JTH

https://jthkkss.com/
e-ISSN 2805-4431
DOI: https://doi.org/10.53797/jthkks.v6i1.4.2025

Students Awareness Level Towards Automotive Workshop Safety Procedures at Kolej Komuniti Sungai Siput

Anuar Shaari[1]*, Mohammed Aqmal Alias, & Helmi Supri

[1]Kolej Komuniti Sungai Siput, Sungai Siput, Perak, MALAYSIA

*Corresponding author email: anuar@kkss.edu.my

Received 20 Jul 2025; Accepted 13 Aug 2025; Available online 13 Sep 2025

Abstract: Safety in automotive workshops is a critical aspect of practical-based learning environments, especially within Technical and Vocational Education and Training (TVET) institutions. This study aims to assess the level of students' awareness of workshop safety procedures based on three key dimensions: knowledge, attitude, and practice. A descriptive quantitative survey design was employed involving 57 automotive program students at Kolej Komuniti Sungai Siput. The research instrument consisted of a five-point Likert-scale questionnaire designed to gather feedback on students' awareness of safety practices in the workshop. Data were analysed using descriptive statistics with SPSS. The findings revealed a high level of overall safety awareness among students. Respondents demonstrated strong knowledge of basic safety procedures such as the use of fire extinguishers, safety warning symbols, and the location of emergency exits. Students also showed positive attitudes, including willingness to wear personal protective equipment (PPE), remind peers of safety compliance, and report incidents to instructors. In terms of practice, students generally adhered to safety measures, although minor weaknesses were identified in the aspect of returning tools to their original place after use. The study suggests the need for regular safety training, periodic policy reviews, and a holistic culture of safety to ensure an effective and safe workshop environment. The implications of this study are significant for enhancing safety strategies in TVET institutions towards producing skilled and safety-conscious graduates.

Keyword: workshop safety, student awareness, automotive, TVET, safety procedures

1. Introduction

Automotive workshops are inherently high-risk environments that demand strict adherence to safety procedures to prevent accidents and injuries. In technical and vocational education and training (TVET) institutions, students undergoing practical training in automotive technology are regularly exposed to hazards involving heavy machinery, tools, and chemicals. As such, a strong awareness of safety protocols among students is crucial not only to safeguard their well-being but also to ensure the effectiveness of hands-on learning processes.

Despite the availability of personal protective equipment (PPE), safety signage, and institutional safety guidelines, accidents in workshops continue to occur. This raises concerns about the actual level of safety awareness among students. Several studies have reported persistent issues related to poor safety attitudes, inadequate supervision, and insufficient training on occupational safety standards. For instance, Agole and Okaka (2021) found that mechanical engineering students in Uganda lacked adequate safety knowledge and practical skills, leading to frequent accidents. Contributing factors included unclear safety policies and limited access to safety training.

Similarly, Smit (2022) reported that 72% of technology teachers did not report workshop incidents, while 45% of schools lacked clear policies prioritizing student safety. These findings highlight institutional shortcomings and suggest that safety education remains a secondary concern despite the potential risks. In the Malaysian context, studies by Abd. Rahman and Mohd (2021) and Norazman and Hashim (2019) revealed that while safety facilities are provided

**Corresponding author:*nursafinas@fskik.upsi.edu.my

in most vocational institutions, supervision is often lax and students display an indifferent attitude toward occupational hazards.

Further, Ogunmilade (2024) noted that although students demonstrated moderate to high awareness in areas such as PPE usage and tool handling, they showed limited knowledge of hazard zones and emergency systems. This reflects a significant gap between theoretical understanding and the actual application of safety procedures during practical sessions. Such findings are consistent with those of Ngah Deman et al. (2018) and Rosliza et al. (2015), who reported that many students adopt safety practices only after incidents occur, rather than taking preventive actions proactively.

To address these gaps, researchers have proposed several strategies, including improved teaching methods (Yan, 2024), more frequent safety training (Wang, 2023), and the cultivation of a safety-oriented culture within institutions (Hu, Zheng, & Ying, 2024). However, despite these recommendations, safety awareness among students remains inconsistent and under-examined in many local contexts.

Although safety regulations and facilities exist in most vocational institutions, students continue to exhibit insufficient awareness and poor compliance with workshop safety procedures. This ongoing issue raises concerns about the effectiveness of current safety education and its ability to prepare students for real-world industrial environments. Failure to address this issue not only increases the risk of accidents but also undermines the credibility of TVET institutions as providers of safe, skill-based training.

This study aims to assess the level of students' awareness regarding safety procedures in automotive workshops at Kolej Komuniti Sungai Siput. Specifically, it seeks to evaluate students' knowledge of safety protocols, examine their attitudes toward the implementation of safety measures, and identify the extent to which they practice safety procedures during workshop activities. By exploring these three dimensions—knowledge, attitude, and practice—the study intends to highlight gaps in the current safety culture and provide recommendations for enhancing safety awareness and practices in vocational training environments.

2. Methodology

This study adopted a quantitative research approach utilizing a descriptive survey design, which is appropriate for systematically assessing the awareness levels of students regarding automotive workshop safety procedures. A structured questionnaire served as the primary data collection instrument, enabling efficient and consistent data gathering from students actively involved in hands-on workshop activities.

2.1 Population and Sample of the Study

The population of this study comprised students enrolled in the automotive program at a Technical and Vocational Education and Training (TVET) institution. A total of 57 students participated in the research, selected using total sampling based on their active involvement in workshop activities. Among the participants, 55 were male and 2 were female. Regarding their academic standing, 5 students were in Semester 1, 42 students were in Semester 2, and 10 students were in Semester 3.

2.2 Research Instrument

The research instrument used was a self-administered questionnaire developed based on previous literature and adapted to suit the context of the automotive workshop. The questionnaire employed a five-point Likert scale ranging from 1 (Strongly Disagree) to 5 (Strongly Agree). It was structured into three main sections to measure different aspects of students' awareness. Section A focused on students' knowledge of safety procedures and consisted of five items. Section B assessed students' attitudes toward workshop safety, also consisting of five items. Section C evaluated students' safety practices during workshop activities, with five items included as well. Each section aimed to gather detailed insights into specific dimensions of safety awareness among the participants.

2.3 Data Collection Procedure

The data collection was conducted face-to-face during scheduled workshop practical sessions. Students were provided with a clear explanation regarding the objectives of the study and the instructions for completing the questionnaire. Participation was voluntary, and the confidentiality of

all responses was strictly maintained. The information gathered was used solely for academic research purposes and not disclosed for any other reason.

2.4 Data Analysis Technique

The data collected from the questionnaires were analyzed descriptively using SPSS software. The analysis involved computing the frequency and percentage of responses for each item, as well as calculating the mean scores for each dimension, namely knowledge, attitude, and practice. This analytical approach enabled the identification of general trends and the overall level of students' awareness regarding safety procedures in the automotive workshop environment.

3. Findings

This section presents the results of the study based on the questionnaires completed by 57 students from the automotive program. The findings are categorized into three main domains: Knowledge, Attitude, and Practice regarding safety procedures in the workshop.

3.1 Knowledge of Safety Procedures

The students demonstrated a high level of knowledge regarding workshop safety procedures. As shown in Table 1, all respondents either agreed or strongly agreed with the items related to their safety knowledge. For example, 100% of the students agreed that they understood basic safety procedures before starting work in the workshop. Additionally, 96.5% agreed that they understood the meaning of safety warning symbols, while 70.2% knew the location of emergency exits and safety equipment. These findings suggest that students possess a solid foundational awareness before engaging in any workshop activities.

Table 1 Knowledge of Safety Procedures

Item	SD	D	N	S	SA	Total
I understand the basic safety procedures before starting work in the workshop.	0	0	0	50	7	57
I know how to use a fire extinguisher in the workshop.	0	0	0	48	9	57
I am aware of the emergency steps to take in case of an accident in the workshop.	0	0	0	48	9	57
I understand the meaning of safety warning symbols in the workshop.	0	0	0	55	2	57
I know the location of emergency exits and safety equipment in the workshop.	0	0	0	40	17	57

Note: SD = Strongly Disagree, D = Disagree, N = Not Sure, A = Agree, SA = Strongly Agree

3.2 Attitudes Toward Workshop Safety

Students' attitudes towards workshop safety were generally positive and constructive. As detailed in Table 2, 87.7% of students reported that they consistently remind their peers when safety is neglected, and 70.2% indicated they take safety issues seriously. Additionally, a significant number expressed willingness to report safety incidents and consistently wear personal protective equipment. These findings suggest that safety values are well-ingrained in students' mindset, although further reinforcement could enhance behavioral consistency.a

Table 2 Attitudes Toward Workshop Safety

Item	SD	D	N	A	SA	Total
I take safety seriously when performing workshop tasks.	0	0	0	40	17	57
I always wear protective clothing and equipment while working.	0	0	0	32	25	57
I believe that neglecting safety procedures can result in serious injury.	0	0	0	32	25	57
I remind my peers if they neglect safety aspects.	0	0	0	50	7	57
I am willing to report any safety incidents to the instructor or supervisor.	0	0	0	17	40	57

3.3 Safety Practices in the Workshop

The results related to students' safety practices in the workshop are presented in Table 3. The findings show that most students reported adhering to safe practices such as handling heavy equipment properly (87.7%), inspecting equipment

before use (84.2%), and maintaining a clean and hazard-free workspace (82.5%). However, a lower percentage (61.4%) was observed in returning tools to their original place after use, indicating that there is room for improvement in this particular post-activity discipline.

Table 3 Safety Practices in the Workshop

Item	SD	D	N	A	SA	Total
I follow safety procedures when handling heavy equipment.	0	0	0	50	7	57
I inspect equipment before use to ensure it is safe.	0	0	0	48	9	57
I ensure the work area is always clean and free from hazards.	0	0	0	47	10	57
I return tools to their original place after use.	0	0	0	35	22	57
I do not carry out any workshop activities without instructor approval.	0	0	0	40	17	57

In summary, the data from Table 1 to Table 3 indicate that students in the automotive program exhibit strong knowledge, positive attitudes, and mostly good safety practices in the workshop. These findings can serve as a basis for reinforcing safety training and improving areas where behavior does not yet align fully with knowledge and attitude.

4. Discussion and Implications

4.1 Discussion

The findings of this study indicate that students in the automotive program possess a high level of awareness regarding safety procedures in the workshop. This awareness is demonstrated across three main domains: knowledge, attitude, and practice. In terms of knowledge, students showed a strong understanding of essential safety elements, including recognition of warning symbols and awareness of emergency exit locations. This suggests that foundational safety information has been effectively communicated and internalized. Comparable studies in the United States have highlighted similar outcomes. For instance, a study by Black (2015) emphasized that a deep understanding of legal regulations and the consistent implementation of standardized procedures are crucial to building robust safety knowledge among students. Meanwhile, a study in Japan by Tomaszewska and Szpila (2020) found that safety knowledge among students was often not influenced by academic level but rather by exposure and frequency of hands-on experience.

With regard to attitude, the majority of students displayed a positive and proactive mindset towards safety. Their willingness to correct peers and comply with safety protocols reflects a culture of mutual responsibility and respect for safety standards. This echoes findings from Hong Kong, where Zhang (2015) argued that positive safety attitudes must be cultivated through both formal training and habitual reinforcement. In Singapore, studies such as those by Moksen (2013) and Rosliza et al. (2015) emphasize that fostering responsibility through peer accountability and instructor modeling significantly contributes to a safe workshop culture. Similarly, in Korea, studies have shown that student safety attitudes are strengthened by structured mentorship and role modeling in technical education environments.

In the domain of practice, students generally adhered to safety procedures during workshop activities. However, the lower percentage in consistently returning tools to their designated places indicates an area where discipline and routine could be further improved. This finding aligns with research in Korea, where Wang (2023) noted that while theoretical safety training is robust, its practical application can fall short without frequent supervision and reinforcement. In the U.S., the implementation of the 6S method and lockout/tagout (LOTO) procedures in technical institutions—as recommended by Soares (2023)—has been shown to greatly improve safety practice compliance among students.

Overall, the integration of safety education within the curriculum appears to have a significant impact on student awareness. Nevertheless, the gap between understanding and consistent practice highlights the need for continuous reinforcement and supervision to ensure long-term safety compliance. Institutions should consider leveraging international best practices, such as real-time monitoring tools (Panli, 2015), peer-led safety campaigns, and embedded risk management frameworks like HIRARC to bridge this gap. This aligns with Japan's approach of integrating simulated safety scenarios into vocational education, helping students translate theory into habitual practice.

By drawing insights from these global studies, it becomes evident that a holistic approach—combining knowledge,attitude, and hands-on safety practices—must be adopted across all technical and vocational education institutions to nurture a sustainable safety culture in the automotive workshop environment.

4.1.1 Knowledge of Safety Procedures

The majority of students agreed or strongly agreed that they understood basic workshop safety protocols, including emergency steps, the use of fire extinguishers, and safety warning symbols. These findings are consistent with studies by Abdullahi (2017) and Ogunmilade (2024), which noted that technical students tend to exhibit moderate to high safety awareness when adequate training and reinforcement are provided. The absence of respondents who were uncertain or disagreed suggests a solid theoretical foundation in safety knowledge among the students.

The results indicate that automotive students demonstrated a high level of knowledge regarding workshop safety procedures. All 57 respondents agreed with statements related to basic safety knowledge, including understanding basic safety procedures before beginning work in the workshop (87.7% agreed, 12.3% strongly agreed), proper use of fire extinguishers (84.2% agreed, 15.8% strongly agreed), and appropriate emergency actions in the event of an accident (84.2% agreed, 15.8% strongly agreed). These findings reflect excellent safety literacy among students, both in theoretical and procedural aspects.

However, for items related to knowledge of the location of emergency exits and safety equipment, only 70.2% agreed and 29.8% strongly agreed. While still high, these figures are lower compared to other items, suggesting that students may have had less direct exposure to the physical safety elements within the workshop environment. This issue is echoed by Cardoso Torres et al. (2018), who emphasized that structural constraints, lack of staff, and workload can impact practical understanding of safety protocols.

Tomaszewska and Szpila (2020) also found that high levels of safety knowledge can exist independently of factors such as work experience or education level, and are more closely related to age and current exposure. This highlights the importance of continuous safety education across all age groups and backgrounds.

Furthermore, the role of informal or tacit knowledge is emphasized in the study by Hejduk et al. (2020), which asserts that a combination of explicit (formal) and tacit (experiential) knowledge enhances individuals' ability to comply with safe work practices. In the context of automotive students, informal learning through interactions with instructors and observations during workshop training forms a critical component of their safety knowledge development.

Lidiana and Rosida (2023) also identified a significant relationship between the level of safety knowledge and compliance with Standard Operating Procedures (SOPs). This suggests that students with higher knowledge levels are more likely to practice prescribed safety measures.

In conclusion, these findings affirm that a high level of safety knowledge is a crucial foundation for developing a strong safety culture in workshops. However, reinforcement of practical aspects, such as familiarization with the location of safety tools and emergency drills, requires more attention. Therefore, regular safety training programs, including live demonstrations and simulation exercises, should be integrated into the teaching practices of technical and vocational training institutions.

4.1.2 Attitude Towards Workshop Safety

Students also demonstrated a positive attitude toward workshop safety, particularly in their willingness to correct peers who violated safety procedures and to report incidents to instructors. More than 85% of students acknowledged the importance of wearing protective clothing and taking safety issues seriously during workshop activities. This attitude reflects the development of a safety culture within the institution, as emphasized by Agole & Okaka (2021), who advocated for collective responsibility in practicing safe behavior.

Students' attitudes toward workshop safety play a critical role in ensuring a safe and effective working environment. The study found that the majority of students held positive attitudes: 100% agreed or strongly agreed that they take safety seriously while working, and 98.2% proactively remind peers who neglect safety aspects. These findings align with those of Ngah Deman et al. (2018), who found that students in training institutions showed strong commitment to complying with safety procedures, thereby contributing to a safer working environment and reducing accident risks.

Furthermore, 89.5% of students consistently wore appropriate safety clothing and equipment, while 70.2% expressed a willingness to report incidents to their instructors. These behaviors reflect a sense of responsibility and collective awareness—key elements in building a strong workshop safety culture (Moksen, 2013). Such attitudes can be nurtured through the active role of instructors who continuously remind and model safety practices (Abdullahi, 2017).

Rosliza et al. (2015) also highlighted that workers who exhibit positive attitudes towards workplace safety culture are more likely to practice safety measures. This is consistent with the current study's observations that awareness of risks and the consequences of negligence is high, with 100% of respondents agreeing that ignoring safety protocols can lead to serious injuries.

Nevertheless, positive attitudes alone are insufficient without systemic support and ongoing training. Zhang (2015) emphasized that correct safety attitudes must be reinforced through consistent habits and monitoring to ensure long-term safety performance. Therefore, while the findings reflect a tendency towards positive student attitudes, institutions must foster a comprehensive safety culture — including formal training, awareness campaigns, and systematic enforcement.

On the contrary, Nalugya et al. (2022) found that in smaller workshops, negative attitudes towards the use of personal protective equipment (PPE) still persist, often linked to lower education levels and limited work experience. This comparison underscores the importance for vocational institutions to strengthen safety education and provide sufficient hands-on experience to ensure students maintain a consistent positive attitude in the workplace.

Ultimately, these findings support the argument by Cakraningrum et al. (2023) that attitude has a stronger influence than knowledge alone in reducing unsafe actions. Thus, it is appropriate for policymakers and educators to emphasize the cultivation of positive attitudes as a core component in workshop safety training.

4.1.3 Safety Practices in the Workshop

While the majority of students practiced essential safety measures such as inspecting equipment and maintaining cleanliness in the workspace, there were minor weaknesses in the discipline of returning tools after use. This suggests that although students exhibit strong safety knowledge and attitudes, practical enforcement and supervision still need to be strengthened. This finding aligns with Wang's (2023) study, which highlighted the gap between safety training and its actual implementation in vocational workshops.

Good safety practices in automotive workshops are critical to minimizing accidents, enhancing productivity, and ensuring the well-being of both students and instructors. According to the study's findings, most students demonstrated high levels of safety practice while working in the workshop. A total of 89.5% reported consistently wearing safety attire, while 100% indicated they knew how to use fire extinguishers and adhered to displayed warning signs.

These results are consistent with the study by Che Abd. Aziz (2019) at Politeknik Sultan Azlan Shah, which recorded an average safety practice index of 4.51 ("Always" category), reflecting high compliance with workshop safety procedures. This indicates that students have internalized the importance of consistently implementing safety measures in workshop environments.

Agole and Okaka (2021) emphasized that safety practices must encompass a range of aspects including the use of personal protective equipment (PPE), availability of first aid kits, safety signage, and regular monitoring. In the vocational education context, routine safety training and awareness campaigns are essential to ensure that students do not only possess theoretical knowledge but also apply safety practices in their daily tasks.

In addition, Soares (2023) recommended the implementation of the 6S method, lockout/tagout (LOTO) procedures, and the establishment of Health, Safety, and Environment (HSE) departments in workshops as key strategies to enhance safety levels. These measures are highly suitable for adoption in vocational institutions to improve risk management effectiveness in student workshops.

However, Anwar et al. (2024) found that awareness of occupational safety and health (OSH) regulations among students remains low in some vocational workshops, particularly in risk management areas. Therefore, a more comprehensive approach — integrating risk management strategies such as HIRARC (Hazard Identification, Risk Assessment, and Risk Control) — should be embedded into workshop syllabi and daily routines.

In this regard, the use of technology-based safety management tools, such as the real-time monitoring modules developed by Panli (2015), shows great potential to improve the systematic and responsive management of workshop safety in educational settings.

Additionally, safety practices can be enhanced through sharing real-life workshop experiences, as suggested by Kluft (2012). Lessons drawn from actual incidents involving colleagues or other students can be used to inform more practical and effective safety policies.

Finally, Black (2015) stressed that safety practices must be supported by a deep understanding of legal regulations and the consistent implementation of standardized procedures across all teaching and training levels. Therefore, safety practices in workshops should not rely solely on individual attitudes and knowledge, but must be reinforced by institutional commitment through clear policies, continuous training, and strict enforcement.

4.2 Implications of the Study

This study presents several important implications for technical education institutions, instructors, and policymakers:

1. **Curriculum Enhancement**
   Institutions should develop structured safety modules and conduct safety simulation training to ensure that students master both theoretical and practical aspects of safety procedures.
2. **Continuous Safety Training**
   Regular activities such as emergency drills and safety workshops can reinforce safe behavior and help bridge the gap between knowledge and practice.
3. **Monitoring and Enforcement**
   Instructors should carry out consistent monitoring and establish clear safety compliance guidelines, particularly for post-task activities such as proper tool storage.
4. **Cultivating a Safety Culture**
   A workshop environment that values and recognizes safe behavior can foster a strong safety culture among students, promoting long-term commitment to safe practices.
5. **Review of Institutional Safety Policies**
   Institutional policies should align with national occupational safety and health standards such as the Occupational Safety and Health Act (OSHA) to support a disciplined and safe learning environment.

5. Conclusion

This study confirms that automotive students at Kolej Komuniti Sungai Siput possess a high level of awareness regarding safety procedures in automotive workshops, across knowledge, attitude, and practice dimensions. Findings indicated that students are well-informed about safety fundamentals and exhibit positive attitudes towards adherence to workshop safety protocols. Although their safety practices are commendable, improvement is needed in post-task disciplines such as proper tool storage.

The high level of awareness observed reflects the effectiveness of current teaching strategies; however, it should be reinforced through continuous training, systematic monitoring, and institutional commitment to safety culture. The study recommends that TVET institutions formulate more comprehensive safety policies aligned with industry standards and national occupational safety regulations. Overall, this research contributes to the body of knowledge in technical and vocational education by providing insights into students' safety awareness and offers practical directions for future interventions and policy enhancement.

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