The Effectiveness of The Occupational Safety And Health (DUW10022) Course On Safety And Health Aspects In The Workplace For Students Undergoing Industrial Training

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Abstract

It is important to understand the elements of occupational safety and health to create a safe working environment and increase employee awareness of occupational safety and health. This study aims to find out how well the DUW 10022 course provides early exposure to industrial training students on occupational safety and health in the workplace. Occupational safety and health (OSH) is important to create a safer working environment. They also need to be enhanced during the learning and teaching process (PdP) in higher education institutions, whether public or private. The study involved 80 students from the Department of Electrical Engineering in Seberang Perai Polytechnic who took a Diploma in Communication Electronic Engineering (DEP), a Diploma in Computer Electronic Engineering (DTK) and a Diploma in Electrical and Electronic Engineering (DEE), Seberang Perai Polytechnic who have undergone industrial training. Respondents are from three different study sessions and have taken the DUW10022 course. The design of this study is quantitative, involving questionnaire instruments. The study instrument consists of 2 parts: part A and part B. Part A involves the respondent's background. In contrast, part B includes ten questions concerning knowledge, skills, and awareness of the DUW10022 course. The percentage distribution is used to identify information about the respondents' backgrounds, while the mean percentage distribution is used to determine the questionnaire instrument items in section B. The overall mean score for knowledge, skills, and awareness is high, with scores of 4.41, 4.21 and 4.31, respectively. The findings showed the effectiveness of the DUW10022 course as an early exposure to students undergoing industrial training on their workplace's safety and health aspects.

Keywords: Electrical Engineering, Safety and Occupational Health, Industrial Training.

1.0 Introduction

Knowledge of occupational safety and health is critical for all parties involved, especially employers, amidst the growing risks posed by technological advancements in the industry. Institutions of higher learning play a pivotal role in preparing skilled personnel across various sectors, exposing students to practical workshops and chemical handling, necessitating their familiarity with safety and health protocols. Studies underscore the significance of workplace safety in reducing accidents and ensuring adherence to regulations. Occupational Safety and Health (OSH) encompasses many disciplines to safeguard employee well-being, prevent accidents, and mitigate exposure to hazards. The Department of Polytechnic Studies and Community Colleges (JPPKK) ensures educational alignment with industry needs, offering courses like DUW10022-Occupational Safety and Health to equip students

with essential management skills. Early education in workplace safety mitigates risks, enhances productivity, fosters employee satisfaction, and reduces costs linked to accidents and injuries.

In industrial settings, occupational safety and health are paramount to preventing accidents, injuries, and illnesses, ensuring a safe and productive work environment crucial for organisational success. This study evaluates the effectiveness of the DUW10022 occupational health and safety course across all polytechnics, which aligns with the objectives of the Occupational Safety and Health Master Plan 2016-2020 to heighten awareness. The course is selected for its industry relevance and its role in preparing students for future job demands, as underscored by Dr. Ahmad Sazali Hamzah (2022). The curriculum encompasses safety responsibilities, accident prevention strategies, risk reduction methods, and safety and health management, promoting a culture of safety awareness. Insights from the National Institute of Organizations Safety and Health (NIOSH, 2018) provide valuable data, revealing varying levels of awareness and engagement in occupational safety and health training within industries and the public. This research assesses the course's impact on enhancing workplace safety and health practices during students' industrial training.

This study explicitly targets final-semester students from the Department of Electrical Engineering at Seberang Perai Polytechnic who have completed Industrial Training. It involves a sample of 80 students selected randomly across three sessions: Diploma in Electronic Communication Engineering (DEP), Diploma in Computer Electronic Engineering (DTK), and Diploma in Electrical and Electronic Engineering (DEE).

2.0 Literature Review

Employee and employer awareness of workplace safety and health is crucial in mitigating the risk of workplace accidents. Employers are responsible for prioritising safety measures and ensuring employees are well-informed about safety protocols. A survey among quarry workers indicated that a majority, 56.9%, emphasised the importance of adhering to safety recommendations while working (Siti, Abdul & Ahmad, 2014), underscoring the need for heightened safety awareness to reduce workplace incidents.

Employers can enhance safety awareness through various initiatives, such as providing clear guidelines, educational programs, and training sessions. Studies by NIOSH highlight that a significant portion, about 80%, of reported accidents stem from human negligence (Subramaniam, Mohd Zin, & Nadir, 2013). This supports theories like Domino's theory and Heinrich's reference, which attribute a substantial percentage, 85% to 95%, of serious occupational accidents to individual negligence.

Given the critical role of safety and health awareness in workplaces, employers and employees must prioritize these aspects to uphold a safe working environment (Amirul et al. 2019; Kadir et al. 2017; Mohd Azhar et al. 2019). Recognizing the impact of occupational safety and health awareness

on workplace safety (Zitty et al. 2017), organizations should evaluate the effectiveness of courses such as DUW10022 among students undergoing industrial training. This assessment can guide improvements to the course content and delivery methods, thereby enhancing future employees' safety and health awareness levels.

3.0 Study Methodology

This study uses a quantitative approach to measure the effectiveness of DUW10022 Occupational Safety and Health courses on students who have undergone industrial training. The design of this study is to assess the students' perception and knowledge of the aspects of occupational safety and health after taking the course.

The study population comprises students from the Department of Electrical Engineering at Seberang Perai Polytechnic who have completed industrial training. A total of 80 respondents were chosen randomly to serve as the study's sample and the basis for purposeful sampling.

The main instrument used in the study is the questionnaire. The questionnaire is focused on two approach questions, namely the multiple-choice questions for Part A and the Likert scale for Parts B, C and D. Part A involves information on the demographics of the respondents. In contrast, Part B involves the objectives of the survey studied. The use of questionnaires can improve the accuracy and correctness of the response given by the sample as it is not influenced by the researcher's behaviour (Mohd Majid Konting, 2005). In addition, the perfect questionnaire clearly states the purpose and wishes of each question, which is clear and understandable to the respondent.

Data collection is done online using questionnaires and *Google Forms*. *Google Form* was chosen as a data collection method so that this data collection runs smoothly. *The Google Form* link is spread through the student group's WhatsApp platform through lecturers. The data collected was collected and analysed using descriptive analysis. This analysis was conducted using Microsoft Office Excel. The questionnaires presented by the researchers are as per Table 1.

Table 1: Question Items

No	Question Item
1	The DUW10022 syllabus introduces students to the fundamentals of occupational health and safety.
2	The course DUW10022 imparts knowledge on several facets of workplace occupational safety and health.
3	The DUW10022 course offers direction and assistance in completing duties at work.
4	You will learn some basic words linked to workplace safety and health with this DUW10022 course.
5	Completing assignments and assessments during the DUW10022 Course enhances one's ability to perform work tasks

No	Question Item
	independently.
6	The knowledge and abilities acquired from the DUW10022 course's evaluation and assignment help the organisation succeed in workplace occupational safety and health.
7	The knowledge and abilities you have gained from the DUW10022 course are extremely applicable to occupational safety and health.
8	Curriculum evaluation: The Polytechnic's DUW10022 course has equipped you with knowledge and abilities related to occupational health and safety.
9	Evaluation of the DUW10022 course curriculum at the Polytechnic has given you an initial awareness of occupational health and safety aspects.
10	Overall, you agree that the DUW10022 Course at the Polytechnic is very helpful as an initial preparation for workplace safety and health.

Respondents are required to state a level of consent based on the five stages in the Likert Scale about Table 2. Students can show how much they agree or disagree with each question by using five alternatives on the Likert scale used in the study. The Likert scale was chosen because it is the main measurement with high reliability and validity.

Table 2**:** Likert Scale

Score Value	Likert Scale
1	Strongly Disagree
2	Disagree
3	Neutral
4	Agree
5	Strongly Agree

(Source Andrew T. Jebb, Vincent Ng and Tay 2021)

3.1 Respondents

The respondents involved in this research were students from the Department of Electrical Engineering from 3 programmes, DEP, DEE and DTK, who completed Industrial training. These students were selected as respondents because this study wanted to study the effectiveness of the Occupational Safety and Health Course they took during the first semester at Seberang Perai Polytechnic. The group of respondents also consists of 3 Sessions: session 1 2022/2023, session 2 2022/2023 and 2023/2024.

3.2 Research Design

The study's design is based on the questionnaire, which links the respondents to answers. As a whole, it can obtain the necessary data to meet the analytical criteria and objectives set by the researcher. The method of distribution of

questionnaires is based on the findings of quantitative patterned studies. It can help researchers peel all the data obtained and, at the same time, achieve the goal of seeing the effectiveness, knowledge, awareness and skills of the DUW10022 course as the first step for students to undergo Industrial Training in the aspect of occupational safety and health in the workplace.

3.3 Questionnaire Design

As a result of the data collection, the researchers analysed the data using Microsoft Office Excel software. Data from Part A involving the demographics of respondents was analysed using mean score analysis.

The researchers used the mean score interpretation table Chua Yan Piaw (2006) presented to analyse the data obtained. The mean score interpretation table is as per Table 3 below.

Table 3**:** Mean Score Interperformance

Mean score	Mean Score Interperformance
1.00 to 2.00	Low
2.01 to 3.00	Moderately low
3.01 to 4.00	Moderately High
4.01 to 5.00	High

4.0 Study Analysis/Study Results

This study included respondents from the Department of Electrical Engineering students from three different sessions who had undergone industrial training. This questionnaire was distributed to respondents using Google Forms through academic advisors and the students' WhatsApp groups.

Table 4: Background of Respondents

Item		Frequency	Percentage
Gender	Male	48	60%
	Female	32	40%
Session	Session 1 2022/2023	20	25%
	Session 2 2022/2023	20	25%
	Session 1 2023/2024	50	50%
Program	DEP	38	47.5%
	DEE	30	12%
	DTK	12	37.5%

The respondents' background based on gender, session and program is shown in Table 4. 60% of the respondents were female students, while 40% were male students, i.e. 32. The table shows that 47.5% of the students from the DTK program were 38 people; 37.5% were from the DEP program, comprising 30 people and 15% from the DEE program, with 12 students. In the session, 50% of respondents underwent industrial training in session 1, 2023/2024,

while in session 1, 2023/2023 and session 2, 2022/2023, 25%, respectively, and 20 students were involved**.**

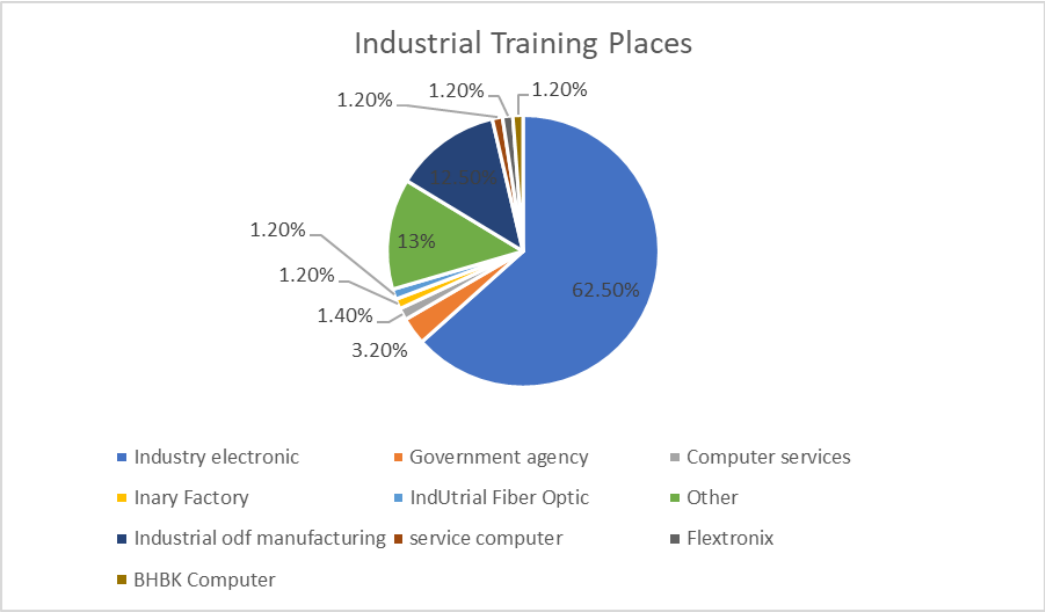

Figure 1: A flow chart of the feature selection heuristic

Based on Figure 1, most respondents work in the electrical and electronics industries. At the same time, a small number of people undergo industrial training in other areas, such as banks, computer centres, and car service shops.

4.1 Section B-Knowledge

Table 5: Descriptive sprinkling of knowledge aspects of the DUW10022 course in preparation for undergoing industrial training

Scales	1	2	3	4	5	Mean
	SD	D	N	A	SA	
1. The DUW10022 syllabus introduces students to occupational health and safety fundamentals.	1.25% 1	2.5% 2	2.5% 2	55% 44	38.75% 31	4.75
2. The course DUW10022 imparts knowledge on several facets of workplace occupational safety and health.	1.25% 1	1.25% 1	2.5% 2	53.75% 43	41.25% 33	4.29
3. The DUW10022 course offers direction and	1.25% 1	0% 0	5% 4	53.75% 43	40% 32	4.31

assistance in completing duties at work.						
4. You will learn some basic words linked to workplace safety and health with this DUW10022 course.	2.50% 2	0% 0	3.75% 3	53.75% 43	40% 32	4.29
			Total Mean			4.41

Table 5 shows the distribution of respondents' perceptions of knowledge of safety and health in the workplace. The analysis found that respondents had very high levels of engagement in safety and health policy topics, with an overall mean score of 4.41, which was higher than the skill and awareness items. Based on the study's results, most respondents, 55% (44), agreed that the syllabus content DUW10022 provides early exposure to safety and health in the workplace. A total of 43 (53.75%) responded that the course DUW10022 provides knowledge on occupational safety and health aspects in the workplace. They also noted that the course helps and provides benefits in performing tasks that need to be done in the workplace.

4.2 Section C-Skill Division

Table 6: Descriptive sprinkling of knowledge aspects of the DUW10022 course in preparation for undergoing industrial training

Scales	1	2	3	4	5	Mean
	SD	D	N	A	SA	
5. Completing assignments and assessments during the DUW10022 Course enhances one's capacity to perform tasks independently at work	2.50% 2	0% 0	3.75% 3	63.75% 51	30% 24	4.18
6. The knowledge and abilities acquired from the DUW10022 course's evaluation and assignment help the organisation succeed in	2.50% 2	0% 0	5% 4	58.75% 47	33.75% 27	4.21

workplace occupational safety and health.						
7. The knowledge and abilities you gained from the DUW10022 course apply extremely to occupational safety and health.	1.25% 1	2.5% 2	5% 3	53.75% 45	35% 28	4.175
8. Curriculum evaluation: The Polytechnic's DUW10022 course has equipped you with knowledge and abilities related to occupational health and safety.	1.25% 1	0% 0	3.75% 3	53.75% 47	40% 29	4.29
			Total Mean			4.22

The distribution of respondents' frequency on DUW10022 course skills in preparation for industrial training in terms of occupational safety and health is shown in Table 6. The analysis found that curriculum assessments DUW10022 provided the best occupational safety and health skills with an overall mean score of 4.29. A total of 47 people, or 58.75%, strongly agreed with the DUW10022 curriculum assessment. The additional score was 4.21 for skill items derived from assignments in the DUW10022 course contributing to the organisation's achievement in occupational safety and health, with 58 per cent expressing strong approval and 27 per cent, or 33 per cent, strongly agreeing with this statement. Overall, the score for the skill level is in the high range.

4.3 Section D-Mindfulness

Table 7: Descriptive Distribution of Awareness Aspects of DUW10022 Courses in Preparation for Industrial Training

Scales	1	2	3	4	5	Mean
	SD	D	N	A	SA	
9. Evaluation of the DUW10022 course curriculum at the Polytechnic has given you an initial awareness	2.50% 2	0% 0	2.50% 2	53.75% 43	41.25% 33	4.31

of occupational						
10. Overall, you agree that the DUW10022 Course at the Polytechnic will be very helpful for you as an initial preparation for the safety and health aspects of work at the workplace.	2.50% 1	0% 0	5% 4	52.50% 42	41.25% 33	4.32
			Total Mean			4.31

Table 7 shows the overall score frequency rate is 4.31. Based on this study's findings, 43 (53.75%) respondents stated that the assessment of the DUW10022 course had given early awareness in the workplace. In comparison, 42 (52.50%) of the respondents agreed that the overall DUW10022 course was very helpful in preparation for the safety and health aspects of the workplace, with a mean score of 4.32.

5.0 Discussion and Conclusion

The results showed that three criteria, knowledge, skills, and awareness, were used to measure the effectiveness of the DUW10022 course Work Safety and Health. Most students agree that the DUW10022 Course provides early exposure to students undergoing industrial training in safety and health. The mean scores for knowledge, skills and awareness items were 4.41, 4.215 and 4.32, respectively. This shows that safety and health policies are important to keep people safe in the workplace. All parties must know about safety and health in the workplace. The likelihood of accidents at work decreases with awareness and commitment to safety.

However, it is suggested that this course be offered in the third or fourth semester. This will allow students to put into practice all the knowledge and skills learned in the DUW10022 course when they are better prepared to work after the first semester. The study is expected to improve DUW10022 courses in the future to teach students more about safety and health in the workplace.

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Author Contributions

Masliza, M.: Conceptualisation, Methodology, Writing-Original Draft Preparation, Data Curation; **Wan Marlina, W.A.:** Data Curation, Validation,

Supervision, Writing-Reviewing and Editing.

Conflicts Of Interest

The manuscript has not been published elsewhere and is not being considered by other journals. All authors have approved the review, agreed with its submission, and declared no conflict of interest in the manuscript.

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