Non-technical Competency Skills through Industrial Training Experience among Civil Engineering Students

Noor Aqilah Salim[1], Mimi Mohaffyza Mohamad[2]*, Nofouz Mafarja[3], Adnan Ahmad[4]

[1,2]Faculty of Technical and Vocational Education, Universiti Tun Hussein Onn Malaysia, Malaysia

[3]Department of Mathematics and Science Education, Faculty of Education, Universiti Malaya

[4]Department of Advanced Technical and Vocational Education and Training, Faculty of Sciences and Technology, Universiti Teknologi Malaysia

DOI: https://doi.org/10.47772/IJRISS.2026.100700327

Received: 15 July 2026; Accepted: 20 July 2026; Published: 31 July 2026

ABSTRACT

In order to fulfil requirements of current workplaces, the engineering industry increasingly demands that graduates in civil engineering have both strong non-technical skills and technical ability. Students can use academic knowledge in real-world industry settings while developing critical non-technical skills like ethics, leadership, teamwork, and communication through industrial training. Therefore, among Civil Engineering students at Universiti Tun Hussein Onn Malaysia (UTHM), this study was to determine the level of non-technical skills, determine the level of industrial training elements, and examine the relationship between non-technical skills and industrial training elements. The survey approach in a quantitative study design. A structured questionnaire was used to gather data from 220 final-year Civil Engineering students who had finished their industrial training. The Statistical Package for the Social Sciences (SPSS) Version 27 was used to analyze the gathered data using Pearson correlation analysis and descriptive statistics like mean and standard deviation. The results showed that the respondents had a high level of industrial training elements and non-technical skills. The findings also showed a strong positive correlation between industrial training elements and non-technical skills. The findings used are limited to Civil Engineering students at a single university and are based on students' self-reported responses. In order to improve students' professional competencies, workplace readiness, and graduate employability, this study focuses on the significance of incorporating non-technical skills into engineering education and industrial training programs. It also offers valuable insights for higher education institutions and industry partners.

Keywords: Non-technical skills, Industrial training, Civil Engineering, Graduate, Employability, Career readiness.

INTRODUCTION

Engineering graduates are increasingly expected to possess both technical expertise and non-technical competencies to meet the evolving demands of the engineering industry. Industrial training has become an important component of engineering education because it provides opportunities for students to apply academic knowledge while developing communication, teamwork, leadership, and ethical competencies in authentic workplace environments. These competencies are essential in preparing graduates who are competent, adaptable, and ready to perform effectively in professional engineering practice. Therefore, this study investigates the level of non-technical skills, the level of industrial training elements, and the relationship between these variables among Civil Engineering students at Universiti Tun Hussein Onn Malaysia (UTHM). Although past research has focused at graduate employability and industrial training, there is no empirical evidence that particularly investigates the relationship between non-technical skills and industrial training elements among Civil Engineering students in Malaysian higher education institutions. Furthermore, most previous studies have relied exclusively on students' perspectives, emphasizing the need for greater inquiry into the role of non-technical skills in industrial training outcomes.

Research Background

One of the major fields of engineering, civil engineering is involved with the planning, design, construction, operation, and maintenance of infrastructure, including buildings, roads, bridges, airports, dams, and water supply systems. Civil engineers contribute significantly to sustainable development, public safety, and economic progress by completing infrastructure projects that satisfy social demands. Civil engineers are expected to have both strong technical and professional competencies that allow them to function well in interdisciplinary settings as the construction sector grows more challenging and technologically advanced. Employers are increasingly expecting engineering graduates to show communication, teamwork, leadership, and ethical competencies in addition to technical expertise to ensure successful project delivery and professional performance [1]. As a result, developing non-technical competencies has become crucial to engineering education and career readiness.

Industrial training is a short-term work placement that provides students with real-world industry exposure and practical experience alongside their academic studies. It plays a crucial role in enhancing graduates' employability by helping them develop both technical and interpersonal skills. Although industrial training has been widely implemented, many graduates still lack industry-relevant competencies, particularly communication skills, workplace experience, and the ability to apply theoretical knowledge in professional practice [2][3]. Universities often priorities technical competencies over non-technical competencies, resulting in a mismatch between graduate capabilities and employer expectations [4]. Students generally possess strong theoretical knowledge but face difficulties in applying that knowledge within authentic industrial environments[5]. Consequently, improving industrial training has become increasingly important to ensure graduates are adequately prepared for professional engineering practice.

Nowadays, employers increasingly emphasize non-technical skills such as communication, teamwork, and ethical values when assessing graduate employability [6]. These competencies are considered essential for effective workplace performance, particularly in civil engineering, where engineers are required to communicate with various stakeholders, collaborate within multidisciplinary teams, and demonstrate professional judgement in engineering projects. Furthermore, global workforce trends indicate that adaptability, professional communication, and collaboration remain among the most important competencies required by employers [7]. As industry evolves, graduates must be able to handle complex project demands, communicate with various stakeholders, and work in ethical behaviors. Hence, the role of industrial training in enhancing these elements must be aligned with academic institutions and industry.

Problem Statement

Industrial training is a compulsory component of Civil Engineering programmers in Malaysian higher education institutions and aims to improve students' readiness for professional practice. However, graduates require more than technical expertise to meet current industry expectations. Communication, teamwork, leadership, and ethics have become essential competencies that support workplace performance and professional effectiveness. Despite the objective of industrial training to expose students to authentic workplace experiences, concerns remain regarding engineering students' ability to demonstrate these competencies during industrial training. Limited information is available regarding the level of communication, teamwork, leadership, and ethics among Civil Engineering students throughout industrial training. Furthermore, the relationship between these non-technical skills and industrial training elements remains underexplored. Therefore, this study was conducted to investigate the level of non-technical skills among Civil Engineering students at Universiti Tun Hussein Onn Malaysia (UTHM) and examine their relationship with industrial training elements.

Research Purpose and Significance

This study aims to identify the level of non-technical skills, determine the level of industrial training elements, and examine the relationship between non-technical skills and industrial training elements among Civil Engineering students at Universiti Tun Hussein Onn Malaysia (UTHM). The findings are expected to provide empirical evidence regarding the role of communication, teamwork, leadership, and ethics in enhancing industrial training experiences. In addition, the findings may assist higher education institutions in strengthening curriculum design and industrial training programmers, while enabling industry partners to improve workplace learning opportunities, mentoring practices, and trainee performance evaluation to enhance graduate employability and workplace readiness.

To achieve the objectives of this study, the following research questions were addressed:

i. What is the level of non-technical skills in industrial training among Civil Engineering students at Universiti Tun Hussein Onn Malaysia (UTHM)?

ii. What is the level of industrial training elements among Civil Engineering students at Universiti Tun Hussein Onn Malaysia (UTHM)?

iii. Is there a significant relationship between non-technical skills and industrial training elements among Civil Engineering students at Universiti Tun Hussein Onn Malaysia (UTHM)?

LITERATURE REVIEW

This chapter aims to establish the theoretical foundation of the present study by reviewing the literature related to non-technical skills and industrial training among Civil Engineering students. It first discusses the concept of industrial training and its role in preparing engineering students for professional practice, followed by the theoretical foundations underpinning this study, namely Experiential Learning Theory (ELT) and Human Capital Theory. Subsequently, the section reviews the concepts of non-technical skills, including communication, teamwork, leadership, and ethics, as well as the key industrial training elements comprising competency and competitiveness, workplace experience with academic knowledge, application of theoretical knowledge, and career readiness.

Industrial Training

Industrial training is recognized as an essential component of engineering education that bridges the gap between theoretical knowledge acquired in higher education and practical experience gained in the workplace. It refers to a structured educational program that provides students with supervised workplace exposure, enabling them to apply classroom knowledge in authentic industrial settings while developing technical and non-technical competencies required by industry [8][9]. Through industrial training, students are exposed to real engineering tasks, organizational practices, and professional responsibilities, allowing them to develop practical

ISSN No. 2454-6186 | DOI: 10.47772/IJRISS | Volume X Issue VII July 2026

competencies that cannot be fully achieved through classroom learning alone. Furthermore, industrial training is increasingly aligned with current industrial needs through collaboration between higher education institutions and industry partners, ensuring that graduates are equipped with competencies relevant to Industry 4.0 and future workforce demands [10]. Recent developments have also shown that industrial training increasingly incorporates digital technologies such as virtual reality, augmented reality, and process mining to improve learning effectiveness, engagement, workplace safety, and competency development [11].

Industrial training also serves as an important platform for developing students' employability by integrating technical knowledge with professional competencies. Previous studies reported that workplace exposure enables students to strengthen communication, teamwork, leadership, problem-solving, adaptability, and ethical behavior while improving their understanding of professional engineering practices[8][12]. However, despite its importance, several studies have highlighted that the effectiveness of industrial training is influenced by factors such as training quality, workplace supervision, industry collaboration, and students' readiness to apply theoretical knowledge in practical situations. Therefore, industrial training continues to play a significant role in producing competent Civil Engineering graduates who are capable of adapting to workplace challenges and meeting employers' expectations.

Experiential Learning Theory

Experiential Learning Theory (ELT), introduced by Kolb, explains that learning is a continuous process in which knowledge is created through the transformation of experience. The theory consists of four learning stages, namely concrete experience, reflective observation, abstract conceptualization, and active experimentation, which allow individuals to acquire knowledge through direct involvement and reflection on real-life experiences [13]. In the context of engineering education, industrial training provides an ideal environment for implementing this learning cycle because students are exposed to authentic workplace situations that enable them to integrate theoretical knowledge with practical experience. Through this process, students develop a deeper understanding of engineering concepts while strengthening professional competencies required in the workplace.

The application of ELT in industrial training enables Civil Engineering students to learn by actively participating in engineering tasks, reflecting on workplace experiences, applying engineering concepts, and continuously improving their performance through practical engagement. Previous studies have reported that experiential learning enhances students' problem-solving ability, critical thinking, communication, teamwork, and adaptability, which are essential competencies for engineering graduates [14][15]. In addition, experiential learning encourages students to become more independent, confident, and capable of applying engineering knowledge in professional practice. Therefore, ELT provides an appropriate theoretical foundation for explaining how industrial training contributes to the development of non-technical skills and industrial training elements among Civil Engineering students

Human Capital Theory

Human Capital Theory explains that education, training, and work experience are valuable investments that enhance an individual's knowledge, skills, competencies, and productivity, ultimately contributing to career success and economic growth [16]. In engineering education, industrial training represents an important investment in human capital because it enables students to acquire practical experience while strengthening both technical and non-technical competencies required by employers. Through workplace exposure, students are able to improve their professional capability, adaptability, and readiness to perform effectively in engineering organizations.

Previous studies have demonstrated that industrial training contributes significantly to competency development, graduate employability, and workplace readiness by providing opportunities for students to apply academic knowledge in authentic workplace environments while developing communication, teamwork, leadership, and ethical competencies [17][18]. Human Capital Theory therefore supports the argument that investments in industrial training improve students' competencies and competitiveness, enabling them to become more productive and employable upon graduation. Consequently, this theory provides an appropriate foundation for understanding the relationship between non-technical skills and industrial training elements examined in this study.

Non-technical Skills

Non-technical skills are increasingly recognized as essential competencies that complement technical expertise in engineering practice. According to previous study, non-technical skills refer to a set of social, cognitive, and personal resource competencies that support effective and safe task performance [19]. These competencies include communication, teamwork, leadership, decision-making, and problem-solving, which improve both individual and team performance. In the context of this study, non-technical skills refer to the behavioural and professional competencies required by Civil Engineering students during industrial training, particularly communication, teamwork, leadership, and ethics. These competencies enable students to perform effectively in workplace environments while supporting professional conduct and collaboration.

Communication is recognized as one of the most fundamental competencies in engineering because it facilitates the exchange of technical information, improves collaboration among project stakeholders, and supports effective decision-making. According to past studies, communication involves the exchange of information, ideas, and messages through verbal, written, visual, and non-verbal forms [20]. Effective communication allows engineering students to explain technical information clearly, interact professionally with supervisors and colleagues, and minimize misunderstandings that may affect project performance. Previous studies have reported that poor communication contributes to project delays, design errors, safety incidents, and ineffective teamwork, highlighting the importance of communication in engineering practice [21].

Teamwork is another important non-technical competency because engineering projects are multidisciplinary and require collaboration among engineers, architects, contractors, and other professionals. Teamwork is defined as a dynamic process involving communication, shared decision-making, mutual trust, and accountability to achieve common goals [22]. Similarly, previous study emphasized that effective teamwork improves problem-solving capability, decision-making, innovation, and project performance, whereas poor teamwork often results in misunderstanding, interpersonal conflict, and project delays [23]. Recent studies also highlighted that multidisciplinary and project-based learning environments contribute significantly to the development of teamwork competencies required by engineering graduates [24][25].

Leadership is equally important because engineering graduates are expected to demonstrate initiative, responsibility, and sound decision-making even when they are not assigned formal leadership positions. Leadership described as a multidimensional process of influencing others to achieve shared objectives through effective coordination and guidance [26]. During industrial training, leadership is reflected through students' willingness to accept responsibility, organize work activities, solve workplace problems, and demonstrate initiative when completing engineering tasks. These behaviors contribute to competency development and prepare students for future professional responsibilities.

Ethics represents another essential competency in engineering because professional practice requires integrity, accountability, honesty, and compliance with organizational and professional standards. Ethics provides the moral principles that distinguish appropriate professional behavior and guide responsible decision-making [27]. During industrial training, ethical behavior enables students to establish trust with supervisors and colleagues while promoting professionalism and workplace responsibility. Consequently, communication, teamwork, leadership, and ethics collectively represent essential non-technical competencies that support students' professional development and workplace readiness throughout industrial training.

Industrial Training Elements

Industrial training elements refer to the expected learning outcomes achieved by students throughout their industrial training experience. These elements reflect students' professional development through workplace exposure and their ability to integrate academic knowledge with practical engineering experience. In this study, industrial training elements consist of competency and competitiveness, workplace experience with academic knowledge, application of theoretical knowledge, and career readiness. These dimensions were selected because they comprehensively represent the expected outcomes of industrial training among Civil Engineering students.

Competency and competitiveness represent students' ability to perform engineering tasks effectively, solve workplace problems, adapt to industrial environments, and demonstrate confidence in carrying out professional responsibilities. Previous studies have shown that industrial training strengthens students' competencies by enhancing their technical knowledge, communication skills, teamwork, adaptability, and professional behavior, thereby improving their competitiveness and employability in the engineering profession [28][29][30][31].

Another important outcome of industrial training is the integration of workplace experience with academic knowledge. Through industrial placement, students are exposed to authentic engineering practices that enable them to relate classroom learning to workplace situations, thereby strengthening their understanding of engineering concepts and improving problem-solving ability[32][33]. In addition, industrial training enhances students' ability to apply theoretical knowledge in practical engineering tasks. Students are expected to apply engineering principles, technical knowledge, and analytical skills acquired during their studies when performing workplace responsibilities. Effective industrial training therefore facilitates the transfer of theoretical knowledge into practical competencies required in professional engineering practice[34].

Furthermore, industrial training contributes significantly to career readiness by preparing students for the transition from higher education to professional employment. Workplace exposure enables students to develop confidence, professional identity, adaptability, and an understanding of workplace expectations. Previous studies have consistently reported that industrial training improves graduates' employability and career readiness by providing meaningful workplace experiences that enhance both technical and non-technical competencies [35][36][37]. Collectively, these industrial training elements demonstrate the effectiveness of industrial training in preparing Civil Engineering students to become competent, competitive, and workplace-ready engineering graduates.

Relationship between Non-Technical Skills and Industrial Training Elements

Engineering education and industrial training, non-technical skills are increasingly recognized as essential competencies that complement technical expertise. Communication, teamwork, leadership, and ethical behavior enable students to collaborate effectively, solve workplace problems, and adapt to professional responsibilities in engineering environments. As engineering projects become more multidisciplinary and industry-oriented, higher education institutions have increasingly emphasized the integration of non-technical skills into engineering programmers to improve graduate employability and workplace performance [38].

Previous studies have consistently demonstrated that communication, teamwork, leadership, and ethics are positively associated with students' workplace learning experiences and professional development. Effective communication enables students to exchange technical information, interact with supervisors and colleagues, and participate actively in workplace activities. Similarly, teamwork promotes collaboration, problem-solving, and knowledge sharing, while leadership encourages initiative, responsibility, and decision-making during industrial training. Ethical behavior also strengthens professionalism, accountability, and compliance with workplace standards, which are important attributes expected by employers [39][40].

Industrial training provides opportunities for students to integrate academic knowledge with authentic workplace experience, enabling them to strengthen competency and competitiveness, relate workplace experience to academic knowledge, apply theoretical knowledge in practical situations, and improve career readiness. Students who possess stronger non-technical skills are generally more capable of adapting to workplace environments, participating in engineering tasks, and maximizing learning opportunities throughout industrial training [41][42].

Although previous studies have examined graduate employability, workplace learning, and engineering competencies, limited empirical evidence has specifically investigated the relationship between non-technical skills and industrial training elements among Civil Engineering students in Malaysian higher education institutions. Therefore, this study examines the relationship between non-technical skills and industrial training elements among Civil Engineering students at Universiti Tun Hussein Onn Malaysia (UTHM). The findings are expected to provide empirical evidence that supports curriculum enhancement and strengthens industrial training programmes to improve graduate competency, employability, and workplace readiness.

METHOD

This chapter discusses the research methodology employed to investigate the level of non-technical skills (NTS) and industrial training elements among civil engineering students and its relationship with the of industrial training elements. The primary goal of this methodology is to provide a structured pathway for the researcher to achieve the specific objectives established at the beginning of the study, which include examine the level of non-technical skills and industrial training elements, and determining the correlation between these two variables.

Research Design

This study employed a quantitative research design using a survey method. The survey approach was selected because it enables the collection of numerical data from a relatively large number of respondents and allows statistical analysis to determine the level of non-technical skills, the level of industrial training elements, and the relationship between these variables among Civil Engineering students. The operational framework guided the research process, beginning with the identification of the research problem, literature review, development and validation of the research instrument, pilot study, actual data collection, data analysis using the Statistical Package for the Social Sciences (SPSS) Version 27.0, and interpretation of the findings. To avoid duplicate responses, the questionnaire was distributed through Google Forms with the "Limit to 1 Response" function activated. In addition, although respondents in both the pilot study and the actual study were selected from the same target population, the pilot study data were analyzed independently and were not included in the final analysis.

Participants

The target population consisted of 555 final-year Civil Engineering students from the Faculty of Civil Engineering and Built Environment, Universiti Tun Hussein Onn Malaysia (UTHM), who had completed their industrial training. The Krejcie and Morgan sampling table was used to determine the required sample size, which recommended 234 respondents. A total of 220 completed questionnaires were successfully collected, representing 94.02% of the recommended sample size. This response rate is considered adequate to represent the study population and achieve the research objectives [43]. Therefore, the sample was considered sufficient for the descriptive and correlational analyses conducted in this study. All of the responders were students who had finished their industrial training. As a result, the findings reflect students' perspectives and do not include

ISSN No. 2454-6186 | DOI: 10.47772/IJRISS | Volume X Issue VII July 2026

feedback from industry supervisors or employers.

Instrument

Data were collected using a structured questionnaire adapted and modified from previous studies[8][14][44][45][46]. The questionnaire consisted of three sections. Section A collected respondents' demographic information, including gender, company type, and Civil Engineering field during industrial training. Section B measured the application of non-technical skills, comprising communication, teamwork, leadership, and ethics. Section C measured the industrial training elements, namely competency and competitiveness, workplace experience with academic knowledge, application of theoretical knowledge, and career readiness. All items were measured using a five-point Likert scale, ranging from 1 (Strongly Disagree) to 5 (Strongly Agree) [47].

Table 3.1: Research Instrument

Non-Technical Skills		
Constructs	**Codes**	**Items**
Communication	C1	1. I can communicate well with my colleague.
	C2	2. I frequently engaged in proactive communication with my supervisor to seek advice and updates.
	C3	3. I am able to speak firmly when expressing my opinions.
	C4	4. I am confident in using English/ Malay language for workplace tasks.
	C5	5. I am able to convey information effectively, either verbally or non-verbally
Teamwork	T1	6. I worked effectively with others to achieve our team goals.
	T2	7. I am good at persuading others to see my point of view or support my suggestions.
	T3	8. I maintained professional and collaborative relationships with both my supervisors and co-workers.
	T4	9. I follow and give contribution idea when we discuss in group.
	T5	10. I prioritize group goals over individual interests during tasks.
Leadership	L1	11. I remained persistent in completing my projects despite having limited experience in the field.
	L2	12. I am good at persuading others to see my point of view or support my suggestions.
	L3	13. I took the initiative to apply my university knowledge effectively to the tasks assigned.
	L4	14. I can work with minimal supervision.
	L5	15. I can take the lead on assigned sub tasks.
Ethics	E1	16. I always chose to do the right thing and followed workplace rules, even when it was difficult.
	E2	17. I consistently followed ethical standards and behaved professionally during my industrial training.

ISSN No. 2454-6186 | DOI: 10.47772/IJRISS | Volume X Issue VII July 2026

	E3	18. I consistently followed health, safety, and environmental sustainability practices in the workplace.
	E4	19. I can accept suggestions or criticism from colleague regarding work.
	E5	20. I respect the confidentiality and privacy policies of the organization.
Industrial Training Elements		
Dimensions	**Codes**	**Items**
Competency and Competitiveness	CC1	21. The internship helped to develop my ability to plan and organize my day-to-day work.
	CC2	22. As a result of internship, I feel confident about tackling unfamiliar work-based problems.
	CC3	23. The skills gained during industrial training improved my ability to solve work related problems.
	CC4	24. The industrial training improved my overall job competency.
	CC5	25. Industrial training enhanced my ability to apply theory in practical situations.
Workplace Experience with Academic Knowledge	W1	26. The industrial training helped me relate workplace experience to what I learned at university.
	W2	27. My understanding of academic concepts improved through practical workplace exposure.
	W3	28. The industrial training allowed me to see how academic knowledge is used in real work situations.
	W4	29. I able to apply specific academic concepts directly to my job responsibilities at the workplace.
	W5	30. I understand the difference between what I learn in lectures and how it's applied at workplace.
Application of Theoretical and Academic Knowledge	A1	31. I was able to apply theoretical knowledge learned in class during industrial training.
	A2	32. Tasks assigned during training required me to use theory to solve real problems.
	A3	33. The training strengthened my ability to apply engineering principles in practice.
	A4	34. I applied standard testing and inspection procedures learned in the university laboratory to verify the quality of raw materials on-site.
	A5	35. I performed technical calculations during work using methods from my study and training
Career Readiness	R1	36. The industrial training helped me feel more prepared to enter the workforce.
	R2	37. I gained workplace experience that helped me making career decisions.

ISSN No. 2454-6186 | DOI: 10.47772/IJRISS | Volume X Issue VII July 2026

	R3	38. The industrial training increased my confidence in pursuing a professional career.
	R4	39. Industrial training experience enhanced my career readiness.
	R5	40. I can handle uncertainty in projects and quickly adapt my plans to changes.

Validity, Reliability and Data Analysis

Before the actual data collection, the questionnaire underwent content validation by experts to ensure the relevance, clarity, and suitability of each item. Subsequently, a pilot study involving 30 final-year Civil Engineering students was conducted to evaluate the reliability of the instrument. The pilot study data were used solely for reliability analysis and were excluded from the final dataset. The internal consistency of the instrument was assessed using Cronbach's Alpha, and all constructs achieved acceptable reliability values before proceeding to the actual study.

The collected data were analyzed using SPSS Version 27.0. Descriptive statistics, including frequency, percentage, mean, and standard deviation, were employed to describe respondents' demographic characteristics and determine the levels of non-technical skills and industrial training elements. Prior to inferential analysis, normality was assessed using skewness values. Pearson Correlation analysis was subsequently conducted to examine the relationship between non-technical skills and industrial training elements among Civil Engineering students.

The analysis results show that the overall Cronbach's Alpha value is 0.895, which represent very good level of reliability. The values for each construct are as follows: communication ($\alpha = 0.837$), teamwork ($\alpha = 0.753$), leadership ($\alpha = 0.740$), ethic ($\alpha = 0.936$), competency and competitiveness ($\alpha = 0.645$), workplace experience with academic knowledge ($\alpha = 0.774$), application of theorical and academic knowledge ($\alpha = 0.666$), and career readiness ($\alpha = 0.664$). Based on the value of Cronbach's Alpha, all construct item was acceptable as the ($\alpha > 0.6$). These findings also align with Edelsbrunner et al. (2025)'s suggestion that a minimum coefficient of $\geqslant 0.6$ is acceptable for reliability.

RESULTS

This section presents the findings based on the data collected from 220 final-year Civil Engineering students who had completed their industrial training. The findings are presented according to the research objectives, namely respondents' demographic information, the level of non-technical skills, the level of industrial training elements, and the relationship between non-technical skills and industrial training elements. Descriptive statistics, including frequency, percentage, mean, and standard deviation, together with Pearson Correlation analysis, were used to analyze the data.

Respondents Demographic Profile

A total of 220 respondents participated in this study. Of these, 113 (51.4%) were female and 107 (48.6%) were male. The respondents completed their industrial training in various sectors, including construction, consultancy, government, development, and other organizations, with the majority undertaking their training in the construction sector. In terms of Civil Engineering specialization, the highest proportion of respondents was from the Structural Engineering field, whereas the lowest proportion was from the Geotechnical Engineering field. These findings indicate that the respondents represented diverse industrial sectors and Civil Engineering disciplines, providing appropriate representation for the study.

ISSN No. 2454-6186 | DOI: 10.47772/IJRISS | Volume X Issue VII July 2026

Descriptive Analysis of Non-Technical Skills and Industrial Training Elements

The descriptive analysis indicated that the respondents demonstrated a high level of non-technical skills, with an overall mean score of 3.72 (SD = 0.39). This finding suggests that the respondents were able to demonstrate communication, teamwork, leadership, and ethical behavior effectively throughout their industrial training. Similarly, the overall level of industrial training elements was also interpreted as high, with a mean score of 3.92 (SD = 0.24). This indicates that industrial training successfully enhanced students' competency and competitiveness, workplace experience with academic knowledge, application of theoretical knowledge, and career readiness. Among the non-technical skill constructs, ethics recorded the highest mean score (M = 4.11, SD = 0.27), whereas teamwork recorded the lowest mean score (M = 3.67, SD = 0.52). For industrial training elements, competency and competitiveness obtained the highest mean score (M = 4.07, SD = 0.28), while application of theoretical knowledge recorded the lowest mean score (M = 3.72, SD = 0.42). Nevertheless, all constructs were interpreted at a high level, indicating that the respondents demonstrated positive non-technical skills and industrial training performance throughout their industrial training

Table 4.1: Descriptive Analysis for Non-Technical Skills and Industrial Training Elements

Variable	Construct	Mean	Standard Deviation	Interpretation
Non-Technical Skills	Communication	3.66	0.52	Moderate
	Teamwork	3.67	0.54	High
	Leadership	3.43	0.52	Moderate
	Ethics	4.11	0.27	High
	Overall	3.72	0.39	High
Industrial Training Elements	Competency and Competitiveness	4.07	0.28	High
	Workplace Experience with Academic Knowledge	3.94	0.32	High
	Application of Theoretical Knowledge	3.72	0.42	High
	Career Readiness	3.97	0.42	High
	Overall	3.92	0.24	High

Relationship Between Non-Technical Skills and Industrial Training Elements

Pearson Correlation analysis was conducted to examine the relationship between non-technical skills and industrial training elements among Civil Engineering students. The analysis revealed a significant positive relationship between the two variables ($r = 0.600$, $p < 0.001$). The correlation coefficient indicates a moderate positive relationship, suggesting that higher levels of non-technical skills were associated with better industrial training elements among the respondents.

Further analysis also showed that the dimensions of communication, teamwork, leadership, and ethics were

ISSN No. 2454-6186 | DOI: 10.47772/IJRISS | Volume X Issue VII July 2026

significantly related to workplace experience with academic knowledge, application of theoretical knowledge, and career readiness ($p < 0.001$). However, no significant relationship was found between the four non-technical skill dimensions and competency and competitiveness ($p > 0.05$), indicating that competency and competitiveness may be influenced by other factors beyond the non-technical skills examined in this study.

DISCUSSION

This chapter discusses the findings based on the research objectives by relating the findings to previous studies and the underpinning theories. The discussion focuses on the level of non-technical skills, the level of industrial training elements, and the relationship between non-technical skills and industrial training elements among Civil Engineering students. The findings are interpreted in relation to Experiential Learning Theory (ELT) and Human Capital Theory to explain how industrial training contributes to students' professional development.

The Level of Non-Technical Skills in Industrial Training among Civil Engineering Students.

The findings indicated that Civil Engineering students demonstrated a high level of non-technical skills during industrial training. This suggests that the respondents were generally able to communicate effectively, work collaboratively in teams, demonstrate leadership qualities, and practise ethical behaviour throughout their workplace experience. The high level of non-technical skills indicates that industrial training provides meaningful opportunities for students to develop professional competencies required in the engineering profession.

These findings are consistent with previous studies, which emphasised that communication, teamwork, leadership, and ethics are essential competencies that contribute to workplace performance, collaboration, and graduate employability [1][6]. Similarly, it was highlighted that non-technical skills improve interpersonal interaction, problem-solving ability, and professional decision-making, enabling engineering graduates to perform effectively in multidisciplinary working environments [19]. The findings also support Experiential Learning Theory [13], which explains that students develop professional competencies through direct workplace experience, reflective observation, and continuous application of knowledge during industrial training. Therefore, industrial training serves as an effective platform for strengthening non-technical skills among Civil Engineering students.

The Level of Industrial Training Elements among Civil Engineering Students.

The findings revealed that the respondents achieved a high level of industrial training elements, indicating that industrial training effectively enhanced students' competency and competitiveness, workplace experience with academic knowledge, application of theoretical knowledge, and career readiness. These findings suggest that industrial training successfully bridges the gap between academic learning and professional engineering practice by allowing students to experience authentic workplace environments and apply engineering knowledge in practical situations.

The findings are consistent with previous studies, which reported that industrial training enhances professional competency, workplace learning, and graduate employability by providing meaningful workplace exposure [30][36]. In addition, it was explained that industrial training enables students to integrate theoretical knowledge with engineering practice, thereby strengthening competency development and increasing confidence in performing workplace responsibilities [32][34]. These findings also support Human Capital Theory[16], which proposes that investments in education and workplace training improve individuals' competencies, productivity, and long-term employability.

Relationship between Non-Technical Skills and Industrial Training Elements among Civil Engineering Students.

The findings demonstrated a moderate positive and statistically significant relationship between non-technical skills and industrial training elements. This indicates that students who demonstrated stronger communication, teamwork, leadership, and ethical behaviour were more likely to achieve better industrial training outcomes. The findings suggest that non-technical skills contribute positively to workplace experience, application of theoretical knowledge, and career readiness throughout industrial training.

The findings are consistent with previous studies that reported positive relationships between non-technical skills and workplace performance. Past research found that communication and teamwork improve workplace collaboration and organisational effectiveness[39], while it was reported that leadership and ethical behaviour positively contribute to students' professional development during industrial training[40]. Likewise, past study also emphasised that integrating non-technical skills into engineering education enhances graduate employability and workplace readiness by preparing students for multidisciplinary working environments [38].

Interestingly, although communication, teamwork, leadership, and ethics demonstrated significant positive relationships with workplace experience with academic knowledge, application of theoretical knowledge, and career readiness, no significant relationship was found with competency and competitiveness. This finding suggests that competency and competitiveness may be influenced by additional factors beyond the non-technical skills examined in this study, such as technical competency, workplace learning opportunities, organisational support, and industrial supervision. Therefore, future studies should consider investigating these additional factors to provide a more comprehensive understanding of competency development among Civil Engineering students.

Overall, the findings support both Experiential Learning Theory, which explains that authentic workplace experiences facilitate competency development through active learning, and Human Capital Theory, which proposes that education and workplace training enhance individuals' knowledge, competencies, and employability. Collectively, the findings demonstrate that industrial training plays an important role in strengthening non-technical skills while enhancing industrial training outcomes among Civil Engineering students.

Limitations and Recommendations for Further Studies

This study has multiple limitations that must be addressed when evaluating the findings. First, the study only included final-year Civil Engineering students from Universiti Tun Hussein Onn Malaysia (UTHM). As a result, the findings may not be applicable to students at other universities or engineering disciplines. Second, the findings were purely based on students' self-reported responses obtained via a standardized questionnaire. Although this approach gives useful information about students' perspectives, it may not accurately reflect their actual job performance during industrial training. Third, the study excluded the opinions of industry supervisors, employers, and university supervisors. Thus, the data only reflect students' views of their industrial training experiences. Finally, while this study examined the relationship between non-technical skills and industrial training elements, it did not look into specific industrial training activities that could help promote communication, teamwork, leadership, and ethics.

Future research should include respondents from different universities and engineering fields to improve the generalizability of the findings. Researchers should also seek information from industry supervisors, employers, and academic staff in order to gain a more comprehensive knowledge of students' job competencies.

ISSN No. 2454-6186 | DOI: 10.47772/IJRISS | Volume X Issue VII July 2026

Furthermore, future research should look into specialized industrial training activities that help to build non-technical skills including communication, teamwork, leadership, and ethical behaviour.

CONCLUSIONS

This study examined the level of non-technical skills, the level of industrial training elements, and the relationship between these variables among Civil Engineering students at Universiti Tun Hussein Onn Malaysia (UTHM). The findings indicated that both non-technical skills and industrial training elements were at a high level, demonstrating that industrial training effectively supports students' professional development. In addition, Pearson Correlation analysis revealed a moderate positive and statistically significant relationship between non-technical skills and industrial training elements, indicating that students with stronger communication, teamwork, leadership, and ethical competencies tended to achieve better industrial training outcomes.

Overall, the findings highlight the importance of integrating non-technical skills into engineering education and industrial training programmes to strengthen graduate competency, employability, and workplace readiness. The study provides useful empirical evidence for higher education institutions and industry partners in enhancing industrial training practices and preparing Civil Engineering graduates to meet current and future industry expectations. Although, the findings should be interpreted within the context of this study because they were gathered from Civil Engineering students at a single university and were based on their self-reported opinions. Future studies with larger samples and diverse stakeholder perspectives may give better evidence about the role of industrial training in the development of non-technical skills.

Declarations

Ethical Approval

This study was conducted in accordance with accepted academic research ethics. Participation in the study was voluntary, and respondents were informed of the purpose of the research before completing the questionnaire. The anonymity and confidentiality of all respondents were maintained throughout the data collection and reporting processes. No personally identifiable information was collected, and the data were used solely for academic and research purposes.

Informed Consent

Informed consent was obtained from all individual participants included in the study.

Conflict of Interest

The authors declare that they have no conflict of interest.

Data Availability Statement

The data that support the findings of this study are available from the corresponding author upon reasonable request. The data are not publicly available due to privacy and ethical restrictions.

REFERENCES

1. Coffelt, T. A., Madson, K., Raju, N., & Shane, J. S. (2024). Which communication skills do I need? A multimethod study of communication needs in construction engineering. *Journal of Business and Technical Communication*, 38(4), 317–344. https://doi.org/10.1177/10506519241258468
2. Hughes, H. P. N., & Davis, M. C. (2024). Preparing a graduate talent pipeline for the hybrid workplace: Rethinking digital upskilling and employability. *Academy of Management Learning and Education*, 23(4), 578–599. https://doi.org/10.5465/amle.2023.0106
3. Nadarajah, J. (2021). Measuring The Gap In Employability Skills Among Malaysian Graduates. *International Journal of Modern Trends in Social Sciences*, 4(15), 81–87. https://doi.org/10.35631/ijmtss.415007
4. Lok Bee Lan. (2022). The demand for soft skills and impacts of training and development on human resource outcomes and firm performance for the Malaysian manufacturing industry. *UTAR*. http://eprints.utar.edu.my/id/eprint/4432
5. Jery, T. a. A., Ma'rof, A. A., & Rosnon, M. R. (2024). The Impact of Industrial Training on Career Challenges and Motivations among Malaysian Public Universities Students. International Journal of *Academic Research in Business and Social Sciences*, 14(12). https://doi.org/10.6007/ijarbss/v14-i12/24000
6. Osman, I., Ibrahim, A., Mohd, I. H., Mohd Hashim, M. J., & Ahmad, N. N. (2025). Graduate Soft Skills and Employability in Malaysia: The view of employers from different manufacturing companies. *Social and Management Research Journal*, 22(1), 1–16. https://doi.org/10.24191/smrj.v22i1
7. World Economic Forum. (2023, April 30). The future of jobs report 2023. Retrieved January 14, 2026, from https://www.weforum.org/publications/the-future-of-jobs-report-2023/
8. Ling, J. H., & Leong, W. K. (2025). Evaluation of industrial training learning experiences. Indonesian *Journal of Education and Social Sciences*, 4(1), 127–139. https://doi.org/10.56916/ijess.v4i1.967
9. Azimi, H. (2023). Evaluation of employees' experiences in the industrial training program in the polytechnic department of Iranian industries. *Annals of Management and Organization Research*, 3(4), 271–288. https://doi.org/10.35912/amor.v3i4.1417
10. Hearn, G., Williams, P., Rodrigues, J. H. P., & Laundon, M. (2023). Education and training for industry 4.0: a case study of a manufacturing ecosystem. *Education + Training*, 65(8/9), 1070–1084. https://doi.org/10.1108/et-10-2022-0407
11. Langendorf, L. N., & Khalid, M. S. (2025). Systematic literature review on usability and training outcomes of using digital training technologies in industry. *Computers in Human Behavior Reports*, 17, 100604. https://doi.org/10.1016/j.chbr.2025.100604
12. Katahama, Z., & Bozorgzadeh, T. (2024). Examining employer experiences in the polytechnic sector's industrial training program. *Annals of Management and Organization Research*, 5(2), 143–161. https://doi.org/10.35912/amor.v5i2.1647
13. Kolb, D. A. (1976). Management and the learning process. *California Management Review*, 18(3), 21–31. https://doi.org/10.2307/41164649
14. Nogueira, T., Magano, J., Fontão, E., Sousa, M., & Leite, Â. (2021). Engineering Students' Industrial Internship Experience Perception and satisfaction: work experience scale validation. *Education Sciences*, 11(11), 671. https://doi.org/10.3390/educsci11110671
15. Kong, Y. (2021). The role of experiential learning on students' motivation and classroom engagement. *Frontiers in Psychology*, 12, 771272. https://doi.org/10.3389/fpsyg.2021.771272

16. Becker, G. S. (1964). Human Capital: A Theoretical and Empirical Analysis with Special Reference to Education, First Edition. National Buruea of Economic Research.
17. Murray, M., Pytharouli, S., & Douglas, J. (2022). Opportunities for the development of professional skills for undergraduate civil and environmental engineers. *European Journal of Engineering Education*, 47(5), 793–813. https://doi.org/10.1080/03043797.2022.2031897
18. Krishnan, S. S., Kumar, S., Bankar, A., & Wadekar, A. (2024). Industrial Training in Polytechnics: Enhancing Diploma Student learning. *International Journal for Multidisciplinary Research*, 6(3). https://doi.org/10.36948/ijfmr.2024.v06i03.19576
19. Prineas, S., Mosier, K., Mirko, C., & Guicciardi, S. (2020). Non-technical Skills in Healthcare. In Textbook of Patient Safety and Clinical Risk Management (pp. 413–434). https://doi.org/10.1007/978-3-030-59403-9_30
20. Efendi, E., Dwi, A., Adfi, L., Fikri, M., & Nadiyah, R. (2024). Analisis Unsur-Unsur komunikasi. Da Watuna *Journal of Communication and Islamic Broadcasting*, 4(3). https://doi.org/10.47467/dawatuna.v4i3.512
21. Alhazmi, A. (2023). Causes and Impacts of Design Deficiencies on Projects. *Zenodo (CERN European Organization for Nuclear Research)*. https://doi.org/10.5281/zenodo.8289297
22. Silaen, M. (2025). Team behaviour and teamwork. *Indonesian Journal of Advanced Research*, 4(9), 2141–2156. https://doi.org/10.55927/ijar.v4i9.15418
23. Asthana, H. K. (2024). The integration of soft skills in civil Engineering: enhancing professional competence and project success. *International Journal of Scientific Research In Engineering And Management*, 08(06), 1–5. https://doi.org/10.55041/ijsrem35975
24. Cima, F., Pazos, P., Lee, M., Gutierrez, K., Kidd, J., Ayala, O., Ringleb, S., Kaipa, K., & Rhemer, D. (2025). Developing Teamwork Skills in Undergraduate Engineering Students: A Comparison Between Disciplinary and Cross-Disciplinary Projects. *IEEE Transactions on Education*, 68(1), 86–94.
25. Wang, J., Yuan, Z., He, Z., Zhou, F., & Wu, Z. (2021). Critical factors affecting team work efficiency in BIM-Based Collaborative Design: an empirical study in China. Buildings, 11(10), 486. https://doi.org/10.3390/buildings11100486
26. Wilson, D. C. (2022). Defining leadership. Philosophy of Management, 22(1), 99–128. https://doi.org/10.1007/s40926-022-00210-7
27. Chander, N. (2020). Ethics in prosthodontic research. *The Journal of Indian Prosthodontic Society*, 20(1), 1. https://doi.org/10.4103/jips.jips_455_19
28. Soliani, R. D., De Oliveira, D. A., Da Silva, M. E., Da Conceição Nascimento Pontes, J., De Andrade Gonçalves, S., Teixeira, M. a. C., Lopes, D. C., & Drumond, T. D. R. (2024). Development of competencies for industry 4.0: a professional training framework. *Observatiotio De La Economia Lationo Americana*, 22(12), e8158. https://doi.org/10.55905/oelv22n12-091
29. Wardhana, M. A., Lestari, E., & Nikmah, M. (2024). Strengthening the competitiveness of Indonesian industry human resources through IQF-Based Workplace learning. *Jurnal Ilmiah Manajemen Dan Bisnis*, 9(2), 169–184. https://doi.org/10.38043/jimb.v9i2.5674
30. Musa, S, Nurhayati, S, & Boriboon, G. (2025). The Effect of Internships on Graduates' Employability, Soft Skills, and Digital Competence. Educational Process: *International Journal*, 17, e2025306.
31. Ameerudin, R., & Hayari, Z. (2025, October 22). Effectiveness Of Industrial Internship Program In Developing Employability Skills Towards TVET Graduates:A Case Study At Polytechnic Ungku Omar. https://upikpolimas.edu.my/ojs/index.php/JTVE/article/view/704
32. Gutiérrez-Pulido, H., & Orozco-Rodríguez, C. (2025). The contribution of professional internships to the academic development of engineering and science students: a case study. *Frontiers in Education*, 10. https://doi.org/10.3389/feduc.2025.1563361

33. Loogma, K., Peterson, B., & Aasa, M. (2024). Conceptualising the learning of general upper secondary students at work. *Social Sciences*, 13(12), 686. https://doi.org/10.3390/socsci13120686
34. Klausen, S. H., & Petersen, E. N. (2021). What is theoretical knowledge? Theoria, 87(3), 559–577. https://doi.org/10.1111/theo.12292
35. Makki, B. I., Feng, F., Waqar, M. A., & Adhikari, I. M. (2023). Work Readiness, Decision-Making Self-Efficacy, and Career Exploration among Engineering Students: A Two-Step Framework. *Mathematical Problems in Engineering*, 2023(1). https://doi.org/10.1155/2023/8166825
36. Mahfud, T., Masek, A., Suyitno, S., Ihsan, A. N. N., Fransisca, Y., Pranoto, P. W., Pranoto, A., Hadi, S., & Susanto, A. (2024). The Role of Work-Based Learning in Enhancing Career Adaptability: An Empirical Study from Vocational Students in Indonesian and Malaysian Universities. *Integration of Education*, 28(3), 436–453. https://doi.org/10.15507/1991-9468.116.028.202403.436-453
37. Marciniak, J., Johnston, C. S., Steiner, R. S., & Hirschi, A. (2020). Career Preparedness among Adolescents: A review of key components and directions for future research. *Journal of Career Development*, 49(1), 18–40. https://doi.org/10.1177/0894845320943951
38. Tushar, H., & Sooraksa, N. (2023). Global employability skills in the 21st century workplace: A semi-systematic literature review. Heliyon, 9(11), e21023. https://doi.org/10.1016/j.heliyon.2023.e21023
39. Mandal, N. K., & Edwards, F. R. (2021). Student work readiness in Australian engineering workplaces through work integrated learning. *Higher Education Skills and Work-based Learning*, 12(1), 145–161. https://doi.org/10.1108/heswbl-02-2021-0025
40. Wahid, A. N., Azmi, N. L., & Mokhtar, S. (2026). Perceptions and Insights on Industrial Training: A study of IIUM Mechatronics Engineering students. *Journal of Engineering Research and Education (JERE)*, 18, 173–184. https://doi.org/10.58915/jere.v18.2026.3017
41. Billett, S. (2024). Constituting integration in work-integrated education and learning. Studies in Continuing Education, 47(3), 513–530. https://doi.org/10.1080/0158037x.2024.2363262
42. Adegbite, W. M., & Hoole, C. (2024). The nexus of work integrated learning and skills among engineering students in Nigerian Universities: A structural equation model approach. *Journal of Teaching and Learning for Graduate Employability*, 15(1), 91–107. https://doi.org/10.21153/jtlge2024vol15no1art1824
43. Creswell, J. W., & Creswell, J. D. (2022). Research design: Qualitative, Quantitative, and Mixed Methods Approaches. Sage Publications, Incorporated.
44. Odit-Dookhan, K., Chittoo, H. B., Armoogum, V., Odit, M. P., Seebaluck, V., & Narsoo, J. (2022). Exploring Work Placement Experience Case of The University of the Technology, Mauritius People. *International Journal of Social Sciences*, 7(3), 208–229. https://doi.org/10.20319/pijss.2022.73.208229
45. Tholibon, D. A., Nujid, M. M., Mokhtar, H., Rahim, J. A., Aziz, N. F. A., & Tarmizi, A. a. A. (2021). Relative Importance Index (RII) in ranking the factors of employer satisfaction towards industrial training students. *International Journal of Asian Education*, 2(4), 493–503. https://doi.org/10.46966/ijae.v2i4.187
46. Beno, N. A., Hasanudin, N., & Jaya, N. A. (2025). The influence of internship experience and soft skills on work readiness mediated by self efficacy. *International Journal of Asian Business and Management*, 4(3), 547–566. https://doi.org/10.55927/ijabm.v4i3.324
47. Mellinger, C. D, & Hanson, T. A. (2020). Methodological considerations for survey research: Validity, reliability, and quantitative analysis. Linguistica Antverpiensia, New Series: Themes in Translation Studies, 19, 172–190.