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Investigating employer perspectives on the polytechnic sector's industrial training program: A case study of iranian companies

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Abstract

Purpose: Industrial training programs are structured educational initiatives that provide supervised, practical experience within designated timeframes in both the private and government sectors. The primary objective was to bridge the gap between theoretical knowledge and practical skills, allowing participants to apply classroom learning in real-world environments. This hands-on approach enhances competency development, understanding of industry practices, teamwork, and professional ethics, ultimately preparing individuals for successful careers in various industries.

Research Methodology: Data analysis was performed using a specialized statistical software tool designed for predictive modeling and analysis. This tool was employed to examine and interpret the dataset, thus enabling the extraction of meaningful insights and predictions. The analytical process involves a series of statistical techniques, algorithms, and models to identify patterns, correlations, and trends within the data. By leveraging the capabilities of this advanced statistical package, the research team derived valuable information, made informed predictions, and drew significant conclusions from comprehensive data analysis.

Results: From the instructors' perspective, industrial training significantly enhances students' proficiency in both formal and informal communication, assists them in identifying appropriate research areas for their projects, and improves their socialization and relationship-building skills. Employees reported that industrial training increased their confidence in problem solving and emphasized the importance of continuous learning. A notable challenge faced by employees during their internships is related to workplace safety.

Conclusions: These observations indicate that industrial training is highly beneficial for employees, and should be a crucial part of the curriculum before graduation.

Limitations: The findings of this study are primarily applicable in educational settings.

Contribution: Our study concludes that industrial training is crucial for enhancing students' post-training abilities and knowledge. We recommend recognizing industrial training as an essential tool for improving employees' skills and capabilities.

Keywords: *Educational initiatives, Knowledge and practical, Employer Perspectives*

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1. Introduction

Training is a systematic process through which individuals gain specialized knowledge or skills for a specific purpose. This often involves acquiring the expertise, competencies, and proficiencies needed for particular job roles or within an organizational context (M. R. Zahedi & Naghdi Khanachah, 2020). Industrial training is defined as a structured program that provides preprofessional work experience with specific assignments and responsibilities (Obasi, 2015). It is designed to impart practical experience within a stipulated timeframe, conducted under supervision, and can take place in both the private sector and government organizations (Srinivasan & Ravi, 2017; Thangaru & Kinyua, 2017; M. Zahedi & Khanachah, 2024). These programs are typically tailored to individuals with theoretical knowledge, exposing them to real-world, hands-on experiences (M. Zahedi, Akhavan, & Naghdi Khanachah, 2024). The goal is to bridge the gap between theoretical classroom instruction and practical experiences encountered in higher education to achieve a global advantage in organizations with high-performance and knowledge-based structures (De Wit-de Vries et al., 2019).

Industrial training is a fundamental component of academic development and has been embraced by many countries worldwide (Nyerinde, 2020). Known by various terms, such as internships, cooperative education, and work-study programs (M. Zahedi, Akhavan, & Naghdi Khanachah, 2;20), its effectiveness is maximized when aligned with students' career aspirations, interests, and academic fields (Ghorbani & Khanachah, 2020b). It facilitates the transition from classroom theory to practical applications, providing exposure to real-world work environments (Spöttl & Windelband, 2021).

In Iran, the federal government established the Industrial Training Fund (ITF) in 1971 to oversee the industrial training program. The ITF operates under Decree 47 of 1971, which was amended in the 2011 ITF Act. This development also led to the creation of the students' industrial work experience scheme (SIWES) in 1973 (ITF 2003a). The ITF aims to produce graduates who are academically proficient, technologically savvy, and practically oriented (Aroh, 2000; M. Zahedi, Abbasi, & Khanachah, 2020). The program equips employees with practical skills, preparing them for real-world scenarios and instilling confidence when they return to their academic institutions (Ghorbani & Khanachah, 2021).

Despite various training programs, a notable deficit in skill enhancement and performance improvement remains, highlighting the gap between academia and industry (M. R. Zahedi, Naghdi Khanachah, & Zahedi, 2024; DeCenzo et al., 2016). Employees face challenges in securing placements and dealing with inadequate supervision, poor working conditions, safety concerns, accommodation shortages, communication gaps, insufficient training materials, transportation issues, geographical distance, limited opportunities, weak academia-industry collaboration, and the attitudes of host organizations (Afonja et SL, & OS, 2005; Hajizadeh et al., 2021; Lengmang et al., 2024).

Comprehensive training benefits academic activities by reducing the need to explain certain terms or ambiguities to employees, as they have already encountered and applied these terms during their training programs (. R. Zahedi & Naghdi Khanachah, 2019). Beneficiaries include the construction industry, employers, ITF, and the nation, as trained employees possess prior knowledge of tasks and promote professionalism within the industry (Ghorbani & Khanachah, 2020a). Industrial training enhances employees' skills and academic performance, recognizing it as a means of improving their abilities (M. Zahedi & S. N. Khanachah, 2020; Zahedi & Khanachah, 2024; Hamouche, 2021).

Recent studies on industrial training span across various countries and educational institutions. Examples include case studies on polytechnics in Ghana (Nduro, Anderson, Peprah, & Twenefour, 2015); industrial challenges at Gweru Polytechnic College in Zimbabwe (Wilson, 2016; Zahedi, 2021); technical and vocational education in Bangladesh (Haolader, Foysol, & Clement, 2017); female participation in vocational training in Kenya (Ngugi & Muthima, 2017); the effects of internship programs in Malaysia (Yaakob[1], Ail, & Radzi, 2018); vocational training in Uganda (Okumu & Bbaale, 2019); industrial training in Indian institutes (Ajithkumar & Pilz, 2019); and vocational education in Zimbabwe (Shereni 2020) and Cambodia (Miller 2020; Bamdad Sufi et al. 2021; Bupo et al. 2018). Other studies include vocational training in Mumbai (Neroorkar & Gopinath, 2020), training graduates in Iran (Okolie et al., 2020), and practical training trends in college employees (Nazarova, Kubrushko,

Alipichev, & Gryazneva, 2021; Sonnentag et al., 2021; Ichdan, 2024). These studies have provided valuable insights into industrial training in diverse settings.

Inspired by these insights, we evaluated employees' experiences within an industrial training program, focusing on the polytechnic sector in Iran. The subsequent sections are structured as follows: Section 2 outlines the methodology; Section 3 presents the findings; Section 4 discusses the results; and Section 5 provides concluding remarks.

2. Literature Review

The development of industrial training programs in the polytechnic sector is crucial to bridging the gap between academia and industry. These programs aim to equip students with the necessary skills and knowledge in the workplace while also meeting the needs of employers. In Iran, the polytechnic sector plays a significant role in vocational education and training, particularly in fields such as engineering, technology, and business (Nazarova et al. 2021).

This case study focuses on investigating employer perspectives on the industrial training programs offered by polytechnic institutions in Iran. This study aims to explore the effectiveness of these programs in meeting the needs and expectations of employers as well as identifying areas for improvement (Yaakob¹ et al., 2018; Zahedi et al., 2023; Vrabcová & Urbancová, 2022). To achieve this goal, a series of interviews and surveys was conducted with representatives from a range of Iranian companies that have employed graduates from polytechnic institutions (Yaakob¹ et al., 2018; Tanha et al., 2024).

The findings of this study provide valuable insights into the strengths and weaknesses of the polytechnic sector's industrial training program from the employers' perspective (Nduro et al., 2015). It also highlights the key skills and competencies that employers value in graduates and how well these are being developed through the current training programs (Ghorbani & Khanachah, 2020a). Additionally, the study seeks to identify any challenges or barriers that employers face in hiring and working with polytechnic graduates and suggest potential solutions to address these issues.

By understanding employer perspectives on the polytechnic sector's industrial training program, policymakers and educators can make informed decisions about how to improve and enhance these programs to better meet the needs of the industry (M. Zahedi, Akhavan, et al., 2020; Matthias & Regel, 2021). This research will contribute to ongoing efforts to strengthen the link between academia and industry and ensure that graduates are equipped with the skills and knowledge they need to succeed in the workplace.

In conclusion, this case study investigating employer perspectives on the polytechnic sector's industrial training program in Iran will provide valuable insights into the strengths and weaknesses of these programs as well as the challenges and opportunities they present. By understanding the needs and expectations of employers, we can work towards improving the quality and relevance of industrial training programs in the polytechnic sector, ultimately benefiting both students and the economy as a whole.

The ITSS module was developed as part of an industrial training program for Malaysian polytechnic students to enhance the immediate application of learned skills. Feedback from industries gathered during students' training programs was used to design the ITSS module and improve the curriculum to meet future employer needs and expectations. By addressing issues such as the lack of practical application noted by employers, students can develop various workplace skills for a smooth transition from the classroom to the workforce. Involvement of the industry in course design, as emphasized by Nduro et al. (2015), is essential to provide students with the right skills. The development of soft skills in the ITSS module involving industry participation is projected to be more effective.

The ITSS module covers elements such as positive personality, communication skills, work etiquette, work exposure, and report-writing. It is offered in the second and third semesters for certificate- and

diploma-level students, accounting for one credit hour. Students must complete this module before enrolling in industrial training to prepare them with generic competencies in both training and employment. During industrial training, students are evaluated by employers. Therefore, assessing students' and employers' perceptions of soft skill competency is crucial. Students' self-assessment is valuable in understanding their views on soft skills competency, whereas employers can provide insight into students' competency in a real work setting. Additionally, investigating the current needs of employers is important for understanding the competencies that they find desirable.

As the demand for skilled workers continues to rise in today's competitive job market, employers are applying the polytechnic sector's industrial training programs to meet their workforce needs. These programs offer students hands-on experience in the real world, allowing them to develop the practical skills and knowledge required to excel in their chosen field(Ajithkumar & Pilz, 2019; Zahedi, 2021).

From the employer's perspective, these industrial training programs are invaluable. They provide a steady stream of qualified candidates who are ready to hit the ground running from day one by partnering with polytechnic institutions, and can actively shape the curriculum to ensure that students are learning the skills that are most relevant to their industry. This not only benefits the students but also gives employers a pool of potential employees who are well-equipped to succeed in their organizations.

Furthermore, the polytechnic sector's focus on practical job-ready skills is a major selling point for its employers. Graduates of these programs are often more prepared for the demands of the workplace than those who have pursued more traditional academic routes. This translates to higher productivity, lower training costs, and, ultimately, a more competitive edge in the market (Ajithkumar & Pilz, 2019).

Overall, employers see the polytechnic sector's industrial training programs as a win-win situation. They provide a steady pipeline of skilled workers, help shape the curriculum to match industry needs, and produce graduates who are ready to contribute from day one. As the demand for skilled workers continues to grow, the role of the polytechnic sector in preparing the future workforce has never been more important or appreciated.

3. Methodology

Our research targeted three distinct groups of respondents: ND2, HND1, and IT supervisors. The respondents were selected using a stratified random sampling technique, a probabilistic method that ensures that each item within the population has an equal opportunity to be included in the sample (Taherdoost 2016). This method ensured that every student with ND2 and HND1 had a fair chance of participating in the study.

The stratified random sampling process involved several steps. First, we established an overall population of ND2 and HND1 students. We then divide this population into constituent groups. Once the population was divided, we calculated the sample size as a percentage of the total population, following the Taherdoost (2016) guidelines.

The following formula was used to determine the sample size: [Insert the specific formula or describe it in detail here if necessary].

By employing this structured approach, we ensured a representative and unbiased sample, thus enhancing the reliability and validity of our research findings.

$$\boldsymbol{n} = \frac{N}{1 + \alpha^2 \boldsymbol{N}} \qquad (3.1)$$

Where: $\boldsymbol{n}$ = Sample size, $\boldsymbol{N}$= No of population, $\boldsymbol{\alpha}$= 0.10.

3.1 Data Collection Tool

The data collection process during industrial training is crucial for students in a built environment to gain real-world experience and apply their theoretical knowledge in practical settings. This process involves collecting, analyzing, and interpreting data related to a specific discipline, enabling students to develop skills in data management, research, and problem solving.

In architectural technology, students can collect data on building materials, construction techniques, and design standards to inform their project plans and ensure compliance with regulations. Building technology students can gather data on structural integrity, construction methods, and building codes to monitor the progress and quality of construction projects.

Estate management students may collect data on property values, market trends, and lease agreements to make informed decisions regarding property management and investment strategies. Surveying students can collect data through land surveys, mapping, and boundary determinations to provide accurate information for land development projects.

Geo-informatics students may collect geospatial data, satellite imagery, and environmental data to analyze and visualize geographic information for environmental planning and resource management. Quantity-surveying students may collect data on project costs, material quantities, and procurement processes to ensure the financial efficiency and viability of construction projects.

Overall, the data collection process during industrial training allows students to gain practical experience, develop critical thinking skills, and enhance their understanding of their chosen disciplines. By engaging in hands-on data collection activities, students can effectively apply their knowledge in real-world scenarios and prepare for successful careers in the built environment.

3.1.1 The Importance of Internship Programs in Environmental Fields

Internship programs are critical for environmental students, as they provide them with extensive knowledge and a deep understanding of their chosen fields. These programmes clarify the roles, responsibilities, and professional obligations that graduates undertake in their careers. The various disciplines within the built environment, such as architectural technology, building technology, estate management, surveying, geo-informatics, and quantity surveying, have distinct requirements for industrial training. Designed to produce skilled technicians and technologists, these programs emphasize specialization within each field and prepare students to perform specific functions upon completing their National Diploma (ND) and Higher National Diploma (HND) programs.

The key responsibilities of each discipline are as follows:

1. **Architectural Technology:** Architectural technologists design and oversee building construction, and ensure compliance with architectural standards and regulations.
2. **Building Technology:** Building technologists manage the construction process, focusing on technical aspects to ensure structural integrity and safety.
3. **Estate Management:** Estate managers oversee property management, including real estate assets, valuations, and maintenance.
4. **Surveying:** Surveyors conduct land surveys, mapping, and property boundary determination, which are essential for land development and construction projects.
5. **Geo-Informatics:** Geo-informatics professionals analyze and visualize geographic information using geospatial data and technology for applications, such as environmental planning and resource management.
6. **Quantity Surveying:** Quantity surveyors manage the cost and procurement processes for construction projects, ensuring financial efficiency and project viability.

In summary, industrial training programs provide students in the built environment with practical skills and knowledge that are essential for their future roles, effectively bridging the gap between academic learning and professional practice.

Table 1. Internship program in Built Environment (www.unesco.org)

Department	Obligations relating to the industrial training program
Building	**Interpretation and Implementation of Project Drawings:** Comprehend and interpret a wide range of project drawings, including architectural, services, and structural designs, ensuring their successful implementation on the construction site. **Creation of Detailed Working Drawings:** Develop and produce detailed working drawings and structural designs specifically for medium-sized buildings. **Preparation of Accurate Estimates:** Prepare accurate estimates for costs, materials, and labor for all building projects, including maintenance work. **Conducting Surveys and Compiling Repair Schedules:** Perform surveys of various existing structures and compile schedules that outline necessary repairs and refurbishments.
Surveying and Geo-Informatics	**Drafting and Maintenance of Survey Documents:** Create and maintain sketches, maps, reports, and legally valid descriptions of surveys. These documents serve to delineate, certify, and assume responsibility for the completed work. **Verification of Survey Accuracy:** Ensure the precision of survey data, including measurements and calculations performed during the survey process. **Supervision of Boundary Surveys:** Oversee surveys conducted to establish legal property boundaries in accordance with legal deeds and titles. **Computation of Geospatial Data:** Calculate elevations, depths, relative positions, property boundaries, and various terrain characteristics. **Calibration of Surveying Instruments:** Regularly calibrate surveying instruments to ensure and maintain accuracy.
Quantity Surveying	**Quantity Measurement and Contract Documentation:** Conduct measurements and prepare bills of quantity and contract documents for construction projects. **Final Account Preparation:** Compile and prepare final accounts for construction projects. **As-Built Measurement:** Measure and document constructed works. **Contract Document Interpretation:** Interpret contract documents for various types of construction projects. **Cost Estimation:** Develop cost estimates for construction projects.
Architecture	**Feasibility Studies and Options Appraisal:** Conduct feasibility studies and appraise options. **Design Concept Development:** Develop design concepts. **Tender Document Preparation:** Prepare tender documents. **Works Inspection:** Inspect construction works. **Production Information Preparation:** Prepare production information.
Estate Management.	**Tenancy Agreement Monitoring:** Oversee and manage tenancy agreements. **Rent Assessment:** Evaluate rental values. **Budget and System Administration:** Manage budgeting and administrative systems. **Contract Negotiation:** Negotiate contracts effectively.

In this study, 430 questionnaires were distributed to evaluate student participation in the Iranian industrial training program. Of these, 210 questionnaires, adhering to the British Standard BS 8210, were completed and returned, indicating an 84% response rate.

Table 2. Category of the respondents

S/N	Category	Frequency	Percentage of Participant
1	Staff	10	4.8
2	Eployee	190	95.2
	Total	**200**	**100.0**

Source: Field Survey (2019)

The data in Table 2 show that the majority of respondents (95.2 %) were students, amounting to 200 individuals. In contrast, staff members constituted a smaller group, comprising only 10 respondents, accounting for 4.8% of the total participation.

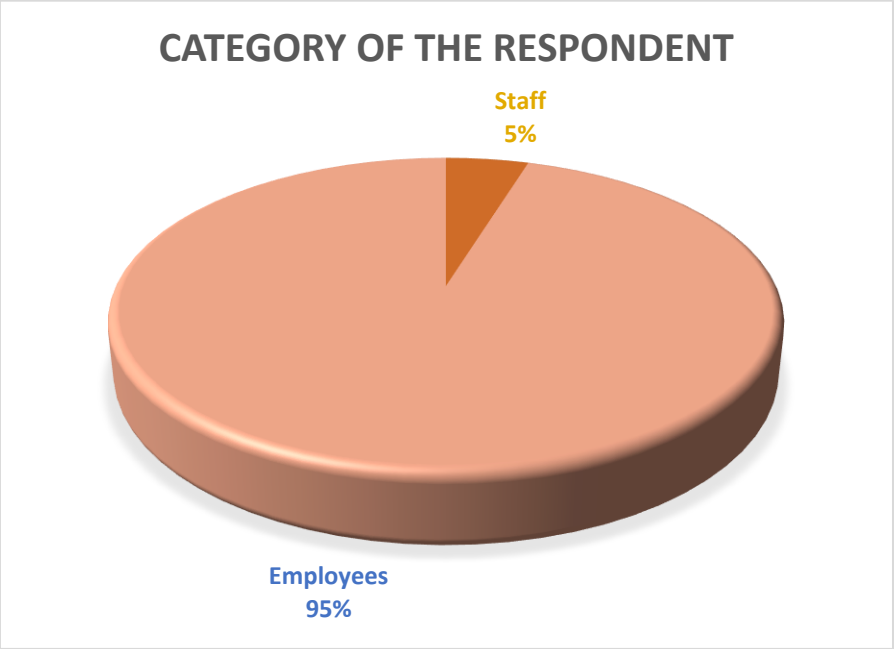

Figure 1: Category of the respondents Demographic characteristic of the staff

Table 3. Years of staff experience

S/N	Year range	Frequency	Percentage	Upper Class Boundaries
1	Less than 1 year	0	0	1.5
2	2 - 5 years	5	37.0	5.5
3	6 - 9 years	20	73.0	9.5
4	Above 10 years	0	0	10.5 Above
	Total	**25**	**100.0**	

Source: Field Survey (2019)

The distribution of staff experience is detailed in Table 3. The majority of staff members (70.0%, have 6-9 years of experience, totaling seven respondents. Participants with 2-5 years of experience comprised 30.0% of the sample. Importantly, there were no respondents from the categories of less than 1 year and more than 10 years of experience in this study.

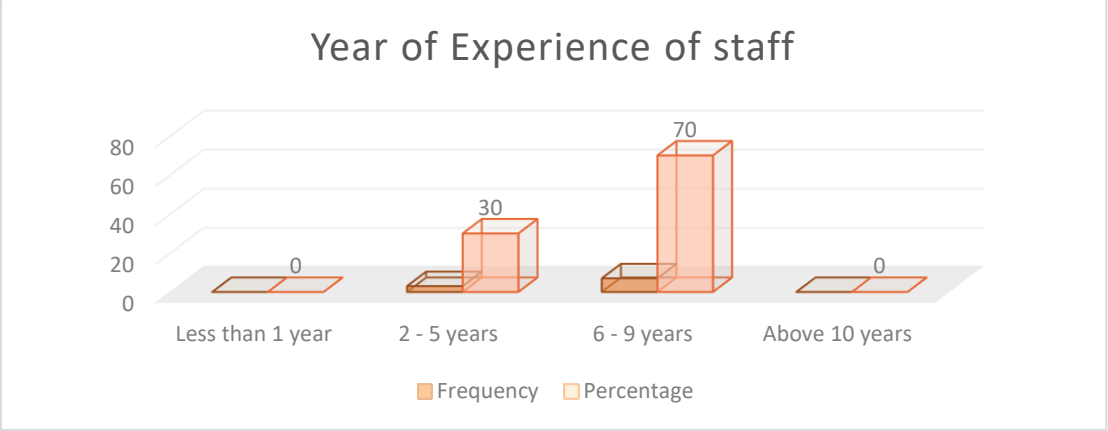

Figure 2. Year of experience of staff

Table 4. Demographic characteristic of the Employees

Department	**Frequency**	**Percentage (%)**
Architecture	2	20.0
Building	1	20.0
Estate Management	3	20.0
Quantity Surveying	2	30.0
Urban and regional planning	0	0.0
Surveying and Geo – informatics	2	10.0
Others	0	0.0
Total	10	100.0
Gender		
Male	130	65.0
Female	70	35.0
Total	**200**	**100.0**
Course		
Architecture	25	12.5
Building	40	20.0
Estate Management	50	25.0
Quantity Surveying	25	12.5
Urban and regional planning	30	15.0
Surveying and Geo – informatics	30	15.0
Others	0	0.0
Total	**200**	**100.0**
Place of Industrial Training		
Consultant	65	32.5
Contractor	54	27.0
Ministry	76	38.0
Others	5	2.5
Total	**200**	**100.0**

Source: Field Survey (2019)

Table 4 presents a comprehensive breakdown of participants' demographic profiles. Estate management stood out as the most represented field, comprising 30% of the participants, with three respondents. Architecture, quantity surveying, surveying, and geo-informatics each contribute 20.0% to the participant pool, with two respondents from each discipline. The building department was represented by one respondent, comprising 10% of the participants. In contrast, urban and regional planning as well as other fields were not included in this study.

In terms of gender diversity, both males and females were included, with males constituting 65% and females 35% of the respondents. Analyzing the distribution of students across courses, estate

management emerged as the predominant field, comprising 25% of students (50 respondents). Buildings accounted for 20% of the student population (40 respondents), while urban and regional planning, surveying, and geo-informatics each contributed 15% (30 respondents each). Architecture and quantity surveying were represented by 25 students each, comprising 12.5% of the participants in each field.

Regarding the distribution of industrial training placements, the Ministry sector had the highest placement rate, constituting 38.0% of participants (76 respondents). Consultants followed closely with 32.5%, involving 65 respondents, while contractors accounted for 27% of placements with 54 respondents. Other categories collectively represented 2.5% of the respondents. Figure 2 shows the participants' demographic characteristics.

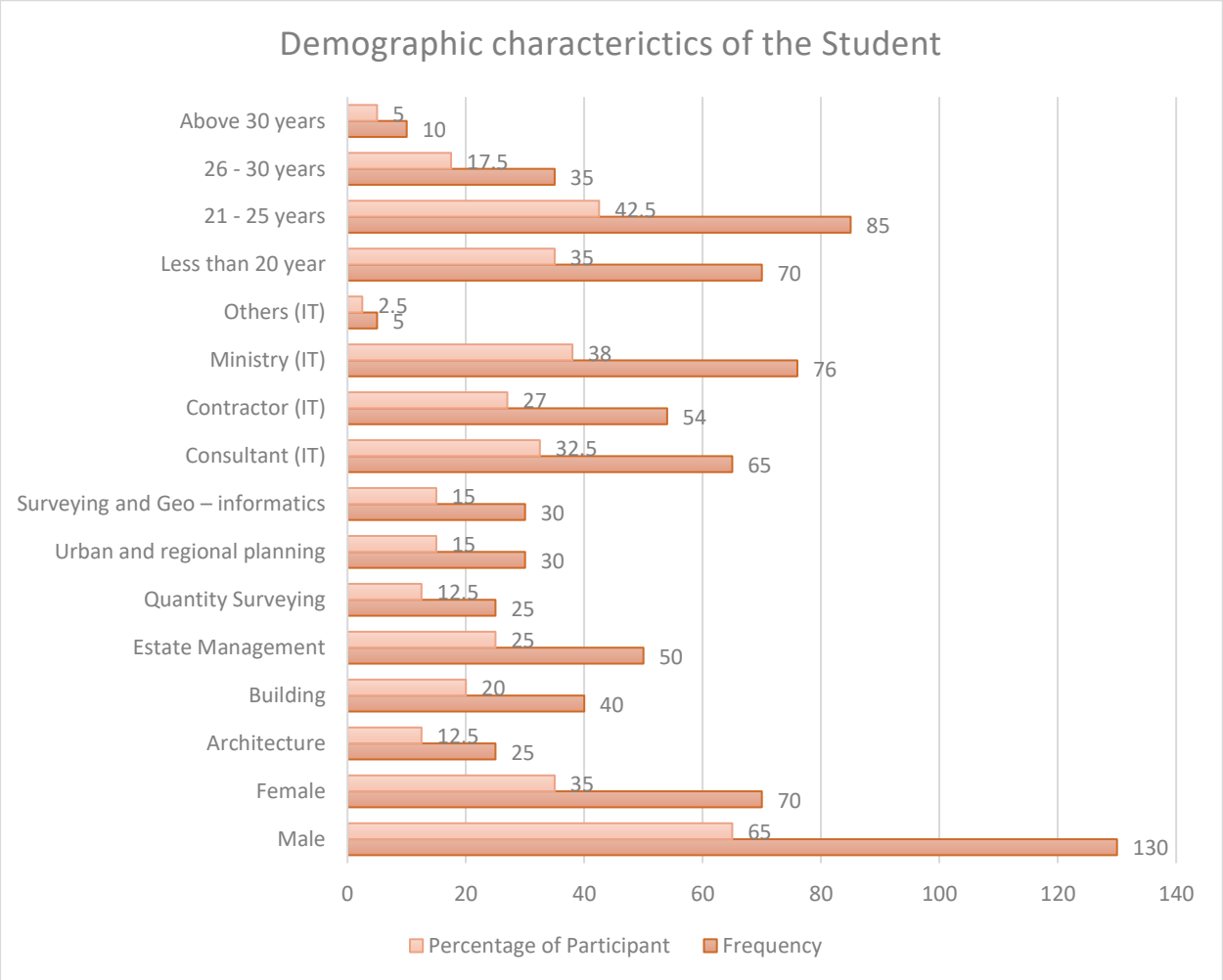

Figure 3. Demographic characteristic of the Employees

Table 5. Age of the respondent

S/N	Age	Cumulative Frequency	Frequency	Percentage	Upper Boundaries	Class
1	Less than 20years	70	70	35.0	20.5	
2	21 - 25 years	155	85	42.5	25.5	
3	26 - 30 years	190	35	17.5	30.5	
4	Above 30 years	200	10	5.0	30.5 Above	
	Total		**200**	**100.0**		

Source: Field Survey (2019)

As shown in Table 5, the majority of the respondents (42.5 %) were within the age range of 21-25 years, representing the largest group of students. Students under the age of 20 comprised 35.0% of the respondents.

Those aged 26-30 years account for 17.5% of the participants, totaling 35. In contrast, participants over 30 years of age were the least represented, constituting only 5% of the respondent pool, as depicted in Figure 4.

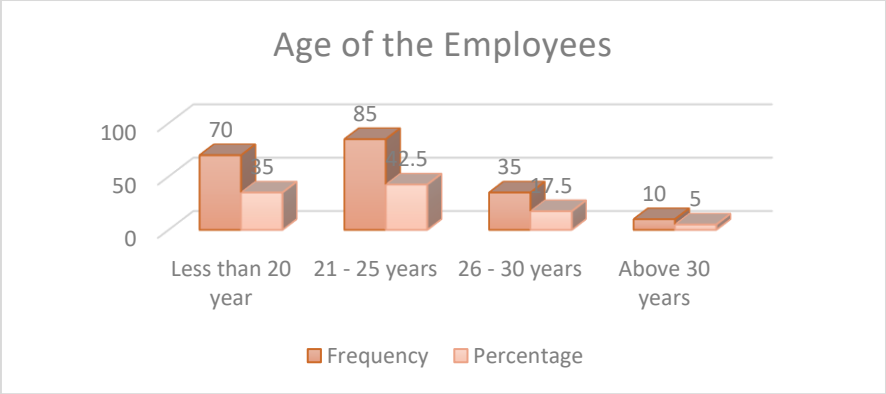

Figure 4. Demographic characteristics of employees.

4. Result and discussions

4.1 Impact of IT on Employees (Staff Perspective)

Table 6 provides insights into staff perceptions regarding the significant impacts of Industrial Training (IT) on students. Notably, IT played a crucial role in guiding students toward identifying suitable research areas for their final-year projects, highlighted as the most important aspect, with a relative importance index (RII) of 0.92. Furthermore, IT serves as a vital platform for exposing students to real-world experiences beyond academia, ranking second, with an impressive RII of 0.88. It also equips students with an understanding of the dynamic industry culture and technological advancements, promoting continuous learning and securing the third rank with an RII of 0.88.

Additionally, Table 6 reveals the staff's perspectives on the diverse skills students acquire during their IT experience. IT significantly enhanced students' proficiency in both formal and informal written communication, deemed paramount, achieving the highest ranking with an RII of 0.94. It also fostered students' ability to meticulously plan and execute tasks, solidifying its second-place position with an RII of 0.92. IT nurtures students' problem-solving skills and their capacity to collaborate effectively with diverse groups, securing a third position with an RII of 0.88. Furthermore, IT boosts students' creativity, landing in the sixth position, with an RII of 0.86. Lastly, IT enhanced students' self-confidence in tackling challenges, earning the seventh position with an RII of 0.82. These findings underscore the multifaceted benefits IT provides, encompassing both academic and practical skill development.

Table 6. Impacts of IT on the Employees (staff perspective)

Variables			5	4	3	2	1	RII	Ranking
Knowledge	1	Industrial training improved Employees' knowledge and intellectual capability	2	8	0	0	0	0.84	5th
	2	Industrial training improved Employees' understanding of course of study	2	8	0	0	0	0.92	5th
	3	Industrial training assisted Employees' in finding a research area for their final year project	6	4	0	0	0	0.92	1st
	4	Industrial training exposed Employees' to having an idea of life after school	6	4	1	0	0	0.92	1st
	5	Industrial training exposed Employees to the changing industry culture and developments in technology	4	6	0	0	0	0.84	3rd
	6	Industrial training exposed Employees to the need for continuous learning	5	4	1	0	0	0.88	3rd
Skills	1	Industrial training improved Employees' creativity ability	4	5	1	0	0	0.86	6th
	2	Industrial training developed Employees' ability to identify problems and proffer solution	4	6	0	0	0	0.88	3rd
	3	Industrial training developed Employees' ability to plan and complete any assigned task	6	4	0	0	0	0.92	2nd
	4	Industrial training developed Employees' ability to work effectively with different groups	4	6	0	0	0	0.88	3rd
	5	Industrial training improved Employees' skills in formal and informal written communication	4	6	0	0	0	0.88	3rd
	6	Training improved Employees' skills in formal and informal written communication	8	1	1	0	0	0.94	1st
	7	Industrial training improved Employees' self confidence in tackling problems	2	7	1	0	0	0.82	7th
Attitude	1	Industrial training developed Employees' ability to socialize and sustain the relationship	5	5	0	0	0	0.90	1st
	2	Industrial training improved Employees' self-control and motivation	3	7	0	0	0	0.86	2nd
	3	Industrial training improved Employees' success consciousness	5	2	3	0	0	0.84	5th
	4	Industrial training increased Employees' confident on employment prospects	3	5	2	0	0	0.76	7th
	5	Industrial training improved Employees' perseverance in challenging situations	1	6	3	0	0	0.82	6th
	6	Industrial training improved Employees' time keeping ability	3	7	0	0	0	0.86	2nd
	7	Industrial training improved Employees' ability to work independently	3	7	0	0	0	0.86	2nd

Table 6 highlights staff perspectives on employees' positive attitudes during their Industrial Training (IT) experiences. IT significantly enhanced employees' ability to establish and maintain interpersonal relationships, ranking highest with an impressive relative importance index (RII) of 0.90. Additionally, IT greatly improves employees' self-discipline, motivation, and punctuality, as reflected in their effective time management skills, securing the second-highest position with an RII of 0.86.

Moreover, IT fostered employees' self-reliance and independence, ranking second with an RII of 0.86. This emphasizes the importance of the self-sufficiency gained through IT. IT also instills a success-oriented mindset in employees, motivating them to strive for excellence and self-improvement and earning the fifth position with an RII of 0.84. Furthermore, IT develops perseverance in employees,

equipping them to handle challenging situations, ranking sixth, with an RII of 0.82. Finally, IT boosts employees' confidence in their employment prospects, placing it seventh with an RII of 0.76.

These findings underscore the comprehensive development of positive attitudes from IT experience, including interpersonal skills, self-motivation, time management, self-reliance, and resilience.

The analysis reveals the profound impact of Industrial Training (IT) on employees' knowledge, skills, and attitudes. In terms of knowledge, IT is crucial in helping employees identify suitable research areas for their final-year projects and provide insights into post-graduation life. These aspects rank highest, as they aid employees in selecting relevant topics for their projects and offer valuable career insights, forming a solid foundation for their professional journeys.

Regarding skills, IT significantly enhanced employees' formal and informal written communication abilities, which respondents ranked as the most important improvement. IT refines students' writing skills and overall communication performance, instilling confidence in their ability to effectively express themselves in both verbal and written forms. Their proficiency prepares them for success in various professional contexts.

In the domain of attitudes, IT's impact is evident in employees' improved ability to socialize and maintain relationships, which the respondents rated the highest. IT fosters an environment in which employees develop meaningful connections with colleagues and host workers, cultivate genuine interest in the organization, and enhance their social skills to interact effectively with employers and fellow staff members. These abilities empower employees to gracefully and confidently navigate challenges, contributing to their personal and professional growth. This comprehensive transformation is depicted in Figure 5, highlighting the far-reaching influence of IT on employee knowledge, skills, and attitudes.

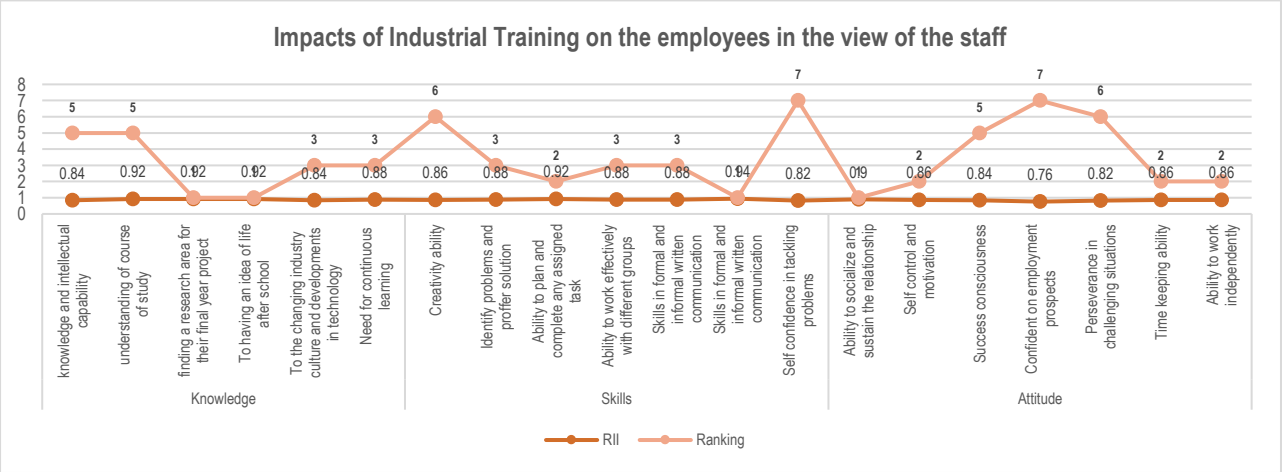

Figure 5: Impacts of IT (staff perspective)

4.2 Impacts of IT on Employees (Employees' Perspective)

Table 7 presents the employees' perspectives on the knowledge and skills acquired through Industrial Training (IT).

Knowledge Component

1. **Continuous Learning:** IT emphasizes the importance of continuous learning, securing the top rank with a Relative Importance Index (RII) of 0.89.
2. **Intellectual Capabilities:** It significantly enhances employees' knowledge and intellectual capabilities, claiming the second position with an RII of 0.88.
3. **Course Understanding:** Improvement in understanding their respective courses ranked third, with an RII of 0.88.
4. **Industry Insights:** IT provides invaluable insights into dynamic industry culture and technological advancements, ranking fourth with an RII of 0.87.

5. **Post-graduation Perspective:** It offers a realistic view of life post-graduation, securing the fifth position with an RII of 0.86.
6. **Research Areas:** IT helps to identify suitable research areas for projects, ranking sixth with an RII of 0.83.

Skills Component

1. **Self-Confidence in Problem-Solving:** IT significantly boosts self-confidence in problem solving, earning the top position with an RII of 0.87.
2. **Problem-Solving Skills:** It develops problem-solving skills, securing the second rank, with an RII of 0.86.
3. **Task Planning and Execution:** IT hones the ability to plan and execute tasks efficiently, ranking third, with an RII of 0.86.
4. **Creativity:** This sparks creativity, standing in the fourth place with an RII of 0.84.
5. **Written Communication:** Improvement in formal and informal written communication ranked fifth with an RII of 0.82.
6. **Collaboration:** IT cultivates effective collaboration skills, claiming the sixth position, with an RII of 0.81.
7. **Overall Communication:** It enhances overall communication skills, ranking seventh with an RII of 0.80.

These insights underscore the profound impact of IT on employees' knowledge and skills, ultimately contributing to their personal and professional development.

Attitudes Component

1. **Time-Keeping Ability:** IT significantly improved time-keeping ability, ranking highest with an RII of 0.87.
2. **Self-Control and Motivation:** This enhances self-control and motivation, ranking second with an RII of 0.83.
3. **Socialization and Relationship:** IT develops the ability to socialize and sustain relationships, ranking third with an RII of 0.83.
4. **Success Consciousness:** This boosts success consciousness, ranking fourth with an RII of 0.82.
5. **Independent Work:** IT improves the ability to work independently, ranking fifth, with an RII of 0.82.
6. **Confidence in Employment Prospects:** This increases confidence in employment prospects, ranking sixth with an RII of 0.81.
7. **Perseverance:** IT enhances perseverance in challenging situations, ranking seventh, with an RII of 0.79.

These findings highlight the comprehensive development of the positive attitudes that employees gain from their IT experiences, encompassing time management, self-motivation, social skills, independence, and resilience.

Table 7. Impacts of IT on Employees' (Employees' perspective)

	Variables	5	4	3	2	1	RII	Ranking
Knowledge	1 Industrial training improved my knowledge and intellectual capability	94	100	0	6	0	0.88	2nd
	2 Industrial training improved the understanding of my course of study	83	113	0	4	0	0.88	2nd
	3 Industrial training assisted me in finding a research area for my project	55	120	25	0	0	0.83	6th
	4 Industrial training exposed me to having an idea of life after school	77	111	8	4	0	0.86	5th
	5 Industrial training exposed me to the changing industry culture and developments in technology	86	100	8	6	0	0.87	4th

	6	Industrial training exposed me to the need for continuous learning	97	95	8	0	0	0.89	1st
Skills	1	Industrial training improved my creativity ability	72	101	23	4	0	0.84	4th
	2	Industrial training developed my ability to identify problems and proffer solution	91	79	30	0	0	0.86	2nd
	3	Industrial training developed my ability to plan and complete any assigned task	80	98	22	0	0	0.86	3rd
	4	Industrial training developed my ability to work effectively with different groups	43	132	21	4	0	0.81	6th
	5	Industrial training improved my skills in formal and informal written communication	56	110	30	4	0	0.82	5th
	6	Training improved my skills in formal and informal written communication	50	111	31	8	0	0.80	7th
	7	Industrial, Industrial training improved my self-confidence tackling problems	84	104	31	8	0	0.87	1st
Attitude	1	Industrial training developed my ability to socialize and sustain the relationship	58	115	21	6	0	0.83	3rd
	2	Industrial training improved my self-control and motivation	56	117	25	2	0	0.83	2nd
	3	Industrial training improved my success consciousness	60	104	36	0	0	0.82	4th
	4	Industrial training improved my success consciousness	60	104	36	0	0	0.82	4th
	5	Industrial training increased my confident on employment prospects	52	114	30	4	0	0.81	6th
	6	Industrial training improved my perseverance in challenging situations	38	126	26	10	0	0.79	7th
	7	Industrial training improved my ability to work independently	37	144	19	0	0	0.82	4th

Source: Field Survey (2019)

Based on the analysis of IT variables concerning knowledge, skills, and attitudes, the following insights emerged.

Knowledge Component: IT significantly exposed employees to the necessity of continuous learning. This aspect ranked highly among respondents who believed that IT has broadened their perspectives and ways of thinking. IT has fostered greater interest in their field of study and has provided a clearer understanding of academic concepts. Respondents appreciated how IT has enhanced their comprehension of what their education aims to impart.

Skills Component: IT notably improved employees' self-confidence in problem-solving. Respondents highlighted that participating in an IT program has acquainted them with the potential challenges they might face post-graduation and what to expect in their professional careers. IT has provided them with an industry overview, helping them to identify areas where they can excel and how to enhance their skills to fit into those roles.

Attitude Component: IT significantly enhanced employees' time management abilities, which was ranked first among the respondents. They recognized that IT taught them the importance of time management, which benefits their academic performance and overall understanding of the program's significance. IT has emphasized how effective timekeeping can enhance students' academic journeys and professional readiness.

These findings underscore the multifaceted benefits of IT, highlighting its role in expanding knowledge, building skills, and shaping positive attitudes toward continuous learning, problem-solving, and time management.

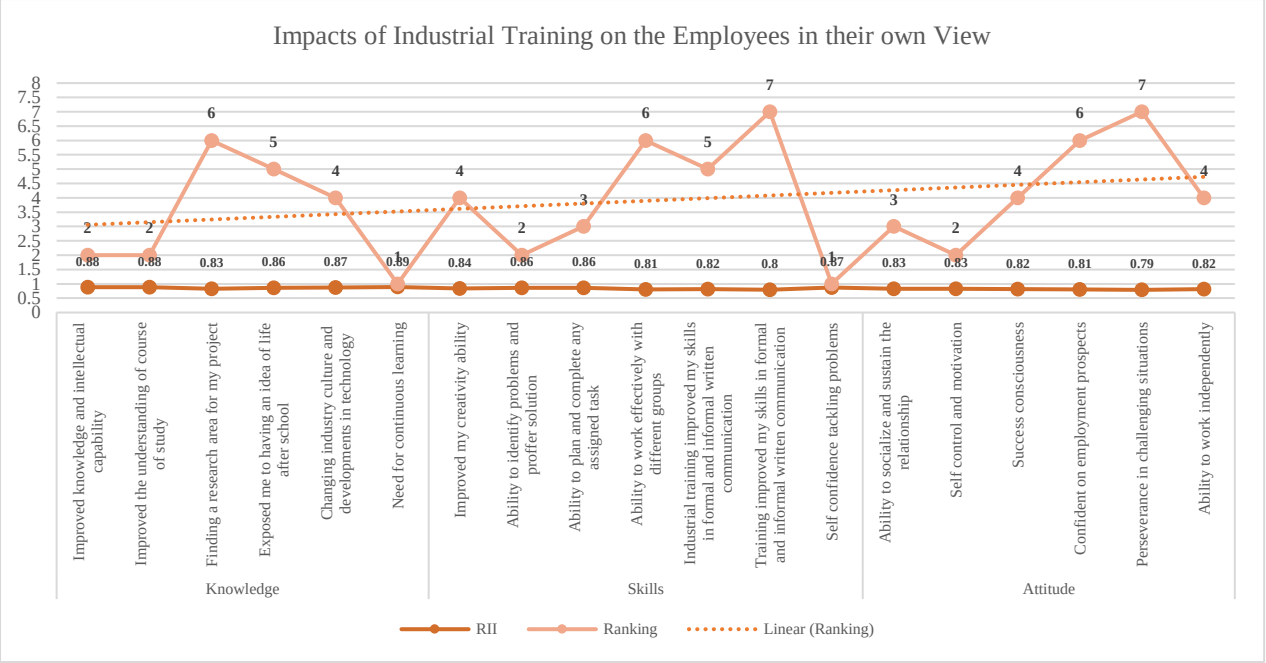

Figure 6. Impacts of IT on Employees (Employees's perspectives)

4.3 Challenges during IT

Table 8 provides an in-depth look at the challenges faced by respondents during their Industrial Training (IT) experiences. The top five challenges, as identified by the respondents, included safety (R = 0.725), commitment of supervisors (RII = 0.705), distance between residence and training location (RII = 0.695), polytechnic policies (RII = 0.685), and transportation (RII = 0.685). Conversely, the least significant challenges were the lack of training materials (RII = 0.56), trainees assigned menial tasks (RII = 0.55), and a poor partnership between academia and industry (RII = 0.55).

Safety has emerged as the most significant challenge, encompassing various workplace hazards, often due to inadequate safety measures by the host organization. The necessary safety precautions include helmets to prevent head injuries, safety boots to guard against sharp objects, gloves for electrical work, and goggles for eye protection. Ensuring the safety of employees and proper functioning of machines and tools are crucial for minimizing risks.

Supervisor Commitment was ranked the second most significant challenge. Effective and dedicated supervision is essential to successful task completion. Without proper monitoring, employees may feel uncertain regarding their responsibilities. Collaborative supervision ensures that students understand their roles and facilitates the achievement of the training objectives.

The distance between residence and workplace ranked third, highlighting a common issue for many students. Long commutes to training locations can incur significant transportation and accommodation costs, discouraging participation in IT programmes. Proximity to the training location can significantly influence employees' choice of placement.

Polytechnic policies, which ranked fourth, also presented challenges. These include the duration of the program, course assessment methods, and the requirement to defend acquired knowledge, all of which may be perceived as unclear or demanding by the employees.

Transportation, ranked fifth, was a significant barrier for many students. Lack of stipends for transportation expenses can lead to absenteeism and higher dropout rates. Providing transportation stipends could motivate students to continue their IT programs despite the logistical challenges.

Conversely, **trainees assigned menial tasks** ranked 25th, indicating that some students were tasked with non-academic duties during their training. This practice, often justified by the premise that students do not pay for knowledge acquisition, can be counterproductive and detract from the quality of their learning experience.

Lastly, **poor partnerships between academia and industry**, as perceived by respondents, primarily affected students. Inadequate preparation by academia before students begin their internships can hinder their understanding of industry-specific terms and concepts, negatively affecting their performance during IT.

These insights highlight the importance of addressing these challenges in improving the quality of students' IT experiences.

Table 8. Challenges Employees' face during IT

S/N	Variables	5	4	3	2	1	RII	Ranking
1	Distance from residence to place of training	33	40	121	16	0	0.695	3rd
2	Duration of industrial training	9	77	110	14	0	0.685	7th
3	Attitude of host organization	7	89	94	20	0	0.685	7th
4	Remuneration during industrial training	7	78	89	32	4	0.655	10th
5	Commitment of supervisor	23	71	105	6	5	0.705	2nd
6	Polytechnic policies	18	71	100	21	0	0.685	6th
7	Transportation	20	66	103	21	0	0.685	7th
8	Safety	27	84	88	11	0	0.725	1st
9	Accommodation	26	48	97	35	4	0.655	9th
10	Lack of social activities	20	56	101	30	3	0.66	8th
11	Inadequate training opportunity	20	34	137	0	19	0.63	12th
12	Ambiguous program grading system	20	37	125	24	4	0.64	11th
13	Lack of communication	14	25	128	43	0	0.61	17th
14	Uncomfortable working environment	4	42	137	24	3	0.62	14th
15	Limited opportunity and lack of responsibility	4	35	145	23	3	0.61	17th
16	Documentation with the Industrial Training Fund (ITF)	6	51	123	27	3	0.63	13th
17	Time spent in getting a place for industrial training	9	39	131	24	7	0.62	15th
18	Poor supervision by supervisors	8	26	120	46	10	0.58	23rd
19	Lack of training materials	0	44	109	44	13	0.58	24th
20	Gender inequality	4	43	126	28	9	0.61	19th
21	Poor partnership between academia and industry	0	7	163	27	13	0.56	26th
22	Employees in host organizations feel endangered due to the presence of interns	4	59	95	42	10	0.61	19th
23	Supervisors from school request that interns to bring their logbooks for assessment rather than visiting the intern's workplace	13	30	109	50	8	0.60	21st
24	Sexual harassment and intimidation of Employees	3	44	114	33	16	0.59	22nd
25	Trainees are made to do menial jobs	3	12	144	40	11	0.56	25th
26	High industrial expectation	7	46	112	45	0	0.61	16th

Source: Field survey (2019)

Strategies to Overcome Challenges during IT

Table 9 provides valuable insights into respondents' perceptions of overcoming challenges encountered during their Industrial Training (IT) experiences. Ranking analysis, based on the Relative Importance Index (RII), highlights several key strategies for effectively addressing these challenges.

The top three strategies, as identified by their RII rankings, are as follows:

1. **Issuing Certificates/Recommendation Letters**: This strategy ranks highest with an RII of 0.88. Respondents emphasized the importance of host organizations providing certificates or recommendation letters to deserving trainees upon completion of their training. Such recognition can enhance trainees' job market prospects, and serve as a testament to their skills and capabilities.
2. **Viewing Trainees as Prospective Assets**: The second-ranked strategy, with an RII of 0.876, underscores the need for host organizations to perceive trainees as potential assets rather than threats. This shift in perspective can create more supportive and collaborative environments, enabling trainees to contribute effectively to the organization's goals.
3. **Timely and Adequate Compensation**: The third-ranked strategy, with an RII of 0.87, highlighted the importance of providing timely and sufficient compensation to trainees. Regular and early payments can alleviate financial burden and motivate trainees to actively engage in IT programs.

Conversely, the least ranked strategies, as per the analysis, are as follows:

1. **Orientation for Supervisors**: This strategy, with an RII of 0.83, involves providing adequate orientation to industry supervisors regarding their roles in overseeing trainees. While not ranked as highly as other strategies, it remains essential to ensure effective IT experience.
2. **Disclosure and Discussion of Host Responses**: Ranking slightly lower, with an RII of 0.82, this strategy suggests that responses from host organizations regarding trainees should be shared and discussed with the students. Open communication can help address challenges and improve the overall IT experience.
3. **Adjusting the Timing of IT**: This strategy, with an RII of 0.80, implies considering changes to the timing of IT programs. While it ranks lower, exploring flexible scheduling options can better accommodate students' needs and enhance their IT experience.

Overall, the RII rankings indicate that there is no significant disparity among the various strategies for overcoming challenges during IT. These strategies collectively emphasize the importance of effective communication, recognition, fair compensation, and a positive perspective toward trainees. Implementing these approaches can contribute to more successful and rewarding IT experiences for students.

Table 9. Ways to overcome challenges during IT

S/N	Variables	5	4	3	2	1	RII	Ranking
1	Employees should be well paid regularly and early	104	88	14	0	4	0.87	3rd
2	Employees on training should be viewed as prospective assets and not threats	110	73	23	4	0	0.87	2nd
3	Relevant stakeholders meeting should be organized regularly	76	123	11	0	0	0.86	9th
4	Outstanding Employees should be identified, and their progress should be monitored	88	83	39	0	0	0.84	13th
5	Industrial Training Fund should assist Employees in getting placement	92	100	10	8	0	0.86	5th
6	Adequate monitoring and supervision of Employees by the industry and academia	95	96	15	4	0	0.86	6th
7	Supervisors in the industry should be given adequate orientation regarding student's supervision	67	109	30	4	0	0.83	16th
8	Responses from student's host should be disclosed and discussed with Employees	51	130	29	0	0	0.82	17th

9	Supervisors in the industry should be monitored	68	12 2	20	0	0	0.84	14th
10	Employees should be monitored early and regularly	86	11 7	4	3	0	0.87	4th
11	There should be synergy and cooperation between industry and academia	83	10 8	19	0	0	0.86	10th
12	Industrial training should be a major requirement for graduation	101	75	34	0	0	0.86	7th
13	The duration of industrial training should be adjusted	92	81	28	9	0	0.84	15th
14	Time of industrial training should be changed	75	74	51	4	6	0.80	18th
15	The academia should recommend places where Employees should go for industrial training	93	83	31	3	0	0.85	12th
16	Employees should defend their reports when they complete industrial training	92	94	24	0	0	0.86	6th
17	Host should issue a certificates/ recommendation letters to deserving Employees after completing training	106	86	18	0	0	0.8	1sh
18	Employees with outstanding course(s) should be allowed to register such course(s) during industrial training	104	71	28	7	0	0.85	11th

Source: Field Survey (2019).

Study Summary and Insights on IT Impact and Challenges

This study aimed to summarize the key issues and focus areas, assessing the impact of Industrial Training (IT) on employees from both staff and employee perspectives, with a primary focus on knowledge, skills, and attitudes. Additionally, this study examines the challenges faced by IT employees during their training and explores strategies to overcome these challenges.

Key Findings

The findings of this study have sparked an intriguing discussion from both the staff and employees' perspectives. Among IT staff (as seen in Table 6), there is a consensus that IT exposes employees to the concept of life beyond academia and guides them in identifying research areas for their final-year projects. This perspective differs somewhat from that of the students (as indicated in Table 7). However, both groups agree on the transformative impact of IT. They believe that IT exposure fosters a recognition of the need for continuous learning, enhances their understanding of their respective courses of study, and augments their intellectual capabilities. Interestingly, there is a convergence of opinions among both staff and students regarding the influence of culture and technological advancements in the industry.

These findings align with Rodzalan and Saat (2012), who noted that the job market increasingly values work experience alongside academic qualifications when hiring new employees. Consequently, industrial training has become a prerequisite for education institutions (British Standard 1986). During this training period, which typically spans around six months, the goal is to equip individuals with the skills required by the industry, thus playing a pivotal role in cultivating a high-quality and professional workforce. Notably, the development of general skills poses a challenge in this context.

Skill Enhancement and Broader Influence

From the staff's perspective, IT significantly enhances employees' skills in both formal and informal written communication, encompassing written expressions and verbal communication pertinent to their courses of study. Conversely, employees believe that IT boosts their self-confidence when addressing problems. This study underscores that IT's influence extends beyond academic activities, permeating various facets of life, including social relationships, self-control, motivation, and the ability to plan and complete assigned tasks within specified timeframes.

Financial Support and Motivation
The issue of regular and timely stipends for employees emerges as a critical concern. The study highlights that inadequate financial support can lead to difficulties for employees in sustaining themselves during their internships. Furthermore, the absence of remuneration can result in reduced motivation among employees, increased student absenteeism, and higher dropout rates. Consequently, offering regular and early stipends is deemed instrumental in motivating employees.

Recommendations for Effective IT Programs
To ensure effective employee development, comprehensive monitoring and supervision should be implemented involving industry-based supervisors, the Industrial Training Fund (ITF), and academia. This robust monitoring system would enable close evaluation of employee progress and participation during their industry internships. Such monitoring engenders employee confidence and provides assurance that what they learn during their internships is valuable.

Research Objectives:
1. To summarize the key issues and focus areas related to Industrial Training (IT) and their impact on employees.
2. To assess the challenges employees face during IT and explore strategies to overcome these challenges.
3. To examine the perspectives of both staff and employees regarding the impact of IT on knowledge, skills, and attitudes.

Relevant theory or research findings: The study aligns with the observations of Rodzalan and Saat (2012), who noted that industrial training has become a prerequisite in higher education institutions as the job market values work experience alongside academic qualifications. The development of general skills poses a challenge in this context, highlighting the importance of equipping individuals with the skills required by the industry during IT.

Research Findings: IT exposure enhances employees' skills in communication, self-confidence, problem-solving, and time management. It also fosters recognition of the need for continuous learning and augments intellectual capabilities. Financial support through regular and timely stipends is crucial for sustaining employees during their internships and for maintaining motivation. Recommendations for effective IT programs include comprehensive monitoring and supervision by industry-based supervisors, the Industrial Training Fund, and academia to ensure employee development.

5. Conclusion
This study aimed to evaluate the experiences of students in an IT program for ND2 and HND1 employees, focusing on their post-internship experience. The goal of the program is to bridge the gap between theoretical knowledge and practical application in higher education, thereby exposing employees to real-world work situations.

According to industrial-based supervisors, industrial training helps students identify research areas for their final-year projects, exposes them to real-life challenges, and develops their ability to identify and solve problems. Employees reported that industrial training promotes continuous learning, enhances knowledge and intellectual capabilities, and improves their understanding of their course of study.

These observations indicate that industrial training is highly beneficial for employees, and should be a crucial part of the curriculum before graduation. However, the study also highlighted several challenges faced by students during their internships, including safety concerns, commitment of supervisors, distance to training locations, transportation, and accommodation issues.

Efficient transfer of information and knowledge within organizations relies heavily on individuals who facilitate this process. Factors that encourage or impede interpersonal communication significantly affect how information is exchanged (Jafari, Zahedi, & Khanachah, 2024; M. R. Zahedi & S. N. Khanachah, 2020). Trust-based communication is crucial for effective knowledge creation and

application (Jafari et al., 2024; Zahedi and N. Khanachah, 2020). Organizations that foster effective interactions among employees, both within and across units, enhance confidence in information exchanges and improve knowledge management. Therefore, promoting a corporate culture that encourages communication and interaction is essential for effective knowledge management (Ghorbani and Khanachah, 2021).

Management literature reveals that knowledge management lacks a universally clear-cut definition. Existing definitions focus on an organization's ability to generate wealth from knowledge-based assets. Knowledge management involves discovering, collecting, and utilizing technical knowledge to improve processes and facilitate effective employee training (Ayoko 2021). It encompasses defining, maintaining, disseminating, and accessing knowledge within an organization to boost productivity and efficiency, making it easier to access the wealth of generated content. Knowledge management significantly impacts various aspects of organizational software, including accounting, human capital management, and production software (Mahmoudi, Fazli, & Morad, 2018).

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