

พรธีรา อิ่มสุวรรณสาคร: การพัฒนาป้ายสัญลักษณ์เพื่อการสื่อสารเรื่องการเตือนภัยพิบัติ ในประเทศไทย

(SYMOBOLOGY DEVELOPMENT FOR HAZARD COMMUNICATION IN THAILAND) อ. ที่

ปริญญาวิทยานิพนธ์หลัก: ศศ.ดร. วรพรรณ องค์กรุทรักษา, 99 หน้า

วัตถุประสงค์ของงานวิจัยนี้คือ เพื่อศึกษาถึงการรับรู้ภาพสัญลักษณ์ สำหรับสัญลักษณ์ และสัญญาณอันตรายต่างๆที่มีอยู่ในประเทศไทย และเพื่อกำหนดและพัฒนาสัญลักษณ์ และสัญญาณอันตรายต่างๆ เพื่อการสื่อสารด้วยภาพอย่างมีประสิทธิภาพมากขึ้น ในระหว่างช่วงเวลากการตัดสินใจที่สำคัญ นอกจากนี้ งานวิจัยนี้ยังมีเป้าหมายในการศึกษาถึง ผลกระทบของสี รูปร่าง ที่มีต่อการรับรู้ภาพสำหรับสัญลักษณ์ และสัญญาณอันตรายต่างๆ ภายในพื้นที่ที่ได้รับผลกระทบ งานวิจัยนี้ได้ใช้วิธีการเก็บข้อมูลสองวิธีคือ วิธีเชิงคุณภาพ ซึ่ง ให้ความสำคัญกลุ่มย่อย และ วิธีเชิงปริมาณหรือการสำรวจข้อมูล งานวิจัยนี้ได้ถูกใช้เพื่อการศึกษาถึงและการพัฒนาสัญญาณอพยพจากอันตรายต่างๆ ในประเทศไทย ขึ้นใหม่ ในขณะที่การสำรวจข้อมูลนั้นถูกดำเนินการเพื่อเก็บรวบรวมข้อมูล เกี่ยวกับสถิติประชากร อิทธิพลจากสัญลักษณ์ และมุมมองเชิงสัญลักษณ์ ผ่านทางวิธีเชิงคุณภาพ และเชิงปริมาณ จากตัวอย่าง 406 คนที่อาศัยอยู่ในหรือเดินทางไปยังพื้นที่อันตรายต่างๆ ผลการศึกษายังบ่งชี้ว่า สี รูปร่าง และบริบท ของสัญลักษณ์และสัญญาณอันตรายต่างๆมี ผลกระทบต่อการพัฒนาการรับรู้ภาพสำหรับคนไทย

สาขาวิชา.....การจัดการการสื่อสารเชิงกลยุทธ์.....ลายมือชื่อนิติต.....

บทคัดย่อและแฟ้มข้อมูลฉบับเต็มของวิทยานิพนธ์ตั้งแต่ปีการศึกษา 2554 ที่ให้บริการในคลังปัญญาจุฬาฯ (CUIR) เป็นแฟ้มข้อมูลของนิสิตเจ้าของวิทยานิพนธ์ที่ส่งผ่านทางบัณฑิตวิทยาลัย

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The objectives of this research were to study the visual perception of symbology on existing hazard symbols and signs in Thailand and also to identify and redevelop hazard symbols and signs for more effective visual communication during the crucial decision making time. In additional, this research aimed to study the color, shapes and text effect on visual perception of symbology on existing hazard symbols and signs in Thailand and also to investigate on the impact of visual perception on hazard symbols and signs within effected sites. This research made used of two data collection methods of qualitative methodology, which is the focus group and the quantitative methodology or the survey.

This research were used to study and redevelop hazard evacuation signs for Thailand, while the survey was conducted to collect data of demographic, symbolic influence and symbology view point through quantitative and quantitative methods from 406 samples who are living or traveling to the hazardous areas. The findings indicated that the colors, the shape and the context of hazard signs and symbols impact visual perception visual development on Thai people.

Field of Study...Strategic Communication Management....Student's Signature.....

Academic Year.....2012.....Advisor's Signature.....

CHAPTER I

INTRODUCTION

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.

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.

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.

What is hazard symbols?

According to Lancashire 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

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

1.4 Research Questions

- 1.4.1. Does colors have effect on visual perception in visual development?
- 1.4.2. Do Symbol shapes have an impact on people's visual perception?
- 1.4.3. Do texts have an impact on people's 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 through 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. In Man-made hazard section, this paper will be focused more upon Fire disaster since it is the most common disaster that Thailand is facing at the moment. The natural hazard, on the other hand, will be focused upon the management system of flood and tsunami disaster for they are the most concerned disasters in Thailand.

CHAPTER II

LITERATURE REVIEW

2.1 Symbology Analysis

Various sources were consulted in an attempt to collect as many existing symbols as possible, although information on hazard symbology was not readily available. Most existing sources on symbols usually relate to cartographic and biohazard symbology (Rogers, 2012). Moreover, the online search for cartographic symbols was not as straightforward as might be expected. However, government agencies and related 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 that can be found in mapping. The first symbol style is replicative followed by abstract.

2.1.1 Replicative or Pictorial

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

Symbols describe 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 a 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

Not all symbols are effective in an emergency. Therefore, symbol mapping is used to identify effective symbols that can be utilized in a health and safety situation (Chaomei Chen, 2003). There are a number of theories used in symbol mapping, but only two are used widely in the mapping process; they are semiotic theory and colour symbolism theory (Rogers, 2012).

2.2.1 Semiotics Theory

Semiotics theory is based on the study of semiosis – the relationship between a sign, an object, and meaning (O.T.Ford, n.d.). The signs in this case represent the object in the mind of an interpreter (O.T.Ford, n.d.). They can be both verbal and nonverbal. An interpreter refers to a sign that serves as the representation of an item. According to C. Morris, (Morris, 1971) people are the predictor of signs and there are altogether three factors that guide interpretation. The first factor is the designative aspect that directs the interpreter to a particular object or an item. 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 interpreters to respond in specific ways. To emphasize the semiotics study on signs Morris also wrote about the meaning of signs and values that semiotics categorize into three stages for meanings and three connections for values (Morris, 1971).

The first three stages are perception, manipulation and the consummation phase (Morris, 1971). The perception stage is the point when a person becomes aware of a sign (Eco, 1986). When that person can interpret the sign and decide how

to respond to it, he or she is sure to be in the second stage of manipulation. The final step is the consummation stage when a person responds or reacts accordingly.

Signs and values, on the other hand, discuss the three connections of a person and signs. Their first connection is detachment. In detachment, a person or system stays independent or autonomous to signs and its' values (Morris, 1971). Unlike the detachment connection, the dominance connection happens when the person or system takes precedence over, or controls, another person or system. However, when a person or system is controlled or ruled over by another person or system this connection is known as dependence connection (Morris, 1971).

2.2.2 Colour 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 is considered being one of the major concerns when developing natural hazard symbols (Smith, 2012). Colour symbolism theory mainly discusses communication in which colour conveys meaning. Colour communicates its meaning in two ways; 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).

The colour blue, for example, is known as the colour of the sky and the ocean (Kendra, n.d.). Blue is seen as a constant in our lives. It is perceived as trustworthy, dependable and committed. The colour green represents plants, and the natural world. 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 meaning in the mind of a person. The meaning of colour in this field arises from cultural and contemporary contexts. Therefore, we can say that the meaning of colour is not universal since it is based on specific cultural backgrounds and contemporary

contexts (Kendra, n.d.). For example, the colour green in certain religions is associated with resurrection and regeneration. In Japan, green is known as the colour of eternal life while it is perceived as representing virtue and beauty in China (Smith, 2012). Furthermore, white is seen as depicting pleasant dreams to Greeks while being seen as a mourning colour in China and parts of Africa. From the psychological point of view colour and its meanings are not seen as a universal idea (Kendra, n.d.). Therefore, when developing symbols it is important to study colours and meaning within the group context. This is because certain colours 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). Reds in the spectrum are known as warm colours. These include red, orange and yellow (Kendra, n.d.). This group of colours evokes the emotion of warmth and comfort to feelings of anger and hostility (Kendra, n.d.). Colours 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 colours are often described 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 cultural contexts.

2.2.3 Contrasting Colours

One part of symbol and sign design is the contrast of foreground and background colours. The colour contrast is much more than the brightness of a colour compared to the background colours (Kyrnin, n.d.). From the chart below we can see that these colours are very bright and show up vibrantly on the background colour (Kyrnin, n.d.) – for example, red on a blue background. However, this combination is considered to have poor contrast, because while one colour is bright, the colours make the text difficult to read. If we were to create symbols or signs in

all red text on a blue background, the reader would have eyestrain very quickly. Unlike a red and blue combination, the combination of white on green is considered to be one of the best. This combination does not strain but it also provides a sense of safety that is suitable for evacuation signs.

COLOR CONTRAST / VISIBILITY CHART

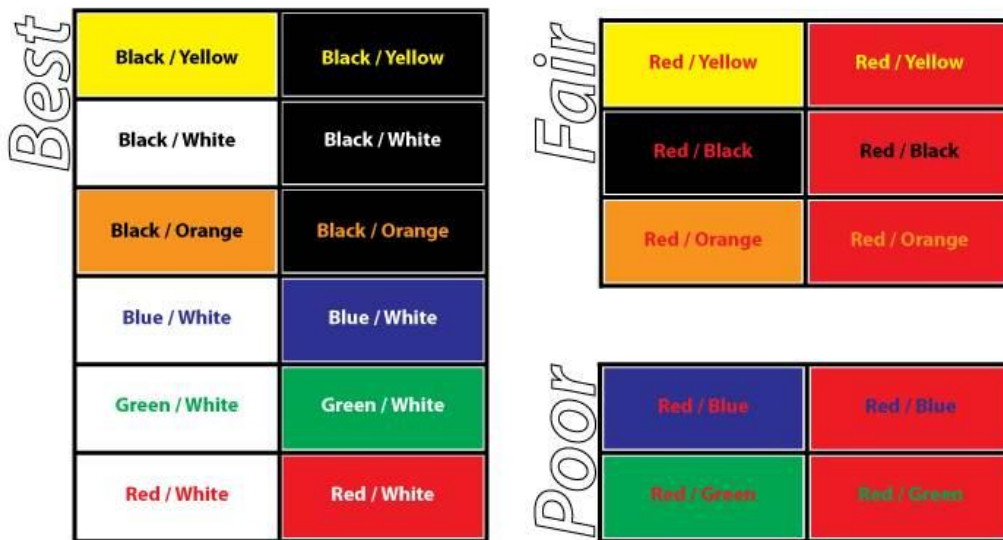


Table 2.1 Colour Contrasting Chart

2.3 Taxonomy for Emergency Mapping Symbology (EMS)

Taxonomy is a classification system that organizes ideas and concepts into groups according to their similarity (Ayfer Ba,sar, 2011). Similarity between two concepts is described in terms of the matches in the values of relevant attributes (Ayfer Ba,sar, 2011). In emergency or health and safety mapping, entities of interest can be called simple entities. Such entities include incident information, infrastructures and operations (Wilson, 2009). The class defined at each level should be based on the physical characteristics and capabilities of the included entities (Wilson, 2009). This is because it is sufficient for the taxonomy to be easily understood and to appear reasonable (Wilson, 2009). Other considerations may be an interest for a given class of entity such as which organization has the

responsibility to broadcast an alert during a disaster (Wilson, 2009). We can say that taxonomy is more or less like the computational classification method used to group the incident and ideas into entities before developing symbols to fit specific EMS.

GeoConnections, a Canadian government program, founded the Emergency Mapping Symbolology or EMS (Government of Canada, 2012). The program is designed to support emergency management applications in order to create common operational pictures throughout emergency management agencies and the public (Government of Canada, 2012). The taxonomy of hazards can be defined into four levels of domain, category, Tier 1 and Tier 2. The domain in this case is the natural hazard mapping symbolology (Ayfer Ba,sar, 2011). The category is the information related to the hazard mapping symbolology. These are incident, infrastructure, operations, and other related information (Ayfer Ba,sar, 2011). The process of taxonomy helps people remember both the types of entities and their corresponding symbols.

2.4 Pictograms

Pictograms are images, which represents a word or idea. It is very important to distinguish the difference between symbols and pictograms (United States Department of Labor, 2012). This is because in certain circumstances a pictogram might be more preferable over symbols (United States Department of Labor, 2012). The difference between pictograms and symbols is that a pictogram is a graphical composition that includes a symbol and other graphic elements such as background pattern and colour intended to convey specific information or a border (United States Department of Labor, 2012). A symbol, on the other hand, is a graphical element that is formed to convey information at glance. It usually consists of a picture or graphic without the background colour or border (Risk Safty System US Inc., n.d.).

2.5 Multiple Hazard Mapping (MHM)

Multiple hazard mapping is used when certain areas are exposed to more than one hazard. This mapping helps the planner to analyze all of the risk that might occur during an emergency (Priti Kaushik, 2005). One of the major benefits of multiple hazard mapping is to be able to gather together useful information related to different hazards and convey effective information in order to develop symbology mapping. Many natural hazards can be caused by the same natural event (Priti Kaushik, 2005). The use of multi-natural hazards allows planners and developers to see the trigger mechanism which can overcome several hazards more easily (Priti Kaushik, 2005). Different sources placed on a single map synthesize different characteristics of a natural phenomenon and its trigger mechanisms. If one wants to create awareness in mitigating multiple hazards within the affected area, MHM is an excellent tool to work with (Pacific Disaster Center, n.d.).

This instrument has become a comprehensive analytical tool when dealing with vulnerability and risk (Pacific Disaster Center, n.d.). Furthermore, it also has several specifications in emergency preparedness planning for it is able to provide a more reasonable basis for allocating disaster planning funds and recovery procedures and the need for project engineering design activities related to the hazards (Pacific Disaster Center, n.d.). On MHM, a symbol representation is similar to one represented on a base map. Symbols on MHM are selected for their legibility and clarity (Priti Kaushik, 2005). Some symbols may convey a specific sense of hazard, while others are totally abstract to the hazard (Priti Kaushik, 2005). Moreover, some symbols may represent derived combinations of hazards that are easy for map reading (Priti Kaushik, 2005). The location of the hazard can be shown through the use of basic geometric symbols such as a line, or an area. For example, lines and dots are typically used to show tornado and volcano active zones on the map (Priti Kaushik, 2005).

2.6 Visual Perception

In order to understand communication symbology we also need to understand the concept of visual perception. Some people believe that when we are exposed to symbols or signs during critical moments we act accordingly and directly via our visual perception. However, a number of psychologists believe that perceptual processes are not direct, but depend on the perceiver's expectations and previous knowledge as well as the information available in the stimulus itself (Wayne State University, 2001). The argument is divided with respect to two theories of top-down processing and bottom-up processing (Wayne State University, 2001).

Top-Down Processing

This is a practice in which a person refers to the use of contextual information or data in pattern recognition. Psychologist Richard Gregory believes that perception is a constructive process that relies on top-down processing. For him, perception is all about trying to make a best guess inference to what we see. Experiences and past knowledge are major driving forces that enable a person to develop perceptual hypotheses based on that knowledge. He also further mentioned that an estimated 90% information coming to our eyes is usually lost by the time it reaches the brain (Serre, 2009). This simply means that our brain has to guess based on past experiences to estimate what we actually see. Our brain constructs our perception of reality based on past knowledge and stored information. However, the formation of false hypotheses will lead the brain to create errors of perception (Serre, 2009).

Bottom-Up processing

James Gibson is strongly against the ideas of Gregory. He believes that perception is direct and not subject to hypotheses (Serre, 2009). He said that sensation is in the perception – what you see is what you get (Serre, 2009). There is

no need for the brain to process and interpret anything regarding the information we receive about size, shape and distance. Such information is sufficiently detailed for us to interact directly with the environment (Serre, 2009).

There is a certain pattern available in texture and gradients, which provides a source of information about the environment (Serre, 2009). This is to be perceived, as the flow of texture is invariant and according to Gibson this is important evidence to support the cue to depth without having the brain to process and make a random guess based on the stored knowledge (Markus Siegel, 2000). Two good examples that Gibson used for this argument is the invariants of texture and linear perspective (Markus Siegel, 2000). The figure below shows the texture gradient giving the appearance of depth and the linear perspective of parallel railway tracks that appear to converge as they recede into the distance (Markus Siegel, 2000).

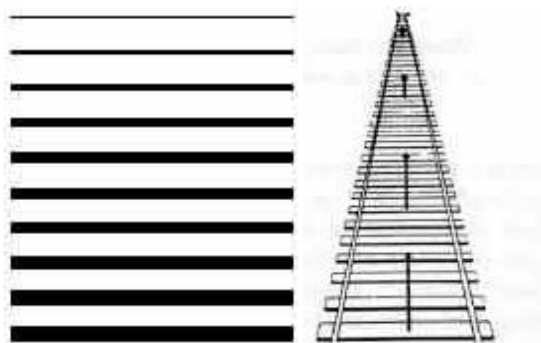


Figure 2.1 Visual Perception Bottom-Up

2.7 Risk communication and Natural Hazards in General

We usually see risk communication as a preventive activity that prepares communicating actors for hazard events that enables us to be better at dealing with them, which in turn help us reduce the impacts, and loss from the natural disaster (World Health Organization, 2012). As a result, we can distinguish risk communication from disaster, crisis and emergency communication. Many researchers have traced the development of risk communication as a popular

concern in theory and practice. In the United States there are altogether three phases of risk communication, which are: one-way communication that focuses on only probabilistic information in order to educate the public and to gain authority over risk management practice (World Health Organization, 2012) the persuasive communication to change people's risk behavior that is related to the scenario (M.D., 2003) and the last phase of the communication is the two-way message that exchanges and engages all actors to act and learn from each other during crucial decision making (M.D., 2003).

2.8 Generation Types

There are a number of ways a person's characteristics are defined. One of which methods is known as generation type categorization. This method is defined by the grouping of ages (Cameron, 1999). The researchers believe that by categorizing the age group of the people living in the world we will be able to understand their personality descriptions and their motivations (Cameron, 1999). The researchers have divided generation type into four groups: mature, born between 1922 and 1945, baby boomers, born between 1946 and 1964, generation X, born between 1965 and 1980, and generation Y born between 1981 onward (Cameron, 1999). Some studies have grouped baby boomers and generation X as one because they think these two groups were born in a similar period of time (Cameron, 1999).

Generation X and the baby boomers were born between 1922 and 1980. This is the largest in terms of numbers. People in this group usually reveal themselves as the most important generation. When compared to other generations, baby boomers and generation X are very independent and do not accept authority easily (Henseler, n.d.). Therefore, we can say that they are individualist, so people of this generation will not sacrifice their personal pleasures for the good of a group. They are revelled as controllers, are competitive and prefer the spiritual over science. They trust their instinct more when deciding a course of action or on making an urgent decision (Henseler, n.d.).

Generation Y, on the other hand, is group oriented. People of this generation work well in a team, so they are more likely to be dependent than independent (Kane, 2012). Unlike Generation X and baby boomers, Generation Y is less image conscientious and questions everything (Kane, 2012). They are very confident, they respect diversity combined with their cautiousness in change. They can be very impatient and can sometimes cause wrong decision-making and may be seen as lacking interpersonal skills (Kane, 2012). (Cameron, 1999)

2.9 Risk communication pillars

The pillars of risk communication include actors, purposes, models, tools and messages. The key elements are the actors and the content of messages as well as the models, tools and channels (Betty H. Morrow, 2009).

2.9.1 Actors

Actors or the communicators are one of the major pillars in risk communication. Communication occurs between individuals, groups, private and public institutions within a small or mass communication setting (Lanard, 2003). Sometimes communication takes place across local, regional or even international levels and actors are regarded as the nodes in the communication chains (Lanard, 2003). Characteristics like strength, frequency and direction of information flow are the defining factors of the networks. Examples of actors are government or local authorities, politicians, the general public, industry, trade unions and other related stakeholders (Lanard, 2003). Thus, it is important to know our actors in order to develop effective risk communication within the community (Lanard, 2003).

2.9.2 Purposes and functions

The purposes and functions of risk communication are about managing the perspective of the system. The management includes building up knowledge and hazard risk, raising awareness, encouraging protective behavior, warn of and trigger action to current events, and involve actors in decision making and enabling mutual

understanding. From a number of studies it is clear that not all communication seeks to convey information and knowledge only. It might also have a more social and perspective side of the community entity as in a more symbolic function.

2.9.3 Channels and Tools

The decision regarding choosing the right channels and tools are based on the purposes and functions of the communication (MindTools, n.d.). In communication mode, communication occurs in both verbal or written and non-verbal or body language and sign language (U.S. Department of Health and Human Services, 2002). Further communication distinctions in mode includes one-way communication where information only flows in one direction and two-way communication where information is exchanged between actors (U.S. Department of Health and Human Services, 2002). Communication channels, on the other hand, consisted of direct and indirect communication channels. An example of a direct communication channel is face-to-face. Unlike face-to-face communication, mediated is a form of indirect communication (U.S. Department of Health and Human Services, 2002). For both pillars, communication modes and channels should match in such a way that is appropriate to communication tools. For example, letters, reports, and telephones are tools of mediated communication, while a focus group or lectures maybe more appropriate for face-to-face communication within individual or small group level (MindTools, n.d.).

2.9.4 Content

The last and most important pillar in risk communication is the content or the message. The style of a message or content can have a dramatic effect on public response especially within a small community (Baruch Fischhoff, n.d.). The content has to fit the needs of the audience and the requirement of the risk communication situation. The content has to be simple and yet detailed enough to be understood by people during crisis (Baruch Fischhoff, n.d.). The language and terms used in the message has to fit the audience rather than the other way around. For example, the

language can be positive and energetic or address fears and stress effective enough for people to act accordingly when they are exposed to the message or the content (Baruch Fischhoff, n.d.).

Finally the content and message should always be set in wide frames of meaning. In order to create good communication one has to do careful planning and active reflecting on these frames (Baruch Fischhoff, n.d.). The lesson for risk communication is that the effectiveness of short-term communication frames such as immediate warnings may depend on the prior effectiveness of long-term frames such as risk communication to better prepare people for future events (Baruch Fischhoff, n.d.).

CHAPTER III

METHODOLOGY

3.1 Research Methodology

The purpose of this research project is to conduct a preliminary investigation for natural hazard symbology development, to identify and analyze the symbology that various agencies and institutions within the Thai community are now currently using and the respective sources of the symbology.

The very first step of this study is to identify existing natural hazard symbols that were used by relevant areas. International organizations, state and local agencies were contacted, and for follow-up, inputs will be done via e-mail and in person for a general q from Internet site.

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

- Identify the hazard evacuation information for which symbology was used
- Identify the agencies that are currently using hazard evacuation symbology

In order to redevelop the evacuation signs for the Thai community two methodologies have been conducted as followed:

- A. The Qualitative Methodology – Focus Group
- B. The Quantitative Methodology – Online and Street Survey

3.2 Qualitative Methodology for Tsunami and Flood Hazard Symbology

In this methodology, the method that will be used in this section is the focus group approach. Natural Hazard, as mentioned earlier, will be included into our investigation, and flood and tsunami are the main models. Therefore, the focus group for this section will be divided into 2 sub-groups. One group will focus on flood symbology and the other will be focus on tsunami. Participants from both focus groups will be asked about specific opinion on symbols and pictograms related to the natural 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.

Objective

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

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 as 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 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.

The reason that symbols and signs will be displayed via PowerPoint is because the nature of Thai people as an organizational community people tends to base their 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 questioning session the better quality of the result we will get.

We will not be using specific symbols and test them randomly on participants. This is because by doing so, we will only confuse the test subjects 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 their opinion and observed on non-verbal communication to confirm on their decision.

Furthermore, each participant will be asked for their understanding 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 symbols and pictograms and timed, but with texts. The interviews will be tape-recorded for further discussion on topics that are 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 questionnaires.

Participants

The participants in this session will be divided into two groups of people. One of them will include those who had disaster evacuation training and the other group includes 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 is for tsunami disaster.

B1 Quantitative Methodology for Tsunami and Flood Hazard Symbology

In this quantitative methodology for natural hazard symbology development, the study will be designed in a way that the result from the symbology development from the focused group will further be used for mass questionnaires.

Objective

The main objective of this section is to identify the natural hazard symbols and pictograms that local community exposed to before and after the crisis time. Another objective of this method is to find out the most effective symbols and pictograms that are currently using within the local community during the crisis time. Furthermore, the study of this part is also to find out people psychological information towards certain symbols and pictograms

Method Overview

- In the first part of the method a group of people will be randomly interview based on the information about symbols and pictograms related to natural disaster, in this case Flood and Tsunami.

- Participants will be given a set of signs and symbols that have been developed based on the qualitative experiment; and will be asked to indicate on the one that they are rapidly exposed to. In the first part of method, the study is going to be focused more on the number of viewers rather than the end result after the visual contact.
- In the second phase of the method, interviewees will be asked for a more specific opinion on symbols and pictograms related to the natural hazard.

The focus of this study in this part is on the wholeness of the experience rather than on individual parts. The data in this section will be obtained from interviews with the local and stakeholders within the community, observations, and historical records on symbols and pictograms used within the affected area. After this part, the participants will be asked respectively about the symbols and pictograms they have seen.

Participants

The participants that will be used in this study will be divided into two major groups of people living in the affected areas and tourists that have potentials to visit the affected areas. There will be together a total of 400 participants for the questionnaires. The participants are most likely to be local community living in the affected or potential area for natural hazardous events.

Materials

The material in this survey will include existing symbols and pictograms within the affected area and universal symbols and pictogram that have not yet introduced to the community. In quantitative survey, the questionnaire focused more toward Likert and general demographic questions. The survey used in the survey will be based in Thai language since the local community that the survey is focusing on has the majority of people knowledgeable for only Thai language.

For participants that can't read or write, they will be read out the questions to and will be taped on audio records. For more detailed information to develop the tsunami symbols and pictograms, the survey in the second part will be focused more toward ethnographic questions and questions that deal with giving an opinions, which include ratings and personal comments and further suggestions from participants. Materials like questionnaire will be paper based rather than online for the local community in certain area, because some community that the survey is going to take place still has limited knowledge and access to the Internet.

3.3 Qualitative Methodology for Fire Hazard Symbology

In this methodology, people will be asked for specific opinion on symbols and pictograms related to the man-made hazard which in this case the fire disaster. 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 man-made hazards.

Objective

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

Method Overview

- A number of people will be given a group of symbols and pictograms related to the man-made hazard and will be observed and interview in a group and individually on the given set of items
- There will only be one focus group in this section because we are only focusing on fire hazard.

- The symbols and pictograms will be divided into three sets similar to natural hazard symbology, but with a combination of existing symbols within the fire potential areas, universal symbols used universally that have not yet introduced to the organization

Similar to natural hazard symbology section, 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 their 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 part.

Participants

There will be together one group of participants in this session with combination of 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.

B2 Quantitative Methodology for Fire Hazard Symbology

In this quantitative methodology for man-made hazard symbology development for evacuation, the study will be designed in a way that there will be

no different in response between the groups of people from the affected sites and the group of people that are visiting or come to contact with the potential sites.

Objective

The main objective of this section is to identify the fire accident symbols and pictograms for evacuation that people exposed to before and after the crisis time.

Another objective of this survey is to find out the most effective symbols and pictograms that are currently being used within the community during the evacuation. Furthermore, the study of this survey is also to find out people psychological information towards certain symbols and pictograms for evacuation.

Method Overview

- In the first part of the survey a group of people will be randomly interview based on the information that had been developed from the qualitative focus group on symbols and pictograms related to fire disaster.
- Participants will be given a set of signs and symbols and asked to indicate on the one that they are rapidly exposed to.
- In this phase of the survey, surveyors will be asked for more specific opinions on symbols and pictograms related to fire accident.

The focus of this study in this part is on the wholeness of the experience rather than individual parts. The data in this section will be obtained from questionnaires within the community, observations, and historical records on symbols and pictograms used within the potential areas.

In this part a number of local will be given a group of symbols and pictograms related to the natural hazard and will be observed and interview individually on the given items. The symbols and pictograms will be divided into two sets of existing symbols and pictograms within the potential areas and other symbols and

pictograms used elsewhere that have not yet introduced to the community. 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.

Furthermore, these participants will also be asked to look at the same set of symbols and pictograms that they have been experienced before, but with given timing. After this survey, the participants will be asked respectively toward the symbols and pictograms they have seen.

Participants

The participants that will be used in this study will be a group of people living or come to contact with the potential areas for fire incident. Together, there is 200 participants for the survey. The participants are most likely to be the community that lives in the Bangkok Metropolitan since it is the most crowded area of Thailand and has the highest potential for fire accident.

Materials

The material in this survey will include existing symbols and pictograms within the affected area and universal symbols and pictogram that have not yet introduced to the community. In quantitative survey, the questionnaire focused more toward Likert and general demographic questions. The survey used in the survey will be based in Thai language since the local community that the survey is focusing on has the majority of people knowledgeable for only Thai language.

For participants that can't read or write, they will be read out the questions to and will be taped on audio records. For more detailed information to develop the fire symbols and pictograms, the survey in the second part will be focused more toward ethnographic questions and questions that deal with giving an opinion, which include ratings and personal comments and further suggestions from participants. Materials like questionnaire will be paper based rather than online for

the local community in certain area, because some community that the survey is going to take place still has limited knowledge and access to the Internet.

Procedures

Procedures for gathering data

The data will be gathered from the local in the affected area and potential area of both man-made and natural hazards. During the survey process there will be audio recording for qualitative survey to focus on the study of psychological factors toward developing more effective symbols and pictograms for the area. Written notes might be used during the focus group or individual interview on qualitative survey.

3.4 Procedures for analyzing data

The data collected after each survey will be grouped and categorized using taxonomy process. The results will be graphed and mapped out to find the collation for further development of symbols and pictograms. The results will also be analyzed for colour symbolism in order to find the most suitable colour that will be used in symbology development. The ethnographical and psychological information will be analyzed in order to work out the most effective risk communication on hazard within the affected area.

3.5 Measurement

Result analysis

The data that used for this research project is gathered form set of questionnaires and analyzed through coding and the used of computational program of SPSS (Statistical Package for Social Science) for statistical calculation. The statistic result that have been calculated by the program will be used as followed:

1. Descriptive Statistic analysis, which make used of the calculation from result frequency, percentage, average mean and standard deviation in order to describe the general information of the sample results of symbology study.

2. The second part of the statistic calculation is the used of Inferential Statistic Analysis to test and strengthen the result reliability and in order for the calculation to work, we have to find out the Pearson's Product Movement Correlation Coefficient to find out the relationship between certain groups of result before analyzing the final results. The measurement of result will be measured using 5 point Likert scales with score as followed:

Level of Satisfaction	Score
Strongly Agree	5
Agree	4
Neutral	3
Disagree	2
Strongly Disagree	1

After we have gathered all the result and calculated the mean and standard deviation, we have to use another scoring scale called Best (1977) to decode the data. Best (1997) formula include the scoring from highest score to lowest score with interval as followed:

Scoring range	Definition
4.21-5.00	Strongly Agree
3.41-4.20	Agree
2.61-3.40	Neutral
1.81-2.60	Disagree
1.00-1.80	Strongly Disagree

Pearson measurement scale

This project is using the scaling measurement of Batz to calculate to relationship of the results.

Scoring level	Meaning
0.00-0.19	Very low association
0.20-0.39	Low association
0.40-0.59	Normal association
0.60-0.79	High association
0.80-1.0	Very high association

CHAPTER IV




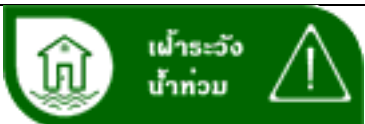
ANALYSIS OF COLLECTED DATA

This research study had divided the research experiment into 2 part of qualitative survey that experiment on focus groups and quantitative survey that experiment on the. Quantitative survey questions are developed base on the qualitative results.

4.1 Secondary Results

The tables below are showing hazard signs and symbols of both Man-made and Natural Hazard in the Thai community and globally. The results were achieved from survey on effected sites and electronic documents.

Table 4.1 Flood Evacuation Signs and Symbols

Local Symbols and Pictograms	Meanings
	(Flood Warning) There is going to be a flood.
	(Severe Flood Warning) There will be a severe flood.
	(All Clear) The situation is back to normal condition.
	(Flood Watch) There is a possibility in flooding in the area, so be cautious.





Local Symbols and Pictograms	Meanings
 <p data-bbox="332 451 479 556">ธงเขียว สภาวะปกติ</p>	Normal Condition
 <p data-bbox="316 802 479 934">ธงเหลือง ระดับน้ำต่ำกว่าปกติ ต่ำกว่า 1.50 ม. ให้ติดตามข่าวสาร อย่างใกล้ชิด</p>	The water level in the reservoir is below 1.50 meters, but keep yourself updated.
 <p data-bbox="284 1155 479 1312">ธงแดง ระดับน้ำท่วมภายใน 4-30 ชม. มีระดับน้ำท่วม เฉลี่ย 0.5-1.00 ม. แนะนำให้รีบอพยพไปพื้นที่ปลอดภัย</p>	There will be flood in 6-30 hours, so be prepared to evacuate you and your belonging into safe areas.
 <p data-bbox="292 1516 479 1627">ธงแดง+ไซเรน ระดับน้ำท่วม ฉุกเฉินภายใน 3-6 ชม. ให้รีบอพยพไปพื้นที่ปลอดภัย</p>	There will be severe flood in 3-6 hours. Quickly evacuate into safe areas.

Table 4.2 Other locations Flood Evacuation Signs and Symbols









Other Symbols and Pictograms	Meanings
	Flood Evacuation Route to the natural hazard institutions.
	(Flood Watch) There is a possibility in flooding in the area, so be cautious.
	(Flood Warning) There is going to be a flood.
	((Severe Flood Warning) There will be a severe flood.
	(All Clear) The situation is back to normal condition.
	A Flood Alert will be used to warn people of the possibility of flooding and encourage them to be alert, stay vigilant and make early preparations for flooding.
	A Flood Warning will be used to warn people of expected flooding and encourage them to take action to protect themselves and their property.
	A Severe Flood Warning is used when there is a significant risk to life to communities and we need to encourage customers to take action to protect themselves and follow the advice of the emergency services.

Table 4.3 Local Tsunami Evacuation Signs and Symbols

















Local Symbols and Pictograms	Meanings
 <p>A blue rectangular sign with a white border. At the top, it features a white circle containing a blue wave and a red cross. Below this, the text 'TSUNAMI EVACUATION ROUTE' is written in blue. At the bottom, there is a white arrow pointing left with the text '1 km.' and Thai text 'ไปศูนย์บรรเทาภัยพิบัติ' above it.</p>	<p>Tsunami Evacuation Route to the natural hazard institutions including the travel distance of 1 kilometers</p>
 <p>A blue rectangular sign with a white border. It shows a white silhouette of a person running up a hill towards a group of people. Below the illustration, the text 'EVACUATION SITE' and Thai text 'จุดปลอดภัยจากคลื่นยักษ์' are written in white.</p>	<p>Evacuation site for people during the tsunami crisis</p>
 <p>A blue rectangular sign with a white border. It features a white silhouette of a person running towards a small white building. The text 'ส้วมที่พิทักษ์อพยพ' (Sanitary shelter) is at the top, followed by 'EVACUATION SHELTER' and 'SHELTER' in white.</p>	<p>Evacuation shelter for tsunami evacuees. This sign is very likely to be located near temples and local tsunami institutions.</p>
 <p>A blue rectangular sign with a white border. It shows a white silhouette of a person running away from a large white wave. The text 'เข้าเขตพื้นที่เสี่ยงภัยอันตราย' (Entering hazard area) is at the top, followed by 'ENTERING TSUNAMI HAZARD ZONE' in white.</p>	<p>Entering Tsunami Hazard Zone. This sign is likely to be seen by people in the affecting area rather than those within the natural hazard parameter.</p>
 <p>A circular blue sign with a white border. It features a white silhouette of a person running towards another person. The text 'TSUNAMI' and Thai text 'ระบบช่วยเหลือร่วมกัน' (Partner system) are written in white.</p>	<p>*Tsunami partner system. This is can only be seen in Thailand where tourists and local are recommended to work together as a team rather than working individually if they come to the area together.</p>
 <p>Two blue rectangular signs with white borders. The left sign shows a white circle with a blue wave and a red cross, with the text 'TSUNAMI EVACUATION ROUTE' and 'เส้นทางหนีคลื่นยักษ์ 550 m.' below it. The right sign shows a white circle with a blue wave and a red cross, with the text 'TSUNAMI EVACUATION ROUTE' and '100m เส้นทางหนีคลื่นยักษ์' below it.</p>	<p>Tsunami Evacuation Route including the travel distance of 550 meters. The distance might be varied accordingly to the sign located site.</p>

Table 4.4 Other locations Tsunami Evacuation Signs and Symbols

Other Symbols and Pictograms abroad	Meanings
	This area is expose to tsunami disaster.
	All vehicles prohibited in front of residences on riverside beach.
	The Tsunami evacuation assembly with the sign shape pointing to the safety location
	Reflex sign for Tsunami evaluation route along with allow pointing to safety destination.
	Entering tsunami natural hazard area
	The person is entering tsunami evacuation area.

*This symbols or pictograms can only be found in Thailand.

Table 4.5 Local Fire Evacuation Signs and Symbols

Local Symbols and Pictograms	Meanings
	<p>Fire phone during fire emergency.</p>
	<p>Fire hose reel is ready to be used.</p>
	<p>Fire alarm during fire emergency</p>
	<p>Fire extinguisher is here to be used</p>











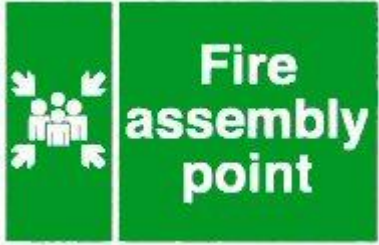



Local Symbols and Pictograms	Meanings
	<p>Medical and first aid kits.</p>
	<p>Fire exit door</p>
	<p>Fire blanket is available here to be used</p>
	<p>Fire Alarm during fire emergency</p>
	<p>Fire ladder is here to be used</p>

Table 4.6 Other locations Fire Evacuation Signs and Symbols

Other Symbols and Pictograms abroad	Meanings
	<p>Fire extinguisher is ready to be used here.</p>
	<p>Operate to the nearest fire alarm.</p>
	<p>This phone can be used in case of fire accident.</p>
	<p>Fire hose reel for fire emergency.</p>
	<p>The glass that located to this sign is able to break in case of fire.</p>

Other Symbols and Pictograms abroad	Meanings
	<p>This is the evacuation point where people should gather together during the fire accident.</p>
	<p>Fire ladder is here to be used.</p>
	<p>Fire fighting equipments are here to be used.</p>
	<p>Exit location for fire (with and without the texts)</p>

4.2 Qualitative Results

This is part of the research experiment people will be asked for their specific opinion that they have towards the current signs and symbols along with further suggestion they have for the future signs and symbols that are yet to be developed.

Flood

People that attended flood-focused group were those that have been affected by the disaster and those that are potential for disaster. From the focus group discussion we have found out that the majority of people in the group have never been exposed to the Flood warning and evacuation signs before. Though, one or two people in the group can guess what are the meaning of some of the signs, but the majority tends to be confused and guessed the meaning incorrectly. More than half of the focus group didn't know that the given signs are the warning or evacuation signs. A few participants stated that during the disaster time, signs could be very helpful when they are navigating for safety path.

Though, some of the signs are placed at the disastrous area, but they are ambiguous and difficult to be notice. The color and the shapes usually blended in with the other signs on the street, so they find it very hard to separate hazard signs from the other signs.

And even if they can separate the hazard signs from the other signs, their ambiguous meaning distract the people to follow and choose to go for the signs that have nothing to do with the hazard but are more understandable.

Tsunami

In the Tsunami-focused group, participants are asked about the Tsunami evacuation signs. Participants in this group are mixture of people living in the Tsunami affected area and tourists travel to the affected area. Similar to the flood-focused group participants, the majority participants in this group have never been exposed to the Tsunami evacuation signs. The one that are likely to expose to the

signs are in fact the tourists that travel to the affected areas and the one that are most like to know or guess the meaning of the signs correctly are the one that live in the affected area.

A number of participants stated that they have seen Tsunami signs via internet, but they don't really know which is which because the variety of Tsunami signs with exact same meaning are being your at the crisis scene. Different locations have placed different signs but they are all sending the same message. Some of the participants agreed that it will be easier to recognized the signs if same Tsunami signs are being used in all location like the fire exit signs in the cinema that can be recognized very easily.

Fire

Unlike the Natural hazard focused group, Man-Man focused group seems to be more exposed to the fire hazard signs. Participants from this group said that the reason they know most of the sign is because they have seen most of them in their everyday life. For example, the Fire extinguisher sign and the Exit sign. However, of all the signs used in the fire hazard, the majority of them didn't do well in sending the message to the evacuators. Most participants choose to follow that one person they think is more likely to survive based on their personal thought instead of using the signs to guide them when evacuating. This is because most of the fire hazard signs are warning signs not evacuating signs like the natural hazard, so they didn't know what to do when the fire hazard occur.

4.3 Quantitative Results

In this section, this research used the method of Survey Research and Questionnaire with One-Shot Descriptive study. From the qualitative focused group we have found out that people pay very little attention to the categories of the

disaster they are in but more to their survival. They combined both man-made and natural disaster as the path to death.

Therefore, in the quantitative survey the questionnaire will not be testing different hazard signs separately, but rather combining them together since the categorization of hazard signs makes very little different in the making of participant decision. The participants in the quantitative survey are the local and tourists exposing or living in the hazard area altogether 406 subjects.

Questionnaire for the participants are designed to have a Close-endquestion with 3 separate sections as followed:

Section 1. The Learning phase - Personal Information or the demographic

Section 2. The Feeling phase - Symbology Influence

Section 3. The Doing phase - Symbology View point

The result presentation

The result from sample will be presented into 3 parts.

- a) General Information – Calculating the frequency and the mean of the results
- b) Symbologic Influence - Calculating the frequency and the mean of the results
- c) Symbology viewpoint – Calculating the mean and standard deviation of the results.

General Information

The parentage and mean of personal information and demographic.

Table 4.7 The percentage of group sample by gender

Gender	Frequency	Percent
Female	258	63.5
Male	145	35.7
Others	3	0.7
Total	406	100.0

From table 4.7 we have found out that the majority of participants in this group sample are female with the percentages of 63.5 and male with the percentages of 35.7 and other with the percentages of 0.7.

Table 4.8 The percentage of group sample by age group

Age	Frequency	Percent
15 – 24	168	41.4
25 – 60	196	57
More than 61	5	1.2
Total	406	100.0

From the table 4.8 we have found out that the majority of participants are between the age of 25-60 with the percentages of 57 followed by the age range of 15-24 with the percentages of 41.1 and more than 61 years old with the percentages of 1.2 at the least.

Table 4.9 The percentage of sample group by nationality

Nationality	Frequency	Percent
Thai	400	98.5
Foreigner	6	1.5
Total	406	100.0

From the table 4.9 we have found out that there are more Thai nationality with the percentage of 98.5 than foreigner with the percentage of 1.5 who participated in doing the questionnaire.

Table 4.10 The percentage of ample group by ability to read and understand Thai language

Ability to read and understand Thai Language	Frequency	Percent
Yes	399	98.3
No	7	1.7
Total	406	100.0

From the table 4.10 we have found out that the majority of participants are able to read and understand Thai with the percentages of 98.3 which is more than the percentage of people who can't read and understand Thai language that has the percentages of 1.7.

Table 4.11 The percentage of sample group based on education

Education	Frequency	Percent
PhD	8	2.0
Master Degree	66	16.3
Bachelor Degree	217	53.4
College Vocational Certificate	55	13.5
High School	44	10.8
Less than high school	16	3.9
Total	406	100.0

From the table 4.11 the results showed that the majority of participants achieved Bachelor degree with the percentages of 53.4 followed by Master Degree with the percentages of 16.3 and College Vocational Certificate with the percentages of 13.5 and High school with the percentages of 10.8 and PhD with the percentages of 3.9 and Lower than high school with the percentages of 2.0.

Table 4.12 The percentage of sample group by Career

Career	Frequency	Percent
Working Full Time	226	55.7
Working Part Time	10	2.5
Freelance	35	8.6
Student	108	26.6
Temporarily unemployed	18	4.4
Retired	3	0.7
Others	6	1.5
Total	406	100.0

From the table 4.12 the results showed that most participants are working full time with the percentages of 55.7 followed by student with the percentages of

26.6 and freelance with the percentages of 8.6 and Temporarily unemployed with the percentages of 4.4 and working part time with the percentages of 2.5 and other types of career with the percentages of 1.5 and retired with the percentages of 1.5.

Table 4.13 Percentage of sample group by place of living

Place of Living	Frequency	Percent
Bangkok	311	76.6
Bankok Perimeter or other provinces	95	23.4
Total	406	100.0

From the table 4.13 the results showed that the majority of participants are living in Bangkok with the percentages of 76.7 and 23.4 in the other provinces.

Table 4.14 The percentage of sample group by salary

Salary	Frequency	Percent
Less than 15,000 baht	176	43.3
15,000 – 20,000 baht	98	24.1
20,001 – 25,000 baht	39	9.6
25,001 – 30,000 bath	34	8.4
30,001 – 35,000 baht	16	3.9
More than 35,000 baht	43	10.6
Total	406	100.0

From the table of 4.14 the results showed that the majority of participants earned lower than 15,000 baht as their monthly salary with the percentages of 43.3 followed by 5,000-20,000 baht with the percentages of 24.1 and more than 35,000 baht with the percentages of 10.6. The participants with the salary of 20,001-25,000 have the percentages of 8.4 followed by the salary range of 30,0001-35,000 with the percentages of 3.9.

Symbolic Influence Result

The parentage and mean of symbolic influence.

Table 4.15 The percentage of sample group by fire signs recognition

Have you ever seen one or more of this signs?	Frequency	Percent
Yes	377	92.9
No	29	7.1
Total	406	100.0

From the table 4.15 we have found out that the majority of participants have been exposing to the fire signs with the percentages of 92.9 and 7.1 who have never been exposing to any of these signs.

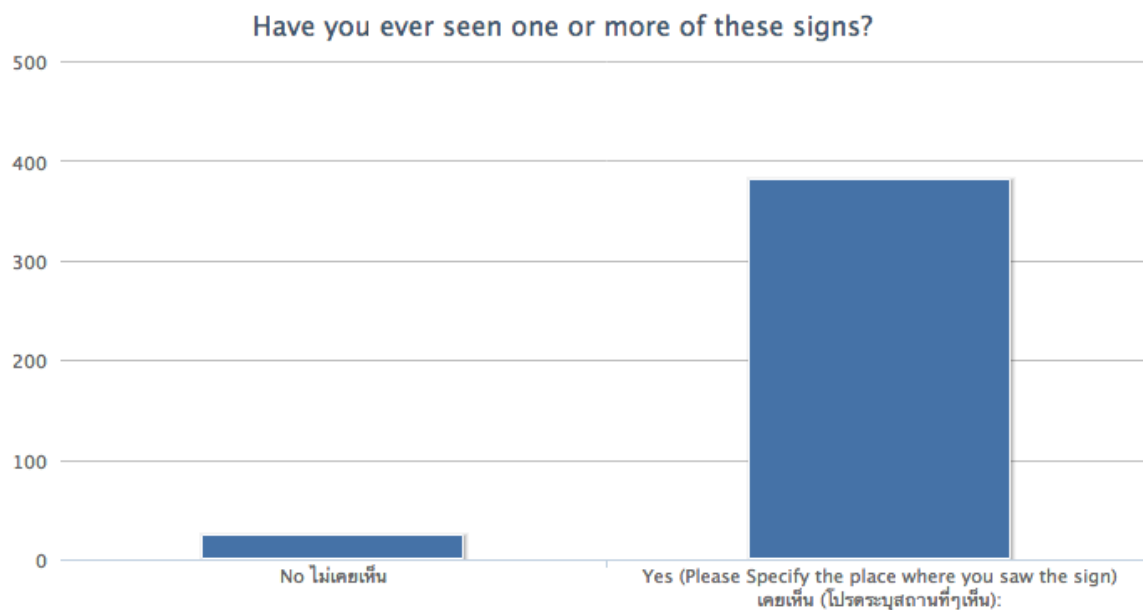


Table 4.16 The percentage of sample group by Tsunami signs recognition

Have you ever seen one or more of this signs?	Frequency	Percent
Yes	124	30.5
No	282	69.5
Total	406	100.0

From the table 4.16 we have found out that the majority of participants have never been exposing to the Tsunami signs with the percentages of 69.5 and 30.5 percent has been exposing to the signs.

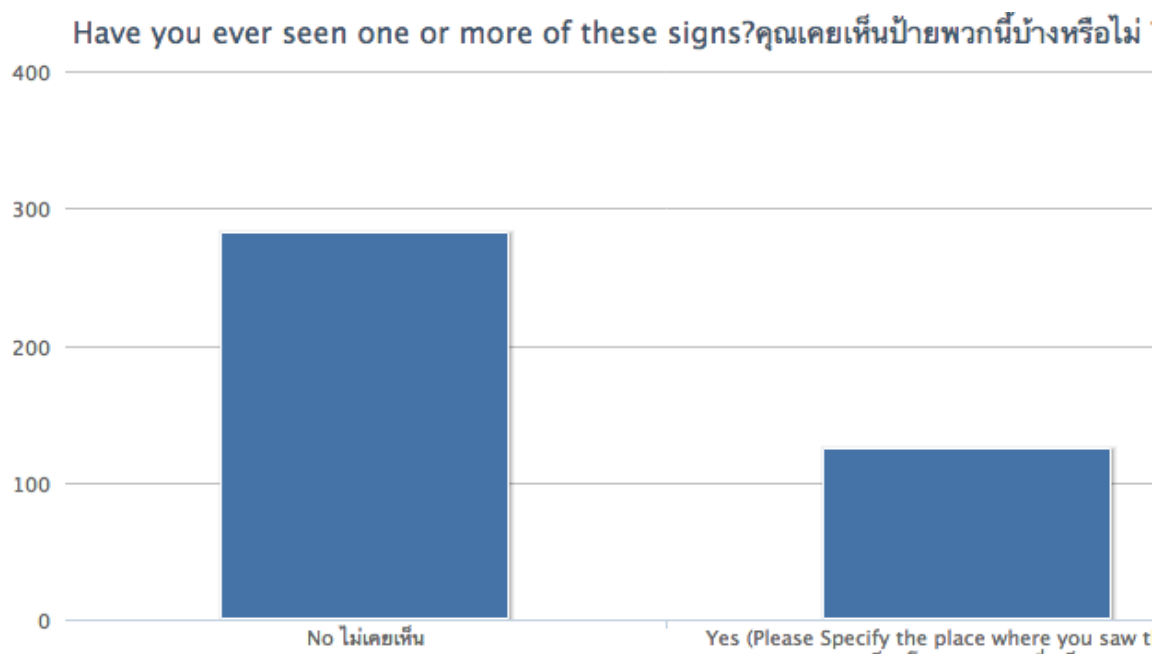


Table 4.17 The percentage of sample group by Flood signs recognition

Have you ever seen one or more of this signs?	Frequency	Percent
Yes	48	11.8
No	358	88.2
Total	406	100.0

From the table 4.17 we have found out that the majority of participants have never been exposing to any of the flood signs with the percentages of 88.2. And 11.8 percent have been exposing to the signs.

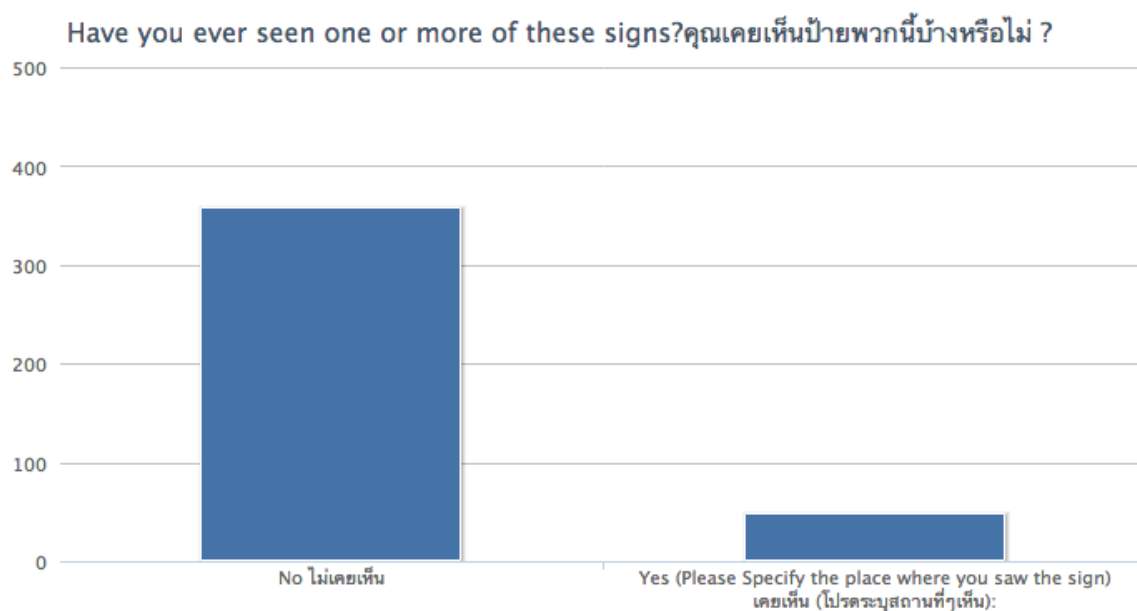


Table 4.18 The percentage of sample group by shape of signs that participants think will direct them to safe location

What sign shape do you think it will direct you to the safe location	Frequency	Percent
Triangle	149	36.7
Circle	131	32.3
Square	112	27.6
Others	14	3.4
Total	406	100.0

The table shows that the majority of people have chosen triangle with the percentages of 36.7 and chose circle with the percentages of 32.3. Other have chosen square with the percentages of 27.6 and others with the percentages of 3.4

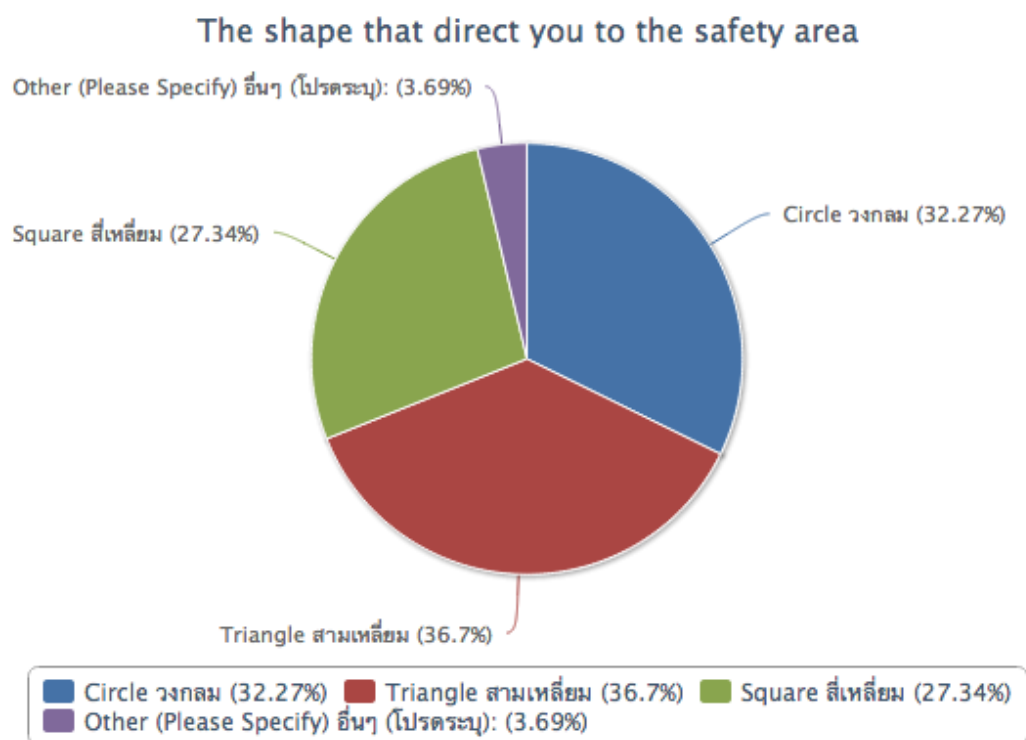


Table 4.19 The percentage of sample group by the color that participants think will direct them to safety area

What sign color do you think it will direct you to the safe location	Frequency	Percent
Red	52	12.8
Yellow	26	6.4
Green	326	80.3
Color Blind	2	0.5
Total	406	100.0

From this table the result shows that the majority of participants think that Green is the color that will direct them to the safety area with the percentages of 80.3 followed by the color of Red with percentages of 12.8 and Yellow with the percentages of 6.4.

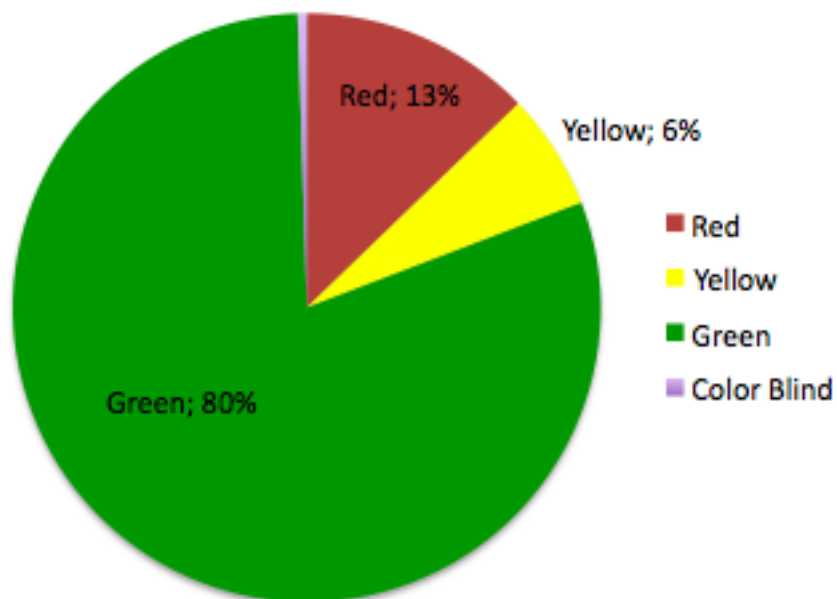
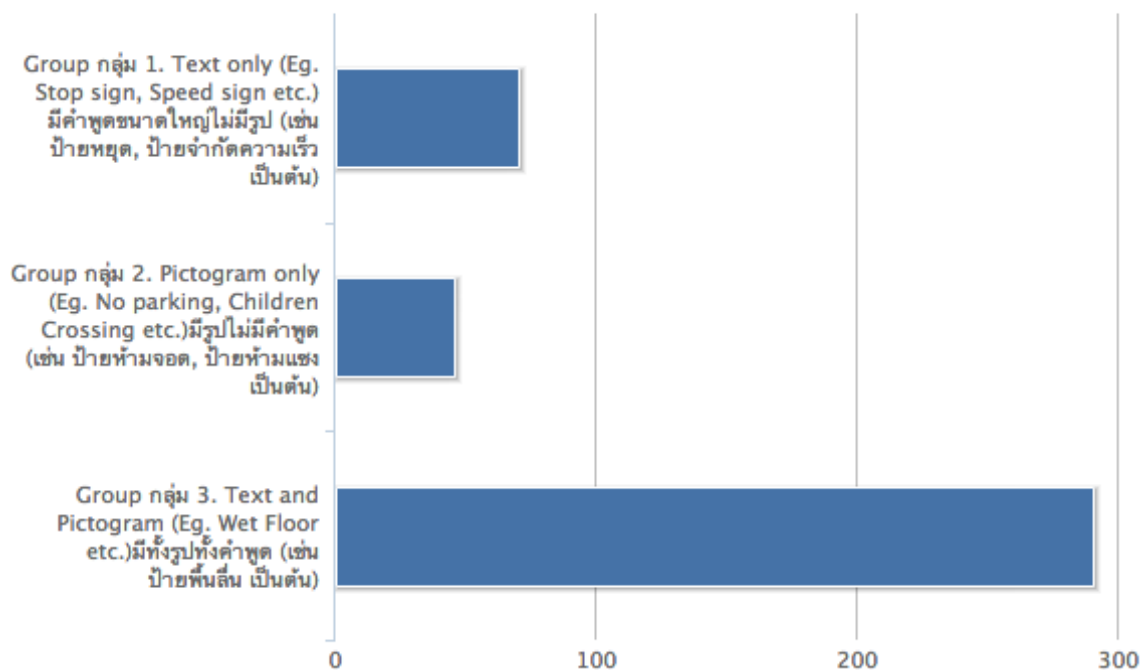


Table 4.20 The percentage of sample group by content of signs

Which group of sign will you choose	Frequency	Percent
Group 1 (Text Only)	70	17.2
Group 2 (Pictogram Only)	46	11.3
Group 3 (Text and Pictogram)	290	71.4
Total	406	100.0

From this table the result shows that the majority of participants think group 3 is of the best content for signs with the percentages of 71.4 followed by group 1 with the percentages of 17.2 and group 2 with the percentages of 11.3

The Content of Signs



The Symbology viewpoint result

Mean and standard deviation calculation.

Table 4.21 The mean and standard deviation of sample group by symbology

	Opinion					\bar{X}	S.D.	Meaning
	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree			
1) The location of the sign helps you to make a better decision in crisis time.	8 2.0	9 2.2	32 7.9	197 48.5	160 39.4	4.21	0.83	Strongly Agree
2) The color of the Warning sign can help	11	15	26	183	171	4.20	0.91	Agree

you make a better decision in crisis time	2.7	3.7	6.4	45.1	42.1			
3) The context (pictogram and text) on the Warning sign can help you make a better decision in crisis time	10 2.5	16 3.9	30 7.4	188 46.3	162 39.9	4.17	0.90	Agree
4) The Warning sign can help you make better decision in crucial decision making time	18 4.4	7 1.7	23 5.7	203 50.0	155 38.2	4.15	0.94	Agree
5) The shape of the Warning sign can help you make a better decision in crisis time	6 1.5	21 5.2	118 29.1	172 42.4	89 21.9	3.78	0.89	Agree
6) Signs that direct you to the evacuation area should be a cool tone	17 4.2	46 11.3	65 16.0	184 45.3	94 23.2	3.71	1.07	Agree
7) The Warning sign should be located only in the area where the hazard occur	35 8.6	163 40.1	63 15.5	108 26.6	37 9.1	2.87	1.16	Neutral
8) The language that use on the Warning sign should either be Thai or English	86 21.2	183 45.1	50 12.3	58 14.3	29 7.1	2.41	1.17	Disagree
Overall Mean						3.69	0.55	Agree

*Note that the number on top is frequency and the number below is percentage

From the table 4.21 the result from questions number 1-6 shows positive opinion toward the use of hazard signs and symbols during crucial moments. This group of questions asked about the impact of colors, shapes and texts of the hazard signs during their crucial decision-making moments. We can observe that the positive opinion form the result confirms that colors, shapes and text do have impact on their visual perception. Question number 7 and 8, on the other hand, shows negative perception toward the use one language and specific location on placing the signs and symbols.

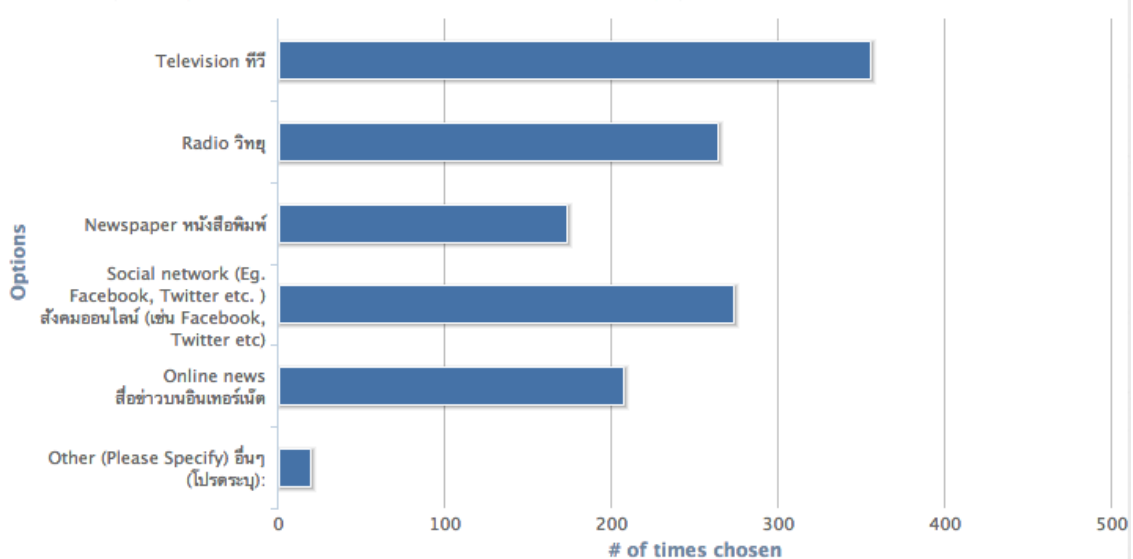
Table 4.22 The percentage of sample group by alternative helps

Which alternative that can help you make a better decision	Yes		No	
	Frequency	Percent	Frequency	Percent
Television	356	87.7	50	12.3
Social Network	273	67.2	133	32.8
Radio	264	65.0	142	35.0
Online News	207	51.0	199	49.0

Newspaper	173	42.6	233	57.4
Other	19	4.7	387	95.3

From the table 4.22 the result shows that television is the alternatives that the majority has chosen to help making a better decision in crisis time with the percentages of 87.7 followed by radio with the percentages of 65.0. 12.3 and 35.0 percent think that it's better not to used television and radio as alternative helps. 57.4 percent think that newspaper is an alternative helps when 42.6 think not. The media of social network has the percentages of 67.2 participants think that it will help in making a better decision and 32.8 disagree with this argument. 51.0 and 49.0 percent of the participants think that online media can and can't help in making a better decision. The other media category that people think can help in making a better decision has the percentages of 4.7 percent and 95.3 think it didn't help.

Which ways do you think is an alternative that can help you make a better decision in crisis.



CHAPTER V

CONTRIBUTIONS TO THE BODY OF KNOWLEDGE

The purpose of this project was to conduct pilot research in order to identify and catalogue existing emergency symbols and signs that are currently used through 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 research questions used for this study are listed as follows:

- 1 Do colours have an effect on visual perception in visual development?
- 2 Do symbol shapes have an impact on people's visual perception?
- 3 Do texts have an impact on people's visual perception?

For this research the methodology for data collection has been divided into two parts.

- 1 The qualitative information and data were gathered from academic papers, books and focus group interviews. Further secondary sources include online and offline journals, signs and symbols information from organizations in Thailand.
- 2 Quantitative data were gathered through questionnaires and online surveys. Questionnaires in this component were developed from the information gathered in the qualitative section. However, in the quantitative part the study expanded in a way that demographics and psychographics of the participants were covered. There were altogether 406 participants who lived in Thailand and likely to be at risk to natural and man-made disasters.

The findings indicated that:

1. The colours of hazard signs have an impact on visual perception in the visual development of Thai people

2. The shape of hazard signs and symbols has an impact on Thai people's visual perception during an emergency.
3. The context and text of hazard signs and symbols has an impact on people's visual perception in an emergency.

From this research we can divide the results into two sections.

- 1 The qualitative results, which focused more toward individual and group opinions and suggestions.
- 2 The quantitative results, which described the general information of demographics and psychographics of participants as a mass with close-ended questions.

5.1 Qualitative contribution

The analysis of qualitative results on development of hazard symbology in Thailand was done. From the qualitative results we can categorize the finding into two parts, which are the symbology of natural hazards and the symbology of man-made hazards.

5.1.2 Natural Hazard Symbology

In natural hazards most of the currently used signs in Thailand have a mixture of abstract and pictogram. For example, flooding signs recognized in Thailand are mostly abstract rather than pictogram based. Tsunami signs, on the other hand, are pictogram based rather than abstract. Flooding signs are created and placed in a different way within geographical areas, but Tsunami signs are adapted from universal Tsunami signs. However, some areas have created their own signs for their community in the local language, making it difficult for tourists to understand. Even though the signs that the local community developed signify the same meaning as the adapted universal signs, the quality of the signs make it difficult for tourists to understand and act accordingly. Therefore, during an

emergency, people tend to follow the ones they feel to be reliable and likely to point the way to safety.

Some people that see locally made evacuation signs find it difficult to decode them because the information is unreadable or unclear. Most of the time unclear signs lead these people to danger rather than saving them. In Thailand there are many signs that have nothing to do with the hazard on streets, so in times of danger the hazard signs tend to blend in with construction signs.

5.1.3 Man-made Hazard Symbology

Most signs used in fire hazard warnings in Thailand are adapted from universal signs. They are usually pictogram based with no text, which make it difficult for people to understand. From the qualitative results, we have found out that there are only a few signs that people rely on during evacuation. The first one is the exit sign, which they are exposed to the most when they go to the cinema. The second sign is a fire extinguisher sign which people see at the shopping mall and hospital. The third sign is the fire alarm where most people came to experience at school. The signs that lead people to evacuation areas are not used in most parts of Thailand, so people tend to follow one another during danger which is risky behaviour. Thai people have lost their lives in fires because they panicked and did not know what to do. The signs are everywhere, but they do not know which is the right one to follow. The Thai community is organizational based, so people are dependent on one another in a crisis; when one panics it is more likely to cause others to panic in a similar way.

5.2 Quantitative contribution

5.2.1 Descriptive Statistics

General Information

From the survey results we can observe that the majority of participants exposed to hazard signs are female with a percentage of 63.5 and 35.7 percent for

male participants. The other 0.8 percent is participants that defined themselves as other gender that is not male or female. According to the Thai population pyramid, this result is to a certain extent reliable since the majority of the Thai population is female, so they are the population most exposed to signs.

From the questionnaire we also found that most of the participants are people between the ages of 25 – 60 years old. This age group are Generation X or baby boomers. Generation X were born after World War II (Henseler, n.d.). Unlike people above 60 years old, this group tends to ignore leaders. They are the people with very strong independent level living in an organizational community structure of Thailand. Because this generation has lived through tough economic times and the first generation to grow with technology, they adapt well to change (Henseler, n.d.).

The second highest age group that participated in the survey are people between the age of 15 – 24. This set is also known as Generation Y. Unlike generation X, they are more team-oriented which is similar to the community structure of Thailand (Kane, 2012). They are more dependent when compared to the baby boomer generation. Generation Y benefits greatly from mentors who can help guide and develop them (Kane, 2012).

From the observation we can see that during an emergency those that are likely to be the leaders are Generation X and the followers are Generation Y. When conducting symbology studies for sign development it is important to value the opinion of those that use the signs rather than ones that follow others. This is because during an emergency followers will still choose to follow the leaders rather than go with their own thoughts or instinct, so the signs that developed from the followers' opinions have less weight than those from the leaders or in this case the Generation X (Henseler, n.d.).

5.2.3 Symbologic Influence

From the results on symbologic influence section, we have found out that there is an equal amount of participants who have had emergency training. The majority of such training is in fire drill training with the percentages of 87.7, so it makes more sense when we take a look at the recognition percentage of participants being exposed to fire hazard signs, which has the highest percentages of 92.9 percent. However, we cannot really conclude that the exposure rate varied accordingly to the types of emergency training and the types of hazard. This is because the Tsunami sign has an exposure rate of 30.5 percent with a lower participant participated in the Tsunami training when compared to flood training which is 2.6 percent higher than the Tsunami training rate.

The other aspect of symbologic influence is the influence of shape, colour and content of the hazard signs. From the survey on the influence of the shape, the result shows that the majority of participants have chosen a triangle as the shape that leads them to safety in an emergency. However, the second highest shape of circle has nearly the same percentage as triangle shapes with only 4.4 percent difference, so we cannot make a hard and fast decision that the triangle is best suitable for the whole community in Thailand.

The colour of the sign, on the other hand, has the highest ranking in green. People think that green is the universal colour that will lead them to safety. Green with the percentages of 79.3 has scored 66.5 percent higher than red which is the second highest in rank. Finally the result from the influence of content or text used in hazard signs show that the majority of participants chose Group 3 or the combination of text and pictogram as the sign best suitable for them when making a crucial decision in an emergency.

5.2.4 Symbology Viewpoint

The symbology viewpoint is the part when participants are given a set of arguments and were asked to choose the scale that is likely to fit most to their satisfaction level toward the argument.

Most of the questions were set in a way that the result will be in positive manner, but two of these questions were set to test out the reliability of answers, so their result will be in the negative manner. From the survey we can observe that participants were agreed that colour, shape and text can help them making a better decision in an emergency and hazard signs as a whole can help them make a better decision at the crucial decision making time.

5.3 Discussion

5.3.1 Descriptive Statistics

This research was conducted to study the sample group of people that live in or travel to hazardous areas. Altogether 406 people taking three factors listed as follows.

Colour

From the survey based on the colour of hazard signs, we have found that the majority of participants chose green as the colour that will guide them to safety. Just like in every other part of the world, green is seen as the safety colour. Green has the symbolic meaning of balance, healing and hope. It is the colour with the combination of blue and yellow that stables the mind and harmonizes everything together. Humans tend to be more calm when exposing to green colours and more alert and cautious toward colours like red and yellow which are likely to make them more panicking and unable to think clearly during an emergency. Though hot colours like red and yellow are likely to promote caution in times of finding the evacuation route it is better to use green rather than red or yellow.

The colours that have been mentioned above are found as backgrounds of the signs. The colour of the pictogram or the text should be bright and contrast well

with the background. The text and pictogram should stand out when reflecting light from vehicles and also attract attention under natural light. Using the right contrast is especially important for text. According to colour theory, the wrong colours can drastically decrease the readability, and will quickly tire the reader's eyes (Kyrnin, n.d.). Green text on red and red text on green is particularly hard for many people to read. A combination of red and blue also creates a vibrating effect that can also make reading very difficult. The colour combination used on road names on highways is a good combination of contrast colour where the text stands out reflecting well in sunlight and the light from vehicles passing by.

Shape

From the survey based on shape of hazard signs, the result shows that the majority of participants have chosen triangles over other shapes for safety navigation. In Thailand a triangle shape is not used much when compared to squares and rectangles. However, when a triangle shape is seen it is usually something that puts people on their guard. In Thailand most triangle shapes are seen on the street at pedestrian crossings. Here, most pedestrian crossings are located outside school or community areas with no traffic light, so it is common sense for Thai people to slow down or be very careful when they see a triangle shaped sign. Nevertheless, the circle shape on the other hand had also been chosen by similar amount of people as triangle, so we can not finalize that result as triangle shape. In fact both shapes should be considered for future evacuation signs.

The other area that the Thai people see triangle signs is at police barricades and at construction sites. These are the sites where triangle shapes are bordered in lights to warn drivers and people that they have to slow down and be very cautious. A circle is usually the shape that gives information about something rather than warning people. Most circle-shaped signs in Thailand are seen on expressways and main roads. The circle sign usually includes either numbers or abstract shapes. For example, the speed limit on expressways or no parking signs. Unlike triangle shapes,

most circles in Thailand have no combination of text and pictures; they rather have either text or pictures in them.

Squares, on the other hand act as navigation that people see everywhere on the street. Squares and rectangles are the shapes used on street or area names. People pay almost no specific attention to this shape because it is something that they are exposed to daily and if used during an emergency this shape will make it more difficult for them to locate an evacuation route.

In an emergency the sign design showing the evacuation route itself should stand out. This is because during an emergency we panic and our brains tend to work in a top-down process according to Richard Gregory the visual perception researcher. This is when we are making a logical random guess based on our past experience. According to the top-down processing theory, the brain chooses to see and believe based on past experience and with very low levels of awareness. During an emergency, the shape that stands out and is most memorable is the one that we are likely to respond to.

Content and Text

Context and text is the last influence that has a strong effect on Thai people's perception towards hazard signs. Most hazard signs in Thailand have very little text relying on pictograms. More than half of the population in Thailand has never received emergency training and a number of them have never notice any hazard signs. Signs without any explanation are confusing. When the message of the signs are not being send to the receiver correctly, it is almost possible for the receiver to act according to the hazard signs. As the country with high heterogeneous level it is recommended to display the language in both English and Thai for the locals and foreign tourists to understand.

The brightness of the text should also be adjusted for people to be able to see clearly in all conditions especially during the rainy reason in Thailand. Some of the text on signs use vey low quality material that wear very easily.

5.4 Suggestions, Development and Limitations

By observing all of the results from our survey we have found out that people pay very little attention to the types of hazard they are in, but more to the final result. They consider all disasters as a path to their death, so signs and symbols used in any hazard scenario are tools that will help them survive. In every emergency scenario, in order for a person to survive an evacuation route is needed and signs should be the one that help guide people to the safety area. However, many hazard signs and symbols in Thailand are mostly warning signs with no evacuation route provided.

The signs with evacuation routes are usually not found in the affected area where people are living in and the evacuation signs that were found were usually unreadable. Therefore, from the collecting of data we have found out that the evacuation signs that are most likely to be effective and can help people make a better decision during emergencies should be triangular, with a green background and bright text colour that contrasts well with the background.

The evacuation signs should also have a combination of both pictogram and text with good contrasting colour to the green background. After the development of hazard signs for evacuation another factor that should also be taken in consideration is the location of the signs. The evacuation signs have to be placed in an area that has potential for hazards and in crowded areas. In addition, we should also consider the auditory element, because during the time when everyone is panicking and people are running around blocking evacuation visual aids sound can be another great option that will help guide the evacuees to safety.

From the survey result I have created a set of evacuation signs that will be effective within the Thai community in an emergency.

Figure 5.1 Triangle Shape Hazard Evacuation Signs

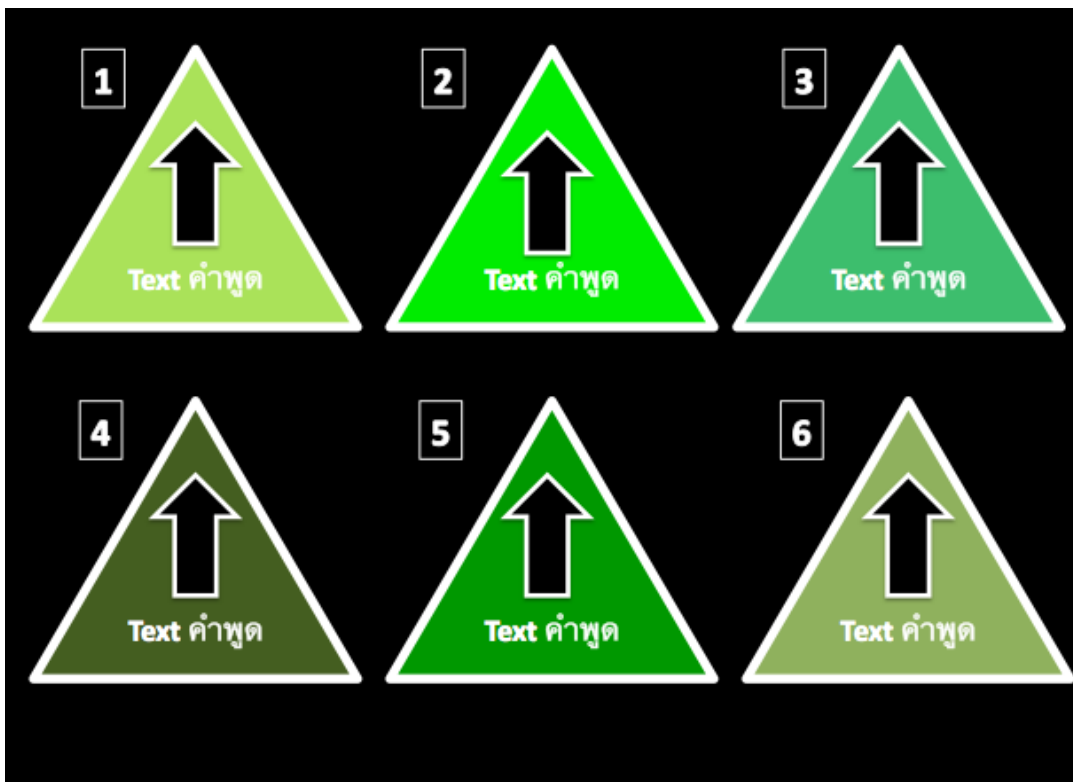
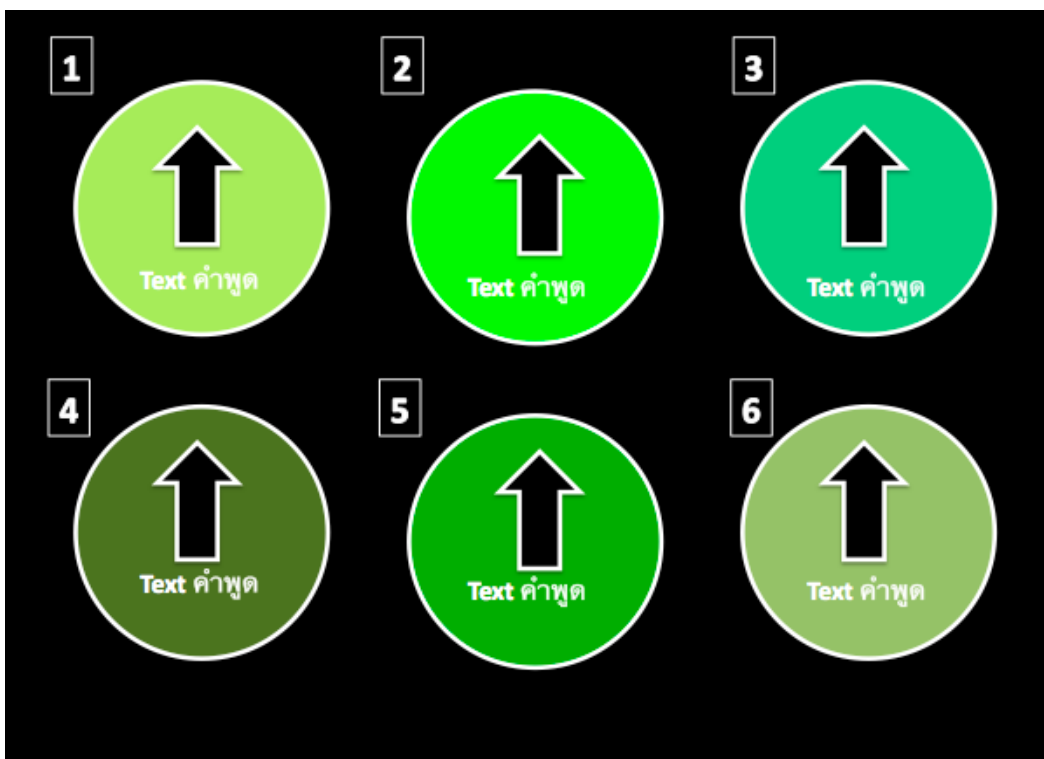


Figure 5.2 Circle Shape Hazard Signs



The evacuation signs have six shades of green and a combination of bright text and pictograms. I have chosen sign number 3 as the evacuation sign because the shade of green is somewhat similar to the shade of green use on road signs in Thailand. This green shade will create a familiar sense of direction as the road signs people see on the street in their everyday life. However, the triangle shape will prevent it from blending in with the other signs in the area. The white border represents the area where light will be reflected. See Figures 5.1 and 5.2)

Figure 5.1 Triangle and Circle Hazard Sign on Street



Figure 5.2 Triangle and Circle Hazard Sign on the seaside



Figure 5.3 Triangle and Circle Hazard Sign in Office Building



5.4.1 Limitations

The study was researched on a certain basis meaning part of the study cannot be specified in explicit detail due to limited amount of resources, time, and the withholding of confidential information for example, the detailed information on budget used for flood and tsunami natural hazard management departments. Furthermore, the sample used in this study may not be fully representative of the general population and thus further study is needed.

5.5 Further study

This research only focused on the elements of evacuation signs but not toward the other types of warning signs or the elements that have an impact on the decision making of people exposed to the signs. This area had not been studied in-depth, so it is another interesting area that is worthy of research. There should also be more in-depth research about the shape of triangles and circles about which shape will create the most impact and help during the crucial decision making period.

I would like to recommend symbology development for hazards signs and symbols in Thailand specialized for people with visual difficulties, for example those that are colour-blind. From the survey there were people who have chosen colour blindness in the colour selection phase. So far there is no in-depth study or development on such issues to help these people to follow accordingly to the hazard signs. Therefore, this is another area that is worthy of research.

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APPENDICES

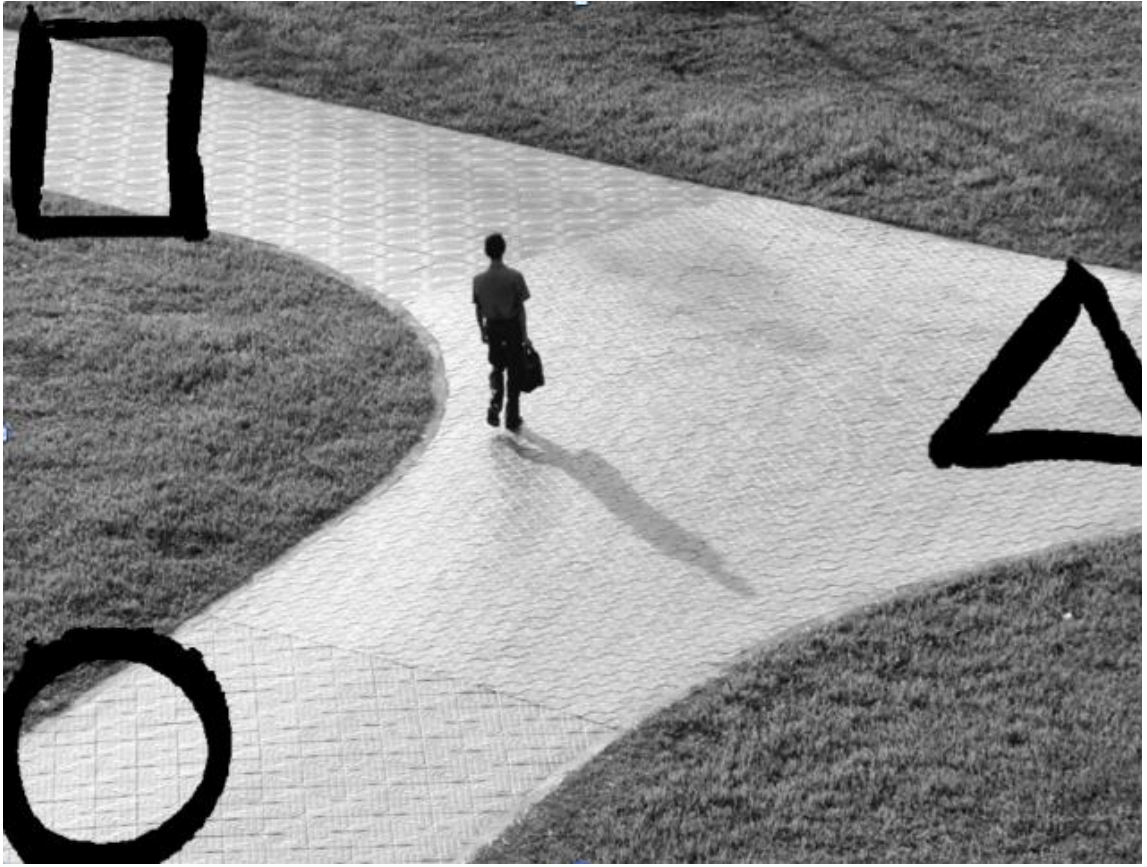
APPENDIX A

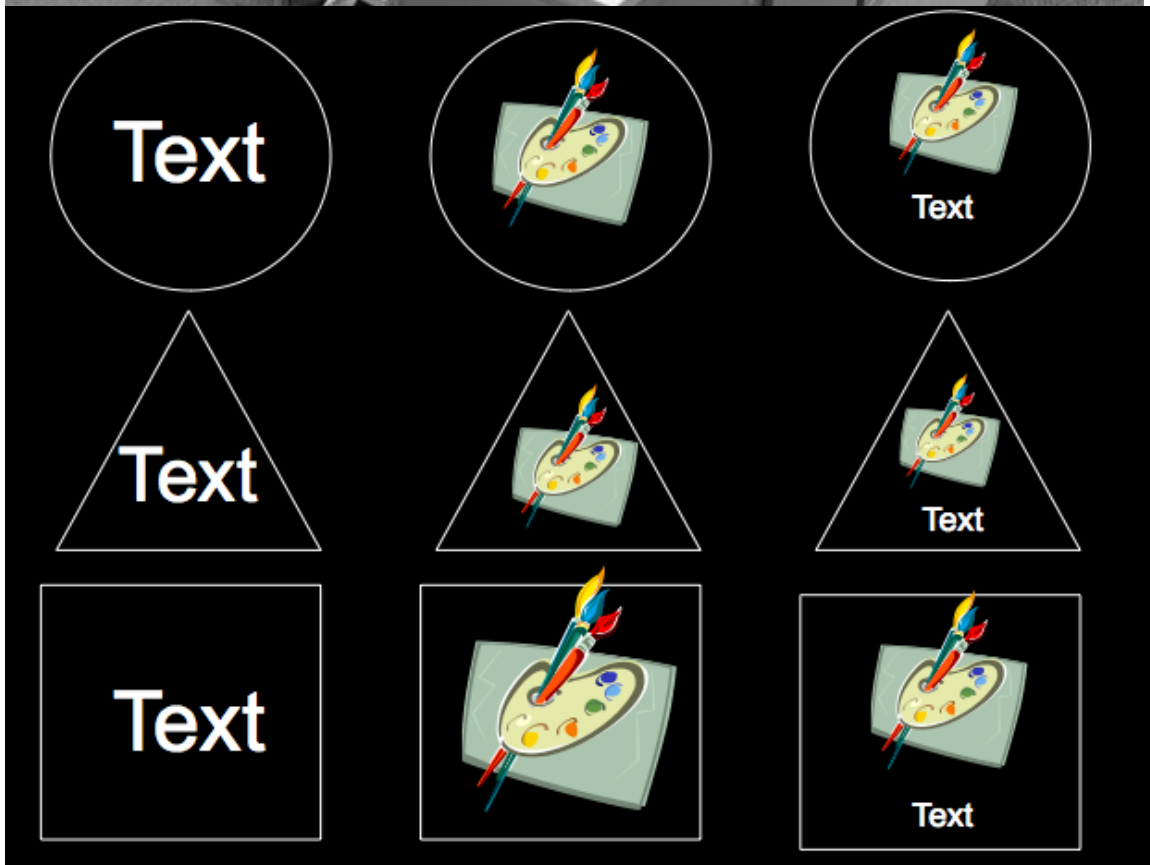
Sign Group I



Sign Group II







APPENDIX B

Sign Group I



ธงเขียว
สภาวะน้ำปกติ



ธงแดง
ระดับน้ำท่วมภายใน
6-30 ซม. มีค่าเฉลี่ย 1.0-1.50 ม.
และระดับน้ำท่วมอยู่ใน 1.0-1.50 ม.



ธงเหลือง
ระดับน้ำท่วมภายใน
1.50 ม. มีค่าเฉลี่ยน้ำท่วม
ภายใน 1.50 ม.



ธงแดง+ไซเรน
ระดับน้ำท่วม
รุนแรงกว่าปกติภายใน 3-6 ซม.
มีค่าเฉลี่ยน้ำท่วมอยู่ใน 1.0-1.50 ม.



เตือนภัย
น้ำท่วม



เตือนภัย
น้ำท่วมรุนแรง



ภาวะปกติ



เผื่อระวัง
น้ำท่วม

Sign Group II



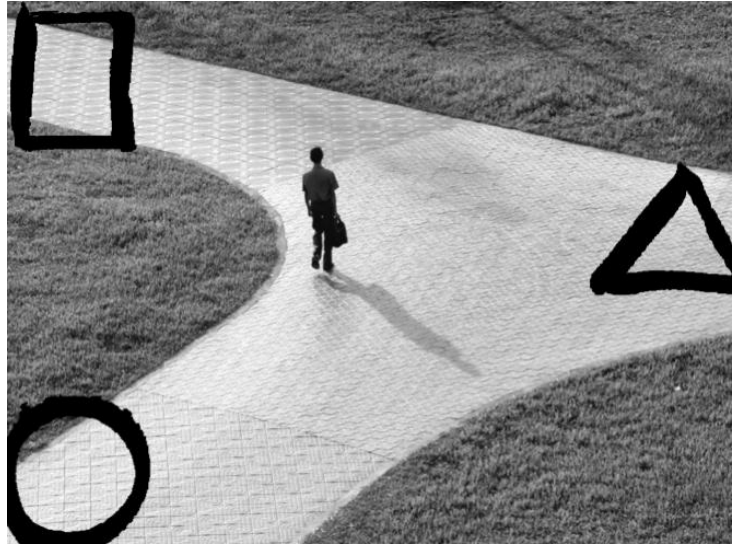
FLOOD ALERT
FLOODING IS POSSIBLE. BE PREPARED.



SEVERE FLOOD WARNING
SEVERE FLOODING. DANGER TO LIFE.



FLOOD WARNING
FLOODING IS EXPECTED. IMMEDIATE ACTION REQUIRED.




APPENDIX C






APPENDIX D



Symbology Development for Hazard in Thailand

ติดต่อ ใต้ที่ Contact e-mail: cucommart2012@gmail.com

Faculty of Communication Arts
คณะนิเทศศาสตร์
มหาวิทยาลัยอัสสัมชัญ



***1** Gender เพศ

- Female หญิง
- Male ชาย
- Other

***2** Age อายุ

- 15-24
- 25-44
- 45-60
- 61+

*3 Nationality สัญชาติ

- Thai ไทย
- Foreigner (Please Specify) ต่างชาติ (โปรดระบุสัญชาติ):

*4 Can you read and understand Thai language?
คุณสามารถอ่านและเข้าใจภาษาไทย

- Yes
- No

*5 Education Level ระดับการศึกษา

- PhD ปริญญาเอก
- Master Degree ปริญญาโท
- Bachelor Degree ปริญญาตรี
- College/Vocational Certificate วิทยาลัย/ปวช ปวส
- High school มัธยมศึกษา
- Less than high school น้อยกว่าระดับมัธยมศึกษา

*6 Occupation อาชีพ

- Working full time ทำงานประจำ
- Working part-time ทำงานนอกเวลา/ไม่เต็มเวลา
- Freelance รับจ้างงานอิสระ
- Student นักเรียน/นักศึกษา
- Temporarily unemployed ยังไม่มีงาน
- Retired ปลดเกษียณ
- Other (Please Specify) อื่นๆ (โปรดระบุ):

*7 Where do you live? At the moment
ที่ๆคุณอาศัยอยู่ปัจจุบัน

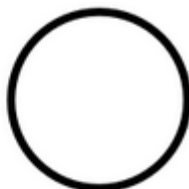
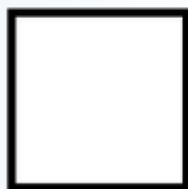
- กรุงเทพฯ
 ปริมณฑล หรือ จังหวัดอื่น (โปรดระบุที่ในประเทศไทยเท่านั้น) Bangkok Perimeter or Other provinces (Please Specify provinces in Thailand only):

*8 Salary เงินเดือน

- < 15,000 baht/บาท
 15,000 – 20,000 baht/บาท
 20,001 – 25,000 baht/บาท
 25,001 – 30,000 baht/บาท
 30,001 – 35,000 baht/บาท
 > 35,000 baht/บาท

*9 Which of these five geometric shapes do you think most accurately reflects your personality?

รูปทรงชนิดไหนที่คุณคิดว่าบ่งบอกลักษณะบุคลิกของคุณมากที่สุด



- Triangle สามเหลี่ยม
 Rectangle สี่เหลี่ยมผืนผ้า
 Square สี่เหลี่ยมจัตุรัส
 Circle วงกลม
 Squiggle เส้นหยัก

- No ไม่เคยเห็น
- Yes (Please Specify the place where you saw the sign) เคยเห็น (โปรดระบุสถานที่ที่เห็น):

*13 Have you ever seen one or more of these signs? คุณเคยเห็นป้ายพวกนี้บ้างหรือไม่ ?



- No ไม่เคยเห็น
- Yes (Please Specify the place where you saw the sign) เคยเห็น (โปรดระบุสถานที่ที่เห็น):

14 Have you ever seen one or more of these signs?
 คุณเคยเห็นป้ายพวกนี้บ้างหรือไม่ ?



- No ไม่เคยเห็น
- Yes (Please Specify the place where you saw the sign) เคยเห็น (โปรดระบุสถานที่ที่เห็น):

*15



You just...heard an announcement....that a **big disaster** is coming to your area and you have to evacuate immediately.

In front of you there are altogether 3 separate routes, but only one will save your life



There are different signs placed right in front of each route.

What sign shape do you think 🌟 it will direct you to the safe location?

คุณเพิ่งจะ...ได้ยินประกาศ...ว่าในพื้นที่ที่คุณอยู่จะเกิดภัยพิบัติและคุณจะต้องหนีเดี๋ยวนี้ ช่างหน้า

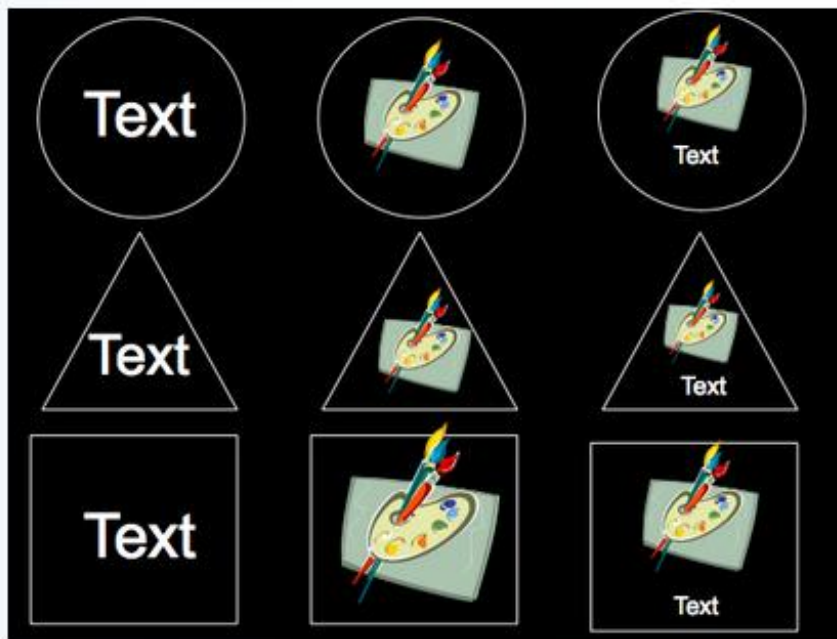
คุณมีทางแยกอยู่ 3 ทาง แต่มีแค่ทางเดียวเท่านั้นที่จะช่วยชีวิตคุณ 🌟

มีป้ายลักษณะต่างๆกำกับอยู่หน้าทางเข้าของทุกทาง คุณ 🌟 ทางที่จะพาคุณไปที่ *ปลอดภัย* มีป้ายลักษณะใด?

- Circle วงกลม
- Triangle สามเหลี่ยม
- Square สี่เหลี่ยม
- Other (Please Specify) อื่นๆ (โปรดระบุ):

- *17 Your organization or your community have chosen you to be the decision maker on choosing the sign for your people. Every life is hanging on the decision you are making Which group of sign are you going to choose?

องค์กรหรือชุมชนของคุณได้เลือกคุณเป็นตัวแทน เลือกป้ายสัญลักษณ์ เพื่อความปลอดภัยของทุกคน ทุกชีวิตขึ้นอยู่กับ การตัดสินใจของคุณ คุณจะเลือกกลุ่มป้ายกลุ่มไหน?



***Note that the size of signs are fix, so it will not will not be adjust accordingly to the content you add in.

***ขนาดนั้นไม่สามารถเปลี่ยนแปลงเพื่อปรับเข้ากับขนาดของ รูป,คำ หรือ การมีอยู่ของทั้งสองสิ่งได้

- Group กลุ่ม 1. Text only (Eg. Stop sign, Speed sign etc.) มีคำพูดขนาดใหญ่ไม่มีรูป (เช่น ป้ายหยุด, ป้ายจำกัดความเร็ว เป็นต้น)
- Group กลุ่ม 2. Pictogram only (Eg. No parking, Children Crossing etc.) มีรูปไม่มีคำพูด (เช่น ป้ายห้ามจอด, ป้ายห้ามแซง เป็นต้น)
- Group กลุ่ม 3. Text and Pictogram (Eg. Wet Floor etc.) มีทั้งรูปทั้งคำพูด (เช่น ป้ายพื้นลื่น เป็นต้น)

*18 Do you think the color of signs can help you make a better decision in crisis time?
 คุณคิดว่า สี ของป้ายมีส่วนช่วยให้คุณตัดสินใจดีขึ้นในยามคับขันหรือไม่?

1	2	3	4	5	Comment	ข้อเสนอแนะ
Strongly Disagree ไม่เห็นด้วยอย่างมาก	Disagree ไม่เห็นด้วย	Neutral เฉยๆ	Agree เห็นด้วย	Strongly Agree เห็นด้วยอย่างมาก		

*19 Do you think the shape of signs can help you make a better decision in crisis time?
 คุณคิดว่า รูปทรง ของป้ายมีส่วนช่วยให้คุณตัดสินใจดีขึ้นในยามคับขันหรือไม่?

1	2	3	4	5	Comment	ข้อเสนอแนะ
Strongly Disagree ไม่เห็นด้วยอย่างมาก	Disagree ไม่เห็นด้วย	Neutral เฉยๆ	Agree เห็นด้วย	Strongly Agree เห็นด้วยอย่างมาก		

*20 Do you think the location of the sign help you to make a better decision in crisis time?
 คุณคิดว่าที่ตั้งของป้ายมีส่วนช่วยในการตัดสินใจที่ดีขึ้นหรือไม่?

1	2	3	4	5	Comment	ข้อเสนอแนะ
Strongly Disagree ไม่เห็นด้วยอย่างมาก	Disagree ไม่เห็นด้วย	Neutral เฉยๆ	Agree เห็นด้วย	Strongly Agree เห็นด้วยอย่างมาก		

*21 Signs that direct you to the evacuation area should be a cool tone
 ป้ายที่นำทางไปยังที่ๆปลอดภัยควรเป็นสีเย็น

1	2	3	4	5	Comment	ข้อเสนอแนะ
Strongly Disagree ไม่เห็นด้วยอย่างมาก	Disagree ไม่เห็นด้วย	Neutral เฉยๆ	Agree เห็นด้วย	Strongly Agree เห็นด้วยอย่างมาก		

- *22 Do you think signs should be located only in the area where the hazard occur?
คุณคิดว่าป้ายควรตั้งอยู่เฉพาะที่ที่เกิดภัยพิบัติเท่านั้นใช่หรือไม่?

1	2	3	4	5	Comment	ข้อเสนอแนะ
Strongly Disagree ไม่เห็นด้วยอย่างมาก	Disagree ไม่เห็นด้วย	Neutral เฉยๆ	Agree เห็นด้วย	Strongly Agree เห็นด้วยอย่างมาก		
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>		<input type="text"/>

- *23 Do you think the context (pictogram and text) on signs can help you make a better decision in crisis time?
คุณคิดว่า เมื่อหา (คำพูดและภาพ) บนป้ายมีส่วนช่วยให้คุณตัดสินใจดีขึ้นในยามคับขันหรือไม่?

1	2	3	4	5	Comment	ข้อเสนอแนะ
Strongly Disagree ไม่เห็นด้วยอย่างมาก	Disagree ไม่เห็นด้วย	Neutral เฉยๆ	Agree เห็นด้วย	Strongly Agree เห็นด้วยอย่างมาก		
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>		<input type="text"/>

- *24 The language that use on signs should either be Thai or English
ภาษาที่ใช้บนป้ายควรเป็นภาษาไทยหรืออังกฤษอย่างใดอย่างหนึ่งเท่านั้น

1	2	3	4	5	Comment	ข้อเสนอแนะ
Strongly Disagree ไม่เห็นด้วยอย่างมาก	Disagree ไม่เห็นด้วย	Neutral เฉยๆ	Agree เห็นด้วย	Strongly Agree เห็นด้วยอย่างมาก		
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>		<input type="text"/>

- *25 Do you think signs can help you make better decision in crucial decision making time?
คุณคิดว่าป้ายเตือนภัยมีส่วนช่วยในการตัดสินใจยามคับขันหรือไม่?

1	2	3	4	5	Comment	ข้อเสนอแนะ
Strongly disagree ไม่เห็นด้วยอย่างมาก	Disagree ไม่เห็นด้วย	Neutral เฉยๆ	Agree เห็นด้วย	Strongly agree เห็นด้วยอย่างมาก		
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>		<input type="text"/>

*26 Which ways do you think is an alternative that can help you make a better decision in crisis time

คุณคิดว่ามีวิธีไหนอีกที่จะช่วยให้คุณตัดสินใจดีขึ้นในยามฉุกเฉิน

***You can choose more than one answer

***คุณสามารถเลือกได้มากกว่าหนึ่งข้อ

- Television โทรทัศน์
- Radio วิทยุ
- Newspaper หนังสือพิมพ์
- Social network (Eg. Facebook, Twitter etc.) สังคมออนไลน์ (เช่น Facebook, Twitter etc)
- Online news สื่อข่าวบนอินเทอร์เน็ต
- Other (Please Specify) อื่นๆ (โปรดระบุ):

Finish Survey

APPENDIX E

Symbology Development for Hazard in Thailand

ติดต่อได้ที่ Contact e-mail: cucommart2012@gmail.com



Faculty of Communication Arts
คณะนิเทศศาสตร์
สาขาสื่อมวลชน

*1 Gender เพศ

- Female หญิง
 Male ชาย
 Other อื่นๆ

*2 Age อายุ

- 15-24
 25-44
 45-60
 61+

*3 Nationality สัญชาติ

- Thai ไทย
 Foreigner (Please Specify) ต่างชาติ (โปรดระบุสัญชาติ):

*4 Can you read and understand Thai language?
คุณสามารถอ่านและเข้าใจภาษาไทย

- Yes
 No

*5 Education Level ระดับการศึกษา

- PhD ปริญญาเอก
 Master Degree ปริญญาโท
 Bachelor Degree ปริญญาตรี
 College/Vocational Certificate วิทยาลัย/ปวช ปวส
 High school มัธยมศึกษา
 Less than high school น้อยกว่าระดับมัธยมศึกษา

*6 Occupation อาชีพ

- Working full time ทำงานประจำ
 Working part-time ทำงานนอกเวลา/ไม่เต็มเวลา
 Freelance รับจ้างงานอิสระ
 Student นักเรียน/นักศึกษา
 Temporarily unemployed ยังไม่มีงาน
 Retired ปลดเกษียณ
 Other (Please Specify) อื่นๆ (โปรดระบุ):

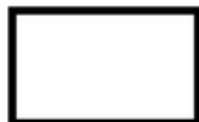
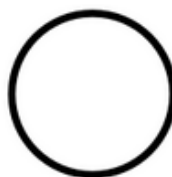
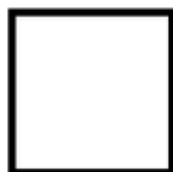
*7 Where do you live? At the moment
 ที่ๆคุณอาศัยอยู่ปัจจุบัน

- กรุงเทพฯ
 ปริมณฑล หรือ จังหวัดอื่น (โปรดระบุที่ในประเทศไทยเท่านั้น) Bangkok Perimeter or Other provinces (Please Specify provinces in Thailand only):

*8 Salary เงินเดือน

- < 15,000 baht/บาท
 15,000 – 20,000 baht/บาท
 20,001 – 25,000 baht/บาท
 25,001 – 30,000 baht/บาท
 30,001 – 35,000 baht/บาท
 > 35,000 baht/บาท

*9 Which of these five geometric shapes do you think most accurately reflects your personality?
 รูปทรงชนิดไหนที่คุณคิดว่าบ่งบอกลักษณะบุคลิกของคุณมากที่สุด



- Triangle สามเหลี่ยม
 Rectangle สี่เหลี่ยมผืนผ้า
 Square สี่เหลี่ยมจัตุรัส
 Circle วงกลม
 Squiggle เส้นหยัก

*10 Have you ever had training for crisis (For example, Fire Drill, Flood training, Tsunami Evacuation Train etc.)
 คุณเคยผ่านการฝึก สำหรับภัยพิบัติหรือไม่ (เช่น การฝึกหนีไฟ, การฝึกน้ำท่วม, การฝึกรับมือซันามิ เป็นต้น)

- No ไม่เคยฝึก
- Yes เคยฝึก

*11 If you've answered yes in the previous question, please specify you training? (You can choose more than one answer)
 หากคุณตอบว่า "เคยฝึก" ในคำถามก่อนหน้านี้ โปรดระบุประเภทของการฝึก? (คุณสามารถเลือกคำตอบได้มากกว่าหนึ่งข้อ)

- I've answered "No" in the previous question ได้ตอบว่า "ไม่เคย" ในคำตอบก่อนหน้านี้
- Fire Drill การฝึกหนีไฟ
- Flood training การฝึกน้ำท่วม,
- Tsunami Evacuation Training การฝึกรับมือซันามิ

Other (Please Specify) อื่นๆ (โปรดระบุ):

*12 Have you ever seen one or more of these signs?
 คุณเคยเห็นป้ายพวกนี้บ้างหรือไม่ ?



- No ไม่เคยเห็น
- Yes (Please Specify the place where you saw the sign) เคยเห็น (โปรดระบุสถานที่ที่เห็น):

*13 Have you ever seen one or more of these signs?
 คุณเคยเห็นป้ายพวกนี้บ้างหรือไม่ ?



- No ไม่เคยเห็น
- Yes (Please Specify the place where you saw the sign) เคยเห็น (โปรดระบุสถานที่ที่เห็น):

- *14 Have you ever seen one or more of these signs?
คุณเคยเห็นป้ายพวกนี้บ้างหรือไม่ ?



- No ไม่เคยเห็น
 Yes (Please Specify the place where you saw the sign) เคยเห็น (โปรดระบุสถานที่ที่เห็น):

- *15 You just....heard an announcement....that a big disaster is coming to your area and you have to evacuate immediately.
In front of you there are altogether 3 separate routes, but only one will save your life 🙌

There are different signs placed right in front of each route.

What sign shape do you think 💡 it will direct you to the safe location?

คุณเพิ่งจะ...ได้ยินประกาศ...ว่าในพื้นที่ที่คุณอยู่จะเกิดภัยพิบัติและคุณจะต้องหนีเดี๋ยวนี้ ช้างหน้าคุณมีทางแยกอยู่ 3 ทาง แต่มีแค่ทางเดียวเท่านั้นที่จะช่วยชีวิตคุณ 🙌 มีป้ายลักษณะต่างๆกำกับอยู่หน้าทางเข้าของทุกทาง คุณคิดว่าทางที่จะพาคุณไปที่ปลอดภัย มีป้ายลักษณะใด?

- Circle วงกลม
 Triangle สามเหลี่ยม
 Square สี่เหลี่ยม
 Other (Please Specify) อื่นๆ (โปรดระบุ):

- *22 The Warning sign should be located only in the area where the hazard occur
ป้ายเตือนภัยควรตั้งอยู่เฉพาะที่ๆเกิดภัยพิบัติเท่านั้น

1	2	3	4	5	Comment
Strongly Disagree ไม่เห็นด้วยอย่างมาก	Disagree ไม่เห็นด้วย	Neutral เฉยๆ	Agree เห็นด้วย	Strongly Agree เห็นด้วยอย่างมาก	ข้อเสนอแนะ
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="text"/>

- *23 The context (pictogram and text) on the Warning sign can help you make a better decision in crisis time
เนื้อหา (คำพูดและภาพ) บนป้ายเตือนภัยมีส่วนช่วยให้คุณตัดสินใจดีขึ้นในยามคับขันหรือไม่

1	2	3	4	5	Comment
Strongly Disagree ไม่เห็นด้วยอย่างมาก	Disagree ไม่เห็นด้วย	Neutral เฉยๆ	Agree เห็นด้วย	Strongly Agree เห็นด้วยอย่างมาก	ข้อเสนอแนะ
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="text"/>

- *24 The language that use on the Warning sign should either be Thai or English
ภาษาที่ใช้บนป้ายเตือนภัยควรเป็นภาษาไทยหรืออังกฤษอย่างใดอย่างหนึ่งเท่านั้น

1	2	3	4	5	Comment
Strongly Disagree ไม่เห็นด้วยอย่างมาก	Disagree ไม่เห็นด้วย	Neutral เฉยๆ	Agree เห็นด้วย	Strongly Agree เห็นด้วยอย่างมาก	ข้อเสนอแนะ
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="text"/>

- *25 The Warning sign can help you make better decision in crucial decision making time
ป้ายเตือนภัยมีส่วนช่วยในการตัดสินใจยามคับขัน

1	2	3	4	5	Comment
Strongly disagree ไม่เห็นด้วยอย่างมาก	Disagree ไม่เห็นด้วย	Neutral เฉยๆ	Agree เห็นด้วย	Strongly agree เห็นด้วยอย่างมาก	ข้อเสนอแนะ
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="text"/>

- *26 Which ways do you think is an alternative that can help you make a better decision in crisis time
คุณคิดว่ามีวิธีไหนอีกที่จะช่วยให้คุณตัดสินใจดีขึ้นในยามฉุกเฉิน

***You can choose more than one answer
***คุณสามารถเลือกได้มากกว่าหนึ่งข้อ

- Television ทีวี
 Radio วิทยุ
 Newspaper หนังสือพิมพ์
 Social network (Eg. Facebook, Twitter etc.) สังคมออนไลน์ (เช่น Facebook, Twitter etc)
 Online news สื่อข่าวบนอินเทอร์เน็ต
 Other (Please Specify) อื่นๆ (โปรดระบุ):

Finish Survey

BIOGRAPHY

Ms. Pornteera Imsuwansakorn was born on 25 June 1991 in Bangkok, Thailand. She graduated her bachelor degree from Faculty of Science, Mahidol University International College with Computer Science, major in 2011. She went for an internship in computer department as software and hardware assistance at Halliburton Energy Service Inc. She decided to enroll in Master Degree of Communication Arts, Chulalongkorn University and finished all credit within the first three semesters. During her years at Chulalongkorn University, she was also working as Teacher assistance at the faculty of Communication Arts, Chulalongkorn University and the writer of Gazette magazine.