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Validity and Reliability of Survey Instrument in Measuring the Occupational, Safety and Health (OSH) Culture Maturity Model

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Abstract: This study aims to check the validity and reliability of survey instrument developed in measuring the occupational, safety and health (OSH) culture maturity model. The validity and reliability of the survey instrument need to be verified as it might affect the quality of the data obtained. The survey instrument is not ready to be used to measure the OSH culture until it is validated and reliable. The survey instrument was developed based on five maturity indicator constructs; (1) information and occupational safety, (2) operational learning, (3) involvement, (4) communication, and (5) commitment. After the development of the survey instrument based on extensive literature reviews, the check on the validity and reliability were conducted by conducting a pilot test. The responses obtain from the pilot test have been analysed using SPSS software. The mean for each construct of the maturity indicators were computed and then be verified with SPSS software and Excel. The reliability of each construct was analysed using the Cronbach's Alpha value. Each construct with Cronbach's Alpha score less than 0.6 will be revised by determining which item need to be revised and deleted and removed in order to increase the Cronbach's Alpha value. The higher the Cronbach's Alpha value, the higher the reliability of the survey instrument. Once the validity and reliability of the survey instrument met the reliability and validity criteria, the survey instrument is ready to be used as the measuring tools for measuring OSH culture at the full scale. In conclusion, the survey instrument developed met all these criteria and ready for full blown study.

Keywords: Survey Instrument, Measuring OSH Culture, Pilot Test, Reliability, Validity

1. Introduction

Occupational, safety and health (OSH) culture is about how an organisation's informal aspects influence OSH in a positive or negative way (Eecklelaert et al., 2012). Zwetsloot and Steijger (2013) also defined OSH culture as a culture where everyone in the organisation believes they have a responsibility to prevent accidents and injuries and where this obligation is put into action. OSH culture often related with safety culture and safety climate.

1.1 Objectives

The objective of this study is to check on the validity and reliability of developed measuring tools in OSH culture. questionnaire's validity is determined by how well it captures the outcomes it claims on and the reliability is defined as its consistency where every time it is conducted. If the questionnaire is not valid and reliable, the questions need to be revise back.

1.2 Safety Culture

Griffin and Curcuruto (2016) states that safety culture can be defined as more than the direct views of individuals, the underlying ideas and values that direct behaviour in organisations. This definition aligns with what stated by The Health Foundation, UK (2011) where safety culture is the norms, values, and basic assumptions of an organisation as a whole. Tengilimoglu et al. (2016) defined safety culture is the end result of individual and group patterns of beliefs, attitudes, competence, and behaviour. This culture affects how well and persistently the organization's health and safety policies are implemented. In simple words to summarised all the literature review stated above, safety culture is a combination of attitudes, beliefs, values, peer pressure, perceptions and taboos held by certain organisation. As safety culture is the combination of attitudes, values and beliefs of all employees within the organisation, it is very important to maintain a good safety culture.

1.3 Safety climate

Safety climate is a subset of safety culture where safety culture representing all aspects across the organization but safety climate solely focuses on staff perception about specific aspect. Safety climate is a summary of holistic perceptions on work environment shared by workers (Zohar, 2011). Similar according to Chyene et al. (1998), safety climate is a broad notion that encompasses an organisation's safety ethics and how employees perceive safety. Safety climate also can be defined as perceptions about many aspects of the work environment can be shared across teams, organizations, and other collectives (Griffin and Curcuruto, 2016). As a subset of safety culture, safety climate is very significant as the accumulation of safety climate is what will develop safety culture of an organisation.

1.4 Measuring OSH Culture

Measuring safety culture and safety climate aims to gain insights of how organisations stand on OSH issues and where to best concentrate resources to sustain and/or improve safety culture and safety climate. The measurement also wants to set a baseline to measure the effectiveness of initiatives to improve safety culture and safety climate. Other than that, is to monitor the progress to achieve good safety culture and safety climate (Vu & Cieri, 2015).

1.4.1 Measuring Safety Climate

Measuring safety climate is simpler than measuring safety culture. Depending on the requirements and capabilities of an organisation, there are various techniques to measure the safety climate. It can be quantified formally using measuring tools like surveys and questionnaires. The results of the surveys or questionnaires can be used throughout the organisation, and there are numerous free tools accessible online that evaluate the safety climate (Queensland Government, 2019).

1.4.2 Measuring Safety Culture

Measuring safety culture is more difficult and requires a variety of assessment methods. It is affected by safety culture, norms, practises, and attitudes. A safety culture assessment looks at these elements using both qualitative and quantitative information. Safety culture assessment procedure includes: (1) review relevant documentations, programmes, and policies, (2) discuss the goal of the assessment with employees, (3) conduct location walk, (4) communicate with management and key person about safety leadership, (5) distribute safety climate survey and (6) report on actionable items (Queensland Government, 2019).

2. Methodology

The questionnaire developed base on five selected maturity indicators. The five selected maturity indicators are; (1) information and occupational safety, (2) operational learning, (3) involvement, (4) communication, and (5) commitment. The questionnaire consists of two part. Part 1 is demographic questions and Part 2 is the main part of the questionnaire where the data obtain for this part will be analysed to evaluate the OSH culture. After the development of questionnaire, the pilot test conducted to check on the validity and reliability of the questionnaire. 10 responses were collected to be analysed using the SPSS software. After the development of the questions, the validity and reliability of the questionnaire need to be checked. The questionnaire cannot be distributed to the respondent until it got validated and the reliability is confirmed. To check on the validity and reliability of the questionnaire, the Cronbach’s alpha score need to be computed based on the 10 responses collected for the pilot test.

2.1 Cronbach's Alpha

One of the most used dependability indicators in the social and organisational sciences is Cronbach's alpha (Cronbach, 1951). The reliability of a sum or average of q measurements, where the q measurements may reflect q raters, occasions, alternative forms, or questionnaire/test items, is described by Cronbach's alpha reliability. A measure of "internal consistency" reliability is Cronbach's alpha, which is used most frequently when the measurements represent many questionnaire or test items (Bonett & Wright, 2014). Taber (2017) quoted from Cortina (1993) and Schmitt (1996) stated that Cronbach's alpha is one of the most significant and prevalent statistics in studies addressing the design and use of reliability test and used in research with multiple item measurements. Based on Vu and Cieri (2015), the good reliability score should be above 0.70. However, for a new developed questionnaire the score of 0.60 is tolerable.

3. Result

By using the pilot test data, the reliability of the questionnaire was checked by analyse the Cronbach's alpha for each category. High Cronbach's alpha score was favourable as the higher the score, the higher the reliability of the questionnaire. The items are deleted if required to increase the Cronbach's alpha score. Table 1 shows the Cronbach's alpha score for each maturity indicator.

Table 1. Cronbach's alpha for each maturity indicator.

Maturity indicator	Deleted item	Cronbach's alpha
Information and occupational safety	No item deleted	0.82
	Item 3	0.83
	Item 5	0.90
Operation learning	No item deleted	0.75
	Item 2	0.86
	Item 1	0.91
Involvement	No item deleted	0.81
	Item 3	0.83
	Item 1	0.86
Communication	No item deleted	0.89
	Item 3	0.89
	Item 2	0.91
Commitment	No item deleted	0.43
	Item 5	0.51
	Item 1	0.60

From the analysation of Cronbach's alpha by using the SPSS software, to obtain the highest Cronbach's alpha two items need to be deleted from every each one of the maturity indicators. With that, each maturity indicator now will only have three items to be rated by respondent of the questionnaire instead of five items. The new number of items for each maturity indicator and the best Cronbach's alpha score presented in Table 2.

Table 2. Number of items and Cronbach's alpha for each maturity indicator.

Maturity indicator	Number of items	Cronbach's alpha
Information and occupational safety	3	0.90
Operation learning	3	0.91
Involvement	3	0.86
Communication	3	0.91
Commitment	3	0.60

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4. Conclusion

With the guide from a report of A Review and Evaluation of Safety Culture and Safety Climate Measurement Tools by Vu and Ceiri (2015), the current set of question developed and adjusted is reliable as the reliable Cronbach's alpha score ranging from 0.60 to 0.91. The objective to check on the validity and the reliability of the questionnaire has been confirmed through computing Cronbach's alpha score based on the data obtained from the pilot test.

5. Refences

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