technical confidence and increases the cognitive demands associated with workplace adaptation, with potential implications for both performance and safety (Stockinger et al., 2021; Almarzouki, 2024). At the same time, the effectiveness of workplace learning depends heavily on industry mentors, whose ability to provide sustained guidance is frequently constrained by competing production responsibilities. As a result, mentoring responsibilities must often be balanced against organizational productivity, limiting opportunities for continuous instruction and individualized support during immersion (Collie & Martin, 2016; Shao et al., 2023).

Although work immersion has received considerable attention in technical-vocational education research, much of the existing literature has examined the program from a broad perspective, offering limited insight into the unique workplace demands of specific specializations such as Electrical Installation and Maintenance (EIM), particularly within industrial communities like Surigao del Sur (Al Nuaimi, 2024; Jaramillo Gomez et al., 2025). Consequently, there remains insufficient evidence on how EIM students navigate the transition from school-based technical preparation to industry-based practice and how this transition is experienced by the employers responsible for supervising them. Addressing this gap requires moving beyond generalized evaluations of the TVL program toward a more context-specific understanding of industry immersion.

This study responds to that need by examining work immersion through the perspectives of both student immersionists and their industry mentors. Integrating these two viewpoints provides a more comprehensive account of the immersion process, revealing where educational preparation aligns with—or diverges from—workplace expectations (Mbua, 2023; Passanisi et al., 2022). Such a dual-perspective approach offers a richer understanding of the factors shaping workplace learning than studies that focus exclusively on either students or industry partners (Hidayat et al., 2025; Torres-Peña et al., 2025). Moreover, the limited availability of localized evidence from the Surigao del Sur Division restricts the ability of schools to design instructional practices that reflect current industry conditions (Rosairo, 2023; Saka et al., 2023). Guided by this context, the present study investigated the challenges encountered during work immersion by Grade 12 EIM students and their partner industries, with the goal of generating evidence that can strengthen curriculum implementation, foster closer school–industry collaboration, and better align technical training with workplace realities (Ceneciro, 2025; Wouters-Soomers et al., 2022).

2. LITERATURE REVIEW

2.1. Work Immersion in Technical-Vocational Education

Work immersion has become a defining element of technical-vocational education by creating opportunities for learners to translate classroom-acquired knowledge into authentic workplace practice (Gupta & Zheng, 2020). Within the Philippine K–12 curriculum, the Technical-Vocational-Livelihood (TVL) track incorporates work immersion as a structured learning experience intended to cultivate technical competence, professional responsibility, and workplace readiness among senior high school students (Bustillo & Aguilos, 2022; Dela Calzada et al., 2026). Beyond exposing students to real work environments, immersion programs are expected to strengthen the connection between educational institutions and industry, ensuring that vocational training remains responsive to evolving labor market needs (Aguilar et al., 2017). Accordingly, the value of work immersion is determined not only by students' workplace exposure but also by the extent to which industry partners provide meaningful learning opportunities that encourage active engagement in technical tasks rather than passive observation (Mbua, 2023).

2.2. Bridging the Theory–Practice Divide in Technical Training

Despite the recognized benefits of work immersion, vocational education continues to face challenges in narrowing the gap between classroom instruction and workplace application. A persistent concern in the literature is the disconnect between school-based technical preparation and the realities of industrial practice, particularly in highly specialized fields such as Electrical Installation and Maintenance (EIM) (Khurshid et al., 2025). Educational institutions often operate with equipment and training environments that differ from those used in contemporary industries, limiting students' familiarity with current technologies before entering the workplace (Passanisi et al., 2022). As a result, learners frequently encounter unfamiliar tools, complex operational procedures, and demanding work processes that require rapid adaptation. These conditions increase the cognitive demands placed on students

during immersion and may reduce both technical confidence and task performance when adequate instructional support and preparatory experiences are lacking (Faber et al., 2024).

2.3. Workplace Adaptation and Professional Socialization

The success of work immersion extends beyond the acquisition of technical competencies and depends substantially on students' ability to adapt to the social and professional demands of the workplace. Entering an industrial environment requires learners to transition from structured classroom routines to organizational settings characterized by professional expectations, workplace hierarchies, and collaborative work practices (Watson, 2016). This process of professional socialization often challenges students to develop confidence, initiative, and effective interpersonal communication while performing unfamiliar responsibilities. Studies have shown that learners who can navigate workplace relationships and organizational norms are more likely to adjust successfully to industrial environments and demonstrate higher levels of workplace adaptability (Jaramillo Gomez et al., 2025). Conversely, communication apprehension, reluctance to seek assistance, and limited social confidence may restrict students' participation in workplace learning and reduce opportunities to acquire practical knowledge through interaction with experienced personnel (Frenzel et al., 2021). These findings reinforce the view that technical expertise alone is insufficient for workplace readiness, highlighting the importance of integrating professional communication and interpersonal competencies into technical-vocational preparation (Al Nuaimi, 2024).

2.4. Industry Mentorship and Workplace Learning

Industry mentors play a central role in translating workplace experiences into meaningful learning opportunities by guiding students through technical tasks, reinforcing safe work practices, and providing timely feedback throughout the immersion process (Shao et al., 2023). Nevertheless, the effectiveness of workplace mentoring is frequently constrained by the operational realities of industrial settings, where mentors must simultaneously fulfill production responsibilities and instructional obligations. This dual role often limits the time and attention available for continuous coaching, resulting in inconsistent guidance and reduced opportunities for individualized learning (Collie & Martin, 2016). Inadequate mentoring support may affect students' technical development, diminish workplace confidence, and increase the likelihood of errors, particularly when learners are expected to perform unfamiliar tasks with limited supervision (Wouters-Soomers et al., 2022). Consequently, recent scholarship advocates for structured mentoring systems that clearly define supervisory responsibilities, allocate sufficient instructional time, and strengthen collaboration between schools and industry partners to maximize the educational value of work immersion (Zeitlhofer et al., 2024).

2.5. Duration of Work Immersion and Skill Development The duration of work immersion has been widely recognized as a critical factor influencing the development of vocational competence. Technical disciplines such as Electrical Installation and Maintenance require repeated practice, sustained workplace exposure, and continuous engagement with authentic industrial tasks to achieve meaningful skill acquisition (Abou Hashish et al., 2023). However, the limited timeframe allotted to many immersion programs often restricts students to introductory workplace experiences, reducing opportunities to refine technical abilities, build confidence, and attain proficiency in complex procedures. Insufficient exposure may also constrain learners' capacity to adapt to workplace expectations, particularly when they are expected to complete unfamiliar tasks within compressed schedules (Sosnowski & Brosnan, 2023). These concerns have prompted growing discussions on the adequacy of existing immersion durations, with scholars advocating for more flexible and extended workplace learning arrangements that provide students with sufficient time to consolidate technical competencies and transition more effectively into employment (Ceneciro, 2025).

3. METHODOLOGY

3.1. Research Design

This study adopted a qualitative case study design to explore the work immersion experiences of Grade 12 Technical-Vocational-Livelihood students specializing in Electrical Installation and Maintenance (EIM), together with the perspectives of their industry mentors. A qualitative case study is well suited for examining context-dependent educational phenomena because it enables an in-depth exploration of participants' experiences within their natural settings (Saka et al., 2023). Focusing on the work immersion program implemented in the Division of Surigao del Sur allowed the study to generate a contextualized understanding of the technical, instructional, and workplace challenges encountered throughout the immersion process. Data gathered through semi-structured interviews provided rich

descriptions of participants' experiences, facilitating an interpretive analysis grounded in the realities of school–industry collaboration.

3.2. Participants

Participants were selected through purposive sampling based on their direct involvement in the work immersion program and their ability to provide relevant experiential insights. The study involved 33 participants divided into two groups: 20 Grade 12 Electrical Installation and Maintenance (EIM) students who had successfully completed their required work immersion and 13 industry mentors responsible for supervising and training these students in their respective workplaces. Including both immersionists and workplace supervisors enabled the study to capture complementary perspectives on the implementation of work immersion, student preparedness, and the challenges encountered during industry placement.

3.3. Research Locale

The investigation was carried out in the Division of Surigao del Sur, Philippines, where senior high schools offering the Technical-Vocational-Livelihood track maintain partnerships with local industries for work immersion. The province provides a range of industrial settings that accommodate Electrical Installation and Maintenance (EIM) students, making it an appropriate context for examining school–industry engagement. The participating schools represent both rural and semi-urban communities, allowing the study to reflect the varied conditions under which work immersion is implemented within the division.

3.4. Research Instrument Data were collected using a semi-structured interview guide developed to explore the work immersion experiences of Grade 12 Electrical Installation and Maintenance (EIM) students and their industry mentors. The interview protocol comprised open-ended questions aligned with the study's objectives, focusing on technical learning, workplace adaptation, mentoring experiences, communication, and operational challenges encountered during immersion. The semi-structured format allowed participants to elaborate on their experiences while enabling the researcher to use follow-up questions to clarify responses and explore emerging issues in greater depth. Aligning the interview guide with the research questions helped ensure that the data generated were relevant to the study's objectives.

3.5. Data Gathering Procedure Following the necessary institutional approvals, participants were invited to take part in individual semi-structured interviews. Before each interview, the researcher explained the purpose of the study, the voluntary nature of participation, and the participants' rights, after which informed consent was obtained. With participants' permission, all interviews were audio-recorded to facilitate accurate documentation and were conducted for approximately 30 to 60 minutes. The recordings were subsequently transcribed verbatim to preserve the completeness and accuracy of participants' accounts. Throughout the data collection process, confidentiality was maintained by assigning coded identifiers and ensuring that all information was handled in accordance with established ethical research practices.

3.6. Data Analysis The interview data were analyzed using thematic analysis to identify patterns that characterized participants' work immersion experiences (Rosairo, 2023). Analysis began with repeated reading of the interview transcripts to achieve familiarity with the data, followed by the generation of initial codes representing meaningful statements relevant to the research objectives. Related codes were then grouped into broader categories, from which recurring themes were developed and refined through continuous comparison across transcripts. To enrich interpretation, the themes emerging from student participants were compared with those generated from industry mentors, allowing areas of convergence and divergence to be identified. This iterative analytical process ensured that the resulting themes accurately reflected the shared and distinct experiences of both participant groups.

4. RESULTS

Objective 1. Identify the Challenges Encountered by TVL-EIM Immersionists

Question 1. What challenges did the immersionists encounter during their work immersion?

1.1. Bridging the Gap Between School-Based Training and Industry Equipment

One of the most prominent challenges described by the immersionists was the disparity between the learning environment provided by the school and the technological demands of the workplace. Although participants reported possessing the foundational knowledge required for Electrical Installation and Maintenance (EIM), many felt inadequately prepared to operate the specialized tools and equipment encountered during immersion. This disconnect

between classroom preparation and industrial practice often required students to learn unfamiliar technologies while simultaneously completing assigned tasks, making the transition to the workplace more demanding.

The unfamiliarity with industry-grade equipment affected not only task performance but also participants' confidence in executing technical responsibilities. Several students explained that they hesitated to use equipment they had never encountered during their school-based training, resulting in uncertainty and a greater reliance on workplace personnel for guidance. These experiences suggest that the challenge extended beyond technical knowledge to the practical application of skills in authentic industrial settings.

The participants' accounts illustrate this perceived mismatch between school resources and workplace expectations. One immersionist described the transition by stating, *"Yes, every task was difficult. Because we were already in the real industry, not just a school work-lab."* Another participant emphasized the uncertainty associated with unfamiliar equipment, explaining, *"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."* Similarly, another student observed, "*Yes, because in our school we do not have those kinds of equipment that are present in the workplace. Like unfamiliar tools."* Collectively, these narratives indicate that differences between school laboratory facilities and industry-standard technologies created a substantial challenge during work immersion, highlighting the importance of aligning instructional resources and practical training with contemporary workplace conditions.

1.2. Adapting to Professional Workplace Culture

Beyond the technical demands of work immersion, participants described the transition into a professional workplace as a significant adjustment. Moving from a structured classroom environment to an industry setting required students to become familiar with workplace routines, organizational expectations, and professional standards within a relatively short period. For many immersionists, this shift involved adapting not only to new responsibilities but also to a different way of thinking and behaving as they navigated authentic work environments.

Participants explained that this transition challenged their confidence and decision-making, particularly during the early stages of immersion. Unlike the classroom, where teachers provided continuous guidance and supervision, the workplace expected students to demonstrate initiative, respond independently to tasks, and integrate into established work teams. These unfamiliar expectations initially created feelings of uncertainty as students learned to balance their role as trainees with the responsibilities expected of them in a professional setting. Over time, however, many participants reported gradually becoming more comfortable as they gained experience and developed familiarity with workplace practices.

These experiences are reflected in the participants' narratives. One immersionist shared, *"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."* Another described the abrupt shift in identity, stating, *"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."* Likewise, one participant emphasized the uncertainty associated with workplace expectations by explaining, *"I found it difficult to know when to take initiative, especially that I am new to the work environment."* Collectively, these accounts demonstrate that adapting to the social and professional culture of the workplace was an important challenge during work immersion, underscoring that successful industry preparation requires the development of professional confidence and workplace adaptability alongside technical competence.

1.3. Communication Challenges and Instructional Misalignment

Effective communication emerged as another significant challenge during work immersion, particularly in the delivery and interpretation of workplace instructions. Participants reported that the pace of instruction in industrial settings often differed considerably from what they had experienced in school. Industry mentors frequently communicated directions within the context of ongoing work operations, requiring students to process information quickly while simultaneously performing unfamiliar tasks. This environment sometimes made it difficult for immersionists to fully understand expectations before beginning their assigned responsibilities.

The findings further indicate that communication barriers were influenced not only by the manner in which instructions were delivered but also by the students' reluctance to seek clarification. Several participants admitted that they hesitated to ask questions because they feared interrupting workplace operations or appearing inexperienced before their supervisors. Consequently, misunderstandings occasionally arose regarding task requirements and expected outcomes, creating uncertainty about whether assigned responsibilities were being performed correctly.

These experiences suggest that effective workplace learning depends on both clear instructional communication and an environment that encourages trainees to seek guidance without hesitation.

The participants' narratives illustrate these communication-related difficulties. One immersionist explained, "*Yes, sometimes, when the given instructions were too fast, and I cannot get it immediately."* Another participant described the uncertainty caused by limited explanations, stating, *"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."* Likewise, one student acknowledged that personal hesitation also contributed to communication challenges, simply remarking*, "Yes, a little bit because I am shy."* Taken together, these accounts demonstrate that communication during work immersion is shaped by both instructional practices and learner confidence, emphasizing the need for supportive mentoring approaches that promote open dialogue and effective knowledge transfer.

1.4. Limited Immersion Duration and Incomplete Skill Development

Participants consistently identified the duration of work immersion as a factor that influenced the depth of their learning experience. Although the allotted immersion period provided valuable exposure to workplace operations, many students believed that it was insufficient for developing the level of competence expected in professional practice. Rather than questioning the quality of the training itself, participants emphasized that meaningful technical proficiency requires repeated practice and sustained engagement with industry tasks, both of which were constrained by the limited timeframe of the program.

The findings suggest that the short duration of immersion affected students' confidence in applying newly acquired skills independently. While participants acknowledged gaining practical knowledge and familiarity with workplace procedures, they expressed a desire for additional opportunities to reinforce their learning through continued hands-on experience. This perceived lack of extended practice left many students feeling that they had only reached the introductory stage of technical development and had not yet attained the level of mastery necessary to perform workplace responsibilities with confidence and minimal supervision.

The participants' statements reflect this perception of insufficient workplace exposure. One immersionist remarked, *"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."* Another similarly expressed, *"No, because I wanted it to be longer, for me to learn more and to efficiently master the skills that I've learned."* Reinforcing this view, one participant stated*, "No. I need to face a higher level of practice in order to master the skills that I've learned."* Collectively, these narratives indicate that students viewed work immersion as an essential foundation for professional learning but believed that a longer period of workplace engagement would better support the development of technical competence, confidence, and industry readiness.

1.5. Limited Mentoring Support Amid Workplace Demands

Another challenge identified by the immersionists was the limited availability of mentors during workplace training. Participants acknowledged that industry personnel were expected to fulfill their regular operational responsibilities while simultaneously supervising student trainees. As a result, opportunities for continuous guidance, immediate feedback, and individualized instruction were sometimes constrained by the demands of the workplace. Rather than perceiving this as a lack of willingness to teach, students generally recognized that mentoring was often secondary to the completion of organizational tasks.

The findings indicate that this competing responsibility affected the quality and consistency of workplace learning. During periods of high workload, mentors had limited time to explain procedures in detail, observe students' performance, or provide timely feedback on assigned tasks. Consequently, some immersionists felt that they needed to learn independently or wait for opportunities to seek clarification, which occasionally slowed their learning process. These experiences suggest that the effectiveness of work immersion is influenced not only by students' motivation and preparedness but also by the availability of structured mentoring within the workplace.

The participants' accounts illustrate these operational constraints. One immersionist explained, *"Yes, because they were also busy and have their own tasks to do."* Another similarly observed, *"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."* These narratives demonstrate that workplace mentoring is shaped by the realities of industrial operations, where balancing production responsibilities with instructional support remains an ongoing challenge. The findings underscore the importance of developing mentoring arrangements that provide students with sufficient guidance while recognizing the operational demands placed on industry supervisors.

Objective 2. Determine the Challenges Encountered by the Industry Partners

Question 1. What challenges did the partner industries encounter in mentoring the immersionists?

2.1. Variations in Technical Preparedness and Task Performance

Industry mentors consistently observed that students entered the workplace with varying levels of technical preparedness, particularly when assigned tasks that required problem-solving, independent decision-making, and the integration of multiple procedures. Although most immersionists demonstrated an understanding of basic concepts, many encountered difficulties when expected to apply these concepts in unfamiliar workplace situations. Mentors noted that assignments involving troubleshooting, sequential operations, or specialized equipment often required closer supervision than initially anticipated, indicating that classroom learning did not always translate seamlessly into practical performance.

These observations suggest that the challenge extended beyond knowledge acquisition to the application of technical competencies under authentic workplace conditions. Participants explained that students were generally able to follow demonstrations and verbal instructions but frequently required additional coaching when carrying out tasks independently. As a result, industry personnel devoted considerable time to monitoring performance, correcting procedures, and reinforcing technical standards before students could complete assignments with confidence and accuracy.

The mentors' experiences reflect these concerns. One industry partner explained, "*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."* Another similarly observed, *"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."* These accounts indicate that while immersionists possessed foundational technical knowledge, many required continued guidance to translate that knowledge into competent workplace performance, highlighting the importance of strengthening practical preparation before industry placement.

2.2. Balancing Workplace Responsibilities and Student Mentoring

A recurring concern among industry partners was the challenge of balancing their operational responsibilities with the demands of mentoring student immersionists. Participants explained that workplace supervisors were expected to maintain productivity while simultaneously providing instruction, monitoring student performance, and responding to trainees' questions. Because production activities remained the organization's primary priority, opportunities for sustained coaching were often limited, particularly during periods of increased workload.

The findings indicate that this competing responsibility influenced both the frequency and quality of mentor–student interactions. Although mentors expressed a strong commitment to supporting the immersionists, time constraints occasionally reduced their capacity to provide immediate feedback, closely supervise technical tasks, or explain workplace procedures in greater detail. Consequently, some learning opportunities were postponed until mentors became available, slowing students' progress in understanding unfamiliar concepts and completing technical assignments independently.

The participants' narratives illustrate these workplace realities. One industry partner shared, "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 similarly explained, "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." These accounts suggest that effective work immersion depends not only on the willingness of industry personnel to mentor but also on organizational structures that provide supervisors with sufficient time and resources to support student learning alongside their regular professional responsibilities.

2.3. Communication and Interpersonal Challenges in the Workplace

Industry partners also emphasized that students' interpersonal and communication skills influenced the effectiveness of the work immersion experience. While most immersionists demonstrated a willingness to learn,

mentors observed that many were initially reserved when interacting with supervisors and other employees. This hesitation often limited students' participation in workplace discussions, reduced their willingness to seek clarification, and affected their ability to engage confidently in collaborative tasks. According to the mentors, adapting to professional communication was as important as developing technical competence because workplace learning depends heavily on continuous interaction with experienced personnel.

The findings further indicate that communication challenges were shaped by differences in language proficiency and varying levels of confidence. Participants explained that some students experienced difficulty expressing their thoughts during formal conversations or understanding workplace discussions conducted in English. These communication barriers occasionally resulted in misunderstandings and slowed the exchange of information between mentors and immersionists, making technical instruction less efficient. As a result, mentors often needed to devote additional time to clarifying instructions and ensuring that students fully understood assigned responsibilities.

The mentors' experiences illustrate these challenges. One industry partner remarked, "Yes, they found it challenging to adapt to the formal tone of professional communication or feel intimidated when expressing opinions during meetings." Another similarly shared, "Yes, there were misunderstandings sometimes. Especially the language of the students was diverse, and they cannot communicate in English fluently." Collectively, these narratives suggest that effective workplace integration requires more than technical preparation alone. The ability to communicate confidently, participate in professional interactions, and navigate diverse workplace environments emerged as important competencies that support successful work immersion.

2.4. Workplace Safety Requirements and Restricted Practical Exposure

Industry partners highlighted that the nature of electrical installation and maintenance work requires strict adherence to safety standards, making the integration of student immersionists particularly challenging. Many of the participating organizations operated in environments where mistakes could compromise personnel safety, disrupt operations, or damage expensive equipment. Under these conditions, mentors explained that students could not immediately perform technical tasks independently and were instead expected to become familiar with workplace systems, procedures, and safety protocols before assuming more active responsibilities.

This cautious approach, while necessary for risk management, inevitably influenced the learning experience of the immersionists. Participants noted that students often spent extended periods observing operations before being allowed to engage in hands-on activities. Although this gradual progression protected both the learners and the workplace, it also reduced the amount of direct technical practice available within the limited duration of the immersion program.

One industry partner emphasized the complexity of the workplace by stating, *"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 account illustrates how workplace safety considerations shaped mentoring practices, requiring supervisors to prioritize operational safety while gradually preparing students for practical participation.

2.5. Resource Availability and Technology-Related Constraints

Industry partners likewise identified resource-related limitations as a factor affecting the quality of work immersion. Some organizations reported constraints in providing students with unrestricted access to specialized software, digital platforms, or updated equipment used in daily operations. These limitations reduced opportunities for immersionists to gain comprehensive experience with industry-standard technologies and occasionally restricted the range of technical tasks that could be assigned during training.

The findings further suggest that differences between the technologies available in schools and those used in industry created additional instructional demands for workplace mentors. Even when appropriate tools were available, students often required introductory guidance before they could use unfamiliar equipment confidently, requiring mentors to allocate additional time for demonstrations and supervised practice. This adjustment period occasionally slowed the training process and added to the instructional responsibilities of workplace supervisors.

The participants' narratives illustrate these constraints. One mentor explained, "*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."* Another similarly observed, *"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."* Together, these

accounts indicate that both organizational resource limitations and students' unfamiliarity with workplace technologies influenced the implementation of work immersion, underscoring the importance of strengthening technological alignment between educational institutions and industry partners.

5. DISCUSSION AND CONCLUSION

The findings demonstrate that the effectiveness of work immersion extends beyond students' individual technical abilities and is shaped by the interaction between school preparation, workplace conditions, and industry expectations. Across the participants' narratives, the challenges encountered during immersion reflected the complexities of translating classroom learning into authentic industrial practice. Rather than representing isolated difficulties, these experiences reveal the importance of aligning educational preparation with the realities of the workplace. Consistent with previous research, the transition from simulated learning environments to professional settings requires students to adapt simultaneously to new technologies, workplace routines, and organizational expectations (Watson, 2016; Siqi-Liu et al., 2020).

Alignment of Training Resources and Equipment

One of the most significant issues emerging from the study was the disconnect between the equipment available in school laboratories and the technologies encountered in industry. Although students possessed foundational knowledge of Electrical Installation and Maintenance, many entered the workplace with limited experience using industry-standard tools and equipment. This mismatch shifted a portion of the immersion period from skill application to basic familiarization, reducing opportunities for students to demonstrate competence and develop confidence in performing technical tasks independently. These findings reinforce earlier observations that disparities between educational resources and workplace technologies continue to hinder the effectiveness of vocational preparation (Khurshid et al., 2025; Faber et al., 2024).

The results further suggest that strengthening school–industry collaboration should involve more than establishing placement opportunities. Greater coordination in the selection of instructional equipment, laboratory resources, and practical training activities may better prepare students for workplace demands before they begin immersion. Such alignment would enable learners to maximize authentic workplace experiences by focusing on refining existing competencies rather than adjusting to unfamiliar technologies, a recommendation that echoes the work of Bustillo and Aguilos (2022).

Workplace Adaptation and Professional Expectations

The findings also highlight that successful work immersion depends on students' ability to adapt to the social and organizational culture of the workplace in addition to demonstrating technical competence. Participants described the transition from the classroom to industry as a period of adjustment during which they learned to navigate professional responsibilities, workplace routines, and organizational expectations. This suggests that industry readiness encompasses behavioral and interpersonal competencies alongside technical knowledge, requiring students to develop confidence, initiative, and professional judgment within authentic work environments.

These observations align with previous studies emphasizing that workplace adaptation is a critical component of vocational education (Frenzel et al., 2021; Al Nuaimi, 2024). Consistent with the findings of Jaramillo Gomez et al. (2025), the ability to interpret workplace norms, communicate effectively with colleagues, and respond appropriately to professional expectations contributed to students' overall adjustment during immersion. Accordingly, preparing learners for industry may require greater attention to professional communication, workplace ethics, and organizational behavior before placement, enabling them to transition more effectively into industry-based learning environments.

Mentoring Capacity Within Operational Work Environments

The experiences of industry partners reveal that the effectiveness of workplace mentoring is closely linked to the operational realities of the organizations hosting student immersionists. While mentors recognized the educational value of guiding trainees, they also emphasized that mentoring responsibilities were performed alongside their regular production and technical duties. This dual role often constrained the amount of time available for continuous supervision, individualized coaching, and immediate feedback, particularly during periods of increased workplace activity. Consequently, the learning opportunities available to students were influenced not only by mentor expertise but also by the operational demands of the workplace.

These findings reinforce previous research suggesting that successful workplace learning depends on organizational structures that support mentoring as an integral component of industry partnerships rather than an additional responsibility assigned to technical personnel (Collie & Martin, 2016). When supervisors have limited time to monitor student performance, provide demonstrations, or address questions promptly, the continuity of instruction may be affected, potentially slowing students' technical development (Shao et al., 2023). Strengthening mentoring frameworks through clearer role expectations, dedicated supervisory time, and stronger coordination between schools and industry may therefore improve the overall quality of the immersion experience (Wouters-Soomers et al., 2022).

Adequacy of Immersion Duration for Technical Competence

The findings likewise underscore the importance of sufficient workplace exposure in developing vocational competence. Participants from both groups generally agreed that work immersion provides valuable practical experience; however, many believed that the existing duration allows students to acquire only foundational workplace skills rather than the level of proficiency expected for independent practice. In technical fields such as Electrical Installation and Maintenance, competence develops through repeated performance, continuous feedback, and prolonged engagement with authentic workplace tasks. A limited immersion period therefore restricts opportunities for students to reinforce their learning and progressively assume more complex responsibilities.

This observation is consistent with previous studies emphasizing that vocational mastery cannot be achieved through brief workplace exposure alone (Passanisi et al., 2022; Zeitlhofer et al., 2024). Extending or adopting more flexible immersion arrangements may provide learners with additional opportunities to strengthen technical confidence, improve task accuracy, and experience a broader range of workplace situations before completing the program (Mbua, 2023). Such adjustments may better support the long-term objective of preparing graduates for the demands of industry.

Differences in Student and Industry Expectations

An important finding of the study was the difference in how students and industry mentors evaluated the outcomes of work immersion. Students generally viewed the program as an opportunity to attain a high level of technical competence and expected the experience to prepare them for independent professional practice. Industry partners, however, regarded immersion as an introductory learning experience designed to familiarize students with workplace systems, professional standards, and the practical application of classroom knowledge rather than to produce fully proficient workers.

These contrasting perspectives suggest that the two groups operate with different expectations regarding the purpose of work immersion. While students tended to associate readiness with technical mastery and complete independence, mentors evaluated readiness in terms of foundational competence, adaptability, and the willingness to learn within a professional environment (Mbua, 2023; Passanisi et al., 2022). Similar observations have been reported by Jaramillo Gomez et al. (2025), who argued that perceptions of workplace readiness are shaped not only by technical performance but also by how learners interpret professional expectations. Establishing clearer communication between schools, students, and industry partners regarding the intended outcomes of work immersion may therefore reduce unrealistic expectations and foster a shared understanding of the competencies that the program is designed to develop.

A similar divergence emerged in participants' explanations of the technical challenges encountered during work immersion. Students primarily associated these difficulties with the limited availability of industry-standard equipment during their school-based training, arguing that insufficient exposure left them unprepared for the technologies encountered in the workplace. Industry partners, in contrast, viewed the issue less as a shortage of resources and more as a gap in students' ability to apply previously learned skills in unfamiliar contexts. From the mentors' perspective, the challenge involved adapting existing knowledge to workplace procedures, equipment, and operational demands rather than simply learning to use new tools (Khurshid et al., 2025). This difference suggests that technical readiness encompasses more than access to equipment; it also requires the cognitive flexibility to transfer classroom learning to authentic industrial settings, an ability that develops through repeated practical experience and workplace exposure (Siqi-Liu et al., 2020).

Differences in perception were likewise evident in participants' accounts of workplace communication. Students frequently described the pace and clarity of mentors' instructions as obstacles to understanding technical tasks, particularly when explanations were delivered quickly within the context of ongoing workplace operations. Industry partners, however, attributed communication difficulties to students' reluctance to ask questions, participate in discussions, or seek clarification when uncertainties arose (Frenzel et al., 2021). Rather than indicating opposing

viewpoints, these findings suggest that communication challenges were jointly shaped by instructional practices and learner behaviors. Effective workplace learning depends on a reciprocal exchange in which mentors provide accessible guidance while students actively communicate their learning needs. When either element is constrained, opportunities for feedback, clarification, and knowledge transfer become limited, reducing the overall effectiveness of the immersion experience (Al Nuaimi, 2024). These findings underscore the importance of strengthening communication practices and establishing shared expectations between schools, students, and industry partners to foster a more collaborative and responsive work immersion environment (Wouters-Soomers et al., 2022).

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