Disaster Risk Management Skills of the Tertiary Students: Tailoring Proactive Approach for Developing the Mental Alertness of the Maritime Education Students

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Abstract

The maritime sector is currently going through changes concerning safety and operational quality. The International Safety Management Code is a regulatory tool that focuses on management and organizational issues within this industry. It mandates that shipping companies enhance their operations. In this research, students studying maritime subjects perceived themselves as lacking proficiency in disaster management skills. Education in disaster preparedness can provide crucial knowledge and abilities that can save lives and support individuals, especially children and young people, during and after emergencies. Therefore, the researcher suggests that personnel involved in disaster risk reduction and management (DRRM) should consistently provide training and equip numerous volunteers to act as first responders for various hazards.

Keywords: ***disaster risk management, tertiary students, approach, mental alertness, maritime education students***

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Introduction

The severity and occurrence of extreme weather events, such as floods, droughts, and tropical storms, have significantly risen globally in recent years. This pattern is projected to continue in a future climate characterized by higher temperatures (Field et al., 2012). The number of documented disaster incidents has more than tripled since 1975, increasing from 65 incidents in 1975 to 344 incidents in 2014. These disasters caused extensive damage globally, reaching a total of US$98.43 billion in 2014 alone, and affecting over 140 million people (Centre for Research on the Epidemiology of Disasters, 2015; EM-DAT, 2015). Low- and middle-income countries bear the brunt of these events, as they are highly vulnerable to their impacts. Consequently, it becomes evident that reducing disaster risks is essential for social and economic development, particularly for ensuring sustainable development in the future. Hence, strengthening resilience and adaptive capacity to climate-related hazards, including the mitigation of disaster risks, is one of the key objectives of Goal 13 in the recently adopted Sustainable Development Goals (UNISDR, 2015). Disasters, regardless of their origin, constitute substantial dangers affecting populations worldwide. The negative effects may result in fatalities, harm to the built environment, disturbance of necessary operations, and

financial uncertainty. In order to efficiently tackle these obstacles, the control of potential disasters has become recognized as an essential discipline of educational exploration and hands-on experience. Disaster Risk Management aims to reduce the susceptibility of local populations and strengthen their ability to recover from calamities through anticipatory steps and successful disaster management approaches.

Within the varied demographics vulnerable to the impacts of calamities, higher education students, especially those studying maritime courses, hold a distinctive position. The maritime sector has a crucial impact for the purposes of worldwide exchange, conveyance, and socio-economic advancement. It is vital for those pursuing maritime education to develop the essential aptitudes and mental sharpness to manage potential catastrophe scenarios.

The objective of this study is to investigate the impact of education in fostering disaster preparedness. A pressing objective of Goal 13 in the Sustainable Development Goals is to strengthen resilience against climate-related risks. Implementing actions such as storing emergency provisions or devising a household evacuation strategy can greatly mitigate the negative impacts and destruction caused by natural calamities. However, even in areas prone to disasters, the level of household preparedness is often low. This paper focuses on the factors that influence personal disaster preparedness and investigates two main aspects: (1) how education contributes to preparedness, and (2) the interaction between education and experience in shaping preparedness actions.

This study examines data collected through face-to-face surveys conducted with adults aged 15 and older in Thailand (N = 1,310) and the Philippines (N = 889, exclusively females). After accounting for various socio-demographic and contextual factors, the results indicate that formal education increases the likelihood of individuals being prepared for disasters. To gain further insights into the impact of education, the study employs the KHB method and discovers that in Thailand, education primarily influences disaster preparedness through factors such as social capital and disaster risk perception. However, in the Philippines, there is no observable evidence of education's influence through these channels. This suggests that the mechanisms through which education affects preparedness are highly contingent on the specific context.

Furthermore, concerning the association between education and prior exposure to disasters, the research finds that education predominantly enhances disaster preparedness for households that have not previously encountered a disaster. Education fosters abstract thinking and the ability to anticipate future events, empowering individuals with higher education levels to take proactive preventive measures even in the absence of personal disaster experiences. These findings align with the current emphasis of United Nations agencies on advocating for education aimed at sustainable development. Furthermore, they offer empirical proof of the beneficial side effects of education in mitigating the risks associated with disasters.

Comprehending the particular difficulties and potential encountered among students studying maritime education is essential for formulating bespoke plans for improving their ability to manage disasters. Creating customized plans to improve their abilities in handling disasters is vital for comprehending the particular difficulties and prospects confronted by those enrolled in maritime education programs. The suggested guidelines will contribute to improving the expertise and abilities of upcoming marine experts by ensuring their thorough preparation to manage all possible hazards and difficulties in their occupational path.

The study seeks to investigate the expertise in disaster risk management among tertiary-level learners. With a particular emphasis on customizing a forward-thinking method to improve the cognitive awareness of those

enrolled in maritime education. Through providing the students in question with the necessary knowledge and skills to efficiently appraise, alleviate, and tackle disasters, they can actively contribute to more secure maritime operations. These entities additionally safeguard the wellbeing of people and ensure the security of oceanic resources.

Moreover, the present research aims to investigate the possible advantages of employing cutting-edge educational instruments and technologies to promote the education and advancement of abilities for handling disaster risk management among the cohort of maritime education students. The objective is to improve their readiness and skill to react efficiently to nautical disasters. Advancing technologies such as computer-generated simulations, learning games, and collaborative training modules can offer engaging and real-life learning opportunities. These allow students to hon their decision-making skills, find solutions to challenges, and work together as a team in simulated emergency situations.

To sum up, the current study seeks to enhance the development of catastrophe hazard control competencies among university students. Especially, the main focus is on people who are pursuing education related to maritime. Through customization and an anticipatory strategy that highlights cognitive vigilance, the objective is to equip students with the understanding and skills required to reduce the influence of calamities and bolster the well-being and flexibility of the shipping field. In the end, the objective of this study is to encourage the inclusion of disaster risk management instruction within the maritime syllabus. The objective is to cultivate an active mindset and equip upcoming maritime experts for the obstacles they might face in their career paths.

Related Litrature and Studies

On the Disaster Risks

In recent years, there have been significant advancements in national efforts to mitigate disaster risks, especially following major events like the 2004 Indian Ocean Tsunami and the 2013 Typhoon Haiyan in the Philippines (Birkmann et al., 2008). Governments have invested in structural measures for buildings and infrastructure, implemented early warning systems, and established evacuation routes and shelters, which have proven effective in saving lives (Andrews & Quintana, 2015). Nevertheless, depending solely at the national level hazard mitigation strategies is inadequate to safeguard families from the destructive consequences of calamities. It is crucial to additionally incorporate strategies at the community level to safeguard the protection and durability of the nearby neighborhoods. Specialists suggest adhering to the "Three-Day Rule" in times of crisis, implying sustaining autonomy for a period of three days at least following a catastrophe. There is a delay for regional authorities and aid agencies to deploy assets to places facing consequences (Russell et al., 1995). Hence, personal readiness steps such as accumulating provisions, keeping a home first aid kit, or formulating a family evacuation plan are vital for an efficient handling of natural calamities. These actions have the potential to significantly enhance the possibility of remaining alive and diminish the consequences of emergencies on people and society. This represents particularly crucial in countries with low and middle incomes where public management of disaster risks is not fully matured. Engaging in preventive measures within the home environment before a catastrophic event can lower the probability of casualties, wounds, and destruction of assets (as stated by Shreve and Kelman in 2014, van der Keur et al. in 2016).

In spite of the importance of personal readiness, research consistently shows relatively modest numbers of disaster readiness, even in locations at high risk of disasters. As stated by The findings of Adiyoso and Kanegae (2014) and Kohn et al. (2012), this is a worrisome pattern. Encouraging people to adopt preventive measures disregarding previous emergency incidents has posed a

significant challenge for scientists within the realm of risk assessment and communication. As mentioned by Harvatt, Petts, & Chilvers (2011), this matter should be dealt with to effectively encourage preparedness. As a reaction, regional and federal authorities, together with non-profit organizations, have put into effect emergency preparedness initiatives and disaster response exercises to increase consciousness and encourage independence and home resilience in multiple vulnerable zones. The initiatives strive to provide people and societies with the required understanding and proficiencies essential for efficiently addressing and reducing the aftermath of emergencies. Despite these educational endeavors have effectively enhanced disaster readiness in certain instances (according to Mishra and Suar, 2007, and Wood et al., 2012), various studies have documented their lack of effectiveness in initiating protective actions. Cases of these unsuccessful attempts contain studies performed by Baker (1980), Paton and Johnston (2001), Sims and Baumann (1983), and Sorensen (1983).

On te Disaster Risk Management Skills

According to Gorgias (2002), it is essential to assess risks in order to determine their relative significance and gather information about their nature and extent. Risk assessment involves identifying potential hazards in a system and ranking them based on their risk characteristics, as previously defined. This ranking can be done qualitatively or quantitatively, depending on the available time and data. Simple qualitative techniques are commonly used to identify most hazards, while more severe hazards are subjected to quantitative analysis if data is available. It is important for risk assessment in the maritime field to have a broader scope than merely searching for oil in the water, encompassing aspects such as health effects, facility damage, human factors, organizational components, and other relevant attributes. Due to the unique nature of the maritime field, there is a lack of common principles and methods for risk assessment. Therefore, there is a need for validated tools that can identify essential requirements and reasons. One of the challenges faced is the scarcity of data, particularly related to human factors. Current assessments heavily rely on the expertise of experienced mariners. Effective risk assessment provides a solid foundation for risk management.

Risk management, on the other hand, involves evaluating various actions to minimize or mitigate risks, selecting the most suitable ones, and implementing them in an integrated manner to optimize risk reduction efforts. Risk management utilizes the risk characteristics (probability, consequence, and sensitivity) developed during the risk assessment phase to control risks. For instance, if a risk is ranked high due to a high probability of occurrence, countermeasures must be devised to prevent the hazard from happening. If a risk is ranked high due to significant consequences, measures must be developed to minimize the potential impacts. Sensitivity is used as an indicator to gauge the potential effectiveness of risk management. Countermeasures are applied to a hazard until the sensitivity decreases to a point where further risk management is not a preferable option. Therefore, sensitivity plays a crucial role in the decision-making process.

On theApproaches for Developing the Mental Alertness

The role of human factors in causing errors and mistakes that result in serious maritime accidents has been emphasized in studies conducted by Hetherington et al. (2006), Chen et al. (2020), and Wrobel (2021). It is imperative to address human factors systematically in order to break the chain of systemic failures and prevent accidents. Therefore, it is essential to analyze the human factors involved in maritime operations to ensure safety at sea (Chauvin et al., 2013). By studying accident reports from 2012 to 2017 obtained from the Transportation Safety Board of Canada (TSB) and the Marine Accident Investigation Branch (MAIB), statistical

analysis demonstrates that multiple human factors play a role in maritime accidents. These factors include "poor communication and coordination" in 30.77% of accidents, "ineffective supervision and support of the bridge team" in 32.69% of accidents, "no clear order" in 37.50% of accidents, "seafarers' unfamiliarity with equipment, insufficient capability, or ill-preparedness" in 32.69% of accidents, and "poor lookout" in 15.38% of accidents (Fan et al., 2020a). In order to ensure effective management of ocean and coastal safety, it is essential to reduce human errors by implementing efficient human performance measurement (HPM) and human reliability analysis (HRA). Unlike other industries, maritime operations require a greater emphasis on non-technical skills that have a significant impact on safety. Considerable studies have been carried out to investigate human and organizational factors (HOFs) that are deemed crucial in ensuring maritime safety (Fan et al., 2020c; Yildiz et al., 2021; Shi et al., 2021; Coraddu et al., 2020). This importance is further magnified by the rapid development and progress of maritime surface autonomous ships (MASS), which necessitates a shift in the focus of human performance management (HPM) from onboard seafarers to traffic controllers stationed in remote control centers.

Psychological factors play a vital role in non-technical skills, significantly impacting cooperative behaviors and the necessary competencies for maritime safety. Recent analysis of marine accidents highlighted that a notable proportion of cases (21.63%) involved operators in a low state of alertness, while distractions or lack of attention contributed to 16.35% of incidents. Fatigue, cognitive overload, and negative emotions (unhappiness, panic, or anger) were also identified as factors in 13.46%, 4.81%, and 1.92% of cases, respectively (Fan et al., 2020a). Situational awareness (SA), a psychological factor, has been identified as particularly influential in maritime accidents. The utilization of advanced navigation devices and autonomous techniques can increase mental workload and influence these factors. Hence, ensuring the safety of future generations in ocean and coastal areas is of utmost significance. Although quantitative methods have been employed to assess maritime risks in areas such as collision avoidance, typhoon risks, and coastal erosion, the human aspects of maritime risk management receive limited attention. Existing research has established positive associations between individual factors and behaviors related to human factors. However, conventional techniques for measuring these emerging psychological factors pose challenges. Consequently, there is a pressing need to develop innovative methods that can effectively comprehend and quantify psychological factors in maritime operations. Such advancements would enable a comprehensive evaluation of associated risks and offer a fresh perspective for human reliability analysis (HRA).

Maritime students

Maritime Education refers to using sailing and journeys on ships to improve understanding and expertise in different maritime skills such as sail management, sail creation, ship rigging, vessel and boat handling, group building, personal growth, cultural history, and connected subjects. This offers an interactive method for education and permits people to feel the real-life components of sea-related tasks. The Philippines holds the largest share (28.1 percent) in the global supply of seafarers, including both officers and ratings, representing over a quarter of the world's seafaring population. This statistic, reported in the Seafarers International Research Centre's 2003 global crew survey (as cited by Lindgren & Nilsson, 2012), is attributable to the widespread preference for Filipino seafarers. The quality of maritime education and training is crucial in upholding the country's reputation as a source of highly skilled seafarers. It is imperative to assess the disaster risk management abilities of maritime students and incorporate such

evaluation into their curriculum to ensure their success as future officers.

Research Objectives

Determine the disaster risk management skills of the Maritime students.

Methodology

This study primarily aims to determine the disaster risk management skills of the selected Maritime students across levels. Using total random sampling, 40 respondents voluntarily participated in this study. In order to meet the research objectives, the researcher utilized a modified instrument taken from the study of Alrazeeni (2015) on the Saudi EMS Students' Perception of and Attitudes toward Their Preparedness for Disaster Management. Prior to the data gathering, orientation was conducted for the respondents, so they were aware of the research objectives as well as their participation, rights, and privileges as respondents. Upon their approval, they were gathered to answer the research instrument within 30 minutes only. The data were subjected to SPSS for interpretation.

Results and Discussions

The data presented in Table 1 showcases the levels of disaster risk management skills among the Maritime students who participated in the study. The findings indicate that, on average, the respondents achieved a score of 2.51, suggesting a generally low level of disaster risk management skills. The students identified several areas in which they perceived themselves to have low proficiency. These include their ability to contribute to the development of new guidelines, emergency plans, or advocating for improvements at the local or national level. They also lacked confidence in assuming a leadership role within their community during a disaster. Additionally, they expressed uncertainty regarding their competence in using personal protective equipment and performing isolation procedures in the event of bioterrorism, biological, or chemical attacks, which are critical for minimizing community exposure risks. Moreover, the students expressed a deficiency in having personal or family emergency plans for dealing with disaster situations. They faced challenges in understanding their responsibilities during the response phase of a disaster, especially when it involved interactions with their workplace, the general public, media, and personal contacts. Additionally, they lacked confidence in their ability to provide patient care independently without the oversight of a physician in a disaster scenario. Furthermore, they struggled with implementing emergency plans, conducting evacuation procedures, and carrying out similar tasks.

However, 40 respondents perceived themselves to have average disaster management skills. They believed they were adequately prepared for managing disasters and had familiarity with the local emergency response system for such events. This suggests that, overall, they consider themselves capable of responding to emergencies in the context of disasters. Nevertheless, there are specific skills within the realm of disaster risk management that need further development among these maritime students.

Table 1. Level of Disaster Risks Management Skills of the Respondents

No.	Items	Mean	Description
1	I consider myself prepared for the management of disaster	3.22	Average
2	I participate/have participated in creating new guidelines, emergency plans, or lobbying you for improvements on the local or national level	2.40	Low
3	I would be considered a key of leadership figure in my community in a disaster situation	2.28	Low
4	In case of bioterrorism/biological or chemical attacks, I know how to use	2.24	Low

	personal protective equipment.		
5	In case of bioterrorism biological or chemical attacks I know how to perform isolation procedures show that I minimize the risk of community exposure.	2.48	Low
6	I am familiar with the local emergency response system for disaster.	3.08	Average
7	I have personal/family emergency plans in place for disaster situation.	2.26	Low
8	I am able to describe my role in the response phase of a disaster in the context of my workplace, the general public, media, and personal contacts.	2.16	Low
9	I feel reasonably confident I can care for patients independently without supervision of a physician in a disaster situation.	2.44	Low
10	I would feel confident implementing emergency plans, evacuation procedures, and similar functions.	2.56	Low
	Overall	**2.51**	**Low**

4.20-5.00 Very High; 3.41-4.20 High; 2.61-3.40 Average; 1.81-2.60-Low; 1.00-1.80 Very Low

Cabiles and Bernido (2021) observed in their study that the compliance status of tertiary schools in Disaster Risk Reduction (DRR) regarding bio floods and threat assessment is not significant. This is because the level of preparedness is not determined by whether a school is classified as a university or not. The researchers also emphasized that the compliance status of tertiary schools in DRR, specifically regarding floods and threat assessment, does not have any bearing on the level of preparedness, irrespective of their university status. Further, Cabiles, Sebastian, Bayos, and Mojana (2022) also emphasized in their study the importance of developing the responding skills of the tertiary students in times of disaster.

Conclusion and Recommendation

Disaster Risk Reduction Management (DRRM) is one of the essential features in ensuring safety and preparedness among schools in the Philippines with regards to disaster risks caused by natural and man-made hazards. Studies like this play a crucial role in enhancing the resilience of individuals, communities, society, and systems to withstand, absorb, adapt to, recover from, and improve well-being in the face of various hazards. In this particular study, Maritime students expressed a low level of confidence in their disaster management skills. Engaging in activities that reduce and manage risks can contribute to the development of resilience to other types of hazards as well. Assessing students' disaster risk management skills is an integral part of the field of education. Disaster preparedness education can provide essential knowledge and skills that can save lives and sustain well-being, particularly for children and young individuals, during and after emergencies. Consequently, the researcher suggests that personnel in Disaster Risk Reduction and Management (DRRM) should continuously provide training and equip a significant number of volunteers to act as first responders for a wide range of hazards. Additionally, it is important to explore new technologies that enhance response capabilities, collaborate with communities to understand the specific needs of the most vulnerable, and establish early warning systems to enable communities to take preemptive action before a disaster strikes.

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