Industrial Training as a Medium for Strengthening Human Soft Skills among Students of Port Dickson Polytechnic, Malaysia.

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ABSTRACT

This study aims to identify the level of soft skills of Port Dickson Polytechnic students after undergoing industrial training, as well as the most mastered and least mastered soft skill components. This quantitative study uses a questionnaire containing 56 items to collect data from 86 respondents who are employers that offer industrial training. The data obtained was analyzed using SPSS software, with descriptive analysis techniques to measure mean, percentage, and standard deviation. The results of the study found that Port Dickson Polytechnic students showed a high level of mastery of soft skills after undergoing industrial training. The teamwork skills component is well mastered, while critical problem-solving skills have a lower level of mastery. Based on these results, several recommendations have been put forward, among which are increased training in critical problem-solving skills through simulations and intensive workshops, more strategic supervision in teamwork skills, as well as the integration of more recent information technology skills training to ensure students can adapt to industry developments. This study provides guidance to strengthen students' soft skills through more effective industrial training programs.

Keywords: Soft skills, industrial training, Port Dickson Polytechnic.

INTRODUCTION

In an increasingly competitive job market, work experience is increasingly emphasized in addition to academic qualifications. This requirement makes work experience or industrial training a fundamental element in higher education institutions (Saat and Ahmad, 2009). Higher education institutions now provide students with the opportunity to translate the knowledge gained into practice through industrial training, also known as practical training or internship. This six-month training period aims to develop the skills required by the industry and play an important role in providing a quality and professional workforce in the future (Omar, et al., 2008).

Rapid changes in information technology, work life, and society (Lam & Ching, 2007) lead to progress in the work context as well as impacting economic growth. In the face of these changes, critical professions such as engineering will hire highly skilled future engineers to overcome market competition. Therefore, to be employed, students need to develop not only technical skills but also generic skills. There is no specific list for generic skills, but in general, they include skills such as communication, teamwork, critical thinking and problem solving, leadership, entrepreneurship, lifelong learning, and ethics (Ministry of Higher Education Malaysia, 2006).

According to Weligamage, marketability skills or generic skills refer to "basic skills needed to obtain, maintain, and succeed in employment" (Weligamage, et al., 2009). These skills are also known as transferable skills (Kelly, 2001; Yorke, 2006) as well as teachable skills (Lorraine Dacre & Peter, 2007). Generic skills are important for students in higher education especially engineering students as has been studied by many scholars recently (Yuzainee, Zaharim, & Omar, 2011; Zaharim, et al., 2010). However, there is an issue of lack of generic skills (Cable, Dale, & Day, 2007; Jackling & Watty, 2010) among engineering students and this can be an obstacle for them to get a job and worse if this leads to unemployment.

To overcome this problem, industrial training in academic programs should serve as the best medium to develop generic skills for students. In the context of engineering students focused on this paper, industrial training provides many benefits by providing initial preparation in the engineering profession and improving engineering skills during training (Omar, et al., 2008). In addition, students can integrate theoretical learning at university with practical work in an engineering environment. The benefits of industrial training for students cannot be denied because many studies conducted in various fields show positive results (Callanan & Benzing, 2004; Cook, Parker, & Pettijohn, 2004; Mihail, 2006).

Nevertheless, previous studies show that the experience during industrial training can be influenced by the type of individual (Cook, et al., 2004; Leonard & Kenneth, 1999; Martin, Myers, & Mottet, 1999; Nill & Schibrowsky, 2005; Rolf van, Patrick, & Guido, 2009) and organizational characteristics (Baker & Comer, 2012; Coralie, Ron, & Rod, 2007; Jehn, 1997; Katajavuori, & Hirvonen, 2011; Smith & Hume, 2005).

Problem Statement

In today's global economy, the success of a country depends heavily on the knowledge, skills, and competencies possessed by the people. Therefore, it is not surprising that countries with highly educated citizens will have the opportunity to enjoy higher economic progress.

Nevertheless, the issue of unemployment and the dumping of unemployed graduates after graduation became a hot topic in the mass media. A total of 54,103 university graduates were unemployed within six months of their graduation last year. The number is based on the Graduate Tracking System (SKPG) which saw 238,187 graduates complete their studies last year. Courses with the highest unemployment rates are business registration, applied science, human resource management, accounting, literature, and social science. That amount is not only from Public Universities (UA) but combined from other private higher education institutions and colleges (Mstar online, Thursday, August 17, 2017).

This is the challenge of Higher Education Institutions (HEIs) today, which is to provide human capital that meets market demands by improving the quality of teaching and learning while applying generic and interpersonal skills in line with the demands of the industry and employers today. The marketability of graduates determines the effectiveness and efficiency of a country's education system.

Therefore, this study was conducted to measure the extent to which employers perceive Port Dickson Polytechnic students who are undergoing industrial training in their place. This information is important in helping the polytechnic to identify whether the students graduating from the polytechnic meet the needs of the industry or vice versa and design appropriate courses or training to produce more holistic students when they are in the workplace later.

Research Objectives

This study aims to achieve the following objectives:

1. Identify the level of soft skills of Port Dickson Polytechnic students after undergoing industrial training in a real career environment.
2. Identify the components of soft skills that are most mastered and least mastered by Port Dickson Polytechnic students after undergoing industrial training in a real career environment.

Research Questions

1. What is the level of soft skills of Port Dickson Polytechnic students after undergoing industrial training in a real career environment?
2. What components of soft skills are most mastered and least mastered by Port Dickson Polytechnic students after undergoing industrial training?

LITERATURE STUDY

In the modern education system, the aspect of soft skills (KI) has become an important component for graduates entering the world of work. Soft skills are closely related to various dimensions of an individual's personality, including communication skills, networking abilities, adaptability, and innovation. These aspects have been identified through the views of experts and studies carried out by institutions of higher learning (HEIs), which aim to stimulate and strengthen the development of students in the field (Sidik et al., 2020).

Today's educational institutions place more emphasis on soft skills than academic achievement alone. The application of KI elements in teaching and learning (PdP) aims to prepare students to face challenges in the world of work. This approach is increasingly relevant in the era of globalization, where the mastery of soft skills gives added value to graduates and increases their marketability. The Malaysian Ministry of Education (KPM) has developed a KI development module that involves input from experts from various fields to ensure compatibility with industry requirements.

According to Bilah et al. (2017), KI is a generic skill that involves cognitive and personality aspects, with a focus on self-development and non-academic skills. Yaacob and Ahmad (2019) assert that the mastery of KI is important for students, regardless of whether they study at public or private HEIs. The Ministry of Higher Education (KPT) Malaysia has also introduced the Human Skills Development Module to foster and improve the human capital of students, emphasizing two main concepts, namely Human Skills Must (KIM) and Human Skills (KI), both of which provide added value to students in the world of work.

Previous studies have also shown a significant relationship between industrial training and the development of soft skills. For example, a study by Musa (2001) shows that students who undergo industrial training are more likely to master skills such as discipline, flexibility, punctuality, and teamwork. Annamalai et al. (2012) also emphasized that these aspects are important to form professional employees. Likewise, a study by Esa et al. (2001) stated that employers value employees who have communication skills, physical fitness, and interpersonal skills more than academic qualifications alone.

In addition, the country's productivity is highly dependent on graduates who have high soft skills. The issue of unemployment in Malaysia is often linked to the lack of soft skills among graduates (Ahmad & Mohd Rhouse, 2016). Therefore, it is important for graduates to have the skills to think critically, solve problems effectively, and make the right decisions. In conclusion, the mastery of soft skills is very important in ensuring that graduates can compete and grow in the world of work (Ahmad & Mohd Rhouse, 2016).

Communication Skills

Communication skills are one of the soft skills that every student needs to master. This skill not only involves delivering a clear message, but also the ability to listen, understand, and give accurate feedback (Mariappan et al., 2018). In an organizational context, effective communication ensures smooth and productive workflow. According to Md. Sabil et al. (2021), effective communication can be implemented verbally, non-verbally, and through various mediums. In addition, language proficiency, especially English, is important in the era of globalization, where graduates need to have the confidence to communicate with various parties (Mohamad et al., 2019).

Critical Thinking and Problem Solving

Critical thinking and problem-solving skills are key requirements for today's graduates. This skill involves the ability to evaluate information objectively and make accurate decisions based on available evidence (Md Sabil et al., 2021). Critical thinking helps graduates in taking wise and effective actions in facing various challenges in the workplace. Therefore, education in the 21st century needs to focus on learning that promotes critical thinking and innovation (Mohd Zhaffar et al., 2016).

Teamwork Skills

Teamwork is an important aspect in ensuring the achievement of organizational objectives. These skills require

everyone to work together, share ideas, and support colleagues in achieving common goals (Ibrahim & Ahmad, 2018). Research by Ahmad and Majid (2018) shows that graduates who have teamwork skills have a higher potential to succeed in the world of work. The ability to collaborate in a team is essential to increase productivity and solve problems collectively.

Continuous Learning and Information Management

Continuous learning is a process that does not end after the end of formal education. Graduates need to continue to develop their skills throughout life, especially in the face of rapid changes in the world of work. Abbas (2018) stated that the mastery of information technology is important to ensure that graduates can access information effectively and solve problems more efficiently. Continuous learning gives graduates the opportunity to add knowledge and skills relevant to current industry requirements (Yaacob & Ahmad, 2019).

RESEARCH METHODOLOGY

This quantitative study in the form of a survey collects data based on questionnaires distributed and answered by respondents. The questionnaire used contains several sections as follows:

Table 1: Distribution of Items in the Study Questionnaire

Section	Variables of the study to be identified	Item No	Number of Items
A	Demographics (Personal Information)	**6**	1-6
B	Communication Skills	**15**	1-15
C	Critical Problem-Solving Skills	**12**	16-27
E	Teamwork Skills	**13**	28-37
E	Information Technology Skills	**10**	38-47
Total Questions			**56**

The questionnaire constructed for this study was adapted from the Ministry of Higher Education's Soft Skills Model (KPT, 2013) and the Malaysian Soft Skills Scale (My3S). This questionnaire contains 50 items representing four main attributes, namely Communication Skills, Critical Problem-Solving Skills, Teamwork Skills, and Information and Communication Technology Skills. Some adaptations were made to meet the specific needs of this study.

The data obtained was analyzed using descriptive analysis methods, including mean, frequency, and percentage analysis, to measure the level of mastery of soft skills among students from the perception of Industrial Supervisors of students undergoing Industrial training programs. Before the full study was carried out, a pilot study was conducted involving 30 sample people. The results of the reliability test using Cronbach's Alpha showed a value of 0.94, which is close to the value of 1. This shows that the research construct is at a good level of reliability, indicating that the questionnaire that was built is consistent and suitable for use in the main study.

The data that has been collected was analyzed using the Statistical Package for Social Sciences for Windows Version (SPSS) software descriptively such as mean scores and percentages. The respondents of this study consist of employer companies that offer industrial training to Port Dickson Polytechnic students' session II 2023/2024. The study sample was a total of 80 employees who were randomly selected based on Krejcie and Morgan's (1970) sample size determination table.

A 5-point Likert scale was used to identify the respondent's level of agreement for each statement. The level of

agreement of the 5-point Likert scale used is as shown in table 2.

Table 2: Five Point Scale Used in the Questionnaire Form

Reality/Score Min	Rank	Scale
Low Level 1.00-2.33	Strongly Disagree (SD)	1
	Disagree (D)	2
Medium Level 2.34 – 3.66	Uncertain (U)	3
	Agree (A)	4
High Level 3.67 – 5.00	Strongly Agree (SA)	5

Source: Adapted from Mohd Majid (2000)

Table 3: 5-Point Likert Scale

Number	Effectiveness Category
1	Strongly Disagree
2	Don't Agree
3	Not Sure
4	Agree
5	Strongly Agree

Source: Robinson, J. (2024)

RESULTS AND DISCUSSION

Descriptive Analysis of Respondent Demographics

Table 4: Demographic Characteristics of Respondents

Demographic Characteristics	Frequency	Percent (%)
1. Gender		
Man	67	77.9
Woman	19	22.1
2. Age		
< 30 years	26	30.2
31 – 40 years	27	31.4
41 – 50 years	27	31.4
>50 years	6	7

4. Highest Academic Qualification		
Certificate/SPM	0	0
Diploma	42	48.8
Degree	42	48.8
Master/ PhD	2	2.3
5. Work Experience		
1-5 years	23	26.7
6-10 years	21	24.4
11-15 years	17	19.8
16-20 years	25	29.1
6. Industrial Training Student Study Program		
Diploma in Electrical Engineering	39	45.3
Diploma in Electronic Engineering (Communication)	8	9.3
Diploma in Electronic Engineering (Computer)	14	16.3
Diploma in Green Energy Engineering	7	8.1
Diploma in Energy Efficiency Engineering	18	20.9

This study involved 86 respondents consisting of industry supervisors who guided Port Dickson Polytechnic students during their industrial training. Based on gender, most respondents were male, namely 67 (77.9%), while only 19 (22.1%) were female. This finding shows that the industrial employment sector involved is still dominated by male workers. In terms of age, most of the respondents were in the productive age range, namely between 30 and 50 years old. Respondents in the age categories of 31–40 years and 41–50 years old recorded the same number, namely 27 people (31.4%), while respondents under 30 years old were 26 people (30.2%). Only 6 people (7%) of the respondents were over 50 years old.

Based on the highest level of academic qualification, many respondents had Diploma and Degree, 42 people (48.8%) respectively. Respondents with Master/PhD qualifications only consisted of 2 people (2.3%), while no respondents had Certificate/SPM qualifications. This data shows that most industrial supervisors involved in student industrial training are highly educated individuals. In terms of work experience, respondents had diverse experience, with almost half of them having more than 10 years of work experience. Respondents with 16–20 years of work experience were the highest, at 25 people (29.1%), followed by 1–5 years at 23 people (26.7%), 6–10 years at 21 people (24.4%), and 11–15 years at 17 people (19.8%).

In addition, the analysis showed that the respondents supervised students from various study programmes at Port Dickson Polytechnic. The Diploma in Electronics and Telecommunications Engineering (DET) programme recorded the highest number of students with 39 students (45.3%), followed by the Diploma in Electrical and Power Engineering (DEQ) with 18 students (20.9%). Other programmes such as the Diploma in Electrical Engineering Technology (DTK), Diploma in Specialised Electrical Engineering (DEP), and Diploma in Generic Electrical Engineering (DEG) recorded the number of students with 14 students (16.3%), 8 students (9.3%), and 7 students (8.1%) respectively.

Overall, the demographic profile of the industry supervisors indicates that they are experienced and highly educated professionals, who are well-suited to guide students in their industrial training. The dominance of students from the DET program reflects the industry sector’s need for a workforce in the telecommunications field. This profile provides a solid foundation for understanding the supervisors’ backgrounds that contribute to

the students' industrial training experience.

Descriptive Analysis of Effectiveness in Online Learning and Teaching

Research Question 1: What is the level of soft skills of Port Dickson Polytechnic students after undergoing industrial training in a real career environment?

Table 5: Soft skills levels of Port Dickson Polytechnic students.

Effectiveness	**Min**	**Stage Interpretation**
1. Communication Skills	4.2845	High
2. Critical Problem Solving Skills	4.1618	High
3. Teamwork Skills	4.3041	High
4. Information Technology Skills	4.2349	High
Soft Skills	4.2463	High

The level of soft skills of Port Dickson Polytechnic students after undergoing industrial training was found to be at a high level based on the study findings. All components measured, namely communication skills, critical problem-solving skills, teamwork skills, and information technology skills recorded a mean value exceeding 4.0. Overall, the overall level of soft skills of students recorded a mean value of 4.2463, indicating the effectiveness of the industrial training program as a medium for strengthening these skills.

From the detailed analysis, teamwork skills recorded the highest mean value (4.3041), indicating that students performed excellently in this aspect. The students' ability to work together effectively, form positive relationships, and contribute to the achievement of group goals is a direct result of exposure to a collaborative work environment during industrial training. Communication skills were also at a high level (4.2845), reflecting the students' ability to convey ideas clearly and receive feedback well.

However, critical problem-solving skills recorded the lowest mean value (4.1618) compared to other components, although still at a high level. This indicates that there is room to improve students' abilities in identifying, analyzing, and solving complex problems that may arise in the workplace. This aspect requires more training involving simulations of real-world situations or problem-based learning approaches.

This finding is in line with previous studies. Mohamad et al. (2021) stated that industrial training is an effective tool to improve soft skills, especially in the aspects of communication and teamwork. A study by Ramli et al. (2020) also supports that industrial training plays an important role in preparing students with the skills needed to face real career challenges. These findings highlight the importance of industrial training in supporting a holistic and skilled graduate development agenda.

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Descriptive Analysis of the soft skills components that are most and least mastered by students

Research Question 2: What soft skills components are most and least mastered by Port Dickson Polytechnic students after undergoing industrial training?

Table 6: Soft skills components that are most and least mastered by students

Obstacles	Low Level (1.00-2.33)	Level Moderate (2.34 – 3.66)	Level High (3.67 – 5.00)	Min	Standard Deviation	Interpretation
1. Communication Skills	0 (0%)	4(4.7%)	82(95.35%)	4.2845	0.42194	High
2. Critical Problem Solving Skills	0(0%)	10(11.6%)	76(88.5%)	4.1618	0.50461	High
3. Teamwork Skills	0(0%)	6(6.9%)	80(93.1%)	4.3041	0.54456	High
4. Information Technology Skills	0(0%)	11(12.8%)	75(87.4%)	4.2349	0.53021	High
Soft Skills	0(0%)	4(4.6%)	82(94.7%)	4.2463	0.46856	High

Based on the study findings, the soft skills component that was most mastered by Port Dickson Polytechnic students after undergoing industrial training was teamwork skills, with the highest mean value of 4.3041 and a standard deviation of 0.54456. This shows that students are generally very capable of working together, contributing to the team, and achieving group goals effectively. This ability may be strengthened by the students' experience working in a group during industrial training where collaboration is an important element in completing tasks.

On the other hand, critical problem-solving skills were found to be the least mastered with a mean value of 4.1618 and a standard deviation of 0.50461, although still at a high level. This result indicates that although students could analyze and solve problems, there is still room to improve these abilities to be more effective. A small number of students (11.6%) were at an average level in this aspect, indicating that there are certain challenges in understanding and dealing with complex problems involving critical thinking.

Communication skills and information technology skills also recorded high levels with mean values of 4.2845 and 4.2349 respectively. Students demonstrated good ability in communicating, both verbally and in writing, as well as using information technology to complete tasks and achieve job objectives.

Overall, the findings indicate that all components of students' soft skills are at a high level. However, critical problem-solving skills are the component that needs the most attention to be improved. Additional training such as problem-based learning approaches and exposure to real-world problem-solving scenarios can help improve this ability.

This finding is in line with previous research by Mohamad et al. (2021) which showed that teamwork skills are often the strongest soft skills among students after undergoing industrial training, as practical tasks usually require collaboration. Ramli et al. (2020) also emphasized the importance of critical thinking elements in shaping graduates who are more competent to face job challenges. Therefore, efforts to strengthen all soft skills components, especially critical problem solving, are important to ensure that students are better prepared

to meet industry needs.

DISCUSSION

Demographic Analysis

Demographic analysis shows that industrial supervisors are experienced, highly educated, and of productive age, making them suitable to guide students in industrial training. The dominance of students from the DET program reflects the high demand for manpower in the telecommunications field. This demographic data provides confidence that Port Dickson Polytechnic students receive adequate and quality guidance, in line with industry needs. This can also contribute to the development of students' soft and technical skills holistically, in line with previous studies that emphasize the importance of quality supervision in industrial training (Abdullah et al., 2017).

Level of Soft Skills of Port Dickson Polytechnic Students After Undergoing Industrial Training in a Real Career Environment

The results of the study showed that the level of soft skills of Port Dickson Polytechnic students was at a high level after undergoing industrial training in a real career environment. Based on the overall mean value of soft skills (4.2463) and standard deviation (0.46856), students showed significant improvement in various aspects of soft skills. Key components such as communication skills, critical problem solving, teamwork, and information technology recorded mean values above 4.00, reflecting good mastery among students.

Communication Skills recorded the highest mean value of 4.2845 (standard deviation = 0.42194), indicating that students have good ability in interacting with industry, colleagues, and customers. These skills are important in building professional relationships and conveying information clearly and effectively. A study by Andrews and Higson (2008) supports that good communication skills are a critical element for success in real-world career environments.

Teamwork Skills recorded a mean value of 4.3041 (standard deviation = 0.54456), which was the component with the highest value. This indicates that students can work well together in groups, including contributing ideas, supporting other team members, and ensuring that common goals are achieved. Previous studies such as those by Katzenbach and Smith (2003) have emphasized that the ability to work in teams is a basic requirement for modern organizations that practice teamwork.

Critical Problem-Solving Skills recorded a mean value of 4.1618 (standard deviation = 0.50461). Although still at a high level, this component is one of the more challenging because it requires students to use critical analysis, creativity, and strategic approaches in solving complex problems. Industrial training provides a real platform for students to apply the theory learned in a real work environment, as suggested by Kolb (1984) in the experiential learning model.

Information Technology Skills: on the other hand, had a mean value of 4.2349 (standard deviation = 0.53021), reflecting students' ability to use technology effectively to complete tasks and increase productivity. This is important in the era of Industrial Revolution 4.0, where technology plays a major role in supporting work effectiveness.

The high level in all soft skills components indicates the effectiveness of industrial training in developing the potential of Port Dickson Polytechnic students. The process of exposure to real work environments helps students develop important skills needed for future careers. This study supports the findings of Abdullah et al. (2017), who found that industrial training can increase the employability of graduates by strengthening their soft skills.

Soft Skills Components Most Mastered and Least Mastered by Port Dickson Polytechnic Students After Undergoing Industrial Training

Based on the analysis, **teamwork skills** were the most mastered component by Port Dickson Polytechnic

students after undergoing industrial training, with the highest mean value of 4.3041 and standard deviation of **0.54456**. These results indicate that students can collaborate effectively with colleagues, share responsibilities, and contribute to the achievement of common goals. These skills are important in meeting the needs of industries that often operate in a group context. Katzenbach and Smith's (2003) study emphasized that the ability to work in a team is one of the important elements to achieve high organizational performance.

On the other hand, **critical problem-solving skills** are the least mastered component by students, although still at a high level with a mean value of **4.1618** and a standard deviation of **0.50461**. This skill requires students to analyze problems in depth, produce creative solutions, and make accurate decisions in challenging situations. This lower mean value reflects the challenges students face in applying their critical and analytical skills in real work settings. A study by Facione (1990) stated that the development of critical thinking skills requires extensive experience and intensive training.

In addition, **communication skills** (mean value **4.2845**) and **information technology skills** (mean value **4.2349**) also recorded a high level of mastery, reflecting students' ability to communicate effectively and utilize technology in completing tasks. Communication skills are essential in conveying information professionally, while information technology skills are important in adapting students to the needs of the digital era and the 4.0 Industrial Revolution.

The teamwork skills that students mastered the most demonstrate the effectiveness of industrial training in fostering the value of collaboration. However, there is room to improve critical problem-solving skills through more strategic approaches, such as industrial case simulations and critical thinking workshops. This study supports the findings of Abdullah et al. (2017), who suggested that practical exposure can improve certain soft skill components, but the critical aspects require a more in-depth approach.

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