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Risk Management Theory and Model in Teacher Characters Building Course: A Literature Review

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Abstract: This literature review compares the similarities of theories and models that are often applied in sports risk management, outdoor activity, facilities, practices achieving course and organizational goals. Exposure to the risk of loss, injury, and accident while organizing outdoor activities encourages organizations to study risk management theories and models to avoid unanticipated events. Risk management theories and models such as Domino's Accident Causation Theory (DACT), Peterson Accident Theory (PAT) and Ferrel Human Factor Theory (FHFT) and six risk management models, such as Berg Risk Management Model (BRMM), Public Risk Communication Model (PRCM), The Kaiser Model (KM), the Berlonghi Model (BM), the Mulrooney Model (MM) and the Clement Model (CM) discussed in this concept paper, in the perspective of the implementation of the Teacher Characters Building (TCB) course. The contribution of this literature review sketches a comparison of constructs used in risk management theory and model, using similarities table, and conclude that public risk communication and stakeholder constructs should be recognized as constructs in the development of Teacher Characters Building risk management model.

Keywords: Risk management, teacher characters building, concept paper

1. Introduction

The fundamentals of risk management are emerging attention of scholars in education management in Malaysia. Circular on specialization 9/2000 dated 20 March 2000: Guide to Personal Safety of Students During the Teaching of Physical Education and Health as well as Co-curricular Activities and Sports Inside and Outside the School Area, shows that the Ministry of Education (MOE) Malaysia concerned about the safety of teachers and students during extracurricular activities outside the classroom require more attention. The issue of risk management in foreign nations was addressed in a report published by the European Agency for Safety and Health at Work (EU-OSHA) in 2013, for education to integrate risk management, safety and health education is part of the routine for educators, staff and students in school (Oriente & Alvarado, 2020). Recommendations are made to policy makers to provide training to teachers on how to assess, manage and integrate risk education into teaching. In addition, various cases are reported and practical ways to train in-service teachers and teacher trainee are proposed in this report. Cultivating risk management in school will result in risk-aware human capital that is prepared to manage a variety of hazards, including time waste and property loss, in addition to physical accidents (Chong & Sungap, 2021).

1.1 Risk Management

Henri Fayol's essential component of risk management includes planning, directing, coordinating, and controlling, along with 14 management principles that are widely recognized in many businesses (Bacud, 2020). While, management is the process of predicting, planning, organizing, directing, coordinating, and controlling activity to become more structured and meet the activity, program, and organization's goals (Godwin et al., 2017). According to Kontz & Weihrich (2008) and Loch & Wu (2007) management are an organizational process that encompasses strategic planning, which is planning, organizing, directing, and regulating all organizational resources to attain the organization's goals. Because each member of the organization has tasks and responsibilities in order to achieve the goals of a planned program, this management process involves all members of the organization. The attainment of organizational goals necessitates the

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cooperation of all members, as well as adherence to the process as defined, control, and monitoring by the organization's leaders.

Risk refers to the probability of unfavorable situations, such as being exposed to uncomfortable risky situations, such as loss, injury, or accidents, which affect the level of uncertainty in achieving objectives (Baharudin et al., 2017; Redja, 2012; Plackett, 1969) of an organization or program. A program should be given extra attention by the organizer based on his or her experience in order to reduce the risk by analyzing the types of accidents that could occur before the program is prepared by providing a checklist. In each activity to be held, the organizer should consider the cause aspects of the accident or injury so that the organizers may decide whether to take risks and resume the activity or avoid risk by skip the activities with a high risk of accidents.

According to Brown (2001) risk management is a systematic approach to detecting risk exposure and taking steps to mitigate its impact. Redja (2012) outlines four risk management practice plans, namely: i) identify loss exposures; ii) measure and analyze loss exposures; iii) select appropriate combinations to treat loss exposures; and iv) implement and monitor risk management programs.

1.2 Teacher Characters Building (TCB) Course

Learning encompasses the cognitive, emotional, and psychomotor domains, all of which influence behavior (Jamian, 2002) delivered from a planned and structured source (curriculum). The TCB course is a curriculum developed by the Malaysian Institute of Teacher Education (MITE) for the use of trainee teachers to strengthen their identity development, leadership, teamwork, socialization, and professionalism through authentic extracurricular activities to use soft skills (Hassan et al., 2015). TCB is a two-credit course for students enrolled in the Bachelor of Teaching (BT) program that includes camping, adventure and survival activities, water confidence, kayaking, flying fox/abseiling, and community and school program that take place off-campus and expose them to the risk of injury, accident and loss.

Based on the synopsis of the TCB MITE (in Hassan et al., 2015), this course aims to produce teachers who are knowledgeable, proactive, resilient, competitive, and have values and professional attitudes in line with local values. This course emphasizes the formation teachers of identity, leadership, teamwork, and social skills through authentic, holistic, and contextual experiences. In addition, teachers' trainees can strengthen soft skills such as leadership, teamwork, socialization, and professionalism of teachers through activities outside the classroom. The course has 2 credit scores equivalent to 83 hours of total interaction, divided into 54 hours of face-to-face interaction and 19 hours of non-face-to-face interaction. Details of curriculum content such as Program Management (4 hours), Citizenship and Unity (3 hours), Active and Patriotic Malaysia (2 hours), Healthy Eating Practices (8 hours), Adventure and Survival (6 hours), Confidence in the water (6 hours), Raft/ kayak/ other buoyancy activities (5 hours), Flying Fox/Abseiling Activities (6 hours), Preliminary/Spirituality/Moral (5 hours), The role of teachers towards the local community (5 hours), Professional interaction with school administrators (4 hours), social etiquette and protocol (3 hours) and reflection activities (3 hours) implemented in 4 days, 3 nights, off campus camp program.

2. Literature Review

The design of this literature review is based on 3 theories and 6 models that applied in risk management. The study findings were analyzed using a construct similarities comparison approach built using a table of similarities.

2.1 Domino's Accident Causation Theory (1920)

Herbert W. Heinrich, while working at an insurance agency, proposed the Domino accident causation theory. He began studying 75,000 case reports of industrial accidents in 1920 and came to three conclusions: 88 percent of accidents were caused by risky acts taken by workers, 10% were caused by unsafe conditions, and 2% were caused by unavoidable reasons. He characterised an accident as something unplanned and uncontrollable based on the study's findings. According to Heinrich, the theory of accident causes includes the human-facility link, the frequency-severity relationship, dangerous acts, the role of management in accident prevention, accident cost, and the impact of safety on efficiency.

Domino's accident theory is based on 5 consecutive factors namely; Compliance and social environment, Individual negligence, acts or unsafe physical facilities, Accidents, and Injuries. Compliance and environmental factors are the processes of knowing the routines, culture, and skills in the work environment. Lack of knowledge and skills to handle tasks, not understanding the work environment will cause individuals to make mistakes. Mistakes made by individuals will result in injuries and accidents while performing tasks.

Individual negligence happens when a person has a negative disposition, is not attentive to the surroundings, such as weather, and uses poorly maintained equipment, resulting in harmful conditions. The factor of neglect can be avoided when arranging an activity if members of an organization are sensitive to early warnings of the environment and facilities by giving a checklist before, during, and after the activity is organized. A crucial checklist is supplied to prevent the loss of critical information that must be handled in order for the organizing process to proceed properly.

Unsafe condition is known by Heinrich as unsafe physical facilities referring to obsolete or unmaintained facilities and equipment, technical errors, and flaws that operate the equipment resulting in injuries and accidents. In organizing the programme, a thorough inspection by an accredited panel must be made before the programme begins to ensure that

all facilities and equipment are safe to use. Failure to inspect facilities and equipment by an accredited panel invites injuries and accidents to the organizers as well as to the participants of the programme. Therefore, the verification of an accredited panel is required in organising TCB courses because facilities and equipment for the use of organizers and participants provided by external parties in order to prevent accidents. The unsafe facility factor is known by Heinrich as the accident factor leading to the injury factor.

All programme organisers and participants are responsible for avoiding injuries and mishaps while planning activities, especially those that involve activities outside of the classroom. Risk management skills and knowledge should not be limited to organisers but participants should also be exposed to programme risk management as a form of preparation and early warning so that all parties are prepared to deal with unforeseen problems in the field. The Domino theory is a well-known idea that frequently stresses the importance of accident prevention by taking suitable measures.

2.2 Peterson's Accident Theory (1982)

Peterson's Accident Theory (1982) is a management-based theory. This theoretical approach is focused on an organization's management system rather than an individual's role in causing an accident. Peterson's theory states that failure in the management aspect of security risk is the failure of the employer and management. This reveals that the employer and management are accountable for ensuring that employee accidents and injuries are prevented during the organization's operations. In his theory, Peterson lists three essential elements: ergonomic traps, error-driven consequences, and system failures. The system is referring to a member, and the organization's management is accountable for ensuring that all safety regulations and guidelines are applied correctly and consistently.

Peterson's accident theory has explained that system failure occurs when there is no serious participation from employers and organizational management in aspects of safety risk management, does not provide complete risk and safety procedures, does not explain in detail about risk and safety-related responsibilities and enforcement, risk and safety management procedures in the organization are not adhered to in terms of monitoring, implementation and maintenance and technical training programmes are not provided adequately (Peterson et al., 2001).

Human accidents and injuries can be caused by organizational issues such as lax safety regulations and procedures, a lack of proper training, and monitoring systems that do not follow established guidelines. According to this idea, organizational management should establish rules and safety guidelines that are enforced, as well as identification, evaluation, operational selection (Communication, Technology, Emergency Management, and Transportation), and execution.

2.3 Farrel's Human Factors Theory (1997)

Russell Farrel's Human Factor Theory (1997), indicated human error as the primary cause of accidents. The causal factors of accidents are overload, inappropriate reactions, and inappropriate activities. Overload contribute by three other factors such as environmental factors (noise, disturbance, weather, etc.), internal factors (personal problems and emotional stress), and situational factors (unclear instructions, level of risk). Overload factor reaction occurs when the load and human capability are incompatible, resulting in an incorrect response. Individuals' lack of knowledge and skill in a particular activity contribute to the occurrence of accidents.

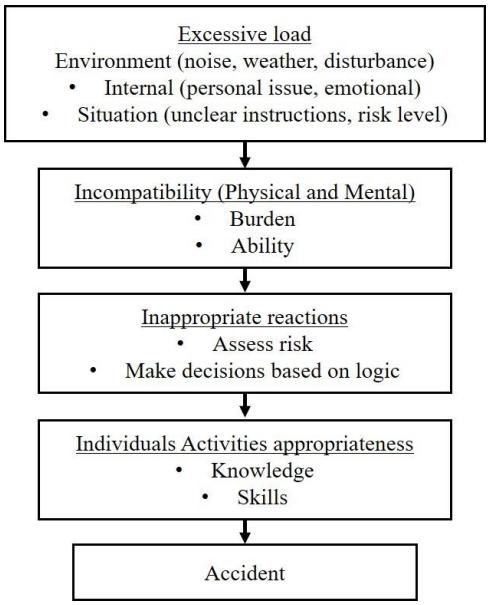

Fig. 1: Farrel's Human Factors Theory (1997)

2.4 Berg's Risk Management Model (2010)

Berg's Risk Management Model (2010) as shown in Figure 2 which has been presented and utilized as a reference by many organizations. According to Berg (2010), risk management measures include setting goals, identifying risks, analyzing identified risks, assessing or selecting risks, treating risks, monitoring and reviewing risks, and engaging with stakeholders.

In the early phase of planning in this model is the process of creating goals, a process of understanding the external and internal cultural environment of the organization's operations. This analysis should be carried out through strategic planning in the context of organizational and risk management, identifying constraints and opportunities in the operating environment, analysis in the context of environmental culture, such as regulatory requirements, codes, and standards, establishing relevant and appropriate corporate guidelines and documents with reference to managing risk in recent years. SWOT (Strengths, Weaknesses, Opportunities, and Threats) and PEST (Political, Economic, Society, and Technology) analysis are two methods for analyzing and evaluating. Part of this measure is to develop risk criteria that are interdependent with the organization's internal policies, goals, and objectives, as well as those of stakeholders.

The second phase is to identify risks, using information from the SWOT analysis and PEST framework to identify risks that may affect the initiatives, activities, and achievement of organizational goals. The risks that have been identified could represent opportunities or strengths that have been ignored. Identifying risks in activities, facilities, and organizations that may inadvertently generate larger risk does not necessitate quantitative risk analysis; instead, insignificant risks will be deleted at the next level, as is normal approach at this point as a risk screening procedure.

The third phase is risk analysis, which involves considering the sources of risk, consequences, and possibilities of the existing risk estimates. The process also involves controls, estimation of effectiveness, and the level of risk controls. Risk matrix tables can be used for qualitative and quantitative analysis, depending on the objective of the analysis, information, and data. The following step in the risk treatment process is to compare the prior documents to the risk matrix table. If the risk covered exceeds the risk accepted, the risk necessitates the implementation of new control measures as well as improvements in the effectiveness of current controls. The manager's intelligence determines whether to accept or reject a risk.

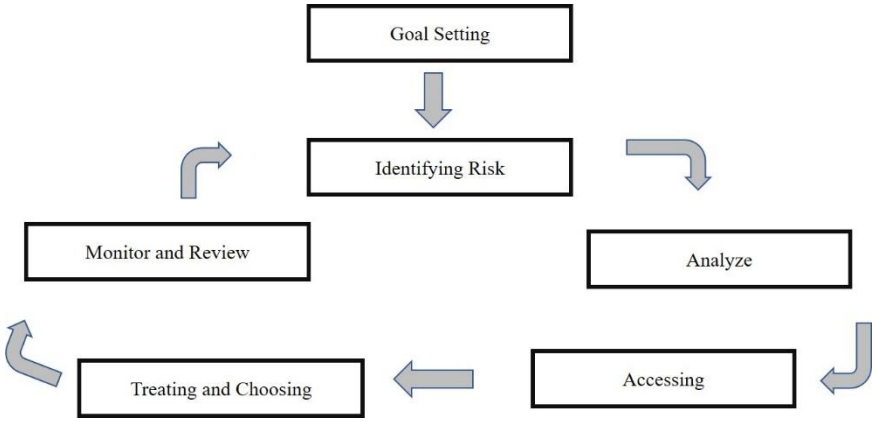

Fig. 2: Berg Risk Management Model (Berg, 2010)

The phase of treating and choosing a risk determines that an unacceptable risk requires treatment. The objective of this phase is to assess risk by developing cost-effective options with a view to risk treatment. Treatment options are not necessarily appropriate in all situations because they are driven by outcomes such as risk avoidance, risk reduction, risk transfer (sharing), and risk acceptance.

Berg's risk management model final phase monitoring and review of hazards. Individuals and organizations must recognize at this point that the idea of risk is dynamic in nature and requires formal and periodic examination. The goal of periodic monitoring and evaluations is to search for new hazards, their influence on the organization by measuring treatment outcomes, and any indications of failure that need to be identified. The duration of the study is determined by the operating environment, including the law. The identification, assessment, and management of risks in all aspects of an organization helps to disclose the level of risk that each part must address, indicating the organization's interdependence. Integrated risk management not only focuses on risk reduction, but also on actions that promote coaching innovation in order to accomplish learning objectives.

2.5 Public Risk Communication Model (2020)

In emergency management, risk communication is critical. Figure 3 shows a public communication management model (Zhang et al., 2020) that highlights three components of communication interaction: government-public communication, government-expert communication, and expert-public communication. The government is a crucial decision-maker that

has a significant impact on the effectiveness of a government administration, according to the public risk communication model. Government-to-public communication is a unique type of external communication in which the government is responsible for providing correct and sufficient information to the public (Zhang et al., 2020), which means that all information is distributed or openly accessible.

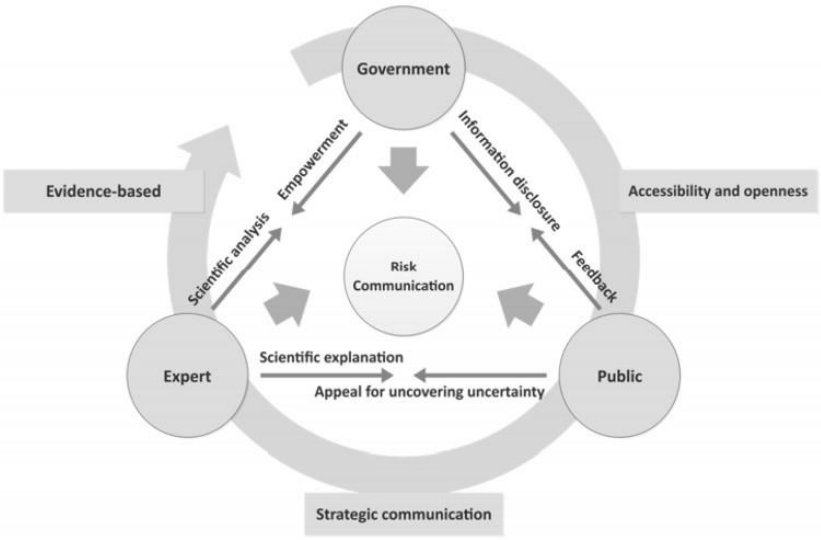

Fig. 3: Public Risk Communication Model (Zhang et al., 2020)

Communication between governments and experts, which is considered as internal communication connected to field knowledge and expertise, is a vital part in risk assessment and decision-making (Zhang et al., 2020). All experts should take responsible action in decision-making to ensure risk assessment and reduce negative outcomes. Communication between experts and the public aims to bridge the gap between the views of experts and the community (Zhang et al., 2020) through strategic communication. In this model, this communication reflects external communication. The big challenge is not only to impart knowledge but people also struggle to comprehend a risk in depth. As a result, it is the expert's obligation to translate knowledge and information into a manner that is easier to comprehend. Communication risks should be balanced and not highly centralized, with each division taking responsibility for its own part. This paradigm highlights the significance of government, expert, and public communication risk sharing.

2.6 Kaiser Model (1986)

Kaiser's (1986) model focuses on financial risk management to reduce the risk of loss which contains the characteristics of classification, evaluation, selection, and execution. The classification phase in risk management is to identify the risk tort liabilities faced by the organization and its management such as financial and legal risks. The evaluation phase involves surveys using questionnaires in analyzing the risks available from insurance companies and restructuring based on organizational needs. Measurement techniques in risk assessment will determine the level of loss based on the duration and financial resources of the organization. The selection phase involves: i) risk avoidance, ii) reduction to risk, iii) risk retention, and iv) risk transfer intended to protect the organization from the risk of loss (Jaffry et al., 2016). The implementation phase involves government policies and policies, administrative procedures that need to be followed such as providing trained staff while conducting activities.

2.7 Berlonghi Model (1995)

The Berlonghi (1995) model was created expressly for event managers to use in their decision-making process in order to minimize the negative consequences of losses experienced when planning activities. Risk analysis, technical analysis and risk management planning, effective planning actions and procedures, risk management implementation, and program evaluation are the five steps proposed by the Berlonghi Model for event organization risk management (Ashwin, 2021). The risk analysis phase looks into the potential for losses, the causes of losses, the parties involved in the losses, and the financial effect of the losses. Management should explore alternative solutions through risk control and financing, where the risk is transferred to the insurer as a preventive measure to the identified risks, during the technical review and risk management planning phase. The action phase of effective planning and techniques involves the selection of the solution that best suits the goals and objectives of the activity by taking into account the frequency and expected level of loss of activity. The implementation phase of the organizer's program is required to carry out the planned activities based on the risk management recommendations because the organizers have experience and skills related to the activities to be implemented. The evaluation phase involves all aspects such as cost and risk prevention measures.

2.8 Mulrooney Model (1998)

Mulrooney & Farmer (1998), risk management approach includes four aspects: risk identification, risk assessment, risk treatment, and standard operating procedures (SOPs). As the best instrument for risk identification, skilled and experienced personnel should be used. The risk assessment part of this strategy involves using a matrix table to classify the dangers that exist. The risk treatment element is based on the frequency and number of losses incurred, as determined by the risk matrix table, in order to assess risk transfer to the insurer (Jaffry et al., 2016). The planning of SOP activities makes it easier to implement in order to reduce losses and accidental injuries.

2.9 Clement Model (1998)

The identification, assessment, and control processes are all part of Clement et al. (1998) paradigm. According to Jaffry et al. (2016), the organizer will identify the risk of loss and legal liability for activities that could result in loss or accident during the identification phase. The evaluation step will identify the likelihood of the quantity of risk present, as well as the risk level. Accept the risk and treat it as a responsibility, maintain the activity and transfer the risk to the insurer, make modifications to the activity to reduce the risk, and reject the risk by dropping the planned activity to avoid the occurrence of the risk are the four options available to the organizer during the liability control phase.

2.10 Risk Management Constructs Based on Theory and Model

Table 1: Constructs based on theory and model

THEORY	**CONSTRUCT**					
Domino's Accident Causation Theory (1920)	Compliance and social environment	Individual negligence	Acts or unsafe physical facilities	Accident	Injuries	
Peterson's Accident Theory (1982)	Ergonomic Traps (Work environment efficiency)	Decisions that drive errors (Knowledge and Experience)	System failure (Preparation, Procedure Compliance)			
Farrel's Human Factors Theory (1997)	Overload (Environment, Interior and Situation)		Incompatibility (Loads and Capabilities)	Inappropriate reactions	Inappropriate Individual activity	
MODEL	**CONSTRUCT**					
Public Risk Communication Model (2020)	Government-Expert (Assessing risk and decision making)	Public-Expert (Scientific Explanation-Resolving Uncertainty)		Government-Public (Disclosure of information and feedback)		
Berg's Risk Management Model (2010)	Goal Setting	Identify risks	Analyse the risk	Assess the risk	Treatment and choosing risks	Monitor and review risks	Communication with stakeholders
Mulrooney Model (1998)	Identify	Assessment	Treatment	Setting Procedures			
Clement Model (1998)	Identification	Assessment		Control			
Berlonghi Model (1990)	Analyze	Technical and Planning Research	Effective technical action	Implementation		Assessment	
Kaiser Model (1986)	Classification	Assessment		Selection		Selection	

2.11 Theory and Model's Construct Similarities Analysis

Table 2: Risk management Theory's construct similarities analysis

No	**Construct**	**Domino's Accident Causation Theory (1920)**	**Peterson's Accident Theory (1982)**	**Farrel's Human Factors Theory (1997)**

1	Establishing and compliance safety procedures	√	√	
2	Unsafe Facilities and Environment	√	√	√
3	Individual activity, negligence and reaction	√		√
4	Knowledge, Skills and Individual Burden		√	√

Table 3: Risk management Model's construct similarities analysis

No	Constructs (Risks)	Public Risk Communication Model (2020)	Berg's Risk Management Model (2010)	Mulrooney Model (1998)	Clement Model (1998)	Berlonghi Model (1990)	Kaiser Model (1986)
1	Identify		√	√	√	√	√
2	Analyze		√			√	
3	Assess	√	√	√	√	√	√
4	Select and Treat			√	√	√	√
5	Implementation					√	√
6	Public Communications and Stakeholder	√	√				

3. Discussion

3.1 TCB Perspective Construct Similarities Between Theory and Model

There are some notable construct similarities proposed by previous researchers based on the theoretical construct comparison. Unsafe facilities and settings are the source of injuries and accidents, according to all three theories of accident causes. Physical facilities, such as swimming pools with a depth that is too deep for the participant to swim in, are not appropriate for the participants' swimming abilities, rotten ropes and other equipment for specific activities, hazardous materials to light fires, unmaintained machines, and so forth in the context of implementing the Teacher Character Building (TCB) course. Unsafe surroundings include jungle tracking routes that are slick, rough, and steep, as well as sites that are too far away for rescue access. The Domino Causes Theory (DACT) and the Peterson Accident Theory (PAT) both emphasize the importance of establishing safety measures and adhering to them in order to avoid accidents. Instructors and participants are exposed to the potential of accidents while participating in TCB activities such as hiking and survival, water confidence, kayaking, flying fox/abseiling, and community service. To avoid injuries and mishaps, it is crucial to plan ahead of time and follow safety protocols before, during, and after these activities. Participants' confidence in organising TCB courses can be boosted by providing a certified emergency crew for each risky activity. Farrel's Human Factor Theory (FHFT) and DACT state that the causal factors of accidents are factors of activity, negligence and individual response to a situation. The activities chosen in the context of TCB should be appropriate for the participants' level of competence. Extreme activities that are beyond the participants' abilities are very likely to result in injuries and accidents. Because negligence is synonymous with accidents, safety considerations such as the preparation of emergency equipment, safety equipment, and the environment should be prioritised when conducting operations. Individual or team response efficiency during an accident is essential to minimise losses and deaths. As stated in the PAT and FHFT, the individual's knowledge, skills, and load are significant in reducing the occurrence of risks. The skills and experience of the teaching staff are a requirement for the appointment of a coach in the TCB environment. In addition, certain activities a professional skills certificate is necessary such as the Bronze Medallion for water activities. When performing an activity, the organiser must give an appropriate ratio of instructors to participants in order to lessen individual burden.

The Public Risk Communication Model (PRCM), Berg Risk Management Model (BRMM), Mulrooney Model (MM), Clement Model (CM), Berlonghi Model (BM), and Kaiser Model (KM) are the six models compared in this concept paper. The risk assessment construct is the proposed construct for all the models studied. In the context of TCB, the risk assessment should be made unanimously and collectively by qualified and experienced parties as BRMM, MM, CM, BM, and KM require organizers to identify the risks that exist before implementing activities. In the context of TCB, identifying risks is particularly important because all activities are conducted outside the classroom that involves physical activity and is prone to injuries and accidents. Identifying risks means, the organizer should conduct a site visit and conduct observations with accredited parties before planning activities. In addition, the organizer must examine the background of the participants to identify the level of health and physical ability of each participant in planning

appropriate activities. Before carrying out the activity, the organizer must choose and treat the risks according to the MM, CM, BM, and KM risk management models. Selecting and treating risk in the context of the TCB means pursuing the activities listed in the curriculum by providing low-risk activities by selecting a suitable site, adequate and trained instructors, providing a qualified emergency team, and ensuring that all participants are covered by insurance. Constructs similarities found in the 6 risk management models studied are: i) risk analysis (BRMM and BM Model), ii) implementation (BM and KM Model) iii). public and stakeholder communications (PRCM and BRMM Models). Other models detect construct mismatch because this construct is a process that cannot be separated from the two fundamental constructs. The researcher pays great attention to these three constructs when it comes to risk management weather to accept and treat or decline risk.

4. Conclusion

Previous risk management theories and models have highlighted the relevance of risk management not only in organizations, but also in everyday life. Safety concerns should be addressed so that all parties are aware of the consequences of any decisions taken. There is a need to introduce new constructs to the risk management framework of the TCB course based on the literature review and the content of the TCB curriculum. Because of the requirement for interaction between experts, government, the public, and stakeholders, the constructs of public risk communication and stakeholders were introduced from PRCM (2020) and BRMM (2010) models. This interaction will provide expert answers to questions, provide information from the government in a transparent manner, and dispel public misconceptions about risk management in the implementation of the TCB curriculum at the Malaysian Institute of Teacher Education.

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