Vol. 5, No. 1, 2024, pp. 13-17
DOI: https://doi.org/10.29210/810458000

Contents lists available at Journal IICET

Southeast Asian Journal of technology and Science
ISSN: 2723-1151(Print) ISSN 2723-116X (Electronic)

Journal homepage: https://jurnal.iicet.org/index.php/sajts

Safety practices in the mechanical engineering workshop politeknik merlimau

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Article Info

Article history:

Received May 12th, 2024
Revised Jun 24th, 2024
Accepted Jul 30th, 2024

Keyword:

Safety practices
Mechanical engineering
Workshop
Knowledge and awareness
Machining and welding
Politeknik merlimau

ABSTRACT

Safety is a crucial aspect that must be emphasized when performing tasks in the workshop. This is important to prevent accidents that can result in injuries or even loss of life. Knowledge, understanding, and practice of safety in the workshop are critical during machining and welding practical sessions. These practices need to be instilled in every student so that they become a culture when students carry out work in the machining and welding workshops. Therefore, this study was conducted to identify the level of knowledge, awareness, and acceptance of safety practices among students. The study location was the Machining and Welding Workshops in the Department of Mechanical Engineering (JKM), Politeknik Merlimau (PMM). The number of respondents involved was 170 students who conducted machining and welding practicals from the first to the fourth semester. A total of 21 questionnaire items were constructed to address each research question. Data were analyzed using the "Statistical Package for the Social Science" (SPSS) software version 20.0. The study findings show the mean average values for the level of knowledge (4.64), environmental conditions (4.61), and equipment readiness (4.72). The study also found a statistical relationship between the level of knowledge, environmental factors, and the readiness of safe equipment impacting the level of safety awareness among students. In conclusion, the level of awareness among students when performing practical work in JKM is at a high level.

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Introduction

Polytechnics offer various diploma-level courses to provide students with recognition and qualifications for employment. They emphasize two aspects of education: theory and practical work. In gaining practical education, students must prioritize and pay attention to safety, equipment, machinery, and the work environment. This is because students will be involved in using various workshop tools, such as hand tools and machines, which expose them to accident risks. Safety practices can be considered a habit or a form of attitude. Safety is a crucial matter that must be adhered to by all parties (Mohd Anuar Abdul Rahman, 2008).

Safety management is one of the important aspects that need serious attention in every job. According to Brauer, R.L. (2006), occupational safety and health management cannot be seen as insignificant and isolated from the total management of an organization. According to Misnan, Mohamed, & Dalib (2011), the safety culture of an organization relates to the attitudes, behaviors, systems, and environmental factors effectively

shared by all members in the safety and health management system. To avoid accidents and injuries, individuals must be aware and responsible. Hence, students' awareness of safety and health practices is vital during practical work in workshops (Niosh, 2011).

Referring to the given information and statements, this study is conducted to identify the level of knowledge, acceptance, and safety practices in the workshop among JKM students at PMM during practical sessions. The study focuses on several aspects: knowledge, acceptance, and safety practices in the workshop among students during practical work. For example, aspects such as the environment, regulations, responsibilities, use of hand tools, machine usage, and health. These aspects are often overlooked and considered unimportant in achieving the objectives of the practical sessions. Some of the issues include a lack of knowledge about workshop management, insufficient exposure to emergency management, and not practicing work ethics during practical work.

The objectives of this study are to dentify the level of awareness of workshop safety practices among students when in the workshop, Identify the level of acceptance of students towards the implementation of workshop safety practices and identify the level of knowledge of students about safety practices when in the workshop.

Method

This study is conducted at PMM. The respondents involved are all JKM students, namely DTP, DKM, and DEM students. They were chosen because they are directly involved in this institution and use the workshop during practical sessions. This study uses a questionnaire distributed to 170 respondents who have been involved in practical work in the machine workshop. The researcher developed the questionnaire covering three sections: Section A for knowledge of safety practices in the workshop, Section B for the workshop environment, and Section C for the benefits of using equipment during practical work in the machine and welding workshops. Likert Scale was used to the determine sentiment level with 1 refer used for Strongly Disagree and 5 for Strongly Agee .This study aims to examine the level of students' awareness of safety, covering knowledge about regulations, hand tool usage, machine usage, environment, and machine handling to create a safe working atmosphere.

The method used to determine the level of awareness among students in this study is through the minimum score assessment. This is similar to what previous researchers like Norasmah (2001) and Azhar (2006) have done. The levels used are weak level, low level, high level, and moderate level. The determination of these levels is based on minimum score values as shown in Table 1.

Table 1 <Interpretation of Level Based on Score Mean>

Score Mean	Level
1.00 – 1.99	Weak
2.00 – 2.99	Low
3.00 – 3.99	Moderate
4.00 – 5.00	High

This study is expected to raise students' awareness of the essential safety aspects they need to understand and adhere to during practical work in the workshop. By making safety practices a culture, it can prevent unforeseen accidents. This study will also identify the level of students' knowledge about safety aspects. Educators will be able to emphasize the aspects that students lack understanding of. Safety must be prioritized by lecturers because any accidents in the school area are under the responsibility of the involved lecturers. Lecturers must also ensure that students cooperate by instilling discipline to maintain safety. Polytechnic administrators can plan suitable safety courses for students, whether awareness or reinforcement courses. Besides, the need for equipment can be identified, and requests for funds can be made to the responsible department for purchasing purposes. The Polytechnic can also create a conducive and safe learning environment and avoid legal issues due to negligence by the educators or administrators (N.S. Abd Rahim, 2013).

Results and Discussions

The result presented in this chapter aim to explain the answers to the research questions, which concern the level of awareness among Mechanical Engineering students regarding safety aspects in the machining and welding workshops. To address these research questions, the researcher has used descriptive statistics to answer the research questions for each section, explaining the demographics of the respondents and the questionnaire concerning students' knowledge about safety in the machining and welding workshops. Furthermore, the environment in the machining and welding workshops during practical work and, finally, the use of equipment

during practical work in the machining and welding workshops are discussed. Additionally, questionnaire analysis and interviews were conducted to support the study findings.

Table of Mean Scores for Section A (Knowledge and Safety Practices in Workshop)

The table below shows the total scores that the researcher obtained from the study results based on the questions in Section A, which concern students' knowledge about safety aspects while in the machining and welding workshops. All Mean Scores are shown in Table 2.

Table 2 <Mean Scores for Section A>

No.	Item	Likert Scale 1 %	2 %	3 %	4 %	5 %	Mean Score
1.	Students know there are regulations in the workshop	0	0	3.5	24.1	72.4	4.69
2.	Students understand the importance of safety in the workshop	0.6	0	2.4	21.2	75.9	4.72
3.	Students comply with regulations during practical work	0	0	5.9	29.4	64.7	4.59
4.	Workshop regulations are displayed on the notice board	0	0	2.4	27.6	70	4.68
5.	There are warning signs on the workshop walls	0	0	3.5	26.5	70	4.66
6.	Safety policies are displayed on the notice board in the workshop	0	0	2.9	28.8	68.2	4.65
7.	Students are aware of safety practices in the workshop	0	0	8.8	31.2	60	4.51
						Average	4.64

Based on the analysis of each question item in Section A, the overall mean score for all items is 4.64. Item 2 recorded the highest mean score of 4.72, while item 7 recorded the lowest mean score of 4.51. The overall average mean score for students' knowledge about safety in the machining and welding workshops is at a high level. Therefore, it can be concluded that the students' level of knowledge about safety in the workshops is very good.

Table of Mean Scores for Section B (Condition of Environment in the Machining and Welding Workshops)

The table below shows the total scores that the researcher obtained from the study results based on the questions in Section B, which concern of condition of the environment in the machining and welding workshops during practical work. All Mean Scores are shown in Table 3.

Table 3 <Mean Scores for Section B>

No.	Item	Likert Scale 1 %	2 %	3 %	4 %	5 %	Mean Score
1.	All doors and windows are always open during practical work	0	0	2.9	28.8	68.2	4.65
2.	Workbenches are arranged neatly to facilitate practical work	0	0	2.9	27.6	69.4	4.66
3.	The environment in the workshop is suitable, orderly, and tidy	0	0	4.1	32.9	62.9	4.59
4.	The pathways in the workshop facilitate student movement	0	0	2.9	31.2	65.9	4.63
5.	The lighting in the workshop is sufficiently bright and facilitates student activities.	0	0	4.7	27.1	68.2	4.64
6.	The ventilation in the workshop is free from dust, smoke, and toxic fumes.	0	0.6	3.5	31.8	64.1	4.59
7.	Flammable materials are placed in a safe location	0	0	4.2	24.2	71.5	4.54
						Average	4.61

In section B, the average score mean for the 7 question items is 4.61. Based on this value, the item "work desk arranged neatly to facilitate practical work" recorded the highest score mean of 4.66, while the item "flammable materials placed appropriately" had the lowest score mean of 4.54. In conclusion, in this section, the safety and comfort of the workplace are at a high level. Furthermore, the environment of the machine workshop and welding workshop is in a good and safe condition.

Table of Mean Scores for Section C (Condition of Facilities and Equipment)

The table below shows the total scores that the researcher obtained from the study results based on the questions in Section C, which concern of condition of the facilities and equipment in the machining and welding workshops during practical work. All Mean Scores are shown in Table 4.

Table 4 <Mean Scores for Section C>

No.	Item	Likert Scale 1 %	2 %	3 %	4 %	5 %	Mean Score
1.	Hand tools are stored neatly or in a designated place	0	0	5.9	28.8	65.3	4.59
2.	The machines used are in good condition	1.2	1.8	7.1	30	60	4.46
3.	Workbenches in the workshop are in good condition	0.6	1.8	8.8	28.8	60	4.46
4.	Dangerous equipment is stored in a safe place	0	0	5.3	23.5	71.2	4.66
5.	Students use sharp tools carefully	0	0	4.7	27.1	68.2	4.64
6.	Face protection provided is in good condition	1.8	1.8	4.8	28.5	63	4.36
7.	Students know how to operate machines properly	0	0	6.7	29.1	64.2	4.44
						Average	4.52

In section C, there are seven items, from item 1 to item 7, regarding the level of equipment and facility adequacy when performing tasks in the machine and welding workshops. The average score mean for all stated items is 4.52. The item "dangerous equipment stored in a safe place" recorded the highest score mean, while the item "face protection facilities provided are in good condition" recorded the lowest score mean of 4.36. Overall, the level of equipment and facility adequacy is high.

Based on the study results, the researcher found that the level of awareness among Politeknik Merlimau students regarding safety practices in the engineering workshop is high, with an average score mean of 4.59. This indicates that the understanding and practice of safety among students during practical work are very encouraging. The efforts of the JKM safety committee have succeeded in raising student awareness about safety understanding and practices when in the machine and welding workshops. This effort continues to be intensified to ensure the safety of students, equipment, and machines is at its maximum level.

Conclusion

Based on the conducted study, the conclusion about the level of awareness among students in the workshop is that there is room for improvement. Although there is a basic awareness of safety in the workshop, there are also deficiencies in consistent understanding and practice. Therefore, it is important to implement a more holistic approach to enhance students' awareness of safety issues in the workshop. With deeper education and consistent enforcement, it is hoped that students can increase their awareness and practice better safety measures in the workshop.

The researcher can also provide good recommendations to the Mechanical Engineering Department at Politeknik Merlimau to ensure that students' awareness of safety aspects in the workshop remains well-maintained. Lecturers can also identify mistakes that need correction and can increase students' awareness. By improving training, organizing safety awareness campaigns, conducting regular inspections, providing supervision and support, the safety of students in machine and welding workshops can be maintained. Thus, the risk of accidents in machine and welding workshops can also be avoided.

References

Brauer, R.L. (2006). *Safety and health for engineers*. New Jersey: Wiley Interscience.

Misnan, Mohd. Saidin and Mohammed, Abdul Hamim and Dalib, Abdul Rahman (2011*). Pembangunan budaya keselamatan di tempat kerja*. Universiti Teknologi Malaysia.

Mohd Anuar Abdul Rahman. (2008). *Amalan peraturan keselamatan bengkel dalam kalangan pelajar di sebuah Institut Kemahiran MARA*. Fakulti Pendidikan, Universiti Teknologi Malaysia: Tesis Sarjana

Muhammad Nazi. (2009). *Kajian terhadap pelaksanaan amalan 5S dalam sistem pengurusan kualiti di Kolej Universiti Tun Hussein Onn (KUiTTHO)*. Fakulti Pendidikan Teknik dan Vokasional, Kolej Universiti Tun Hussein Onn: Tesis Sarjana

Niosh (2011). *Occupational Safety and Health Act and Regulations 2011 edition*. Kuala Lumpur: MDC Publisher Sdn .Bhd.

S.N. Abd Rahim (2013). *Pengetahuan dan pengamalan staf Politeknik Mukah Sarawak terhadap Keselamatan dan Kesihatan Pekerjaan (OSH) di tempat kerja*. Kolokium PMU. Politeknik Mukah.