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Building a culture of safety: Teacher and peer impact on safety behaviors among vocational high school students

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Abstract

There is an increased risk of workplace accidents for younger employees. Academic laboratories have demonstrated a higher prevalence of accidents. Occupational health and safety (OHS) education plays a central role in reducing the risk of accidents and aims to habituate safety behavior in educational settings. The current research aims to investigate the factors affecting students' safety behaviors using a knowledge-attitude-behavior model within stimulus-organism-response frameworks. A quantitative and non-experimental study involved sending an electronic questionnaire to 959 Indonesian vocational high school students who had undergone half of their learning process in a workshop that put them at risk of accidents. A structural equation model was conducted on the data which showed that all variables in the model were valid and reliable. Teachers' OHS leadership encourages students' safety knowledge, attitudes and behaviors. Positive and noteworthy benefits to students' safety knowledge, attitude and behaviour are demonstrated by peer safety behaviours as indicated by similar results. Among the predictors, OHS knowledge had the greatest influence on students' safety behavior. The current research findings provide evidence that supports the fact that student safety behavior follows the knowledge attitude behaviour model within the stimulus organism response framework.

Keywords: KAB model, Peers' safety behavior, SOR framework, Students' safety behavior, Teacher safety leadership.

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Contribution of this paper to the literature

One notable feature of the study is the combination of two frameworks to examine how vocational high school students make decisions about occupational health and safety behaviours in academic laboratories. Additionally, the research explores the impact of teachers and peers on shaping students' safety cultures, distinguishing it from prior studies.

1. Introduction

Occupational health and safety are of utmost importance in workplaces and laboratories. It ensures the protection of workers' health and well-being and prevents occupational injuries, illnesses and fatalities (Feszterová, 2014; Michalak, 2002; Ramos, Costa, & Afonso, 2014). Among all age groups, young employees are inclined to face greater susceptibility to workplace accidents with a risk level that is approximately 25-40% higher than that of others (Verjans, 2007). Young employees typically reduce the risks involved and view accidents as an expected component of their work routine which is another factor contributing to this issue (Tucker & Turner, 2013; Turner, Tucker, & Kelloway, 2015). Moreover, accidents have a higher prevalence in academic laboratories than in the workplace or industry (Al-Obaidi et al., 2018; Lestari, Bowolaksono, Yuniautami, Wulandari, & Andani, 2019; Steward, Wilson, & Wang, 2016). Occupational health and safety (OHS) education has been introduced at colleges to address these issues and modify students' OHS behaviour.

The concept of triadic reciprocal determinism indicates that human behaviours including those pertaining to an individual's health and safety at work are constantly influenced by behaviour and the surrounding environment (Bandura, 1986). Behavior-related variables can be investigated using psychological frameworks. Prior research on occupational health and safety has been conducted using psychological frameworks (Johnson & Hall, 2005; Milton & Mullan, 2012; Perdana, 2021).

Research conducted by Dombrowski and Hagelberg (1985) investigated the effects of safety units as interventions on students' safety knowledge and safety behavior. The participants were 333 biology and chemistry students. The findings showed that the safety unit as a stimulus had a significant and positive effect on students' safety knowledge and behavior. Jung, Park, and Kwon (2000) conducted experimental research on 62 elementary school students using school safety education as a research intervention. The study concluded that students with safety education showed higher scores for indoor and outdoor safety behaviors than those without safety education. More recent research by Abdullah and Abd Aziz (2020) investigated the effects of safety climate on safety behavior using safety knowledge as a moderation variable. These research findings are in line with the Stimulus-Organism-Response (SOR) framework. In the context of this study, safety climate as a stimulus affects organisms' safety knowledge and safety behavior. However, these studies did not explicitly use the SOR framework.

Abdullah and Abd Aziz (2020) conducted research on student safety behavior using the SOR framework (Abdullah & Abd Aziz, 2020). This study found that safety leadership as a stimulus has positive effects on safety knowledge, motivation and behavior using the responses of 361 college students. However, the study focused only on safety leadership as a stimulus which may also be regarded as an organism because it measured students' safety leadership. The current research included teachers' safety leadership and their peers' safety behavior as stimuli. Incorporating peer safety behaviour and teacher safety leadership into the model will provide understanding because occupational health and safety education is implemented in schools where interactions with peers and teachers occur.

Moreover, the organism and response parts will be integrated with the knowledge-attitude-behavior model as Zulkifly (2020) conducted empirical research on the safety behavior of manufacturing workers. The processes occurring within students, namely knowledge and attitude will be considered part of the organism component. Behavior, resulting from both knowledge and attitude will be categorized as part of the responses. Extending the previous SOR framework of students' safety behavior will provide a comprehensive understanding of students' safety behaviors and their predictors.

This study aims to provide a comprehensive understanding of the factors that impact students' safety behavior based on the previous explanation. The research questions addressed in this study are as follows:

- 1) Does teacher safety leadership affect students' safety knowledge, attitudes and behaviors?
- 2) Does peer safety behavior affect students' safety knowledge, attitudes and behaviors?
- 3) Does student safety behavior follow a knowledge-attitude-behavior model?
- 4) Which factor showed the strongest effect on students' safety behaviors?

2. Theoretical Framework

2.1. Stimulus-Organism-Response Framework

The stimulus-organism-response (SOR) is a popular framework used to understand the influence of the environment and behavioral intention (Islam et al., 2021) in decision-making to perform certain behaviors. This framework has been widely used in various fields, including education, to understand and explain human behavior in response to different stimuli (Baharuddin et al., 2023; Pandita, Mishra, & Chib, 2021; Shanshan & Wenfei, 2024; Yang, Zhou, & Cheng, 2019). The framework is based on the research of R. S. Woodworth (1929) who expanded on the stimulus-response paradigm and proposed that behaviour occurs in an environment with a variety of stimuli (Pavlov, 2010).

SOR consists of stimuli, organisms and responses. Skinner (1935) described the concept of stimulus and response as integral components of behavior and the environment. Changes in the environment can impact an individual's psychological and emotional well-being subsequently leading to changes in their behavior (Robert & John, 1982).

A stimulus is defined as an external factor that affects an individual's mental or psychological state (R. Woodworth & Marquis, 2014). The current research uses teacher safety leadership and peers' safety behaviors as stimuli. Previous research by Sebastian, Allensworth, and Huang (2016) found that teachers' leadership has a significant and positive effect on student learning and behavior. Other studies also indicate that peers' behavior may affect one's behavior (Amialchuk & Kotalik, 2016; Charroin, Fortin, & Villeval, 2022).

Organisms, as defined by Bagozzi, (1986) are entities capable of shaping an individual's perceptions, emotions, and cognitions. On the other hand, responses refer to the reactions of individuals influenced by environmental factors encompassing both behavioral and psychological aspects. An individual's reactions to cognition and perception are in the form of behavioral changes.

2.2. Knowledge-Attitude-Behavior Model

The knowledge-attitude-behavior (KAB) model is a theoretical framework that explains the relationship between knowledge, attitudes and behaviors. It suggests that knowledge and attitudes influence behavior and that behavior change can be achieved by targeting these factors (Fabrigar, Petty, Smith, & Crites Jr, 2006).

According to the KAB model, knowledge serves as the foundation for behavioral change. When individuals possess accurate and relevant knowledge of a particular topic, they are more likely to engage in behaviors that align with that knowledge (Fabrigar et al., 2006). On the other hand, attitudes refer to individuals' evaluations of or feelings towards a particular behavior or topic. Attitudes can be positive or negative and can influence behavior by shaping individuals' intentions and motivations (Fabrigar et al., 2006).

Krosnick and Petty's (1995) definition of the relationship between knowledge and attitude. According to Krosnick and Petty (1995), knowledge is a characteristic of one's attitudes determined by the quantity of beliefs and experiences associated with that attitude in memory as well as the intensity of the connections between these beliefs or experiences and the attitude itself (Krosnick & Petty, 1995).

Behavior, the final component of the KAB model refers to the actions or conduct of individuals. Behavior is influenced by both knowledge and attitude. Individuals with accurate knowledge and positive attitudes towards a behavior are more likely to engage in that behavior (Fabrigar et al., 2006).

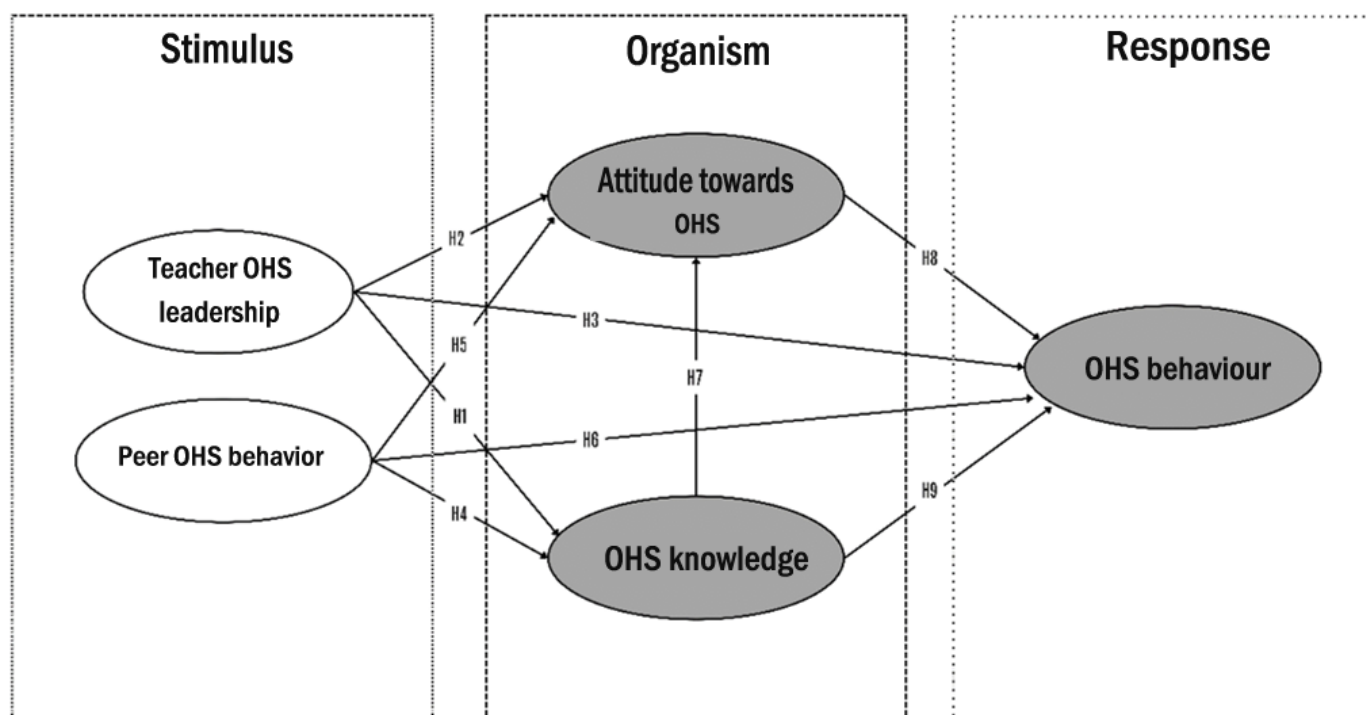


Figure 1. Integrating the knowledge-attitude-behavior (KAB) model into the SOR framework to explain student decision-making on OHS-related behavior. The grey variables are parts of the KAB model.

The KAB model suggests that behavioral change can be achieved by targeting knowledge and attitudes. Interventions can effectively promote behavioral changes by providing individuals with accurate information and promoting positive attitudes towards desired behaviors (Schrader & Lawless, 2004). Figure 1 illustrates the combination of the SOR and KAB frameworks to explain the decision-making process students make in OHS-related behavior.

3. Methods

3.1. Research Design

This quantitative and non-experimental study was conducted in Indonesia from January to February 2023. Cross-sectional data were collected by sending an electronic survey to 1000 vocational high school students in South and West Sulawesi. Of these, 959 completed the questionnaire.

3.2. Research Population

The study population consisted of vocational high school students in South and West Sulawesi, two provinces in Indonesia. Vocational high school students were chosen because they had undergone upper secondary education with theoretical and practical subjects in the workshop. This places them at risk of accidents while learning in the workshop. Among the participants, 62.8% (602) were male and 37.2% (357) were female. The proportion was significantly equal to global youth employment stating that 39.6% of young female employees are youth employees (Dasgupta, 2022).

The data gathered were prepared and analyzed using structural equation modelling with the partial least squares method of parameter estimation (PLS-SEM). PLS-SEM is the preferred method used in complex models with a high number of variables (Akter, Fosso Wamba, & Dewan, 2017; Hair et al., 2021).

The minimum sample in PLS-SEM can be determined using the rule of thumb which states that the number of samples should be 10-fold that of model indicators (Shmueli et al., 2019). The number of indicators used in the

instruments was 29 indicating that the minimum sample should be 290 students. The research sample size was suitable because there were more than 290 participants in the study.

3.3. Instruments

3.3.1. Teacher Safety Leadership

Teacher safety leadership data were collected using the safety leadership scale (Çalış & Büyükakıncı, 2019; Wu, 2005) which has three factors of safety coaching, safety caring and safety controlling (*Cronbach alpha* > 0.9). However, the study only used nine items with three items on each factor to reduce the bias produced by a long survey.

3.3.2. Safety Knowledge

Student safety knowledge data were gathered using the safety knowledge scale developed by Basahel (2021) (*Cronbach's alpha* = 0.86). The scale consists of six items.

3.3.3. OHS Perceived Usefulness

The perceived usefulness of students was collected using a self-developed scale based on a usefulness framework (Hendrickson, Massey, & Cronan, 1993) with three main reasons for safety: humanitarianism, law and cost (Sapuan, Ilyas, & Asyraf, 2022). The scale consists of six items reflecting these three main reasons.

3.3.4. Attitude towards OHS

Attitudes towards OHS were self-developed using the Affective Behavioral Cognitive (ABC) framework. Attitude is a combination of cognition, emotion and behavior based on the ABC framework (Solomon, 2017). The self-developed questionnaire consisted of three items that represented these three attitudes.

3.3.5. OHS Behavior

The study uses safety behavioral scale (Neal, Griffin, & Hart, 2000; Uzuntarla, Kucukali, & Uzuntarla, 2020) to measure student OHS behavior. The scale consists of six items reflecting two factors: safety compliance (*Cronbach's alpha* = 0.90) and safety participation (*Cronbach's alpha* = 0.82). Appendix 1 displays the items for each of the constructs used in this study.

3.4. Validity and Reliability Test

Since the relationship between variables was analyzed using PLS-SEM, the validity and reliability tests will also be included in the PLS-SEM measurement model. The measurement model investigated the construct reliability, convergent validity and discriminant validity of the items and constructs in the study (Sarstedt, Hair, & Ringle, 2022; Sarstedt, Ringle, & Hair, 2022).

4. Results

The results of the current research are provided in three subsections: (1) descriptive statistics and correlations, (2) the measurement model and (3) structural models. The last two subsections are part of structural equation modelling (Hair et al., 2021; Hair, Risher, Sarstedt, & Ringle, 2019).

4.1. Descriptive Statistics and Correlations

Table 1 displays the descriptive statistics (mean and standard deviation) of participants' responses on each scale and correlations between scales. On average, participants showed the highest responses on the attitude scale ($M = 8.35, SD = 1.79$) and the lowest responses on peers' safety behavior ($M = 7.89, SD = 2$). Other scales are higher than 8. (1) Teacher OHS leadership ($M = 8.26, SD = 1.87$); (2) safety knowledge ($M = 8.08, SD = 1.87$); and (3) students' safety behavior ($M = 8.06, SD = 1.89$).

Table 1. Descriptive statistics and correlations between variables.

| Variable | M | SD | Correlations | | | | | | | | |
|------------------------------|-------|-------|--------------|-----|-------|-----|-------|-----|-------|-----|---|
| | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | |
| 1. Teacher OHS leadership | 8.255 | 1.866 | — | | | | | | | | |
| 2. Peers' safety behavior | 7.887 | 2.006 | 0.796 | *** | — | | | | | | |
| 3. Safety knowledge | 8.081 | 1.874 | 0.778 | *** | 0.781 | *** | — | | | | |
| 4. Attitude towards OHS | 8.354 | 1.793 | 0.801 | *** | 0.747 | *** | 0.834 | *** | — | | |
| 5. Students' safety behavior | 8.059 | 1.893 | 0.74 | *** | 0.744 | *** | 0.799 | *** | 0.794 | *** | — |

Note: *** $p < 0.001$.

Bivariate statistics and Spearman correlations were used to examine the relationship between the variables as part of the analysis. There are strong and favourable relationships between teacher OHS leadership and students' safety behaviour as an endogen variable ($r = 0.74, p < .001$), peers' safety behavior ($r = 0.744, p < .001$), safety knowledge ($r = 0.799, p < .001$) and attitude towards OHS ($r = 0.794, p < .001$). Attitude towards OHS also shows significant and positive correlations with teacher OHS leadership ($r = 0.801, p < .001$), peers' safety behavior ($r = 0.747, p < .001$), safety knowledge ($r = 0.834, p < .001$). The last endogen variable, safety knowledge displays significant and positive correlations with exogen variables: teacher OHS leadership ($r = 0.778, p < .001$) and peers' safety behavior ($r = 0.781, p < .001$).

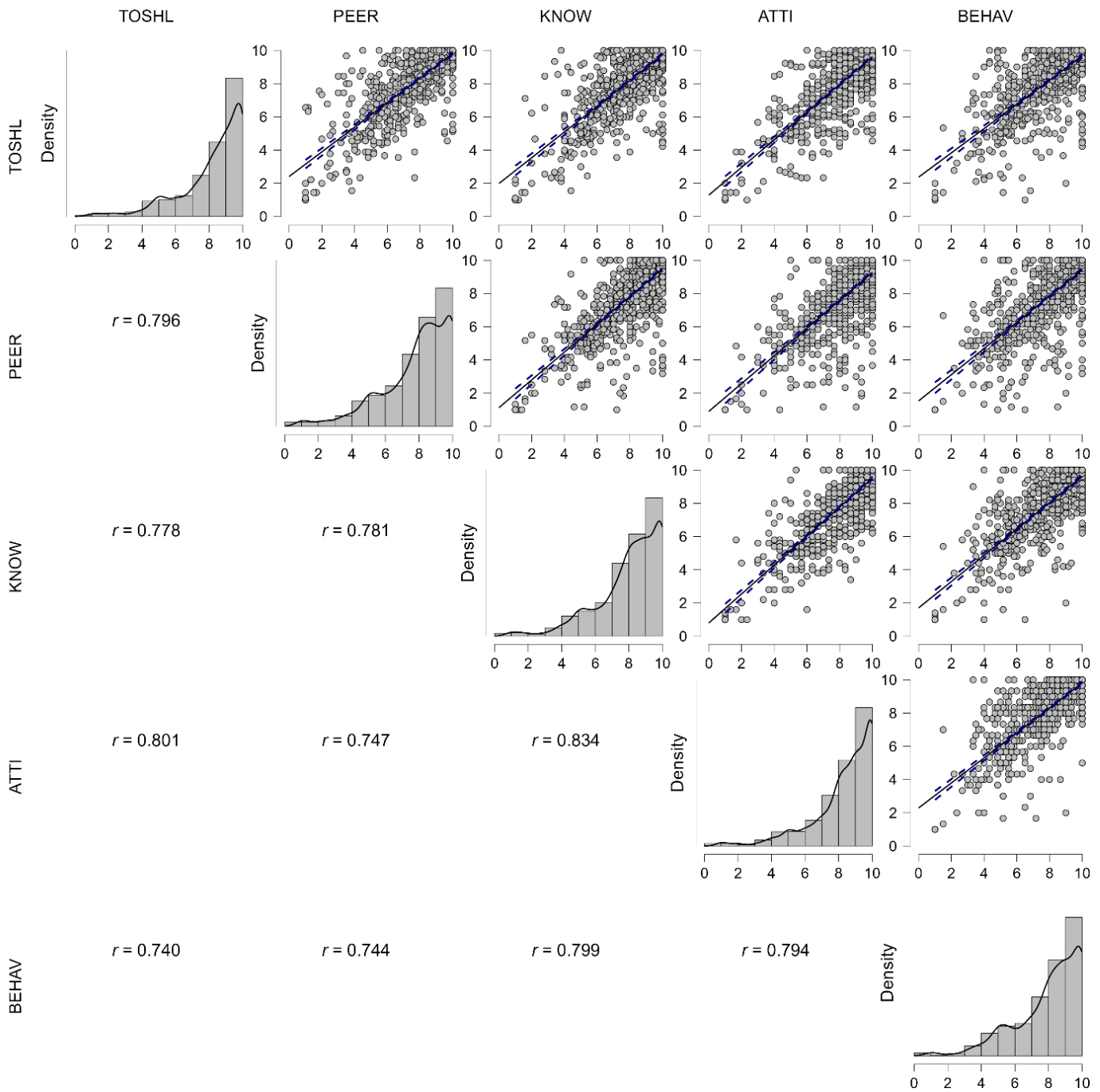


Figure 2. Correlation matrix of variables in the student OHS behavior model.

Note: TOHSL: Teacher OHS leadership; PEER: Peers' safety behavior; KNOW: OHS knowledge; ATTI: Attitude towards OHS; BEHAV: Students' OHS behavior.

Figure 2 illustrates the bivariate statistics of these variables. Bivariate statistics indicate that the data provide evidence to support the KAB model and SOR frameworks. KAB-related variables displayed the highest correlations with each other and the two stimuli showed significant correlations with KAB-related variables.

4.2. Measurement Models

Measurement models in PLS-SEM aim to investigate the reliability and validity of the items and constructs used in the model (Hanafiah, 2020). Table 2 displays metrics used to evaluate the reliability and validity of the items and constructs.

Table 2. Reliability and validity of constructs.

| Variable | Cronbach's α | AVE | HTMT |
|-------------------------------|---------------------|-------|-------|
| Teacher safety and leadership | 0.952 | 0.723 | 0.875 |
| Peer safety and leadership | 0.953 | 0.811 | 0.813 |
| OHS knowledge | 0.935 | 0.793 | 0.898 |
| Attitude towards OHS | 0.884 | 0.813 | 0.898 |
| OHS behavior | 0.942 | 0.776 | 0.87 |

Table 2 provides Cronbach's alpha, average variance extracted (AVE) and Heterotrait Monotrait criterion (HTMT) for each construct. Cronbach *alpha* is a measure of construct reliability that has a rule-of-thumbs of a minimum of 0.708 (Hair et al., 2021). All variables used in the model display a Cronbach alpha between 0.884 and 0.953 which is higher than 0.708 meaning that they have adequate internal consistency. In other words, they can be consistently used to measure a specific psychological state (Henseler, 2021).

Average variance extracted(AVE) serves as a consolidated measure of convergence computed by aggregating the variance extracted from all items associated with a particular construct (Hair et al., 2021). A minimum variance extracted by the joint items of the construct should be at least 0.5 or 50% (Ghasemy, Teeroovengadum, Becker, &

Ringle, 2020). The AVE of the model variables lies between 0.723 and 0.811 which leads to the conclusion that all variables have sufficient construct validity.

The last metric to examine in the measurement model is HTMT. The HTMT or heterotrait monotrait criterion was used to assess the discriminant validity of the constructs. This type of validity ensures that each construct is distinct in empirical terms and captures a phenomenon that is not duplicated by other constructs within a statistical model (Franke & Sarstedt, 2019). Since it distinguishes a construct from other constructs in the model, the rule of thumb for HTMT was a maximum value of 0.9 (Henseler, Ringle, & Sarstedt, 2015). The last column of Table 2 displays the maximum HTMT criterion for one construct compared to other constructs. The maximum HTMT criterion of the constructs falls within the range of 0.813–0.898 which fulfills the rule of thumb. This indicates that each construct used in this study is unique in that it measures different variables.

4.3. Structural Model

The next step in SEM is to investigate the structural model after carefully examining the measurement model and concluding that all constructs are valid and reliable (Lin et al., 2020). A structural model is conducted to investigate the significance of path coefficients between variables (Cepeda-Carrion, Cegarra-Navarro, & Cillo, 2019; Grace & Bollen, 2008) using bootstrapping methods with a minimum of 5000 replications (Streukens & Leroi-Werelds, 2016). Table 3 shows the results of the structural model investigation.

Table 3. Direct, indirect and total effects of the variables.

| Hypothesis | Path | Effect (Path coefficient) | | | f^2 |
|------------|----------------|---------------------------|----------|----------|-------|
| | | Direct | Indirect | Total | |
| H1 | TOHSL -> KNOW | 0.432*** | - | 0.432*** | 0.21 |
| H2 | TOHSL -> ATTI | 0.36*** | 0.217*** | 0.576*** | 0.161 |
| H3 | TOHSL -> BEHAV | 0.082*** | 0.323*** | 0.405*** | 0.006 |
| H4 | PEER -> KNOW | 0.437*** | - | 0.437*** | 0.216 |
| H5 | PEER -> ATTI | 0.067*** | 0.22*** | 0.287*** | 0.006 |
| H6 | PEER -> BEHAV | 0.188*** | 0.232*** | 0.42*** | 0.036 |
| H7 | KNOW -> ATTI | 0.502*** | - | 0.502*** | 0.336 |
| H8 | KNOW -> BEHAV | 0.32*** | 0.161*** | 0.481*** | 0.086 |
| H9 | ATTI -> BEHAV | 0.321*** | - | 0.321*** | 0.086 |

Note: ***) $p < .001$. TOHSL: Teacher OHS leadership; PEER: Peers' safety behavior; KNOW: OHS knowledge; ATTI: Attitude towards OHS; BEHAV: Students' OHS behavior.

The bootstrapping on path coefficient (see Table 3) shows that teacher OHS leadership has a significant and positive effect on students OHS knowledge ($\beta = 0.432, p < .001$), attitude towards OHS ($\beta = 0.576, p < .001$) and safety behavior ($\beta = 0.405, p < .001$). Teacher OHS leadership has a moderate effect on OHS knowledge ($f^2 = 0.21$) and attitude towards OHS ($f^2 = 0.161$) based on Sullivan and Feinn's (2012) classification of effect size. On the other hand, teacher OHS leadership shows a small effect size on student OHS behavior ($f^2 = 0.006$).

The study findings also indicate that peers' safety behavior also has a significant and positive effect on students OHS knowledge ($\beta = 0.437, p < .001$), attitude towards OHS ($\beta = 0.287, p < .001$) and safety behavior ($\beta = 0.420, p < .001$). The impact of peers' safety behavior is moderate on students' occupational health and safety (OHS) knowledge ($f^2 = 0.216$), moderate on students' safety behavior ($f^2 = 0.036$) and small on students' safety behavior ($f^2 = 0.006$).

The findings also provide evidence to support the KAB model of student safety behavior. Student OHS knowledge has a significant and positive effect on attitudes towards OHS ($\beta = 0.502, p < .001$) and students' safety behavior ($\beta = 0.481, p < .001$). A similar result is also shown by student attitudes towards OHS which display a significant and positive effect on students' safety behavior ($\beta = 0.321, p < .001$). Student OHS knowledge has a medium effect size on attitude towards OHS ($f^2 = 0.336$) and students' safety behavior ($f^2 = 0.086$). The medium effect size is also shown by the path between attitude towards OHS and students' safety behavior ($f^2 = 0.086$).

The strongest direct effects on students' safety behavior were shown by students' OHS knowledge and attitudes towards OHS based on Table 3. Students' OHS knowledge also provided the largest total effect on students' safety behaviors using the total effect. Teacher OHS leadership has stronger effects on students' safety-related knowledge, attitude and behavior especially on attitude towards OHS focusing on the findings of the current study on exogenous variables (stimuli).

5. Discussion

The current research aims to provide empirical evidence on the factors affecting student safety behavior in academic laboratories and workshops. These factors are derived from the knowledge-attitude-behavior model in the stimulus-organism-responses framework. The findings of the current research will provide a comprehensive understanding of student decision-making to execute safety behaviors when attending laboratory or workshop classes.

5.1. Teacher OHS Leadership Effects

Teachers' safety leadership had a significant effect on students' knowledge. Teacher leadership has been shown to affect student knowledge and performance (Cheng, 1994; Rashid, Amin, & Ahmad, 2019; Uysal & Sarier, 2019; Yusof, Min, Jalil, Noor, & Yusof, 2018). Teacher OHS leadership was built based on three of the five teacher powers provided by French, Raven (1968) and Yuki (1989). Teacher OHS leadership includes teacher position, reward, expert and personal power. These teacher powers encourage students to gain knowledge from expertise powers, a power type that relies on the perception of teachers' capacity and readiness to offer or withhold the expertise that students seek (Cheng, 1994).

Another finding showed that teacher OHS leadership had significant effects on students' attitudes towards OHS. Teacher OHS also reflects teacher reward power focusing on how teachers appreciate student performance (Cheng, 1994). Teacher appreciation leads to higher student motivation for learning (Amerstorfer & Frein Von Münster-Kistner, 2021; Theobald, 2005). High levels of motivation cause people to feel revitalized and driven to give their resources to their work which leads to favourable attitudes regarding safety performance (Quansah, Zhu, & Guo, 2023).

Teachers' OHS leadership also had a significant effect on student safety behavior. This finding is in line with those of Shanmugam (2018), Quansah et al. (2023); Subramaniam, Johari, Mashi, and Mohamad (2023) and Wu, Chen, and Li (2008). Teacher OHS leadership emphasizes a goal-oriented approach encouraging teachers to instill a strong sense of responsibility in students regarding safety rules and regulations in laboratories as they recognize the gravity of achieving safety objectives (Shanmugam, 2018).

5.2. Peer's Safety Behavior Effects

The research findings show that peers' safety behaviors have a significant and positive effect on students' OHS knowledge, attitude towards OHS and safety behavior. The effect of peers has been discussed in the educational field (Bäckström, 2023a, 2023b; Baharuddin et al., 2023; Sacerdote, 2011). The presence of peers typically enhances student outcomes by fostering a more favorable learning environment and facilitating the exchange of knowledge through both formal and informal interactions (Epple & Romano, 2011). Student behavior can be affected by peers' attitudes and behaviors (Wolniak & Ballerini, 2020).

5.3. Knowledge, Attitudes and Behavior Interrelations

The previous theoretical framework claimed that knowledge has a potential effect on attitudes and behaviors (Bandura & Walters, 1977). The findings of the current study confirm these theoretical frameworks by displaying significant relationships between knowledge, attitudes and behaviors. These results are in line with those of prior studies on students' safety behaviors (Jeong et al., 2019). Safety knowledge has a significant and positive effect on attitudes towards OHS. Knowledge can be considered a structural attribute of attitudes, influenced by both the quantity of beliefs and experiences connected to the attitude in one's memory and the intensity of the associative connections between these beliefs or experiences and the attitude itself (Fabrigar et al., 2006; Krosnick & Petty, 1995). In a nutshell, an adequate knowledge of OHS can affect students' attitudes towards safety. The significant effect of safety knowledge on safety behavior echoes the research conducted by Lu and Yang (2010) and Neal et al. (2000) which state that one's with adequate safety knowledge will perform safety behavior.

Since knowledge is the basis of one's attitude and behaviour, among the four predictors, students' OHS knowledge shows the largest direct and overall effect on their safety behaviour (Fabrigar et al., 2006). This result aligns with Al-Kandari, Al-abdeen, and Sidhu (2019) who found that safety food knowledge has the highest correlation with attitude and behavior (practices). Higher amounts of knowledge will form a higher attitude and behavior than will one's attitude and behavior with lower amounts of knowledge. Peers' safety behavior showed a slightly higher total effect on students' safety behavior than teacher OHS leadership by focusing on stimuli. This leads to the conclusion that teachers and peers are important stimuli that encourage students' learning climates (Warburton, 2017).

5.4. Implications of the Study

This study has theoretical and practical implications for safety behaviors in academic settings.

5.4.1. Theoretical Implications

This study has the following theoretical implications: First, it contributes to the body of knowledge as it explains the student decision-making process that students go through related to safety behavior in learning using teacher OHS leadership and peers' safety behavior as stimuli. It showed that students who perform safety behaviors are influenced by their learning climate related to their teacher and peers. Second, it has been demonstrated that the most influential factor in student safety behavior is OHS knowledge. Higher OHS knowledge will encourage students to have a positive attitude towards OHS and perform safety behaviors in their learning laboratories or workshops.

5.4.2. Practical Implications

The practical implications of the study were derived from the student safety behavior model. First, the teacher or lecturer should set a learning climate that reflects adequate safety behavior to encourage students to perform safety behavior. This safety climate includes teacher OHS leadership and peer safety behaviors. Second, students must be equipped with qualified OHS knowledge to demonstrate adequate safety behaviors in laboratories and workshops.

6. Conclusion

The current study concludes that all the hypothesized statements are supported by the data. The behavior of teachers and peers as stimuli has significant effects on students' safety behaviors in laboratories or workshops. The KAB model was also applied to explain students' safety behaviors. Among all predictors of safety behaviors, OHS knowledge showed the highest effect. Higher OHS knowledge leads to a higher probability of executing safety-related behaviors.

However, this study had some limitations. The self-reported questionnaire also had a risk of bias in terms of social desirability and consistency.

Further research is needed to address these limitations. It can also expand the model by adding other variables to provide a more comprehensive understanding of students' decision-making processes in safety-related behavior. Further research may formulate interventions to increase students' safety behaviors by using the model developed in this study.

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Appendix

Appendix 1. Items of each constructs on the model.

| Teacher occupational health and safety leadership (TOHSL) | | |
|---|---|--|
| Code | Statements | Source |
| TOHSL1 | My teacher obeys work rules related to OHS (Occupational health and safety) during practicum as well as setting an example for students | Çalış and Büyükakıncı (2019) and Wu (2005) |
| TOHSL2 | The teacher can explain about OHS well and make us as students able to learn OHS well. | |
| TOHSL3 | The teacher helps us to understand how important OHS principles are used in practicum. | |
| TOHSL4 | Our teacher believes that we can carry out the OHS rules properly during practicum. | |
| TOHSL5 | The teacher will provide solutions when problems related to OHS occur in the practicum learning process. | |
| TOHSL6 | The teacher will mediate when there is a conflict that is dangerous to students' safety during practicum. | |
| TOHSL7 | The teacher always reminds us to obey the OHS rules during practicum. | |
| TOHSL8 | The teacher gives appreciation to students who obey the OHS rules during practicum. | |
| TOHSL9 | The teacher reprimands students who do not obey the OHS rules during practicum | |
| Peer's safety behavior (PEER) | | |
| Code | Statements | Source |
| PEER1 | My friends use all the safety equipment needed for the lab. | Neal et al. (2000) and Uzuntarla et al. (2020) |
| PEER2 | My friends use appropriate safety procedures to complete the practicum. | |
| PEER3 | My friends use the best safety equipment for practicum. | |
| PEER4 | My friends encourage each other to use OHS procedures in the practicum. | |
| PEER5 | My friends always strive to improve occupational health and safety (OHS) in practicum | |
| PEER6 | My friends voluntarily practice doing work that can improve the application of occupational health and safety (OHS) in practicum | |
| Occupation health and safety knowledge (KNOW) | | |
| Code | Statements | Source |
| KNOW1 | I understand how to conduct the practicum in a safe manner. | Basahel (2021) |
| KNOW2 | I know well how to use protective and safety equipment in practicum. | |
| KNOW3 | I understand how to create a practicum site that complies with health and safety standards. | |
| KNOW4 | I know how to reduce the risk of accidents and work incidents in practicum. | |
| KNOW5 | I understand the hazards of practicum and the precautions that need to be taken during practicum. | |
| Attitude towards OHS (ATTI) | | |
| Code | Statements | Source |
| ATTI1 | OHS procedures are easy to carry out in the practicum. | Self-developed based on definition of attitude and OHS context |
| ATTI2 | OHS procedures are useful for students. | |
| ATTI3 | I will always pay attention to OHS procedures in every practicum | |
| Student safety behavior (BEHAV) | | |
| Code | Statements | Source |
| BEHAV1 | I use all the safety equipment needed in the practicum. | Neal et al. (2000) and Uzuntarla et al. (2020) |
| BEHAV2 | I used appropriate safety procedures in completing the lab. | |
| BEHAV3 | I ensure that I have used the best safety equipment in the practicum. | |
| BEHAV4 | I encourage my friends to use OHS procedures in the practicum. | |
| BEHAV5 | I always strive to improve occupational health and safety (OHS) during practicum. | |
| BEHAV6 | I voluntarily do work that can improve occupational health and safety during practicum | |

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Figure 2. Correlation matrix of variables in the student OHS behavior model.Note: ...
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Appendix Appendix 1. Items of each constructs on the model. Teacher occupationa...
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My teacher obeys work rules related to OHS (Occupational health and safety) durin...
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The teacher can explain about OHS well and make us as students able to learn OH...
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The teacher helps us to understand how important OHS principles are used in pract...

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Peer's safety behavior (PEER)CodeStatementsSourcePEER1My friends use all the ...

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My friends use appropriate safety procedures to complete the practicum

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My friends use the best safety equipment for practicum

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Occupation health and safety knowledge (KNOW)CodeStatementsSourceKNOW1I ...

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I will always pay attention to OHS procedures in every practicum attitude and OHSc...

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I used appropriate safety procedures in completing the lab

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I ensure that I have used the best safety equipment in the practicum

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