

Developing Criteria of Design Guidelines for Public Spaces Serving as Evacuation Centers in Malaysia

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Abstract: *The yearly monsoon phenomenon in flood-prone areas of Malaysia is usually given an advanced warning time to residents and disaster relief management to prepare and provide means to evacuate when flooding occurs. Victims will be navigated to designate public spaces serving as evacuation centres for protection and safety.*

Public spaces such as schools, gymnasiums and community halls which act temporarily are often spaces that are uninhabitable, unmanageable and structures that were for other purposes, forcing them to shelter. The space provision and services of these evacuation centres were found to be ineffective and lack in the conditions of humanity. The significance of human senses is more likely to focus on the inner conflicts, of people and shared spaces. Key issues that are causing conflicts among victims include poor disaster relief management, insufficient site selection and services, community participation and also technical aspects of the buildings.

This study posits to determine the compliance of minimum shelter design standards for selected public spaces to ensure that they are suitable to facilitate the victims and humanitarian assistance. For example, building specifications and design, site location, food, water and sanitation supplies, and special facilities for disabled. With the challenges posed by the frequency of flood events, worldwide shelter guidelines and technological advances in disaster management, there is a critical need to develop criteria for design guideline to optimise the public space usage in terms of design and its spatial conditions.

It is hoped that future modifications to the evacuation centres will incorporate measures of spatial quality and respectability of human senses.

Keywords: *emergency shelter, disaster management, spatial quality, design criteria.*

1. Introduction

Public spaces that are selected to serve as evacuation centres play an important role in the disaster stage of preparedness and response. They are considered as emergency shelters that are depended on directly after a flood event reaches the 'alert' level and often evacuees will be navigated to these designated centres. Despite the limitations of space and services provided in the evacuation centres, there are problems identified between individuals involved in the crisis and public spaces in terms of space management, functionality and usability of the selected sites.

2. Problems & Issues

At the moment, a majority of the evacuation centres in flood-prone areas of Malaysia have been criticised to have problems, particularly in the space management and the distribution of disaster relief. Shafiai & Khalid (2016) argues that during the process of evacuation, victims are expected to receive help from the government officials to reduce the distress condition, this however was denied and have been discussed by other researchers that the assistance provided to victims is slow and irregular with inadequate support (Said, Gapor, Samian, & Abd Malik, 2013). Moreover, the problems were caused by insufficient relief operation and dissatisfaction with the management of the evacuation centre.

Apart from that, there is also an increasing number of environmental health risks among the end users of these public spaces. This is a challenge, which the relief organisations must manage in order to provide a safe place for flood victims. Wang (2016) suggests that every public space that is selected to become evacuation centres should have an effective safety planning; prevention, mitigation and preparation, as well as a practical management of space. For example, if schools can implement a disaster management approach by organising knowledge transfer on disaster preparedness and simulating disaster drills, therefore internal conflicts during the process of evacuation can be reduced, while school resilience to disasters can be successfully enhanced.

Unfortunately, until now there has not been an in-depth research that has been conducted to assess the emergency shelter standardisation in parallel to the satisfaction of the users. The need to measure these standards is even more pressing considering the importance of recovery from the trauma that could lead to physical and mental deprivation among flood victims.

3. Theoretical Framework

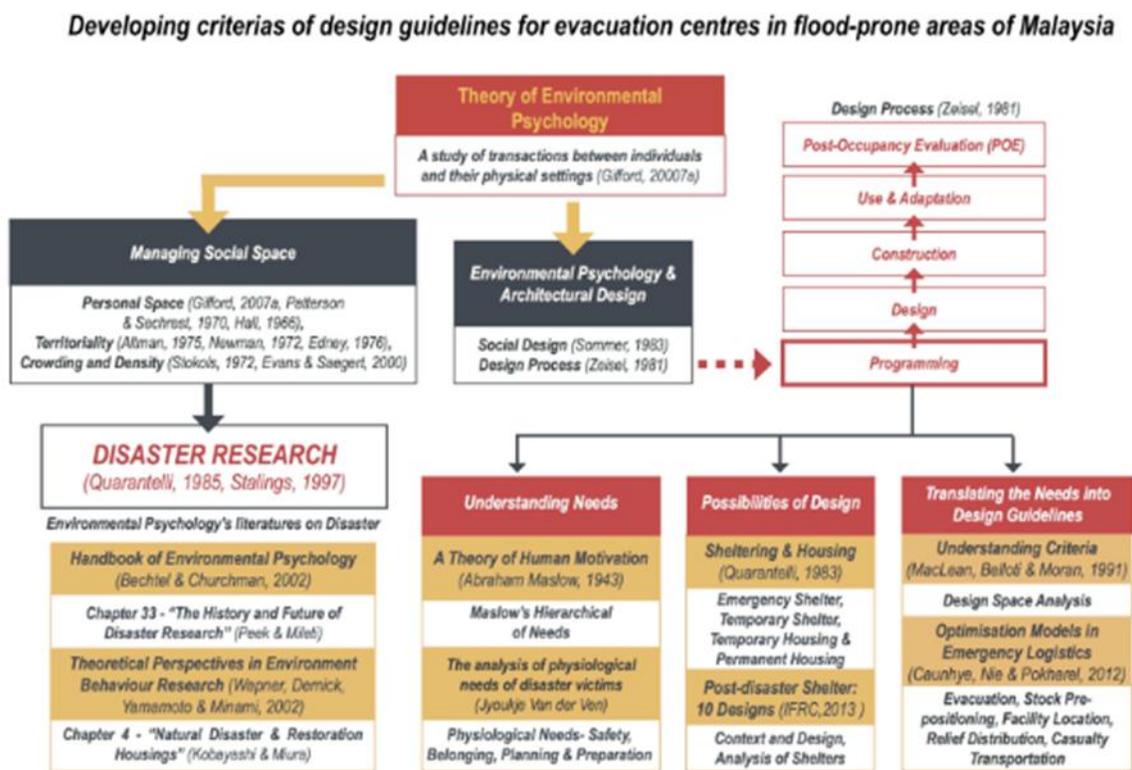


Fig. 1: Theoretical framework (Source: Author)

This topic revolves around two major areas; people and place. Hence, the theory of Environmental Psychology is selected as the main theory as Gifford (2007) defines it as a study of transactions between individuals and their physical settings. This theory was found to have covered topics of disaster in journals and handbooks on ‘The history of disaster and its future research’ and also the study of ‘Restoration housings’. Therefore, this shows the relevancy to further explore the theory to co-relate it with disaster research. To closely connect the theory of Environmental Psychology to the framing of the problem, key concepts of social space management and architectural design with key variables such as personal space, territoriality, crowding, social design and design process, are investigated in this research.

In the relationship between Environmental Psychology and architectural design, Gifford, Steg, & Reser (2011) also mentions that the process of designing a social design shall consist of five steps; programming, design, construction, use and adaptation and post occupancy evaluation, referring to Zeisel (1984), ‘Inquiry By Design’.

To understand the design criteria, this research will look into the study of programming which Zeisel (1984) categorises it in three phases; understanding the needs of building users, involving them in the possibilities of design and translating their needs into design guidelines. The model of Hierarchy of Needs (Maslow, 1943) is examined to define the significant needs of victims (eg Safety, Belonging, Planning and Preparation), while the design possibilities are shown in many literatures, on the past, current and future emergency shelter designs.

Criteria play an important role in understanding the arrangement of a design space, and this is essential to provide sufficient spaces in an evacuation centre. Example of spaces for post-disaster operations identified are the facility location, the relief distribution and casualty transportation. This, however, does not cover the design and technical aspects in the operation of the evacuation centre. Hence, the issue that revolves around the space planning of the facility structures and resources suggests a possible optimisation model to improve the current spatial condition and the handling of emergency situations (Caunhye, Nie, & Pokharel, 2012).

Together with the understanding of the environmental behavior of the public space through the relationship between people and physical setting, designers or architects can make design decisions, establishing a more humane approach of design guidelines of the evacuation centre.

4. Research Aim

The purpose of this study is to explore the current spatial conditions and provision of the public spaces serving as evacuation centres during flood events for victims, government officials and also humanitarian organisations at Kuala Krai, Kelantan. The 2014 Kuala Krai flood event was selected as the basis of the case study of flood-prone areas in Malaysia, as it was considered as a major disaster event with homes and villages submerged in floodwater.

The study also sought explanation as to why human conflicts still occur in these centres despite the existence of the relief operation and management. At this stage in the research, there is no comprehensive guideline for the planning of evacuation centres in Malaysia in relation to the space provided and the end users, in comparison to other countries that have established guidelines of the same purpose. Therefore, with the approach of qualitative research design, methods of inquiry including case study, interviews and observation of selected public spaces serving as evacuation centres in Kuala Krai, Kelantan will be conducted in order to gain insights of the phenomenon. This study aims to develop design criteria for these spaces acting as evacuation centres in order to make an impact to the current guideline and design standards.

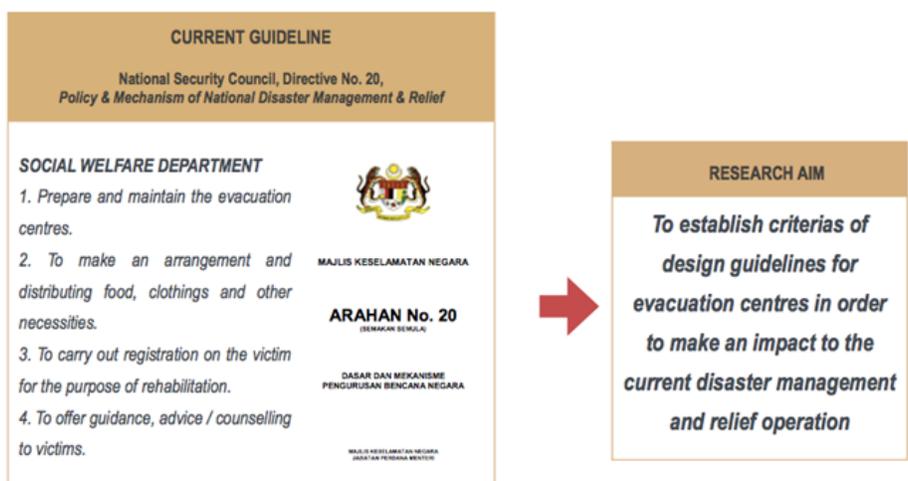


Fig. 2: Aim of research (Source: Author)

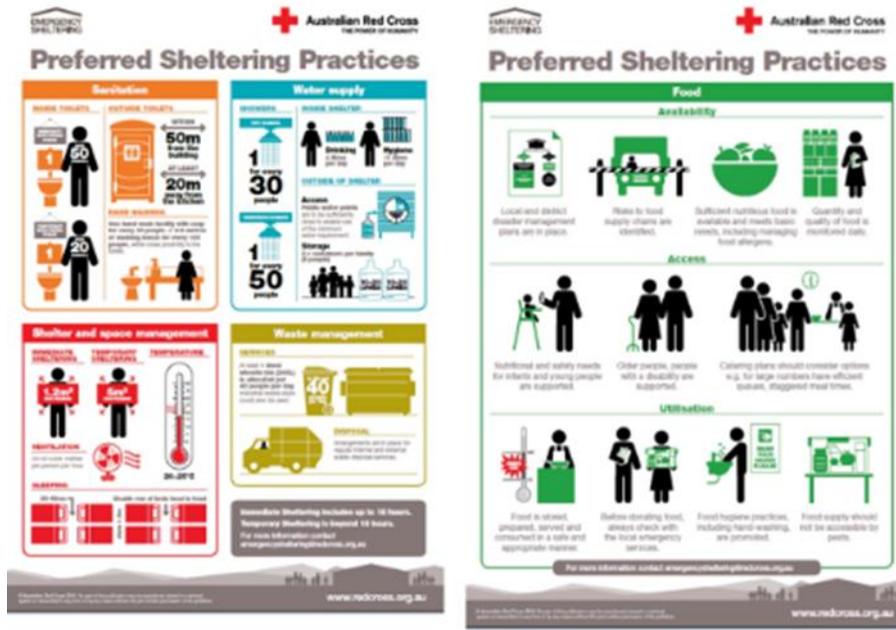


Fig. 3: Graphical presentation of Preferred Sheltering Practices by Australian Red Cross (Source: Australian Red Cross, 2015)

TABLE I: Worldwide guidelines for the living space and sanitation facilities in evacuation centres (Source: Author)

Worldwide evacuation centre guidelines	Minimum living space (sqm)	Sanitation facilities (toilet-person ratio)	
		M	F
The Sphere Project (2011)	3.5	1:60	1:30
International Federation of Red Cross, IFRC (2010)	3.5	1:50	1:25
Australian Red Cross (2015)	1.2	1:30	1:30
World Health Organisation, WHO (2007)	3.5	1:50	1:25
Centre of Disease Control, CDC (2016)	1.8	1:40	1:40

5. Research Design

Generally, the research design is divided into four main phases. The research process starts with literature review, following with qualitative methods of inquiry through primary data (qualitative interviews and qualitative observations), secondary data (reviews on supporting documents) and preliminary data (a case study of public schools serving as flood evacuation centres in Malaysia). The third phase is reviewing issues and problems of current spatial conditions of the evacuation centres and finally, the fourth phase which shows the establishment of research questions, research objectives and research methods.

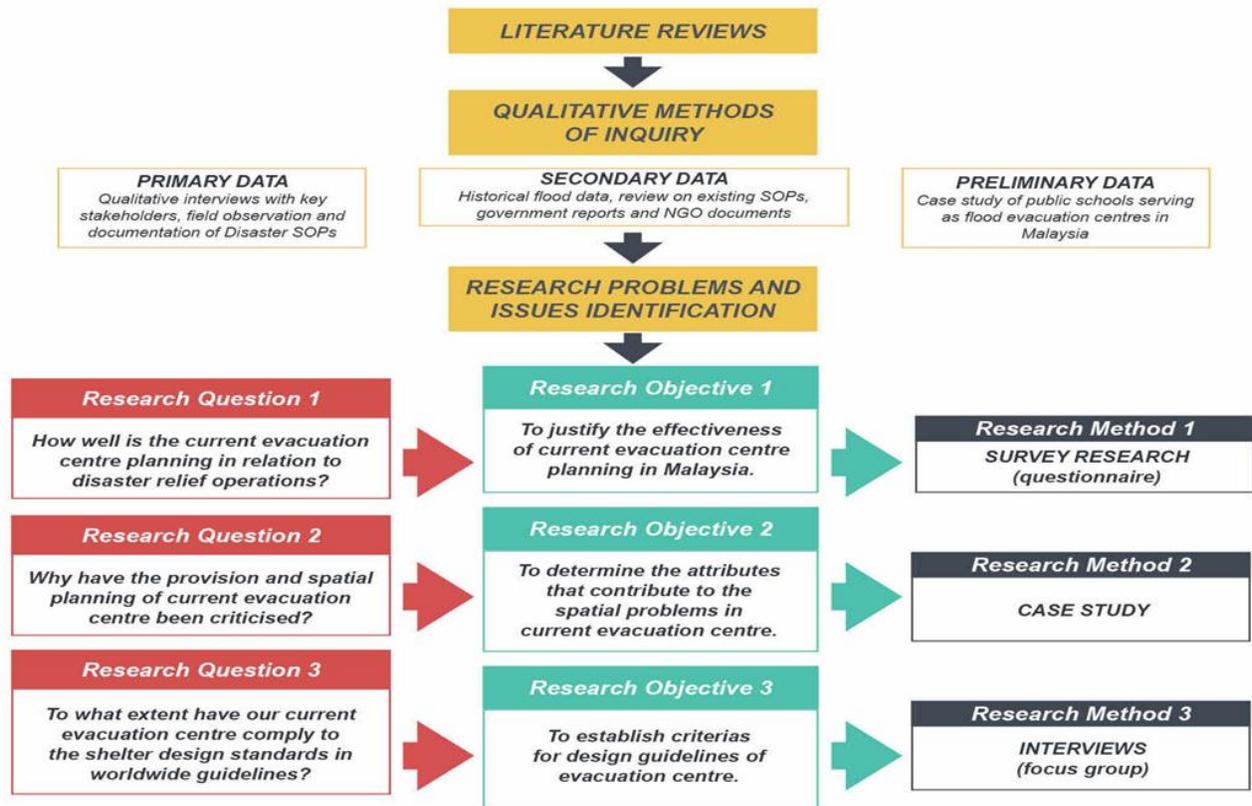


Fig. 4: Research design (Source: Author)

6. Summary

Enrico L. Quarantelli initiated disaster research with multiple publications and presentations since the 1940s specifically to the subject area of disaster management. His book, 'What is a disaster?' (Quarantelli, 1986) brings forward the discourse of the impact of a disaster generated from debates among the multi-disciplinary nature. He concludes that different disciplines have different ways of defining a disaster, focusing on aspects such as social, technical, economical, biological and environmental impacts. 'Shelter after disaster' (United Nation, 2010) guideline explains about disaster's impact on complex social and environmental systems. Works of monitoring and evaluating impacts of disaster will provide critical feedback about the effectiveness of risk reduction for these systems; hence it becomes a good learning curve in the improvement and construction of safer communities.

According to the guideline, floods develop from a range of slow-to-rapid degree of occurrence, especially in river basins, along coasts or in urban areas, often result in heavy rainfall, storms and high tides. Evacuation routes should be planned in advance and practiced regularly through exercises within the community (United Nation, 2010). Emergency shelters should be sited in areas of higher elevations or in pre-existing public spaces that act as evacuation centres. During flood events, affected victims that are evacuated into these centres are either scared, confused or stressed and are probably experiencing loss. In Malaysia, hundreds and thousands of evacuees may gather for shelter and safety. This, however, increases several environmental health risks, mainly caused by inadequate facilities (water supply, sanitation and waste management), as well as, the increasing number of people in close proximity to each other.

The selected public spaces must be managed properly to ensure the safety of the victims and others involved during the flood event. There is a possibility of a subsequent disaster to occur due to poor disaster management, for instance, contagious disease outbreak or food poisoning. Hence this research posits to develop design guidelines for public spaces serving as evacuation centres to improve future operations and services at the evacuation centre, focusing on the building capacity and design layout.

7. References

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