The Symbology Development for Hazard Communication in Thailand

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Abstract. When it comes to disaster communication during hazardous time. Thailand, a country with majority of population leaving in poverty, detailed signs and symbols confused most local people during the emergency period. With lack of preparations for the disaster and ineffective used of symbols and sign during the decision making time lead to communication break down during the crisis time chained up with urgent incidents aggravate the situation. This research paper is conducted in order to study, identified and redeveloped more effective symbols and signs use during the crucial decision making time. The research paper will be focused toward the symbology elements that effect people visual perception and help them communicate better during disaster period.

Keywords: Symbology, Hazards, Signs, Pictogram, Natural Hazard, Man-Made Hazard, Anthropogenic

1. Introduction

1.1. Background

Human has been occupying more space on this planet; the strain of destruction rate and property losses from natural and technological hazards has also increased over the past decades. Furthermore, human have also been coping with the effects of both natural and man-made hazards throughout the history and in every part of the globe. Both the impact of disasters and the ways in which humans have dealt with them have changed over time. Maps for hazard management, especially emergency signs and symbols are also being produced and published by various federal state and local agencies, institutions and the private sectors (United States Department of Labor, 2012). Natural hazards management provides a unique organization of important information for natural hazard identification, risk estimation and allocation of resources. These are the major support for emergency managers at all stages of disaster(United States Department of Labor, 2012). There have been a number of plans provided detailed information about each type of emergency event, for example, tsunami. However, such plans are not working effectively in the Thai environment. A country with majority of population leaving in poverty, detailed signs and symbols confused most local people during the emergency period.

During the natural hazards, Thai natural hazards management institution has missed a number of ingredients for emergency mapping. For example, when it comes to spatial information that is needed during a disaster, there is currently no consistent national set of map symbols available for the development of hazard and emergency management maps. Therefore, in order to help improve the exchange of information data and to promote understanding of hazardous and vulnerable location within the Thai community, a set of standard cartographic symbols needs to be developed and endorsed by the Federal Geographic Data Committee of Thailand. The development of standards for hazard symbology will strengthen coordination and communication between planners, the local and will improve the ability of emergency managers to better understand information during crucial decision making moments.

1.1.1 Natural Hazards in Thailand

According to The Earth Institute at Columbia University, one of the observations on Thai natural hazards shows that droughts and floods pose the greatest threat to Thailand(Columbia University, n.d.). Influencing the entire country in with varying degree of risk. The entire country I severely impacted by floods when weighted by mortality and GDP. Cyclones, on the other hand, also pose a minor risk to the northern portions of the country(Columbia University, n.d.). Recently, a rare natural hazards incident has pose a great destruction to Thailand, tsunami disaster in year 2004 have killed tremendous number of both local and international citizens(Columbia University, n.d.). A number of people living in the disastrous area still living

in fear yet with such damage to the country natural hazard management system within the sites is still not up to an international standard and not adaptable to the local people.

1.1.2 Man-Made Hazard in Thailand

Anthropogenic hazards or man-made hazards are hazards that caused human intent or human error. Anthropogenic hazards can be divided into 3 categories of technological, transportation among others, and sociological. Most man-made hazards are usually related to technological hazards and terrorism. Technological hazards refer to incidents that can rise from human activities, for example, use of hazardous materials or manufacture; and just like every other disaster anthropogenic hazards lead to human suffering, loss of life and long term damage.

There are a number of man-made hazard events occurring in Thailand everyday. The most famous man made disaster in Thailand is Fire hazard. Fire is considered to be one of the most dangerous disasters for Thai people. The Santika Club Fire incident in 2009 had killed hundreds on that New Years Eve celebration. Those that survived and live to tell the story were the one who had been into certain kind of emergency workshop or training. Santika is not the only terrible fire incidents that happened in Thailand, there are still many more horrible man-made disasters that relate to fire. In addition, just like every other hazard, understanding signs and symbols are always the main factor when surviving in hazardous moment. However, in order to understand the signs and symbols and act accordingly, it is also very important that the signs and symbols use can communicate with the reader effectively. Though, most fire signs and symbols in Thailand are adapted from universal, but some of them are still not working effectively in the Thai community.

1.1.3 What is Hazard Symbols?

According to Lancasshire County Council, Hazard symbols are the representations of a recognizable idea, a process or a physical entity that developed to warn people about hazardous scenarios. The used of hazards symbols are usually directed by the standard organization inside and outside the country. Hazard symbols may sometimes reveal differently in colours and supplemental information in order to indicate different type of hazards.

1.2. Problem Justifications

Poor hazard management system has made disaster from hazard in Thailand worst. This is because with lack of preparations for the disaster and ineffective used of symbols and sign during the decision making time lead to communication break down during the crisis time chained up also urgent incidents aggravate the situation. Most signs as symbols used in the effected areas are adapted from international hazards symbols. Though, some of those signs and symbols can be understandable by the local, but a number of them are still not appropriate and adaptable by the local community.

1.3. Objectives

- To study the visual perception of symbology on existing hazard symbols and signs in Thailand
- To investigate the historical impact of hazard symbols and signs within the effected sites.
- To identify the hazard information for which symbology used
- To redeveloped hazard symbols for more effective visual communication during the crucial decision making moments.

1.4. Research Questions

- Colours has effect on visual perception in visual development or not?
- Do Symbol shapes have an impact on people visual perception?
- Do texts have an impact on people visual perception?

1.5. Scope of Research

The purpose of this project is to conduct pilot research in order to identify and catalog existing emergency symbols and signs that are currently used thought various agencies and institutions in Thailand. In addition, the study and the development of new symbols and signs incorporate existing ideas and the local community is preparing conventions for review and proposed standardization. The project was limited to examination of the point symbols for hazard management in Thailand for depicting geographical area. This

does not cover techniques for all hazard conditions happening in Thailand. For man-made hazard this study will be focused the study towards Fire disaster since it is the most common disaster that Thailand is facing frequently. The natural hazard, on the other hand, will be focused towards the development of flood and tsunami disaster for they are the two well-known disasters in Thailand.

2. Literature Reviews

2.1. Symbology Analysis

Various source were conducted in an attempt to collect as many existing symbols as possible, but information on hazard symbology was not readily available. Most existing sources on symbols are usually related to the cartographic and biohazard symbology (Rogers, 2012). Moreover, the online search for the symbols on cartographic was not as straightforward as might be expected for natural hazard study. However, government agencies and relate institutions are more likely to provide this research with more specific information on natural hazards(Rogers, 2012).

In symbology there are altogether two major classes of symbols that can be found in mapping. The first mapping symbol style is the replicative follow by abstract symbol.

2.1.1 Replicative or Pictorial

Replicative symbols are those that developed to look like their real world corresponding elements(Dymon, 2003). There are only used to represent tangible objects rather than intangible such as, coastlines, trees, and schools(Dymon, 2003). Base-map symbols, for example, are replicative in nature, while thematic-overlay symbols or the symbols that used in type of map that is specially designed to show a particular theme connected with specific geographic area may be either replicative or abstract(Dymon, 2003). Many organizations prefer pictorial symbols for demining applications to ensure that symbols are easily understood when indicate danger or hazard when necessary(Dymon, 2003).

2.1.2 Abstract

Symbols described as abstract may be any geometric shape assigned to represent a feature(The Department of Geography, n.d.). For example, a series of graduated dots could represent high- density area on map. Abstract symbols are usually revealed as simple shapes and colours(The Department of Geography, n.d.).

2.2. Symbol Mapping

As we all know that not all symbols can be used during disaster time effectively. Therefore, symbol mapping is created to work out the most effective symbols that can be utilized during the crisis time(Chaomei Chen, 2003). There are a number of theories used in symbol mapping, but only two are being used widely in the mapping process, which are Semiotic theory and Color symbolism theory (Rogers, 2012).

2.2.1 Semiotic Theory

Semiotic theory is based on the study of semiosis that talks about the relationship between a sign, an object, and a meaning (O.T.Ford, n.d.). The sign in this case represents the object in the mind of an interpreter (O.T.Ford, n.d.). They can be both verbal and nonverbal. An interpretant is referring to a sign that serves as the representation of an item. According to C.Morris, people are the predictor of signs and there are altogether 3 factors that guide the interpretation (Morris, 1971). The first factor is the designative aspect that directs the interpreter to a particular objects or items. The second factor is the review aspect that highlights object qualities and enables the interpreter to evaluate(Morris, 1971). The last factor is the prescriptive aspect that directs interpreter to respond in specific ways. To emphasized more on the semiotics study on signs. C.Morris has also mentioned about the signs' meanings and values that categorized into three stages for meanings and 3 connections for values(Morris, 1971).

The first three stages in signs' meanings include the perception stage, the manipulation stage and the consummation stage(Morris, 1971). The perception stage is the stage of a person that he or she becomes aware of a sign he exposes to(Eco, 1986). When that person can interprets the sign and decides how to respond to it, he or she is sure to be in the second stage of manipulation(Morris, 1971). The final stage in the signs' meaning is the consummation stage when a person is responds or reacts accordingly to the signs.

Signs and values, on the other hand discussed about the three connections of a person and the signs. The first connection is the detachment. In detachment connection, a person or system stays independence or autonomy to the signs and it's value(Morris, 1971). Unlike, detachment connection, Dominance connection is happening when the person or system takes precedence over, or controls another person or system. However, when a person or system is controlled or rule over by another person or system this connection is known as dependence connection (Morris, 1971).

2.2.2 Color Symbolism Theory

Colour is a powerful communication tool that can be used to signal action, influence mood and cause physiological reactions, which in this case considered being one of the major concerns when developing natural hazard symbols (Smith, 2012). Colours symbolism theory mainly discussed about the communication in which colour conveys it's meaning. Colour communicates it's meaning into two ways, which are natural association and psychological symbolism. In order to create a successful symbol design, it is important to know how and why colours communicate meaning(Wright, 2008-12).

As we all know that that the occurrence of colours in nature are timeless and universal. The colour blue, for example, is known as the colour of sky and the ocean (Kendra, n.d.). Blue is being seen as a constant in our lives. It is perceived as trustworthy, dependable and committed colour. The colour green, like wise, represents the vegetations, forests and trees. Natural association is usually common to all people since it is universal. Psychological symbolism, on the other hand, is slightly different. Psychological symbolism may generate another level of colour's meaning in the mind of a person. The meaning of colour in this field takes place from cultural and contemporary contexts. In this field we can say that the meaning of colour is not universal since it is based on specific cultural background and contemporary contexts (Kendra, n.d.). For example, the colour green in certain religions is the colour associated with resurrection and regeneration. In Japan, green is known as the colour of eternal life while it is perceived as the colour of virtue and beauty in China (Smith, 2012). Furthermore, the colour white is seen as an ensurence of pleasant dreams in Greeks while being seen as a mourning colour in China and parts of Africa. In psychological point of view colour and it's meaning is not being seen as universal idea(Kendra, n.d.). Therefore, when developing symbols it is important to study the colour and it's meaning within that certain contemporary contexts group. This is because certain that can be understood globally might be perceived differently within the local community(Wright, 2008-12).

While perception of colour is somewhat subjective, there are some colour effects that have universal meanings both unconsciously and subconsciously(Wright, 2008-12). Colour in the red area of the colour spectrum as known as warm colors(Kendra, n.d.). These colours include red, orage and yellow(Kendra, n.d.). This group of colours evokes the emotion of warmth and comfort to fellings of anger and hostility(Kendra, n.d.). Colour on the blue side of the spectrum, on the other hand, are known as cool colours which include blue, purple, and green(Kendra, n.d.). These colour are often describe as calm, but can also call to mind feelings of sadness and indifference.

At the end, of course, our feelings about colour can also be deeply personal and are often rooted in our own experience or culture contexts(Kendra, n.d.).

3. Observations

The purpose of this research project is to conduct a preliminary investigation into natural hazard symbology development in order to identify and analyze what symbology various agencies and institutions within the Thai community now currently using and where these agencies get their symbology from.

The very first step in this study requires the identification of existing natural hazard symbols that used within affected areas. International organizations, state and local agencies were contacted and as a follow-up inputs will be done via e-mail and in person for a general survey from internet site revealed that there was lack of information available concerning natural hazard symbology.

The second step includes the development of symbols and pictogram that will be used by the affected community. This step includes:

- Identify the hazard evacuation information for which symbology was used

- Identify the agencies that currently use hazard evacuation symbology

3.1. Qualitative Methodology for Hazard Symbology

In this methodology, the survey method that will be used in this section is the focus group approach. There will be altogether 3 focus groups of both Man-made and Natural Hazard; and because in Natural Hazard as mentioned earlier that we will be testing on two major natural disaster which are flood and tsunami. Therefore, the focus group for this section will be divided into 2 sub groups. One group will be focused toward flood symbology and the other will be focused toward tsunami. People of all focus groups will be asked for specific opinion on symbols and pictograms related to the hazard. The focus of this study is on the wholeness of the experience and every other factor that can help develop more effective signs and symbol for natural hazards.

3.1.1 Objective

The objective of this experiment is to find out the most effective symbols and pictograms that are currently being used within the local community during the crisis time. Furthermore, the study of this experiment is also to find out people psychological information towards certain symbols and pictograms that related to the hazard.

3.1.2 Method Overview

A number of people will be given a group of symbols and pictograms related to the natural hazard and will be observed and interview in a group and individually on the given set of items. The symbols and pictograms will be divided into three sets with a combination of existing symbols within the affected areas, universal symbols used universally that have not yet introduce to the community, and the symbols that had been developed from local and universal symbols. The symbols used in the experiment will be displayed via powerpoint of electronic devices rather than on paper, hard copy or with someone holding the symbols, because the nature of Thai people as an organizational community people tends to base there opinion on other people which in this case the facial expression or non-verbal language they can observe of the examiner. Therefore, the less human interaction during the survey the more quality the result we will get. We will not be using specific symbols and test them randomly on participants. This is because by doing so, it is only going to confuse the test subject on the existed symbols and signs rather than getting a quality result to develop more effective symbols and signs. However, the experiment will be focused more toward the elements of existence symbols, for example, shapes and colors found in all the existed symbols. This is because this paper wants to prove that symbol elements like colors and shapes are playing major roles when developing effective symbols and signs. Participants will be asked for there opinion and observed on non-verbal communication to confirm on their decision. Furthermore, each participant will be asked for the meaning of the symbols and pictograms just by looking at the image without texts and timed. The same group of participants will be asked again about the meaning of the symbols and pictograms and times, but with texts. The focus group will be taped record for further discussion that is not included in the questionnaire. The results from qualitative section will categorized the symbols and help develop more effective symbols and signs that will further be used by a much larger number of people in the quantitative survey.

3.1.3 Participants

The participants in this session will be divided into two groups of people. One of them is people who have disaster evacuation training and the other group is those that have not been in disaster training before. The focus group will include about 6-8 people for each session. Since this study is focusing on the research of two major natural hazards, so the focus group of 6-8 people will have to be divided into 2 sessions. One session is for flood disaster and the second one if for tsunami disaster.

4. Discussion

From the observation in the three focus groups, we have found out that the majority of people do not recognize any of flood and tsunami hazard signs and symbology. Unlike Natural Hazard signs, Man-made hazard signs like Fire symbols that had more acknowledgment. For the natural hazard signs people do not know the location of their existence and even if they did the content of the signs confused them. Furthermore,

from the observation in focus group we have also found out that people prefer bright and warm color tone for warning signs rather than cool tone like the current one that are used within the local community. They believe that cool signs should be used only for the sign that direct them to the evacuation route. Moreover, people also prefer edgy shapes more than curvy shapes like circle because they said that the edgy shapes make them feel more cautious and always on their guard. Circular shape, on the other hand, make them feel more relax and unaware of the hazardous situation.

4.1. Further Work

The focus group results were future used to develop questionnaires to test out with the mass audiences of over 400 people for more relevance results. The results are in their collecting process and will to be ready for discussion in December conference.

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