



# Research Framework for Safety Culture in Malaysian Education Sector: Moderating Effect of Safety Knowledge

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## Abstract

The main purpose of the conceptual paper is to discuss development of a proposed conceptual framework in exploring the relationship between psychological, behaviour and situational dimension towards safety culture in Malaysian education sector focusly in Vocational College (VC). Previous literature showed fewer frameworks that have been established in occupational sector. A quantitative method was adopted, in which sample for the study was limited to vocational instructors that only teach engineering technology courses. The paper discusses possible relationship between all three dimensions with safety culture and offers a conceptual framework based on Cooper's Reciprocal Safety Culture Model. Additional research is needed to empirically validate the proposed conceptual framework in the other organisation under education sector in Malaysia such as primary and secondary school, boarding school and also Matriculation College. This paper could assist top management and teachers in school to have deeper understanding of the importance of creating a positive safety culture at the workplace. The proposed conceptual framework could be used as a leading indicator for future research in this area especially in education sector.

**Keywords:** Research Framework; Safety Culture; Education; Vocational College's Instructor; Malaysia

## 1. Introduction

Safety culture plays a key function in determining an organization's success or failure (Sukadarin, Suhaimi, & Abdull, 2012). Regarding to Choudhry, Fang, & Mohamed (2007), safety culture can be defined as "the product of individual and group values, attitudes, competencies, and patterns of behaviour that determine the commitment to, and the style and efficiency of, an organizations Health and Safety programs. Organisations with a positive safety culture are characterized by communications founded on mutual trust, by shared perceptions of the importance of safety, and by confidence in the efficacy measures. A development of positive safety culture provided little guidance on how organizations might improve safety performance. A goal of positive safety culture is to create an atmosphere in which employees are aware of the risk in their workplace, continually on guard against them, and avoid taking any unsafe actions (Ostrom, Wilhelmsen, & Kaplan, 1993). In Malaysia, there is an increasing number of accident happen in Public Services and Statutory Bodies sector which was from 0.96 % in 2015 and increased to 3% in 2016 and slowly decreased at 1.45% until last October of 2017. Based on the press reports, there were 47 cases of accidents involving injuries and even deaths occurred in school area (Kamilah, Balakrishnan, Nazri, & Rasdan, 2018). School is one of the organizations under the Public Sector and Statutory Bodies according to the first table list in Occupational Safety and Health Act (OSHA) 1994. Through the enactment of the Occupational Safety and Health Act (OSHA) in 1994, main purpose of the introduction of self-

regulation was to promote safety culture at workplace (Ismail, Harun, Ismail, & Zaimi, 2010). Somehow, the management in education sector had low knowledge on the need for a written safety policy and also the importance of safety audits to be carried out in the education sector (Ainun Hamzah & Ariff, 2009) although it was a compliance with the OSHA 1994.

Furthermore, less measurement has been established to enable the employees in education sector (e.g. top management, teachers, students, non-academic staff and outsiders) to measure the level of safety culture among them. Thus, this paper presents the development of a framework to promote safety culture in Malaysian education sector. Many studies had been conducted to build a model of safety culture in various sectors, but as stated by Guldenmuld (2010), there is no satisfying model of safety culture that can be used generally in all occupational sector. This suggested framework of the next discussion hopefully will be useful in steering future research on safety culture in education sector.

### 1.1. Reviews on Initial Safety Culture Framework

Safety culture has become a challenging and interesting topic around the world for many researchers and practitioners due to it being responsible for many accidents and disasters within organisations (Choudhry et al., 2007). Most of these studies focus on building a model either for interpreting the concept of safety culture or an assessment for improvement. However, there is not yet any universal and acceptable model for safety culture (Cooper,

2000). The reciprocal safety culture model as example will be used as theoretical fundamental knowledge in this research to prepare an initial draft of framework for safety culture in Malaysia education context. The next paragraph will discuss some of the safety culture models that have been developed by previous researchers.

Bandura (1986) tried to interpret the concept of safety culture in terms of reciprocal determinism based on Social Cognitive Theory, and derived three components: behaviour, person and environment. Geller (1994) adopted Bandura (1986) work and made an excellent effort to identify the characteristics for each component and that leading to the development of a model called Total Safety Culture. Safety Culture Table model developed by Ho and Zeta (2004) involved elements like person, environment, behaviour and organisation, and they pointed out that safety culture is similar to the table that is constructed on four legs. Choudhry et al. (2007) also adopted and developed Bandura (1986), asserted through his new model that safety culture is a product based on interactions between people, jobs and organisations and called that model as a Reciprocal Safety Culture model. In Malaysia, Ismail et al. (2010) adopted Cooper's model to develop a framework for operationalization of construction safety culture which involved three dimension which were psychological (value & beliefs), behavioural and situational (observable practices & provided environment) and safety officers & supervisors (communication, trust & commitment).

Based on these previous studies, the initial framework in this research will be developed and formulated from the Reciprocal Safety Culture Model by Cooper (2000). The characteristics of the safety culture factors constitute psychological, behavioural, and situational factors, which allow triangulation of the perspectives in the context of safety culture within an organisation. Besides the model itself promotes self-regulatory processes that are consistent to the definition of safety culture. This proposed research framework also includes the three safety culture components that describe the behaviour, adaptability to the external changes and demands on the requirement of safety management system.

Vinodkumar and Bhasi (2010) using safety knowledge as a mediator in their research and suggested the role of safety knowledge as a moderator. Subramaniam, Mohd Zin, & Nadir (2013) also used safety knowledge as a mediator in workers behaviour towards compliance of safety at workplace in their study. Previous study by Cooper (2000) also stated that fewer research studied the role of mediator/moderator in safety culture model. With these previous findings, the main purpose of this study was to test the influence of safety knowledge as a moderator on the relationship between each of the three dimension elements with safety culture.

## 2. Methodology

### 2.1 The Measurement Tools

Cooper (2000) stated that the three main aspects of safety culture models (psychological, situational and behavioural) could be measured using quantitative and/or qualitative method. Quantitative method is the most popular method being used in safety culture research (Guldenmuld, 2010). Psychological and behavioural measurement is generally collected from the individual perspective and then requires some amalgam of the measurement to gauge the collective culture (Flannery, 2001). Psychological aspect is popularly measured by quantitative approach using the safety climate questionnaire to access employee perception and attitude towards safety. The items of safety attitude, peers influence and safety knowledge which related to psychological aspect will be adopted from previous questionnaires that have been developed by a number of researchers (e.g. Frazier, 2011; Idrus et al., 2004; Vinodkumar & Bhasi, 2010). The behaviour aspect will be meas-

ured using items from Chenhall (2010), Frazier (2011) and, Vinodkumar and Bhasi (2010) with the elements of management commitment, safety communication and, reward and recognition. The situational aspect will appear in the Vocational College structure and will include items such as safety rules, personal protective equipment, safety training and accident and incident reporting. The questionnaire on this dimension will be adopted from previous questionnaires that have been developed by a previous researchers (e.g. Abdullah (2010), Idrus et al. (2004) and, Vinodkumar & Bhasi (2010)).

### 2.2. The Unit of Analysis

The target respondents involved in this study are instructors that teach engineering technology courses from VC all over Malaysia. These instructors facing a wide range of safety hazard and hazard risks due to the use of various types of machinery and equipment in the VC workshops and laboratories. The approach is consistent with the proposition that instructors play an important role in education sector to influence cultural identity.

### 2.3. The Main Survey

The formulation of the Main Survey formed the first stage of the proposed framework development. A five-point likert scale with a total of 74 items will used to measure all the factors of these three dimensions. This lead to the development of the main survey measuring the psychological, behavioural, and situational factors of the Malaysian education sector specifically at vocational and technical education organisation. The questionnaire survey was divided into four main sections. The first section solicits the background of the respondents, while the second, third and fourth focused on the priority given on the characteristics of the three main factors, as well as the psychological, behavioural, and environmental factors. The final section solicits on the safety culture of the VC.

### 2.4 The Survey Validation

The survey validation process will undergo two phases of validation. On the first phase, specialists will validate the survey questionnaire instrument in occupational safety and health, as well as academicians in a local university. Apart from the specialist and also academicians, the questionnaires will be given to future respondents, which are the instructors at VC. These panels of the validations were selected based on their proactive involvement and contribution in enhancing safety at the national level and also experience in quantitative research. We validate measurement instruments by considering criteria such as face validity and content validity. This is to ensure that the measure consists of an adequate and representative set of items that tap a particular concept (Maiyaki & Mokhtar, 2011). The validation aspects was limited to the appropriateness, ease of use, coverage in terms of its content, components, elements and items, and soliciting comments for future improvement (Idrus et al., 2004). While for the second phase of validation is a pilot study. About 40 of the future respondents will answer the questionnaire. Analysis by using SPSS V24 will be used to get the value of Cronbach Alpha to see the inter-item reliability test. Items are reliable if the value of Cronbach Alpha above the benchmark of 0.70 (Sekaran, 2003).

### 2.5 Descriptive Statistics

Demographic variables will be analysed using SPSS 24 to study the perception of the respondents towards all the factors involved in this study. This will be the preliminary result towards safety culture in Malaysian education sector.

### 3. Causal Relationship between Psychological, Behavioral, Situational, Dimension and Safety Culture using SEM

SEM is selected to achieve the objective of finding the causal relationship between safety culture dimensions (psychological, behavioural and situational) factors and the safety culture, and effect of safety knowledge as a moderating factor between all the relationships tested. SEM is primarily used to examine the relationship of one or more independent variables (IVs) with one or more dependent variables (DVs). Both IVs and DVs can be either measured variables (directly observed) or latent variables (unobserved) (Hair, Ringle, & Sarstedt, 2011). SEM is unique from other multivariate techniques as it can take into account latent variables, and can provide explicit estimates of error variance parameters (Hair, Hult, Ringle, & Sarstedt, 2014). PLS-SEM is selected for this study because of its effectiveness in exploring key driving constructs, theory testing, theory development, its capability of dealing with non-normality data sets, and its minimum demand for a sample size (Hair et al., 2014). The analysis of the

causal relationship will help to explore the effects of safety culture factors on safety culture in the VC as one of the organisation in Malaysian education sector.

### 4. Research Framework of the Study

Through a review from the previous relevant literatures, a conceptual framework has been developed for a study in investigating the relationship between psychological, behavioural and situational dimension with safety culture, while safety knowledge as moderating factor in Malaysian education sector. Figure 1 illustrates the proposed conceptual framework of the study. It is hypothesized that psychological dimension (i.e. safety attitude, peers influence), behavioural dimension (i.e. management commitment, safety communication and, reward and recognition) and situational dimension (i.e. safety rules, safety training, personnel protective equipment, accident and incidence reporting) have a positive significant relationship with safety culture and safety knowledge could enhances safety culture of the employees in the context of the present study.

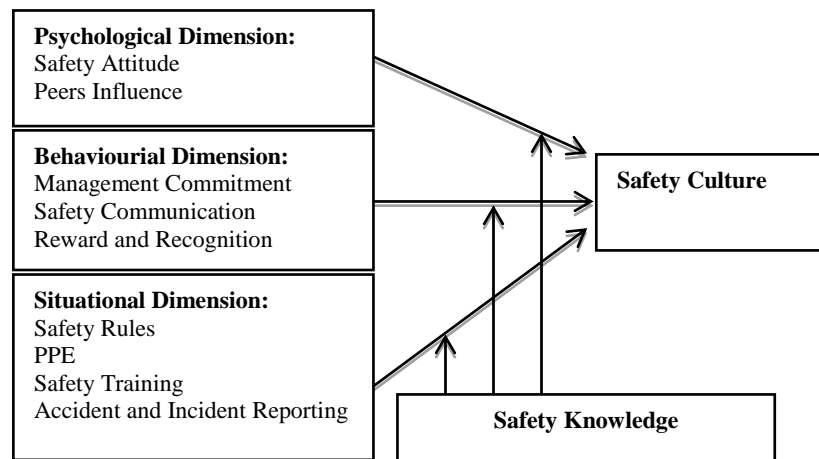


Fig. 1: Proposed Conceptual Framework

Based on the above framework, six hypotheses are proposed to be tested in the research.

H1 There is a positive significant relationship between psychological dimension (safety attitude and peers influence) and safety culture

H2 There is a positive significant relationship between behavioural dimension (management commitment, safety communication and, reward and recognition) and safety culture

H3 There is a positive significant relationship between situational dimension (safety rules, PPE, safety training and, accident and incident reporting) and safety culture

H4 Safety knowledge moderates the relationship between psychological dimension (safety attitude and peers influence) and safety culture

H5 Safety knowledge moderates the relationship between behavioural dimension (management commitment, safety communication and, reward and recognition) and safety culture

H6 Safety knowledge moderates the relationship between situational dimension (safety rules, PPE, safety training and, accident and incident reporting) and safety culture.

Research in safety culture has attracted much attention in many sectors however, not much has been done in education sector.

Researches on dimensions of safety culture have suggested many models and also dimension to be used in order to measure safety culture in many critical sectors such as construction, manufacturing and also in oil and gas industry. So this study will determine the specific dimensions of safety culture for the Malaysian education sector. Comparison of results with similar studies in other sectors at other countries will help to identify the differences of safety culture constructs and their respective significance.

### 5. Conclusion

This paper presents a research framework to investigate the relationship between dimension of psychological, behaviour and situational towards safety culture in Malaysian education sector with safety knowledge as a moderator. The present study extends Cooper's Reciprocal Safety Culture Model and studies such as Ismail et al. (2010), Sekaran (2003) and Sukadarin et al. (2012) by integrating safety knowledge as a potential moderator variable of safety culture model. Additionally, it bridges the gap of safety culture model in education sector and enhances the empirical literature by integrating safety knowledge as a moderator in the proposed model. Instructors from VC all over Malaysia are selected for the data collection. Calibration and validation samples are being used for conducting measurement model analysis to confirm the factors that contributing to safety culture. Partial least squares structural equation modelling is being used to explore the causal

relationship and develop a model with the dimension of psychological, behavioural, situational and safety culture. Besides cross-validating the safety culture dimensions in many critical sectors in an entirely different culture, region and organisational, the proposed methodology may help the education stakeholders, Ministry of Education in Malaysia to monitor and enhance safety culture in education sector.

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