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Management Roles in Promoting Safety Awareness Among Teaching Staff in TVET Institutions

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Abstract

The recent government focus on Technical Vocational Education and Training (TVET) underscores its pivotal role in developing a highly skilled workforce. TVET institutions primarily offer diploma and certificate courses in technical and vocational fields, which involve teaching and learning activities in workshops and laboratories. These settings pose inherent hazards which present risks to both students and staff. Therefore, ensuring safety awareness is essential to prevent industrial accidents. This quantitative cross-sectional study examines the impact of the management's roles in promoting safety awareness among teaching staff in selected Government TVET Institutions. The study focuses on three critical independent variables representing the management's duties: safety policy, safety and health committee functions, and safety training. Data were collected through self-administered questionnaires distributed to 119 teaching staff across four institutions in the central, northern, and east-coast regions of Peninsular Malaysia. The findings highlight the significant role of management in shaping safety awareness among teaching staff within Government TVET Institutions. Based on these results, it is recommended that institutions prioritize implementing robust safety policies, enhancing the effectiveness of safety and health committees, and investing in comprehensive safety training programs to further increase safety awareness levels among staff members.

1. Introduction

The Malaysian government has recently intensified its focus on Technical Vocational Education and Training (TVET) as a crucial source of highly skilled human resources for the nation's industrial sector (Karthega, 2018; Zulkifly, Hasan, et al., 2023). Government Skills Training Institutes, a prominent type of TVET institution, offer a variety of programs, including Automotive Technology and Civil Technology-related courses, which encompass Heavy Machinery Mechanics, Motor Vehicle Mechanics, Civil and Structure Supervisor, and Landscape

Construction, among others. Given TVET institutions' essential role in supplying medium to high-skilled labour to the market, their practical sessions conducted within workshops and worksites expose staff and students to various hazards, making it imperative to address safety concerns (Zulkifly, Hasan, et al., 2023).

The Occupational Safety and Health Act 1994 (OSHA 1994) serves as a cornerstone for ensuring workplace safety and health in Malaysia, encompassing all industrial sectors, including public institutions like Government Skills Training Centres (Bahari, 2002; Hassan et al., 2020). OSHA 1994 mandates that employers (management) uphold safety and health standards within the institution, including formulating safety policies, establishing safety committees, and providing relevant occupational safety and health (OSH) training to employees (Zulkifly & Ranjan, 2024). Notably, prior research indicates that inexperienced workers, particularly young employees, are more susceptible to workplace accidents (Koo et al., 2014; Schulte et al., 2005). Therefore, integrating occupational safety practices into educational curricula, as advocated by Schulte et al. (2005), underscores the vital role of TVET institutes' management and teaching staff in cultivating safety consciousness among students (Karthega, 2018; Zulkifly, Hasan, et al., 2023).

Practical teaching sessions in TVET institution workshops and laboratories expose students to various hazards, such as excessive noise (Abdul Rahim et al., 2022), chemical, mechanical, electrical, and dust (Ab Ghani et al., 2021). Thus, mitigating the associated risks to prevent workplace accidents is paramount. Research suggests that lecturer-led safety practices play a crucial role in laboratory safety (Abdullah & Aziz, 2020). Therefore, safety awareness, defined as an individual's cognizance of workplace safety issues (Kiani & Khodabakhsh, 2014), is essential for enhancing safety performance and behavior among workers (Sarkam et al., 2018; Wang et al., 2018). Thus, fostering safety awareness among TVET teaching staff is crucial for creating a safer working environment in workshops and laboratories and reducing work-related accidents.

Various studies have examined safety awareness levels in Malaysian workplaces, revealing shortcomings and emphasizing the need for improving safety training and commitment (Hamirul Adli, 2013; Nurul Asmad, 2015; Zulkifly, Hasan, et al., 2023). Similarly, research focusing on TVET institutions has identified factors influencing safety awareness among students and teaching staff (Ahmad, 2009; Idrus et al., 2004). Notably, safety policy implementation and safety training emerge as key factors influencing safety awareness levels (Ahmad, 2009), echoing findings from studies highlighting the significance of safety training in enhancing safety awareness and practices (Ramli et al., 2020; Shafie et al., 2021).

In theoretical terms, Cooper's Reciprocal Model is a comprehensive framework that elucidates the reciprocal relationship between individual, work, and organizational factors in shaping safety awareness and behavior within a workplace (Clarke, 2006; Cooper, 2000). At its core, the model emphasizes the interplay between personal attributes, job-related factors, and organizational influences, highlighting their collective impact on safety outcomes. Cooper's Reciprocal Model serves as a relevant theoretical framework for understanding the dynamics of safety awareness within the context of this study. By examining the interplay between individual, work-related, and organizational factors, the model provides valuable insights into the determinants of safety awareness among TVET teaching staff. Specifically, the model highlights the importance of individual attributes such as self-commitment and competence, which align with the emphasis on lecturer-led safety practices and personal safety awareness within the study. Furthermore, the model underscores the significance of organizational elements such as management commitment to safety and effective communication channels, which are reflected in the findings regarding the impact of safety policy implementation and safety committee involvement on safety awareness. By integrating Cooper's Reciprocal Model into the analysis, this study gains a comprehensive understanding of the multifaceted factors influencing safety awareness among TVET teaching staff, thereby informing targeted interventions and promoting a culture of safety within educational institutions.

2. Safety Awareness in TVET Institutions

This section includes a comprehensive review of previous research and theories supporting this study. Relevant literature on safety awareness in TVET institutions highlights the critical role of management in promoting safety practices and the effectiveness of safety policies and training programs in enhancing safety awareness. Safety awareness within educational institutions, particularly TVET environments, is crucial due to the inherent risks associated with practical and technical training. According to Ahmad (2009), the implementation of effective safety policies significantly influences the safety awareness levels among students and staff. This aligns with findings by Idrus et al. (2004), who emphasize the importance of management's role in developing and enforcing safety regulations to create a safer educational environment.

Safety training programs are essential in equipping staff with the knowledge and skills necessary to identify and mitigate hazards. Ramli et al. (2020) highlight that comprehensive safety training positively impacts safety awareness and practices among employees. This is supported by Shafie et al. (2021), who found that ongoing training and safety drills enhance the overall safety culture within organizations.

The role of safety and health committees is also pivotal in promoting a culture of safety. These committees facilitate communication and collaboration between management and staff, ensuring that safety concerns are

J. of Technical Education and Training Vol. 16 No. 2 (2024) p. 89-102

promptly addressed. Zulkifly, Hasan, et al. (2023) found that active involvement of safety committees leads to better safety outcomes and higher awareness levels among staff members. Cooper's Reciprocal Model (2000) provides a theoretical framework for understanding the interplay between individual, work-related, and organizational factors in shaping safety awareness. The model emphasizes the dynamic relationship between these factors, suggesting that improvements in one area can positively influence the others. Clarke (2006) further elaborates on this model, noting that organizational commitment to safety, including management's dedication to implementing safety policies and training, plays a crucial role in enhancing safety awareness and behavior.

In the context of TVET institutions, research by Karthega (2018) and Zulkifly, Hasan, et al. (2023) underscores the unique challenges faced by these environments. The practical nature of TVET training exposes students and staff to a variety of hazards, making the need for robust safety measures even more critical. Their studies suggest that management's proactive approach in fostering safety awareness through policy implementation, training, and committee involvement is essential for mitigating risks and preventing accidents. Furthermore, Abdul Rahim et al. (2022) and Ab Ghani et al. (2021) provide insights into specific hazards encountered in TVET workshops, such as excessive noise and exposure to chemicals and machinery. These studies highlight the importance of targeted safety interventions to address the unique risks in these settings.

In summary, the literature underscores the significant impact of management's roles in promoting safety awareness within TVET institutions. Effective safety policies, comprehensive training programs, and active safety committees are critical components in fostering a culture of safety and reducing workplace accidents. Cooper's Reciprocal Model offers a valuable framework for understanding the multifaceted factors influencing safety awareness, emphasizing the need for a holistic approach to safety management in educational settings.

3. Methodology

3.1 Research Design

This study employs a hypothesis-testing quantitative research methodology utilizing a cross-sectional design. A validated self-administered questionnaire, incorporating items delineating both independent and dependent variables, was formulated drawing upon insights from prior research endeavours. Comprehensive analyses were conducted following questionnaire administration to elucidate the intricate effects of the input variables on the outcome variable.

3.2 Research Framework and Hypotheses Development

The research framework, illustrated in Figure 1, elucidates the relationships between independent variables (safety policy, safety and health committee functions, and safety training) and the dependent variable (safety awareness). Drawing upon this framework, the following hypotheses were developed:

- H1: There is a significant effect of Safety Policy on Safety Awareness among TVET teaching staff.
- H2: There is a significant effect of Safety Training on Safety Awareness among TVET teaching staff.
- H3: There is a significant effect of Safety Committee on Safety Awareness among TVET teaching staff.

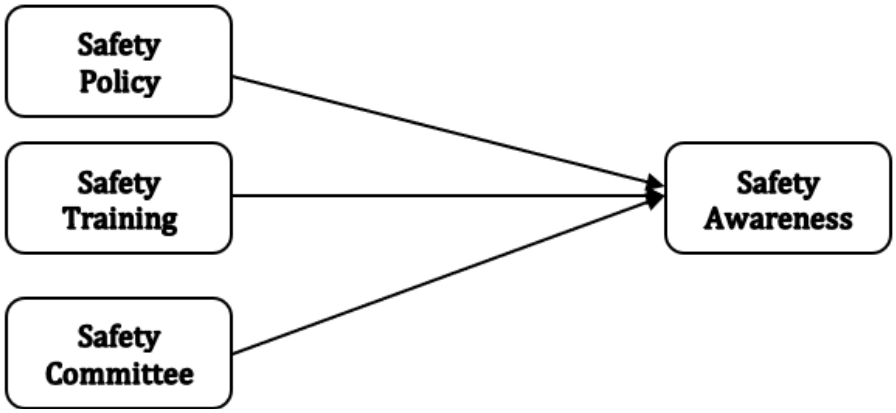


Fig. 1 *Research framework*

3.3 Research Participants

The study involved 119 teaching staffs from four government TVET institutions in the southern, east-coast, and northern regions of Peninsular of Malaysia. These institutions were selected based on the similarity of courses offered, resulting in workplaces with comparable hazards and safety concerns.

3.4 Measurements

A self-administered questionnaire comprising items aimed at gauging both the dependent and independent variables was devised and employed as the primary research tool. All questionnaire items were structured utilizing a Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree), drawing upon methodologies from previous research (Ahmad, 2009; Idrus et al., 2004; Jaafar & Ikhwan Ahmad, 2023).

To ensure the reliability and validity of the instrument, the study reported Cronbach's Alpha values for each construct, with all values falling within acceptable ranges, indicating good internal consistency. Specifically, the Cronbach's Alpha for Safety Awareness was 0.699, for Safety Committee was 0.716, for Safety Policy was 0.777, and for Safety Training was 0.703. Additionally, the study conducted a convergent validity analysis, which confirmed that the constructs had adequate convergent validity, further supported by composite reliability and average variance extracted (AVE) values. The questionnaire comprised multiple constructs aimed at gauging different aspects of safety awareness and management roles within TVET institutions. The dependent variable in the study was Safety Awareness, which was measured through several items designed to assess the participants' awareness and understanding of safety procedures in their workplace. Example items included statements like, "I am aware of the safety procedures in my workplace," and "I understand the importance of following safety guidelines."

In addition to the dependent variable, the questionnaire also included items to measure the independent variables, which were categorized into three main constructs: Safety Policy, Safety Training, and Safety Committee. The Safety Policy construct included items such as "The safety policies in my institution are clear and accessible," and "Management regularly updates us on new safety policies." These items aimed to evaluate the effectiveness and clarity of the safety policies implemented by the institutions. The Safety Training construct included items like "I have received adequate training on safety practices," and "The training provided has helped me to identify hazards in the workplace," which were designed to assess the adequacy and impact of the safety training programs provided to the teaching staff. The Safety Committee construct measured the effectiveness and responsiveness of the safety committees within the institutions, with items such as "The safety committee is active and responsive," and "I feel that my concerns about safety are taken seriously by the committee."

In summary, the questionnaire was a robust tool, carefully designed to capture the nuances of safety awareness and the roles of management in promoting safety within TVET institutions. Its reliability and validity were thoroughly tested, providing confidence in the findings derived from the data collected using this instrument.

3.5 Sample Size

The sample size for this study was determined using G*Power software, resulting in 119 respondents (Figure 2). The targeted population for the study consisted of teaching staff from government Technical and Vocational Education and Training (TVET) institutions in Peninsular Malaysia. Specifically, the study focused on four selected TVET institutions located in the central, northern, and east-coast regions of the peninsula. The total population of teaching staff across these institutions was reported to be 340 individuals. Out of this total population, a sample of 126 teaching staff members was selected using a random sampling method. The selected individuals were contacted via email or WhatsApp to participate in the questionnaire survey. Ultimately, 119 respondents completed the survey, resulting in a response rate of approximately 93.65%. This high response rate provides a robust basis for the study's findings and ensures that the sample is representative of the broader population of teaching staff within the targeted TVET institutions.

J. of Technical Education and Training Vol. 16 No. 2 (2024) p. 89-102

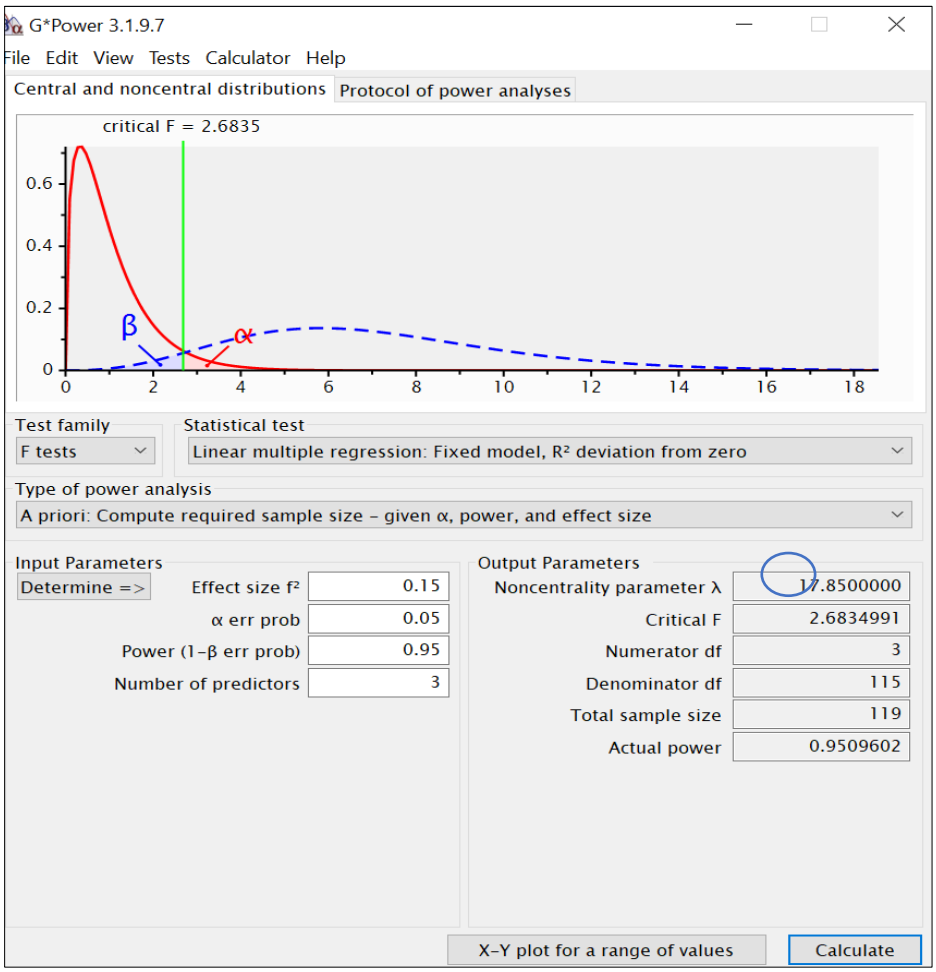


Fig. 2 *Sample size calculation*

3.6 Data Collecting Procedure

A comprehensive roster comprising 340 teaching staff members' names and contact details was procured from the participating TVET institutions' administration personnel. Using a random number table (MacNealy, 1999), 126 respondents were selected and contacted via email or WhatsApp to participate in the questionnaire survey. The data collection for the study was conducted over a period of approximately three months in 2022, specifically from March to May. The research focused on gathering data from teaching staff in TVET institutions located in the areas of Perlis, Negeri Sembilan, Kelantan, and Kuala Lumpur. This timeframe allowed for the collection of comprehensive data across multiple regions, ensuring a diverse and representative sample for the study. Out of the initial 126 selected teaching staff members, 118 responded, representing a response rate of 93.65%.

3.7 Data Analysis

Partial Least Squares Structural Equation Modeling (PLS-SEM) was employed to analyze the measurement and structural models (Ramayah et al., 2018). PLS-SEM allows for the examination of complex relationships between latent constructs and observed variables, making it suitable for this study's multi-dimensional framework. The analysis involved assessing path coefficients and bootstrapping techniques to evaluate their significance and estimate standard errors (Hair et al., 2014; Henseler et al., 2009).

4. Results

In this section, the results of the study are presented and discussed. First, an overview of the respondents' profile is provided, detailing key demographic information such as age, gender, and years of experience. Following this, the measurement model is examined to assess the reliability and validity of the constructs under investigation. This includes an analysis of the factor loadings, composite reliability, and average variance extracted (AVE). Subsequently, the structural model is explored to investigate the relationships between the independent and dependent variables. Path coefficients are examined to determine the strength and direction of these relationships, while bootstrapping techniques are employed to assess the significance of these findings.

4.1 Respondent's Profile

4.1.1 Gender Distribution

The study involved a total of 119 respondents, with a notable gender distribution where 63.03% of the participants were male, and 36.97% were female. This gender breakdown suggests a higher representation of male teaching staff in the surveyed TVET institutions, which could reflect the general gender composition in these technical and vocational fields.

4.1.2 Age Range

The age of the respondents varied across several age brackets, contributing to the diversity of perspectives in the study. The largest group, comprising 48.74% of the respondents, fell within the 31-40 years' age range. This was followed by 21.85% of respondents who were aged between 41-50 years, 15.97% in the 18-30 years range, and 13.45% aged 51 years and above. The predominance of respondents in their 30s and 40s suggests that the majority of the teaching staff surveyed are in the middle of their careers, which could influence their views and experiences related to safety awareness and policies.

4.1.3 Departmental Affiliation

Respondents came from various departments within the TVET institutions, ensuring that the study captured a broad spectrum of disciplines. The largest representation was from the "Other" category, accounting for 39.50% of the respondents, followed by the Automotive Technology department with 31.09%. The Civil Technology department represented 17.65%, while 11.76% of the respondents were from the Advanced Diploma programs. This distribution highlights the diverse academic and technical backgrounds of the participants, which is essential for understanding how safety awareness and practices may differ across different technical disciplines.

4.1.4 Service Tenure

The respondents also varied in terms of their length of service in their current positions. The largest group, representing 32.77% of respondents, had been in their roles for five years or less. Another 27.73% had between 6-10 years and 11-15 years of service, respectively, while 11.76% had been in their positions for 16 years or more. The range of service tenures provides a mix of perspectives from both relatively new staff and those with extensive experience, offering insights into how familiarity with institutional practices and policies might impact safety awareness.

4.1.5 Position Level

In terms of job hierarchy, the majority of respondents, 48.74%, held the position of Senior Assistant Officer, followed by 24.37% who were Officers. Assistant Officers made up 6.72% of the respondents, with the remaining 20.17% classified under "Other" positions. The distribution of respondents across different levels of responsibility within the institutions suggests that the study gathered input from a wide array of roles, potentially influencing the diversity of perspectives on safety practices and management roles within the institutions.

Table 1 provides an overview of the respondents' profiles, detailing key demographic characteristics such as gender, age, departmental affiliation, service tenure, and position level.

Table 1 *Respondent's profile*

Variables		Frequency	Percentage
Gender	Male	73	63.03
	Female	45	36.97
Age	18 – 30 years old	19	15.97
	31 – 40 years old	58	48.74
	41 – 50 years old	26	21.85
	51 and above	16	13.45
Department	Civil Technology	21	17.65
	Automotive Technology	37	31.09
	Advanced Diploma	14	11.76
	Others	47	39.50

J. of Technical Education and Training Vol. 16 No. 2 (2024) p. 89-102

Service Tenure	5 year & below	39	32.77
	6-10 years	33	27.73
	11-15 years	33	27.73
	16 years & above	14	11.76
Position Level	Assistant Officer	8	6.72
	Senior Assistant Officer	58	48.74
	Officer	29	24.37
	Others	24	20.17
	Total	**119**	**100**

4.2 Measurement Model

Table 2 presents the results of the convergent validity analysis, indicating satisfactory internal consistency, high levels of composite reliability, and adequate convergent validity. The R^2 values show moderate explanatory power, while the f^2 values suggest varying degrees of practical significance. The study's findings reveal that the independent variables collectively exhibit moderate explanatory power, as indicated by the R^2 values. This suggests that these variables are able to account for a meaningful portion of the variance in Safety Awareness among the respondents. In other words, the independent variables included in the model—namely, the implementation of safety policies, the effectiveness of safety training, and the role of safety committees—are significant factors in explaining the level of safety awareness among the teaching staff. However, the moderate R^2 values also imply that while these factors are important, they do not fully explain all the variability in Safety Awareness, indicating that other factors not included in the model may also play a significant role. R^2 value is around 0.40, it suggests that 40% of the variance in Safety Awareness can be explained by the independent variables in the model. While this is not a high level of explanatory power, it is sufficient to suggest that these variables are indeed influential, though there may be other factors not included in the model that also play a significant role in explaining Safety Awareness.

The study also assessed the practical significance of each independent variable using f^2 values. The results show that these variables have varying degrees of practical significance. This means that while all the independent variables contribute to the prediction of Safety Awareness, they do so to different extents. For example, some variables might have a strong practical impact, suggesting that changes in these areas would significantly enhance Safety Awareness among the teaching staff. On the other hand, some variables, although statistically significant, might have a less pronounced practical impact, indicating that their influence on Safety Awareness is relatively smaller. A higher f^2 value indicates a stronger effect of a particular independent variable on the dependent variable, implying that changes in this variable have a more substantial impact on Safety Awareness. Conversely, a lower f^2 value suggests a weaker impact, indicating that while the variable is statistically significant, its practical influence on Safety Awareness is less pronounced. The combination of moderate R^2 values and varying f^2 values indicates that while the independent variables collectively explain a moderate portion of the variance in Safety Awareness, their individual contributions to this explanation differ.

Table 2 *Convergent validity*

Variables	Cronbach's Alpha	Composite Reliability	Average Variance Extracted (AVE)	R^2	f^2
Safety Awareness	0.699	0.813	0.522	0.419	
Safety Committee	0.716	0.823	0.539		0.090
Safety Policy	0.777	0.843	0.520		0.118
Safety Training	0.703	0.814	0.524		0.142

The discriminant validity analysis, as presented in Table 3 of the study, utilized the Heterotrait-Monotrait (HTMT) ratio to assess whether the constructs being investigated were truly distinct from one another. Discriminant validity is a critical aspect of construct validity, ensuring that each construct within the model represents a unique dimension and is not overly similar to other constructs.

The HTMT ratio is a robust method for evaluating discriminant validity. It works by comparing the correlations between different constructs (heterotrait) with the correlations within the same construct (monotrait). Essentially, the HTMT ratio examines whether the items intended to measure different constructs, such as Safety Policy and Safety Training, are less correlated with each other than the items measuring the same construct, such as all the items within Safety Policy.

In this study, the HTMT ratio values confirmed that the constructs exhibited adequate discriminant validity, meaning that they were sufficiently distinct from each other. This is significant because it demonstrates that each construct whether it be Safety Policy, Safety Training, Safety Committee, or Safety Awareness is measuring a specific, unique aspect of the overall phenomenon being studied. The results indicate that the constructs do not overlap significantly, which is an important validation of the measurement model. In practice, this means that the relationships observed between different constructs are based on actual differences in the constructs, rather than on a potential overlap or similarity between them. The HTMT values fell below the commonly accepted thresholds, typically set at 0.85 or 0.90, further confirming the distinctiveness of the constructs.

By establishing discriminant validity through the HTMT ratio, the study reinforces the credibility of its findings. It ensures that the constructs used to measure various dimensions of safety management practices in TVET institutions are indeed capturing different, non-overlapping aspects. This validation is essential for the overall integrity of the research, providing confidence that the conclusions drawn are based on solid, distinct constructs that accurately reflect the diverse elements of safety practices within these institutions. Table 3 presents the results of the discriminant validity analysis using the Heterotrait-Monotrait (HTMT) ratio, confirming the distinctiveness of the constructs under investigation.

Table 3 *Discriminant validity (HTMT)*

	1	2	3	4
1.Safety Awareness	0.722			
2.Safety Committee	0.341	0.734		
3.Safety Policy	0.503	0.106	0.721	
4.Safety Training	0.547	0.219	0.512	0.724

4.3 Structural Model

Table 4 presents the path coefficients between the independent variables and the dependent variable. The analysis presented in Table 4 provides crucial insights into the relationships between the independent variables—Safety Policy, Safety Training, and Safety Committee—and the dependent variable, Safety Awareness among teaching staff in TVET institutions. The path coefficients indicate that all three independent variables positively influence Safety Awareness, though to varying degrees. Safety Training emerges as the most influential factor, with a path coefficient of 0.340, suggesting that enhancing safety training programs significantly boosts safety awareness among staff. Safety Policy also plays a vital role, as indicated by a path coefficient of 0.304, highlighting the importance of clear and well-implemented safety guidelines. Safety Committees, while still positively affecting safety awareness, have a slightly weaker impact, reflected in a path coefficient of 0.234. Despite this, their role remains important in promoting a safety-conscious culture within the institutions. Overall, these findings underscore the need for TVET institutions to prioritize comprehensive safety training and robust safety policies, while also recognizing the valuable, albeit less pronounced, contribution of safety committees in enhancing safety awareness.

Table 4 *Path-Coefficient*

	β-value	T Statistics
Safety Committee -> Safety Awareness	0.234	3.716*
Safety Policy -> Safety Awareness	0.304	3.174*
Safety Training -> Safety Awareness	0.340	3.562*

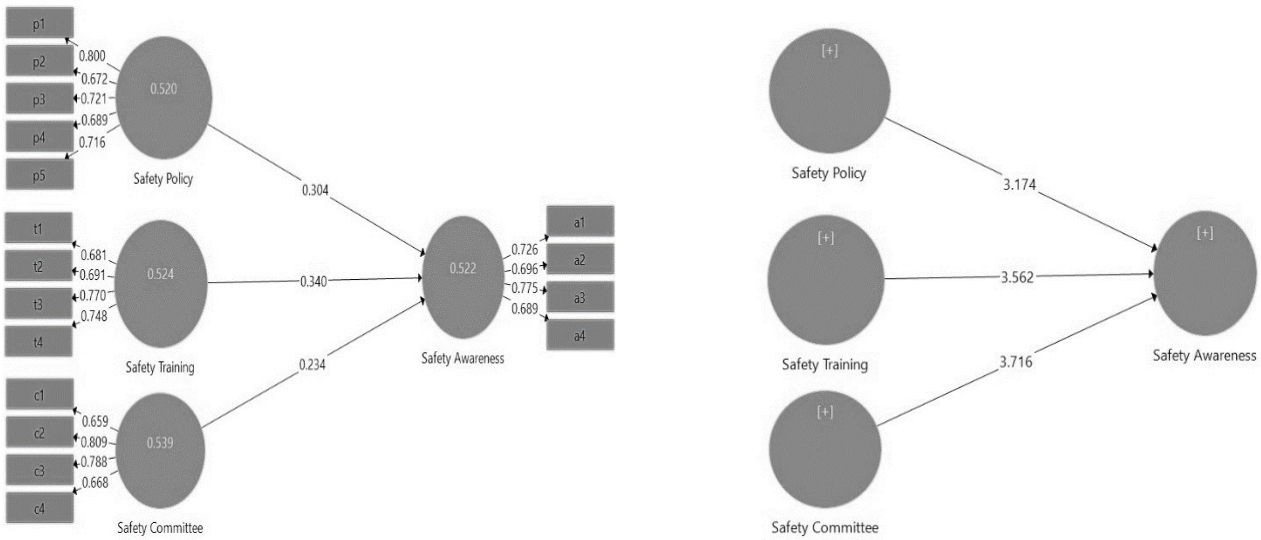
* Significant at P<0.05

The research findings are effectively summarized and visually represented in Figure 1, which provides a clear and concise overview of the relationships explored in the study. This figure illustrates the connections between the independent variables—Safety Policy, Safety Training, and Safety Committee—and the dependent variable, Safety Awareness among teaching staff in TVET institutions.

In Figure 1, arrows or paths depict the direction and strength of the relationships, with corresponding path coefficients indicating the impact each independent variable has on Safety Awareness. For instance, Safety Training, with a path coefficient of 0.340, is shown to have the strongest positive influence on Safety Awareness. Similarly, Safety Policy, with a coefficient of 0.304, is also highlighted as a significant contributor, while the Safety Committee, with a slightly lower coefficient of 0.234, is shown to have a positive but less pronounced effect. The purpose of this figure is to provide a visual summary that complements the detailed explanations given in the text.

J. of Technical Education and Training Vol. 16 No. 2 (2024) p. 89-102

By presenting the data in a graphical format, Figure 1 allows readers to quickly and easily grasp the key outcomes of the research, understanding how the different factors interact to influence Safety Awareness. This visual depiction reinforces the study's findings and serves as a useful reference for interpreting the complex relationships analyzed in the research. Overall, figure 3 encapsulates the essence of the study's results, offering a straightforward and accessible way to understand the dynamics between the safety management practices and the level of safety awareness among TVET teaching staff. In summary, present research results are depicted in Figure 3 below.



(a) **(b)**

Fig. 3 *Research results (a) Measurement model; (b) Structural model*

5. Discussions

The study's findings support all three hypotheses, highlighting the significant impact of management's role in promoting safety awareness among teaching staff in TVET institutions. Safety policy, safety and health committee functions, and safety training all emerged as crucial factors influencing safety awareness. These findings align with prior research emphasizing the importance of management commitment to safety and the effectiveness of safety policies and training programs (Ahmad, 2009; Idrus et al., 2004; Ramli et al., 2020). Safety Training emerged as the most significant predictor of Safety Awareness, with a path coefficient of 0.340. This finding aligns with recent research emphasizing the crucial role of comprehensive and ongoing training programs in enhancing safety practices, especially in high-risk environments like vocational education (Lingard et al., 2021). However, it is essential to recognize that the effectiveness of such training may diminish over time without regular updates and reinforcement. Studies suggest that the retention of safety knowledge and practices requires periodic refresher courses and the integration of real-life scenarios into training modules (Burke et al., 2019).

Moreover, the quality of the training provided is paramount. If training programs are overly generic and fail to address the specific hazards faced in technical education environments, their impact can be significantly reduced. Recent studies have shown that training that is interactive, context-specific, and incorporates hands-on learning is more effective in promoting long-term safety awareness and behavior change (Haslam et al., 2020). Thus, while the positive impact of Safety Training is well-established, its true effectiveness depends on its relevance, frequency, and the extent to which it engages staff in practical and meaningful ways. For the evaluation of Safety Policy, the study found that Safety Policy also has a significant impact on Safety Awareness, with a path coefficient of 0.304. This is consistent with recent findings that underline the importance of clear, well-communicated safety policies in building a safety culture (Zohar & Polachek, 2021). However, the moderate strength of this relationship suggests that merely having policies in place may not be sufficient. The literature increasingly points to the importance of how these policies are perceived by employees, emphasizing that policies must be seen as relevant and enforceable (Dahl & Olsen, 2022).

One critical aspect is the involvement of staff in the development of safety policies. Recent research highlights that when employees participate in policy-making, the policies are more likely to be practical and reflective of on-the-ground realities, leading to higher compliance and effectiveness (Reason et al., 2020). If policies are perceived as top-down directives with little relevance to daily work, their impact on safety behavior may be limited.

Therefore, while the study confirms the importance of Safety Policy, it also suggests that the effectiveness of these policies is contingent upon active employee involvement and practical applicability.

Finally, the assessment of Safety Committees, were found to have the least influence on Safety Awareness, with a path coefficient of 0.234. This result highlights a potential underutilization of these committees in TVET institutions. Recent studies have noted that the effectiveness of safety committees often depends on their level of engagement, authority, and the resources available to them (Goh et al., 2022). When safety committees are proactive and integrated into the daily operations of the institution, they can play a vital role in promoting safety culture. However, if they are seen as symbolic or reactive bodies, their impact may be minimal (Lingard & Turner, 2020).

The study's findings suggest that safety committees in the surveyed institutions may lack visibility and active participation in safety management, which could explain their weaker influence. To enhance their effectiveness, these committees need to be empowered with the authority to enforce safety measures and engage regularly with staff through inspections, training sessions, and open forums for discussing safety concerns (Neal et al., 2021). The relatively lower impact observed in this study indicates a need for a more dynamic and participatory approach to the role of safety committees.

The results have important implications for the management of TVET institutions. The strong influence of Safety Training suggests that institutions should prioritize the development of high-quality, relevant training programs that are regularly updated to reflect new risks and technologies. However, as supported by recent research (Bahn & Barratt-Pugh, 2022), training alone is insufficient. A multifaceted approach that includes robust safety policies and active safety committees is necessary to foster a comprehensive safety culture. The moderate impact of Safety Policy highlights the need for more participatory approaches in policy development, ensuring that policies are clear, well-communicated, and perceived as relevant and actionable by staff. Finally, the relatively weaker influence of Safety Committees underscores the need for these bodies to be more engaged and proactive, with sufficient resources and authority to effect change.

This study emphasizes the importance of an integrated approach to safety management in TVET institutions, where Safety Training, Policy, and Committees work together to enhance Safety Awareness. While each factor is critical, their effectiveness is interdependent, and their impact can be significantly enhanced through better integration, regular reinforcement, and active staff engagement. The findings suggest that to truly foster a culture of safety, TVET institutions must not only invest in these individual components but also ensure they are aligned and mutually reinforcing, creating an environment where safety is a continuous priority and improvement is an ongoing process. Finally, this study contributes to the existing body of knowledge by providing empirical evidence on the relationship between management's roles and safety awareness among TVET teaching staff. The findings underscore the need for TVET institutions to prioritize safety policy implementation, enhance the effectiveness of safety committees, and invest in comprehensive safety training programs.

6. Conclusions

This study highlights the pivotal role of management in promoting safety awareness among teaching staff in Government TVET Institutions. By implementing robust safety policies, enhancing safety and health committee functions, and investing in comprehensive safety training programs, institutions can significantly improve safety awareness levels among staff members. By implementing robust safety policies, enhancing the functions of safety and health committees, and investing in comprehensive safety training programs, institutions can significantly elevate safety awareness among their staff members. Each of these components plays a crucial role in fostering a culture of safety, and when combined, their impact is even more profound.

Robust safety policies are the cornerstone of any effective safety management system. These policies provide clear and detailed guidelines that outline the procedures staff must follow to maintain a safe working environment. When these policies are well-crafted and consistently enforced, they ensure that safety becomes an integral part of the institution's daily operations. Staff members understand the expectations placed on them, and the consequences of not adhering to these guidelines are made explicit. This clarity and consistency help embed safety awareness deeply into the organizational culture, making it a routine consideration in every activity and decision.

The role of safety and health committees is pivotal in monitoring and improving safety practices within an institution. By enhancing their functions, these committees can become more proactive rather than merely reactive. A proactive safety committee actively seeks out potential hazards before they result in accidents, engages regularly with staff, and ensures that their concerns are addressed promptly. These committees also facilitate better communication between staff and management, serving as a vital link that ensures safety issues are not overlooked. Regular inspections and continuous feedback from the committee keep safety at the forefront of everyone's mind, reinforcing the importance of maintaining a safe work environment.

Safety training is essential for equipping staff with the necessary knowledge and skills to identify and respond to potential hazards. Comprehensive training programs go beyond basic instruction, offering detailed, context-

specific training that is regularly updated to reflect new risks and best practices. These programs often include practical, hands-on sessions that engage staff in real-world scenarios, making the training more effective and memorable. Continuous investment in safety training ensures that staff remain aware of the latest safety protocols and can apply them in their everyday work. This ongoing education is crucial in high-risk environments like TVET institutions, where the nature of the work can expose staff to significant hazards.

When these three strategies robust safety policies, enhanced safety committees, and comprehensive training programs are implemented together, they create a powerful framework for improving safety awareness across the institution. The policies provide a solid foundation, the committees ensure active oversight and communication, and the training empowers staff with the skills they need to maintain a safe environment. Together, these elements contribute to a culture of safety where staff are not only aware of potential hazards but are also actively engaged in preventing them. This integrated approach leads to a safer, more conscientious work environment, ultimately reducing the risk of accidents and enhancing the overall well-being of staff members. These findings have practical implications for TVET institutions seeking to create a safer working environment and reduce the risk of industrial accidents. TVET institutions operate in environments that are inherently more hazardous due to the nature of technical and vocational education, which often involves machinery, tools, and potentially dangerous materials. The study highlights the importance of developing robust safety policies that are specifically tailored to the unique risks present in these settings. Institutions should focus on creating clear, detailed, and context-specific policies that directly address the most common hazards in their workshops, laboratories, and classrooms. This targeted approach ensures that the policies are not only relevant but also practical, thereby increasing compliance and effectiveness. The role of safety and health committees is crucial in fostering a proactive safety culture within TVET institutions. The study suggests that these committees need to be more empowered and active in their roles. For practical implementation, TVET institutions should ensure that their safety committees are not just symbolic but are given the authority, resources, and training necessary to perform regular safety audits, conduct risk assessments, and respond promptly to safety concerns raised by staff or students. Additionally, these committees should actively engage with the staff, providing a platform for continuous dialogue about safety issues, which can help in identifying and mitigating risks before they lead to incidents. By developing tailored safety policies, empowering safety committees, investing in comprehensive training, integrating safety into daily practices, and committing to continuous improvement, TVET institutions can significantly enhance safety awareness and create a safer environment for both staff and students. These actions will not only help in reducing accidents but will also contribute to the overall effectiveness and sustainability of safety practices in these institutions.

7. Recommendations

Based on the study's findings, several recommendations are proposed for TVET institutions:

To effectively enhance safety in TVET institutions, a multifaceted approach is required, starting with the development and enforcement of robust safety policies. For instance, a TVET institution specializing in automotive technology might develop a detailed policy outlining the proper procedures for handling hazardous materials such as engine oils, coolants, and other automotive fluids. These policies would specify the use of personal protective equipment (PPE), such as gloves and safety goggles, and outline emergency procedures in case of spills or exposure. To ensure these policies remain effective, the institution would regularly review and update them, incorporating new industry standards or lessons learned from incidents at similar institutions. This ongoing review process ensures that the policies stay relevant and continue to mitigate risks effectively.

In addition to strong policies, the role of safety and health committees is critical. For example, at a TVET institution with a focus on electrical engineering, the safety committee could be empowered to conduct regular risk assessments of the workshops where students work with high-voltage equipment. The committee might identify a need for additional grounding mats or improved signage to warn of electrical hazards. By holding regular meetings and maintaining transparent communication with both staff and students, the committee ensures that these safety enhancements are implemented promptly and that everyone is aware of the potential risks and the steps taken to mitigate them.

Equally important is the investment in comprehensive safety training programs. Consider a TVET institution offering courses in welding and metalwork. Here, safety training programs would include practical, hands-on sessions where staff and students learn not only the theory behind safe welding practices but also engage in supervised practice sessions using the actual equipment they will encounter in their daily work. These training sessions could cover the correct use of protective gear, proper ventilation techniques to avoid inhaling harmful fumes, and the steps to take in the event of a fire. By ensuring that these training programs are specifically tailored to the unique risks of welding and metalwork, the institution significantly enhances the safety awareness and preparedness of its staff and students, thereby creating a safer educational environment.

Future research could explore the long-term impact of management's roles on safety awareness and investigate additional factors that may influence safety practices in TVET institutions. Longitudinal studies and

comparative analyses across different regions and types of TVET institutions could provide further insights into effective strategies for enhancing safety awareness and reducing workplace accidents.

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Conflict of Interest

Authors declare that there is no conflict of interests regarding the publication of the paper.

Author Contribution

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