

Industry-based Learning Exposure in an Inclusive Higher Education: Experiences, Challenges, and Opportunities

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ABSTRACT:

The growing demand for industry-ready graduates has prompted higher education institutions to strengthen industry-academe partnerships through experiential learning initiatives. This study explored the experiences of Industrial Technology students who participated in an Industry-Academe Lecture Series designed to enrich classroom instruction through expert-led lectures, workplace visits, and hands-on learning activities. Specifically, the study examined students' overall experiences, knowledge and skills gained, workplace exposure, technical competence, challenges encountered, and lived experience of inclusivity, equity, access, and opportunities.

Using a qualitative descriptive research design, data were collected through open-ended questionnaires and reflective responses from students who participated in the program. The responses were analyzed using thematic analysis, involving coding, categorization, and theme development to identify recurring patterns across participants' experiences.

The findings revealed six major themes: (1) Transformative Learning Through Industry Exposure, (2) Bridging Theory and Practice, (3) Development of Technical Competence and Workplace Skills, (4) Workplace Safety Awareness and Professional Responsibility, (5) Confidence Building Through Mentorship and Hands-On Learning, and (6) Inclusivity, Equity, Access, and Continuous Improvement. Students reported that industry engagement enhanced their understanding of classroom concepts, strengthened technical competencies in PLC programming and automation, increased workplace safety awareness, and improved their confidence and career readiness. Although participants experienced challenges related to unfamiliar equipment, limited technical knowledge, and fear of making mistakes, these were effectively addressed through mentorship, guidance, and industry support. Students also recommended longer immersion periods, more hands-on activities, greater support for beginners, and expanded opportunities for participation.

The study concludes that the Industry-Academe Lecture Series is an effective industry-based learning strategy that bridges academic instruction and professional practice while fostering technical competence, employability, and professional growth. Strengthening industry-academe collaboration and expanding inclusive experiential learning opportunities

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can further enhance students' preparation for the evolving demands of the engineering and technology workforce.

Keywords: Industry-based learning, experiential learning, industry-academe partnership, Inclusive education, Industrial Technology education

1. Introduction

Background of the Study

The rapidly evolving landscape of technology and industry has transformed the competencies expected of graduates entering the workforce. Educational institutions are increasingly challenged to ensure that students not only acquire theoretical knowledge but also develop practical skills, professional attitudes, and workplace competencies that align with industry demands. As a response, higher education institutions have adopted various forms of experiential learning and industry engagement initiatives to bridge the gap between classroom instruction and real-world practice.

Industry-based learning has emerged as an important educational strategy that provides students with opportunities to engage directly with professionals, observe workplace operations, and experience authentic industrial environments. Through industry immersion, company visits, internships, and expert-led instructional activities, students gain exposure to current technologies, operational processes, workplace culture, and professional expectations. Such experiences facilitate the development of technical competencies while simultaneously cultivating communication skills, problem-solving abilities, adaptability, and professional identity.

Within industrial technology programs, industry engagement plays a particularly significant role because these disciplines emphasize the practical application of scientific and technological principles. Traditional classroom instruction alone may be insufficient to expose students to emerging technologies, modern production systems, safety practices, and industry-specific challenges. Consequently, partnerships between academic institutions and industry organizations have become essential

mechanisms for enhancing educational quality and graduate employability.

Recognizing this need, the academic institution implemented the Industry-Academe Lecture Series, a collaborative initiative designed to strengthen the relationship between the university and its industry partners while enriching classroom instruction. Through this program, industry experts are invited to deliver lectures on selected topics within specific courses. Beyond classroom discussions, students participate in company visits, workplace observations, and hands-on demonstrations that enable them to witness the practical application of concepts learned in their courses. These activities expose students to contemporary technological developments and real-world engineering challenges encountered by professionals in industrial settings.

The Industry-Academe Lecture Series further promotes co-teaching strategies by integrating the expertise of industry practitioners into the academic curriculum. Faculty members collaborate with industry partners to ensure alignment between course outcomes and workplace requirements. During industry visits, faculty members serve as coordinators and mentors, while participating companies provide the necessary personal protective equipment (PPE) and facilitate safe learning experiences. Such collaborative arrangements create opportunities for students to engage in meaningful learning experiences while maintaining adherence to workplace safety standards.

Beyond the technical benefits of industry exposure, questions remain regarding students' lived experiences during these activities. While industry-based learning initiatives are generally viewed as beneficial, students may encounter challenges related to accessibility,

communication, workplace adaptation, confidence, transportation, inclusivity, and equitable participation. Understanding these experiences is essential for ensuring that industry engagement programs remain responsive to the diverse needs of learners and continue to provide meaningful opportunities for professional growth.

This study seeks to explore the experiences of Industrial Technology students who participated in the Industry-Academe Lecture Series and related industry engagement activities. Specifically, it aims to identify the knowledge and skills acquired by students, examine the challenges they encountered, explore their experiences regarding inclusivity, equity, and access, and determine how these experiences contribute to their professional development and career preparation.

The findings of this study may provide valuable insights for academic institutions, faculty members, industry partners, and policymakers seeking to strengthen industry-academe collaborations and improve the design and implementation of industry-based learning programs. By examining students' experiences and perspectives, the study contributes to ongoing discussions regarding effective strategies for preparing future engineering technology professionals for the demands of an increasingly complex and technology-driven workforce.

Research Questions

This study seeks to answer the following questions:

1. How do students describe their overall experience attending lectures conducted by industry experts?
2. What knowledge, skills, and insights did students gain from the lectures and discussions facilitated by industry professionals?
3. How do students describe their experiences during industry visits and hands-on learning activities?
4. What workplace tasks, equipment, and safety practices were students exposed to during the program?
5. How did the Industry-Academe Lecture Series help students connect classroom learning with actual industry practices?
6. In what ways did the program contribute to students' technical competence and preparation for future employment?
7. What challenges did students encounter during the program, and how were these challenges addressed?
8. What aspects of the program were most valuable to students, and what recommendations do they offer for improvement?

Theoretical Foundation

This study is anchored in Kolb's Experiential Learning Theory, which posits that learning occurs through the transformation of experience into knowledge. Students learn more effectively when they actively engage in concrete experiences, reflect on those experiences, conceptualize lessons learned, and apply them in new situations. The Industry-Academe Lecture Series provides opportunities for students to engage in all stages of experiential learning through lectures, workplace observations, and hands-on activities.

The study is further anchored by Situated Learning Theory, which suggests that learning occurs within authentic contexts through participation in communities of practice. Industry visits and interactions with professionals enable students to learn within actual workplace environments where knowledge is contextualized and socially constructed through interactions with experts and practitioners.

Together, these theoretical perspectives provide a framework for understanding how industry engagement activities influence students' learning, professional development, and career readiness.

Literature Review

Industry-Based Learning and Work-Integrated Learning

Industry-based learning has become an important pedagogical approach in higher education

because it enables students to integrate academic knowledge with authentic workplace experiences. Work-integrated learning (WIL) has gained considerable attention due to its contribution to graduate employability, professional competence, and career preparedness. Rafiq et al. (2024) observed that research on WIL has expanded significantly over the past decade, highlighting its growing role in preparing students to learn, work, and adapt in increasingly complex professional environments. Their bibliometric review further identified WIL as a multidisciplinary educational strategy that strengthens the relationship between higher education and industry while improving graduate outcomes.

Similarly, Vailasseri et al. (2021) emphasized that engineering education increasingly recognizes industry engagement as an essential component of learning. Their review noted that engineering graduates benefit from authentic workplace exposure because it enables them to connect theoretical engineering principles with industrial applications, thereby improving both technical competence and workplace readiness. The authors argued that engineering curricula should incorporate structured work-integrated learning experiences to better align educational outcomes with industry expectations. Similarly, Curto-Reverte et al. (2025) reported that WIL plays a critical role in addressing the changing demands of higher education by integrating academic learning with authentic workplace experiences. Their systematic review concluded that well-designed work-integrated learning programs improve technical competence, career readiness, reflective learning, and employability while fostering stronger collaboration between universities and employers.

Industry-Academe Partnerships in Industrial Technology Education

Strong collaboration between higher education institutions and industry partners is fundamental in ensuring that graduates possess competencies aligned with workforce needs. Corporate-based work-integrated learning models demonstrate that close coordination between universities and

companies enhances students' learning experiences through workplace immersion, mentorship, and practical problem-solving. Students participating in such programs reported high levels of satisfaction and perceived improvements in workplace preparedness, suggesting that structured industry partnerships create meaningful learning environments for engineering students. According to Khan et al. (2025), meaningful university-industry collaboration enhances student engagement, academic performance, and employability by exposing learners to real-world industry practices through expert lectures, mentoring, and workplace interaction. The study further emphasizes that collaboration between educators and industry professionals enriches learning by connecting theoretical instruction with current professional practices.

Recent scholarship likewise emphasizes that industry-academe partnerships should move beyond traditional internships toward more integrated models that combine classroom instruction, workplace experiences, mentoring, and collaborative curriculum development. Such approaches ensure that educational institutions remain responsive to technological innovation and evolving industry requirements while preparing graduates with the competencies required for Industry 4.0 and future workforce demands (Putra, et al., 2025).

Authentic Learning, Technical Competence, and Employability

Authentic workplace experiences provide students with opportunities to develop technical competence while enhancing higher-order thinking skills. Engineering students who participate in industry-based learning demonstrate stronger problem-solving abilities, improved confidence, and greater readiness for professional practice because they are exposed to real industrial problems and workplace expectations. These authentic experiences allow learners to contextualize theoretical concepts and develop competencies that cannot be acquired through classroom instruction alone. Meanwhile, O'Mahony et al. (2025) found that authentic

workplace learning significantly enhances graduate employability by allowing students to apply theoretical knowledge in real professional settings while developing critical thinking, technical competence, and workplace confidence. Their comparative study across disciplines highlights that workplace learning facilitates meaningful learning transfer from the classroom to professional environments.

In addition to technical skills, industry-based learning contributes to employability by promoting communication, teamwork, adaptability, and professional responsibility. Recent reviews have shown that authentic workplace learning develops graduates' ability to transfer knowledge across academic and professional contexts while strengthening their readiness to transition into employment. These competencies have become increasingly important as industries demand graduates who possess both technical expertise and transferable workplace skills.

Student Support and Mentorship

The effectiveness of industry-based learning depends not only on workplace exposure but also on the quality of mentorship and learner support. Recent studies indicate that industry supervisors and academic mentors play essential roles in facilitating knowledge transfer, confidence building, and student engagement during workplace experiences. Guided practice enables students to overcome unfamiliarity with workplace technologies while developing professional confidence and adaptive learning behaviors. Choi-Lundberg et al. (2024) emphasized that employability-focused teaching should integrate authentic workplace experiences with reflective learning and professional mentoring to facilitate students' successful transition into employment.

Current literature also highlights the importance of designing inclusive workplace learning experiences that provide equitable opportunities for all students. Learners enter industry placements with varying levels of technical competence and confidence; therefore, institutions and industry partners should provide

structured guidance, sufficient immersion time, and differentiated support to maximize learning outcomes. Inclusive and well-supported industry engagement programs promote equitable participation and enhance both educational quality and employability outcomes.

Inclusivity, Equity, and Access in Industry-Based Learning

Inclusive education is founded on the principle that every learner has the right to participate meaningfully in quality education regardless of ability, disability, gender, socioeconomic status, or other personal characteristics. According to the United Nations Educational, Scientific, and Cultural Organization (UNESCO, 2020), inclusive education goes beyond placing diverse learners in the same classroom; it requires educational institutions to identify and remove barriers that prevent learners from fully participating in academic and experiential learning opportunities. UNESCO further emphasizes that inclusion is a fundamental component of Sustainable Development Goal 4 (SDG 4), which advocates for inclusive and equitable quality education and lifelong learning opportunities for all. In this context, inclusivity means that every learner is accepted, respected, and provided equal opportunities to participate in all educational activities, including authentic workplace and industry-based learning experiences.

The concept of equity differs from equality because it recognizes that learners have diverse backgrounds, needs, and abilities that may require different forms of support to achieve comparable educational outcomes. The Organisation for Economic Co-operation and Development (OECD, 2023) explained that equitable education systems provide targeted resources, differentiated instructional approaches, appropriate accommodations, and continuous learner support to ensure that every student can fully participate and succeed. Rather than treating all learners identically, equity focuses on providing the necessary support that enables each learner to achieve his or her full potential. The OECD further argues that

equitable educational environments are built through effective governance, resource allocation, capacity building, and continuous monitoring of student participation and achievement.

Closely related to inclusivity and equity is the concept of access, which refers not only to physical entry into educational institutions but also to meaningful participation in learning opportunities. UNESCO (2020) emphasized that access should include appropriate learning environments, accessible instructional materials, flexible teaching strategies, and opportunities for learners to actively engage in educational experiences. Similarly, UNESCO (2021), through its Inclusive Education Resource Pack, stressed that access requires educational systems to redesign curricula, pedagogy, assessment, and learning environments to accommodate learner diversity and ensure that all students can participate successfully in mainstream education. These principles are particularly relevant to experiential and industry-based learning, where meaningful access involves allowing every student to participate in workplace visits, laboratory activities, technical demonstrations, and hands-on industrial experiences.

The principles of inclusivity, equity, and access are reflected in the implementation of the Industry-Academe Lecture Series examined in the present study. Among the participants were two Persons with Disabilities (PWDs) who attended regular classes and actively participated in expert lectures, workplace visits, and hands-on technical activities together with their classmates. They performed the same learning tasks and achieved the same learning objectives while receiving appropriate instructional guidance whenever necessary. This practice demonstrates inclusivity by ensuring that all students are welcomed and valued, equity by providing appropriate academic support according to individual learning needs, and access by ensuring that every learner has meaningful opportunities to engage in authentic industry-based experiences. As emphasized by UNESCO (2020) and the OECD (2023), educational quality is achieved not merely by providing equal treatment

but by creating learning environments where diversity is recognized, participation is encouraged, and every learner has the opportunity to succeed.

2. Methodology

This study employed a qualitative research design to explore and understand the lived experiences of Industrial Technology students who participated in the Industry-Academe Lecture Series and industry engagement activities. Qualitative research is appropriate for investigating participants' experiences, interpretations, and reflections regarding a particular phenomenon, allowing the researcher to capture rich descriptions of experiences that may not be adequately represented through quantitative measures.

The study specifically utilized a descriptive qualitative approach combined with thematic analysis to identify recurring patterns, meanings, and themes emerging from students' narratives. This approach enabled the researcher to examine how students interpreted their industry exposure, the challenges they encountered, and the opportunities they perceived as a result of participating in the program.

The research conceptualizes industry-based learning environments as dynamic sites of social and technical learning where students interact with industry experts, faculty mentors, workplace technologies, and organizational cultures. Through these interactions, students develop knowledge, skills, attitudes, and professional awareness that contribute to their career readiness and professional formation.

The participants of the study consisted of Industrial Technology students who attended the Industry-Academe Lecture Series and participated in the accompanying industry visits and hands-on learning activities. They are officially enrolled in the program and have completed attendance in industry expert lectures and participated in industry visits and hands-on demonstrations. These students are willing to

share their experiences and reflections regarding the program.

The study was conducted in a state university that implemented the Industry-Academe Lecture Series as part of its industry engagement and instructional enhancement initiatives. The program involved collaboration between faculty members and industry partners who provided expert lectures, facility tours, practical demonstrations, and workplace exposure opportunities.

Participating companies facilitated industry visits and provided students with access to workplace environments, technological systems, and operational processes relevant to their academic disciplines. To ensure safety, the industry partners supplied appropriate personal protective equipment (PPE) and orientation on workplace safety protocols.

Data were collected through reflective narratives and open-ended questions submitted and administered after the completion of the Industry-Academe Lecture Series and industry visits. The guide questions focused on the following: Students' overall experiences during the lectures and industry visits; Knowledge and skills gained from industry experts; Experiences during hands-on activities and workplace exposure; Understanding of industrial processes and safety practices; Connections between classroom learning and actual industry practices; Perceived contributions to technical competence and employability; Challenges encountered during participation; and Recommendations for program improvement.

The collected data were analyzed using thematic analysis following a systematic process of coding, categorization, and theme development. The analysis involved the following stages:

1. Familiarization with the data through repeated reading of transcripts and responses;
2. Initial coding to identify meaningful statements and recurring ideas;
3. Grouping related codes into categories;
4. Development of broader themes that captured common patterns across participant experiences;

5. Review and refinement of themes to ensure coherence and representativeness; and
6. Interpretation of findings in relation to the research objectives and theoretical framework.

The thematic analysis focused on identifying students' lived experiences particularly learning, professional development, workplace exposure, challenges, and opportunities resulting from participation in the Industry-Academe Lecture Series.

Participants

The participants of this study consisted of eleven (11) third-year Industrial Technology students who participated in the Industry-Academe Lecture Series and the accompanying industry immersion activities. Participants were selected through purposive sampling based on their direct involvement in the program. All participants attended the expert-led lectures, workplace visits, and hands-on learning activities and voluntarily shared their experiences through reflective responses.

Among the participants were two (2) students identified as Persons with Disabilities (PWDs) who were enrolled in regular classes and actively participated in all program activities alongside their classmates. Consistent with the institution's commitment to inclusive education, these students were provided with the same opportunities to attend lectures, engage in hands-on activities, interact with industry professionals, and participate in workplace visits. They performed the same learning tasks and met the same academic expectations as the other participants, while receiving appropriate instructional support whenever necessary. Their participation reflects the principles of inclusivity, where all learners are welcomed and valued regardless of disability; equity, where students receive the support needed to participate successfully; and access, where industry-based learning opportunities are made available to every learner. The inclusion of students with disabilities enriched the study by demonstrating that meaningful industry engagement can be implemented in ways that promote equal

participation and learning opportunities for diverse student populations.

3. Results and Discussion

This section presents the experiences of the student in the Industry-based Learning by the Higher Education Institution in partnership with a chosen manufacturing company in the Philippines.

Experience during industry experts' lectures

Students' experiences during lectures conducted by industry experts refer to the knowledge, skills,

perceptions, and professional insights they acquire through direct interaction with practitioners who share authentic workplace experiences and current industry practices.

Table 1 presents the thematic analysis of the participants' responses regarding their overall experiences in the Industry-Academe Lecture Series. The table summarizes the initial codes, categories, and emerging themes generated from the participants' narratives.

Table 1. Students' experience during industry experts' lectures

Research Question	Initial Codes	Categories	Emerging Themes
How was your overall experience attending the lectures by industry experts?	Amazing experience; eye-opener; expert knowledge; workplace exposure; real-world applications; professional lecturers; enjoyable learning; safety awareness	Positive learning experiences; Industry exposure; Professional interaction	Transformative Learning through Industry Engagement
	Understanding lessons easier; practical explanations; learning shortcuts and techniques	Enhanced understanding of concepts	Bridging Academic and Industry Knowledge

The university invited three (3) industry experts to discuss a specific topic of a selected course. This was conducted in a typical classroom setting, wherein experts discuss the coverage of the topic. The learners provided learning materials. Based on the answers of eleven (11) students on their experiences during the lectures, the students found it enjoyable through practical explanations and the opportunity to interact directly with the experts. The students were able to gain a clearer understanding of the practical applications of concepts. The lectures provided by the industry experts are an eye-opener for them to know the real-world application of the technology, as reflected in Table 1. Learners are also given techniques to enhance their understanding of the concepts. This approach is considered Transformative Learning through Industry

Engagement. According to Omer (2023), Transformative Learning is an exploration of new perspectives that can be important for people's development. The goal of transformative learning is to empower individuals to change their beliefs, which is essential to allow one to remain flexible in the face of uncertainties. These findings are also aligned with Experiential Learning Theory (Kolb, 1984), in which learners engage in experiences that allow them to connect theory with practice. Moreover, the findings suggest that industry experts should act as mentors who integrate theoretical content with practical applications. This observation aligns with the concept of Work-Integrated Learning (WIL), which seeks to bridge the gap between higher education and employment by integrating

academic learning with workplace experiences (Ferns et al., 2014).

Knowledge and skills gained from the lectures and discussions

Knowledge and skills gained from lectures and discussions conducted by industry experts refer to the acquisition of technical competencies, professional knowledge, practical insights, and

workplace awareness that complement formal classroom instruction.

Table 2 illustrates the results of the thematic analysis derived from the participants' responses. It highlights the recurring codes, categories, and themes that describe their experiences in the program.

Table 2. Students' knowledge and skills gained from the lectures and discussions

Research Question	Initial Codes	Categories	Emerging Themes
What new knowledge and skills did you gain from the lectures and discussions?	PLC programming; ladder diagrams; relay logic; counters; wiring techniques; troubleshooting; symbols; practical applications	Technical knowledge acquisition; PLC competency development	Development of Technical Competencies
	Understanding workplace demand; industry relevance; problem-solving	Professional awareness	Industry-Relevant Skill Development

After the lectures, there are corresponding activities for each topic with the use of a training module. Such as PLC programming, ladder diagramming, wiring, and troubleshooting. The learners are guided by the course instructor and industry experts. For every output, students are required to explain the flow of the diagram. In this activity, learners were assessed to determine if they applied and acquired the necessary technical competency. These competencies contribute directly to workforce readiness. Further, learners were able to apply problem-solving based on the given activity by the industry experts. As emphasized by Ibrahim, et. al (2018), problem-based learning was a useful method that benefits the students' point of view. They found it effective to increase students' experiences after taking and mastering the modules. Further, according to Jackson (2015), employability is strengthened when students are exposed to actual environments that facilitate the development of both technical and professional competencies. The Industry-Academe Lecture Series appears to

contribute to this process by helping students understand industry expectations and identify areas for personal and professional growth.

Experiences in industry visit and hands-on activities

Industry visits and hands-on activities are integral components of industry-based learning that provide students with authentic opportunities to experience real workplace environments and apply theoretical knowledge in practical settings. These experiences enable learners to observe industrial processes, interact with professionals, operate industry-standard equipment, and participate in workplace tasks, thereby strengthening technical competence, workplace awareness, and professional confidence.

Table 3 summarizes the major findings of the thematic analysis by organizing participants' responses into initial codes, categories, and emerging themes. This presentation facilitates a systematic interpretation of the qualitative data.

Table 3. Students' experience during the industry visit and hands-on activities

Research Question	Initial Codes	Categories	Emerging Themes
How was your experience during the industry visit and hands-on activities?	Nervousness; fear of mistakes; confidence building; enjoyable experience; learning by doing; workplace observation	Emotional responses; Hands-on learning experiences	Experiential Learning and Confidence Building
	Guidance from experts; support from trainers; direct engagement	Mentorship and support	Learning Through Guided Practice

The initial experiences of the students were to feel nervous and fear making mistakes. These emotions are expected among students to be in an environment that is new to them. Despite these, students describe their experience as enjoyable and meaningful. Through active participation, the students were able to apply the concepts learned in the classroom to real-world situations and have confidence to apply technical procedures during the industry visit. According to Bandura, et. al (1997), confidence develops through mastery of experiences, wherein individuals successfully perform tasks and overcome challenges. Completing the activities, understanding the workplace process, and receiving positive feedback from mentors may develop confidence and readiness for future employment. Moreover, the students frequently highlighted the role of industry experts, trainers, and instructors in facilitating their learning. Guidance, encouragement, demonstrations, and personalized explanations were cited as critical factors that helped students overcome difficulties and gain confidence. These findings underscore the importance of mentorship in industry-based learning. Mentors serve as facilitators who support learners as they navigate unfamiliar

environments and technical challenges. This observation aligns with Vygotsky's concept of the Zone of Proximal Development, which emphasizes the role of knowledgeable individuals in supporting learners as they develop new competencies.

Tasks or equipment used, and understanding the real work processes and safety practices

Tasks performed and equipment utilized during industry-based learning provide students with opportunities to understand workplace operations, industrial technologies, and occupational safety practices. By engaging with industry-standard equipment and participating in actual workplace tasks, students develop practical competencies while gaining firsthand knowledge of operational procedures, quality standards, and safe work practices.

Table 4 shows the thematic analysis corresponding to Research Question 4, presenting the participants' experiences regarding workplace tasks, equipment, and safety practices encountered during the industry immersion.

Table 4. Tasks or equipment used, and understanding the real work processes and safety practices

Research Question	Initial Codes	Categories	Emerging Themes
What tasks or equipment were you able to use, and how did these help you understand real work	PLC systems; sensors; counters; relays; wiring tools; Mitsubishi PLC; wire stripper; screw gun; diagrams	Equipment utilization; Workplace technologies	Exposure to Industrial Technologies and Processes

processes and safety practices?	PPE use; safety protocols; company rules; proper tools; safety awareness	Occupational safety practices	Workplace Safety Consciousness
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The findings show that the learning outcomes of the industry visit intend to expose the students to industrial technologies, equipment, and actual operational processes. The students were able to interact with various technologies used in the manufacturing industry, including the Programmable Logic Controllers (PLCs), sensors, counters, relays, wiring tools, PLC systems, screw gun, and electrical diagrams. Utilization of technologies demonstrates that students gained learning experiences by directly engaging with tools and systems used by industry professionals. Lave & Wenger (1991) argue that learning becomes more effective when it occurs within contexts where knowledge is being applied. The program provided for the students is effective by letting the students observe the industry experts solving problems and maintaining production operations.

Connections to classroom lessons with actual industry practices

Connecting classroom lessons with actual industry practices is a fundamental objective of industry-based learning, as it enables students to apply theoretical knowledge in authentic workplace settings. Through exposure to real industrial processes, technologies, and professional practices, students gain a deeper understanding of how academic concepts are translated into practical solutions.

Table 5 provides an overview of the participants' narratives that were analyzed through thematic coding. The resulting categories and themes reflect the common experiences shared by the students during the Industry-Academe Lecture Series.

Table 5. Students' connections to classroom lessons with actual industry practices

Research Question	Initial Codes	Categories	Emerging Themes
How did this program help you connect classroom lessons with actual industry practices?	Similarity between classroom and industry; real-life application; practical understanding; problem-solving; trial and error; workplace relevance	Theory-practice integration; Application of learning	Bridging Theory and Practice
	Better understanding of PLC; improved analysis skills; reinforcement of lessons	Learning transfer	Authentic Contextual Learning

Students repeatedly emphasized that the program enabled them to connect classroom lessons with actual industrial practices. Concepts previously learned in lectures became more meaningful when observed in workplace applications. This connection between theory and practice is one of the primary objectives of industry-based learning initiatives. The findings support previous studies

suggesting that authentic learning environments enhance knowledge transfer by providing opportunities for students to apply academic concepts in realistic contexts (Herrington & Oliver, 2000). Meanwhile, students overwhelmingly viewed direct exposure to industrial environments as the most valuable aspect of the program. The opportunity to

interact with professionals, observe workplace operations, and participate in hands-on activities provided insights that could not be fully replicated in classroom settings. Authentic industry exposure helps students understand workplace culture, organizational practices, technical operations, and professional expectations. These findings support the notion that workplace learning experiences enhance student engagement, motivation, and understanding of career opportunities (Billett, 2026).

Technical skills improvement and preparation for employment

Technical skills improvement and preparation for employment are among the primary goals of industry-based learning in engineering and technology education. By engaging students in authentic workplace experiences, expert-led instruction, and hands-on technical activities, industry-based learning enables learners to develop discipline-specific competencies while strengthening the practical skills required in professional practice.

Table 6 presents the themes that emerged from the participants' responses following the coding and categorization process. These themes capture the shared meanings and lived experiences of the students throughout the program.

Table 6. Students' technical skills improvement and preparation for employment

Research Question	Initial Codes	Categories	Emerging Themes
In what ways did the activity improve your technical skills or prepare you for future employment?	Improved technical skills; installation techniques; programming; diagram creation; critical thinking; workplace awareness; safety awareness	Technical readiness; Career preparation	Career Readiness and Workforce Preparation
	Understanding industry environment; identifying skills to improve; future career awareness	Professional identity formation	Professional Development and Employability

The initial codes, including improved technical skills, installation techniques, programming, diagram creation, critical thinking, workplace awareness, and safety awareness, demonstrate that students viewed the activity as an opportunity to acquire competencies directly relevant to future employment. These competencies extend beyond theoretical knowledge and encompass practical skills that are essential for success in industrial and technological workplaces. Through hands-on activities involving PLC programming, wiring, troubleshooting, and system installation, learners

developed technical proficiencies that mirror workplace expectations. Becker (2019) suggests that educational experiences that enhance knowledge, skills, and competencies increase an individual's productivity and employability. Industry-based learning activities provide opportunities for students to acquire specialized skills and workplace knowledge that enhance their value as future employees. Additionally, an important aspect of this theme is the development of critical thinking and problem-solving skills. Students noted that industry activities required them to analyze situations,

identify solutions, and apply technical knowledge to real-world challenges. Another notable finding is that the industry experience enabled students to assess their own strengths and weaknesses in relation to workplace expectations. The findings align with the concept of professional identity formation, which refers to the process through which individuals develop an understanding of themselves as members of a professional community (Trede et al., 2012). Exposure to workplace practices, organizational culture, and professional responsibilities helped shape their experiences of what it means to work in the industry.

Challenges during the industry-academe lecturer series program

Challenges encountered during industry-based learning are considered a natural component of

students' professional development because they expose learners to unfamiliar technologies, workplace expectations, and real-world problem-solving situations. As students transition from classroom instruction to authentic industrial environments, they may experience difficulties related to technical competence, confidence, communication, and adaptation to workplace practices.

Table 7 displays the consolidated findings of the thematic analysis. The identified themes represent the participants' challenges during the program.

Table 7. Challenges encountered during the program

Research Question	Initial Codes	Categories	Emerging Themes
What challenges did you encounter during the program, and how were they addressed?	Fear of failure; unfamiliar equipment; lack of knowledge; wiring difficulties; nervousness; advanced tasks	Learning barriers; Technical challenges	Overcoming Learning Challenges Through Support
	Trainer guidance; instructor support; encouragement; motivation; explanations	Mentorship and scaffolding	Supportive Learning Environment

One of the most prominent challenges identified by students was the fear of making mistakes while performing technical tasks. Many participants expressed nervousness and hesitation when interacting with industrial equipment and performing hands-on activities. The fear of failure often stemmed from concerns about damaging equipment, making incorrect connections, or demonstrating inadequate knowledge in front of peers and industry professionals. According to Kolb's Experiential Learning Theory (1984), meaningful learning occurs when individuals encounter new experiences that challenge their existing

knowledge structures. The unfamiliarity of workplace equipment and procedures prompted students to engage in active learning, reflection, and problem-solving, thereby facilitating deeper understanding. Another important aspect of the supportive learning environment was the emotional encouragement provided by mentors and trainers. Students frequently mentioned that instructors motivated them, reassured them when they made mistakes, and encouraged them to continue participating despite their fears. Research on workplace learning suggests that supportive mentoring relationships enhance learner motivation, reduce anxiety, and improve

learning outcomes (Billett, 2011). The findings of this study reinforce this perspective, demonstrating that students are more likely to persist through challenges when they receive constructive guidance and encouragement from experienced practitioners.

Valuable part of the Industry-Academe Lecture Series program

The value of an Industry-Academe Lecture Series lies in its ability to provide students with authentic learning experiences that extend beyond conventional classroom instruction. By

bringing industry professionals into the academic setting and providing opportunities for workplace exposure and hands-on learning, such programs enable students to acquire practical knowledge, develop technical competencies, and gain insights into current industry practices.

Table 8 highlights the significant themes generated from the participants' reflections. These themes provide deeper insights into how the Industry-Academe Lecture Series can be improved.

Table 8. Valuable part of the Industry-Academe Lecture Series program

Research Question	Initial Codes	Categories	Emerging Themes
What was the most valuable part of the program, and what suggestions can you give to improve it?	Real industry experience; confidence building; direct interaction with professionals; hands-on activities; workplace exposure	Valuable learning experiences; Industry immersion	Authentic Industry Exposure as a Valuable Learning Experience
	More immersion hours; longer training; more activities; clearer instructions; focus on beginners; more opportunities	Program enhancement recommendations	Need for Expanded and Inclusive Learning Opportunities

A recurring observation among participants was the significance of experiencing a real industrial environment. For many students, this was their first opportunity to enter a professional workplace, observe operational processes, and interact with industry practitioners. Such exposure enabled them to gain a realistic understanding of industrial operations, workplace expectations, and professional responsibilities. The findings support recent evidence that work-integrated and experiential learning initiatives contribute significantly to students' employability, technical competence, and workforce readiness by providing opportunities to apply academic knowledge within authentic workplace environments (Rafiq, 2024). Research has shown that students who participate in industry-based learning experiences

develop stronger professional skills, increased confidence, and a clearer understanding of workplace expectations compared to students who rely solely on classroom-based instruction. Students felt that the limited duration of the program constrained their ability to fully understand industrial processes, practice technical skills, and engage more deeply with workplace activities. Although the exposure was valuable, many participants believed that additional time would allow for more comprehensive learning and skill development.

The findings also highlight issues related to inclusivity and equitable participation. Several students suggested that beginners and those with limited prior knowledge should receive additional support and attention during industry-based learning activities. This recommendation reflects

the diversity of student backgrounds, experiences, and skill levels within technical education programs. Longer and more structured workplace experiences allow learners to develop deeper technical competencies, professional confidence, and stronger connections between academic knowledge and industry practice (Macqueen, 2025).

Summarized Themes on Industry-based Learning

The summarized themes on industry-based learning represent the collective experiences of students as they participated in the Industry-Academe Lecture Series, encompassing expert-led lectures, workplace visits, and hands-on technical activities. These themes synthesize the participants' perceptions of how authentic industry engagement influenced their learning, technical competence, workplace awareness, professional development, and career preparation. Collectively, the themes demonstrate that industry-based learning extends beyond knowledge acquisition by fostering meaningful connections between academic instruction and professional practice while promoting continuous learning and workforce readiness.

Table 9 presents the summary of the major themes that emerged from all research questions. The table synthesizes the participants' experiences into broader thematic categories that collectively describe the outcomes of the Industry-Academe Lecture Series.

The findings demonstrate that the Industry-Academe Lecture Series provided meaningful learning experiences that enhanced students' academic, technical, and professional development. Through industry visits, expert lectures, and workplace exposure, students gained firsthand insights into industrial operations, making learning more relevant and engaging. These experiences transformed classroom knowledge into practical understanding, supporting experiential and authentic learning principles (Kolb, 1984; QAA, 2024).

A key outcome of the program was its ability to bridge theory and practice. Students reported a better understanding of PLC concepts, automation systems, and workplace processes because they were able to observe and apply these concepts in real industrial settings. This finding supports the idea that authentic workplace experiences strengthen knowledge transfer and workplace readiness (Ferns et al., 2014; Rafiq et al., 2024).

Table 9. Summary of Themes on Industry-based Learning

Major Theme	Supporting Categories
1. Transformative Learning Through Industry Exposure	Industry visits, workplace observations, expert lectures, real-world exposure
2. Bridging Theory and Practice	Application of classroom concepts, authentic learning experiences, PLC implementation
3. Development of Technical Competence and Workplace Skills	Programming, wiring, troubleshooting, equipment handling, problem-solving
4. Workplace Safety Awareness and Professional Responsibility	PPE utilization, safety protocols, workplace discipline, risk awareness
5. Confidence Building Through Mentorship and Hands-On Learning	Guided practice, overcoming fear, instructor support, experiential learning
6. Inclusivity, Equity, Access, and Continuous Improvement	Need for additional time, support for beginners, equitable participation, expanded opportunities

The program also contributed to the development of technical competencies such as programming, wiring, troubleshooting, and equipment handling. These hands-on experiences

enhanced students' technical readiness and employability by allowing them to develop industry-relevant skills and problem-solving abilities (Lavado-Anguera et al., 2024).

Another important outcome was the development of workplace safety awareness. Exposure to PPE usage, safety protocols, and workplace regulations helped students recognize the importance of safety, discipline, and professional responsibility in industrial environments. Such experiences are essential in preparing future engineering and technology professionals to work safely and ethically.

Students also reported increased confidence as a result of mentorship and guided practice. Initial feelings of nervousness and fear were gradually overcome through support from industry experts and instructors. The guidance provided by mentors helped students build self-confidence, develop technical skills, and engage more actively in workplace learning activities (Vygotsky, 1978; Macqueen et al., 2025).

Finally, students emphasized the need for expanded and more inclusive learning opportunities. Recommendations such as longer immersion periods, additional hands-on activities, clearer instructions, and greater support for beginners suggest that future implementations should focus on enhancing accessibility, equity, and participation. Inclusive and well-supported industry-based learning experiences can maximize student engagement and learning outcomes while ensuring that all learners benefit from workplace exposure (Wilkinson, 2025; Pickering, 2024). The findings suggest that the Industry-Academe Lecture Series successfully enriched instruction, strengthened industry-academe collaboration, and prepared students for future employment by integrating authentic workplace experiences with academic learning.

Table 10 presents the proposed action plan for strengthening the Industry-Academe Lecture Series and enhancing the curriculum of Industrial Technology programs based on the findings of this study.

Table 10. Proposed Action Plan for Strengthening the Industry-Academe Lecture Series and Technology Programs

Improvement Area	Objectives	Proposed Activities/Strategies	Expected Outcomes	Responsible Office/Stakeholders
1. Curriculum Enhancement through Industry Integration	Align the curriculum with current industry practices and emerging technologies.	Integrate industry-led lectures, co-teaching, and case-based learning into professional courses; conduct periodic curriculum reviews with industry representatives.	Updated and industry-responsive curriculum that enhances graduate employability.	Academic Affairs, College Dean, Program Chairs, Industry Partners
2. Expanded Industry Immersion Program	Increase students' exposure to authentic workplace environments.	Extend industry visits, plant tours, workplace observations, and short-term immersion activities throughout the academic year.	Improved understanding of workplace operations, professional culture, and industry expectations.	College, Industry Partners, Internship/OJT Office
3. Strengthened Hands-on	Enhance students' technical competence	Increase laboratory activities, simulation exercises, equipment demonstrations, and	Improved technical proficiency, critical thinking,	Faculty Members, Laboratory Coordinators, Industry Experts

Technical Training	through practical application.	industry-based projects involving PLCs, automation systems, instrumentation, and troubleshooting.	and problem-solving skills.	
4. Faculty-Industry Collaboration	Improve instructional quality through collaboration with practitioners.	Invite industry experts as guest lecturers, adjunct instructors, mentors, and curriculum advisers; implement faculty immersion in industry.	Stronger linkage between theory and industry practice and enhanced faculty capability.	Human Resource Office, External Affairs Office, Industry Partners
5. Career Readiness and Professional Development	Prepare students for employment and lifelong professional growth.	Conduct career talks, resume writing workshops, mock interviews, industry certification training, and professional ethics seminars.	Increased employability, workplace confidence, and professional competencies.	Career Development Office, Guidance Office, Industry Partners
6. Workplace Safety and Professional Responsibility	Strengthen occupational safety knowledge and professional work ethics.	Integrate industry-standard safety training, PPE orientation, workplace regulations, and risk assessment activities into laboratory and immersion programs.	Enhanced safety awareness and responsible workplace behavior.	Safety Office, Faculty Members, Industry Partners
7. Inclusive, Equitable, and Accessible Learning Opportunities	Ensure equitable participation of all students, including Persons with Disabilities (PWDs) and students with diverse learning needs.	Develop inclusive instructional practices, provide reasonable accommodations when needed, assign faculty mentors, ensure accessible venues and equipment, and implement differentiated learning support during industry activities.	Increased inclusivity, equitable participation, improved learning experiences, and equal access to authentic industry-based learning opportunities.	Student Affairs Office, Guidance Office, Disability Support Services, Faculty Members, Industry Partners
8. Student Mentoring and Learning Support	Improve students' confidence and readiness before industry exposure.	Conduct pre-immersion orientation, technical refresher sessions, peer mentoring, faculty coaching, and post-activity reflection sessions.	Reduced student anxiety, improved confidence, and enhanced learning outcomes.	Faculty Advisers, Industry Mentors, Guidance Office

9. Continuous Program Evaluation and Quality Improvement	Sustain the effectiveness of the Industry-Academe Lecture Series.	Collect feedback from students, faculty, alumni, and industry partners after every activity; review outcomes annually for curriculum enhancement.	Evidence-based improvement of the program and strengthened industry-academe partnerships.	Quality Assurance Office, Academic Affairs, External Affairs Office
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The proposed initiatives address the major themes identified from the students' experiences, including the need to strengthen industry-academe collaboration, improve technical competency, expand authentic workplace exposure, enhance workplace safety awareness, and develop students' employability skills. The action plan also emphasizes continuous curriculum enhancement through industry participation, faculty-industry collaboration, structured mentoring, and regular program evaluation to ensure that instructional practices remain aligned with current industry trends and workforce requirements.

Furthermore, the proposed plan highlights the importance of promoting inclusivity, equity, and access in industry-based learning. By providing reasonable support, accessible learning opportunities, and equitable participation for all students—including Persons with Disabilities (PWDs) and those with varying levels of technical preparedness—the program can create a more inclusive learning environment without compromising academic and professional standards. In this digital world, students are permitted to use social media platform for self-exploration of concepts and knowledge as Acheron (2026) highlights that social media can serve as a valuable learning and communication tool mostly specially when there is a post on educational and technical concepts and knowledge - an exploration beyond classroom and industry set ups. Collectively, these strategies are expected to strengthen graduate preparedness, improve the quality of technology education, foster sustainable industry partnerships, and support the development of competent, ethical, and industry-ready graduates

who can respond effectively to the demands of the evolving technological workforce towards “sustainable development and continuous quality improvement” (Acheron et al., 2024).

4. Conclusion

The findings demonstrate that the Industry-Academe Lecture Series effectively enriched students' learning by integrating classroom instruction with authentic industry experiences through expert-led lectures, workplace visits, and hands-on activities. The program enhanced students' technical competence, workplace safety awareness, critical thinking, confidence, and career readiness while strengthening their understanding of real-world industrial practices. Although students initially encountered challenges such as unfamiliar equipment, limited technical knowledge, and anxiety in performing workplace tasks, these were successfully addressed through mentorship, guided practice, and continuous support from faculty members and industry professionals. Furthermore, the study highlights that meaningful industry engagement can promote inclusivity, equity, and access by providing all students—including those with disabilities—with equal opportunities to participate in authentic learning experiences, receive appropriate instructional support, and develop industry-relevant competencies. Overall, the Industry-Academe Lecture Series demonstrates that industry-academe collaboration is an effective approach to developing competent, confident, and industry-ready graduates while fostering an inclusive learning environment where every student has equitable access to meaningful educational opportunities.

Recommendations

Academic institutions should institutionalize and continuously strengthen industry-based learning initiatives by expanding partnerships with industry, integrating expert-led instruction into the curriculum, extending workplace immersion opportunities, and implementing regular program evaluation to ensure continuous improvement. Institutions should likewise adopt inclusive instructional practices that promote equity and access, ensuring that all students, including Persons with Disabilities (PWDs) and those with varying levels of technical preparedness, receive

appropriate support, accommodations when necessary, and equal opportunities to participate in authentic workplace learning experiences. Industry partners are likewise encouraged to continue providing structured mentorship, safe and accessible learning environments, hands-on training, and meaningful workplace exposure while collaborating with academic institutions in designing inclusive and learner-centered programs. Strengthening these collaborative efforts will help produce graduates who are not only technically competent and workforce-ready but also prepared to thrive in diverse, equitable, and inclusive professional environments.

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