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Research Article

Using Google Trends for Investigating Flood Awareness of Thai Citizensduring 2011-2018

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Abstract: This present study aimed at assessing people attention on flood awareness during 2011-2018 through the use of Google Trends. This was the first study in disasters field in Thailand that utilized this analytical tool to measure search queries of Thai citizens. Although flood events were ranked as the most periodic disastrous occurrence of Thailand, search volume index retrieved from Google Trends in monthly basis indicated a lack of interest in this topic among Thai Internet users. The greatest attention on flood events based on the search volume index, was in October, 2011 when more than 10 million residents of 65 provinces were impacted. Nevertheless, the search volume index of this topic radically declined in the following months. The term "disasters" was retrieved a lower attention by the Internet users when compared to flood topic in the same period of time. This study also found that the search volume index of disasters topic demonstrated a greater interest and more attention from Thai people than floods since year of 2013. Surprisingly, when used the term "flood awareness" and "flood preparedness" to investigate level of search interests on Google Trends, data showed no public attention on this topic as indicated by a tiny search volume index.
Keywords: Google trends, Flood awareness, Floods, Natural disaster, Thai citizens.

INTRODUCTION

Natural hazards are defined as incidents originated from the physical environment, which occurs in three different movements including the atmosphere, the hydrosphere, and the lithosphere [1]. Floods, one of the hydrosphere types, are the most extensive of any hazard that result from natural or human errors. However, floods involve both atmosphere and hydrosphere actions of physical environment with varying impacts on the scale and timing of flood [2]. Whatever types of floods, more or less, can cause direct and indirect damage for people and animals' lives, properties, and physical infrastructures. Floods are perceived as the worst natural disaster as the statistics of International Red Cross organization indicated that more 66 million people as the average were affected and suffered from flood damage in the past 25 years [2]. Also, floods are viewed as the priciest hazard in natural disaster [3].

Thailand is one of many countries in South East Asia that has been affected by the flood damage in the past decades. The substantial flood disaster in Thailand history in 2011 had both directly and indirectly impacted on people, animals, standing crops, infrastructures, and businesses resulting in a high number of death tolls and injuries as well as individual financial losses [4]. In this historical flood of Thailand, more than ten million inhabitants in 65 provinces across the country were severely affected by this drastic flood [5]. Although historical floods in 2011 were resulted from various factors including an increase of urbanization, levee failures, and dams and stream imbalance, the enormous damage of historical floods was rooted by the little knowledge and awareness of flood preparedness of Thai people.

Many people attempted to use the internet to search for the information during the flood incidents. This gigantic quantity of information searched by the users has been recorded by Google, and this search data is publicly accessible through what it is called "Google Trends (GT)" [6]. To find out Thai citizens' awareness of flood preparation through the search on the internet, this study aimed at investigating the use of Google

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Trends to help understand the flood awareness of Thai citizens from 2011-2018. The reason to begin the search from 2011-2018 was due to the great flood of Thai history in 2011, and the other major floods in the year after until 2018. Thus, it was appropriate for this study to focus on data of search interest in floods during 2011-2018.

LITERATURE REVIEWS

In the past decade, numerous studies tended to utilize Google Trends as an analytical tool to evaluate people's level of interest in a specific topic, and disasters were listed as one of the most interesting and favorable topics used for data analysis through Google Trends. The following literature reviews contained relevant studies in disasters that used Google Trends to analyze time-series data.

Linkov *et al.*, [7] evaluated the Internet users' interest level in disasters through "Google Trends." The term "disasters" was used for the search in Google Trends. Data showed that the most searched disaster was the 2004 Indian Ocean tsunami, which indicated more than million views globally. Thereafter, the researchers continued their search on "tsunami" only. Results of analysis from Google Trends displayed that the peak of the search and tsunami interest was limited in a couple days after the incident, and showed an impulsive decline in interest. Also, this study focused on the other major events of disasters by using terms on "tsunami", "hurricane", "H1N1", and "earthquake" during the past six years. The level of interests in these globally different disasters was generated indicating that the interest for the tsunami was two times higher than for the earthquake in Haiti, and five times greater than Hurricane Rita. However, the interest of these incidents dramatically increased for 3-4 days, and then dropped rapidly.

Kittipongvises and Mino [5] collected data from respondents who were affected by severe flooding in Bangkok through an online questionnaire. A total of 437 questionnaires were returned with completion indicating participants' perception of flooding incidents in 2011. Results showed that people affected by radical flood events based on their biases, perceived that government mismanagement and negative impacts of climate unpredictability were the major causes of this drastic flood. These biases were resulted from the limitation of flood knowledge and preparedness among people in Thailand.

Nghiem *et al.*, [8] conducted time series analyses on Google Trends using data from 2004-2013 to examine conservation science topics in social trends and the influence of news articles and educational printings on search volume. Results demonstrated that there was no public interest towards conservation science topics on climate change, ecosystem services, deforestation, orangutan, and invasive species. Also, this study found that the topic on endangered species was strongly declined and the topic on ecosystem services was in an increasing trend. Furthermore, this study also revealed that the number of news reporting was associated to Google search volume forms while the quantity of academic articles was not a good forecaster. This study examined the importance of news role in conveying conservation science topics to the public.

Kam, Stowers, and Kim [9] used "Google Trends" to monitor the evolution of drought awareness in California during the 2011-2017. The key term "drought" was searched on the Google Trends and the results demonstrated the occurrence of topmost drought awareness in January 2014 when the drought incident reached the highest level of devastation and declaration for drought emergency was implemented. Moreover, when the issue of public interest in drought recovery was addressed after the forecast of the robust EI Niño winter of 2014/2015 and California flood in 2017, the search in terms of "drought" in google was elevated to the top level again in August 2014, April 2015, and January 2017.

Yeo and Knox [10] examined the trends of public attention on natural disasters focusing on disaster management and its importance to policy alteration using Google Trends as the analytic tool for analyzing data. Time-series Search Volume Index on Google Trends was used to assess public attention. In addition, this study compared the trend of the 2016 Louisiana Flood with trends for other disasters in the U.S. such as Texas-Oklahoma Flood, Colorado Flood, and Superstorm Sandy. Data of analysis demonstrated that public attention to the 2016 Louisiana Flood grew faster than other national disasters. Interestingly, results showed that flood disaster was not the most searched event of public attention at the national level. Moreover, public attention to flood disaster when compared to other political and social events was approximately higher than Olympics Games, and leading presidential candidates (Donald Trump, and Hilary Clinton).

According to literature reviews, Google Trends has been used in various studies relating to disasters to assess the Internet user's interest level in this area. However, despite Thailand has been affected by major disaster events particularly flooding in the past decade, lack of research interest tended to place its emphasis on investigating people's interests in flood awareness and preparedness through the use of Google Trends. Thus, this present study aimed at assessing Thai residents' level of interest in flood awareness during 2011-2018 by using Google Trends as the analytical tool for data analysis.

METHODOLOGY

Google Trends was firstly introduced as a new source of big data in 2006, and utilized as an instrument

for numerous time-series data analysis research in the past decade. This tool was very productive in providing organizations to better understand social changes and make predictions [11]. In this present study, Google Trends was used to evaluate Thai internet users' level of interest in flood during 2011-2018 based on the Search Volume Index (SVI). Google Trends is a free Internet service, which is created as an analytic tool to measure the numbers of searches depending on users' interest in specific issues or topics over time. Key terms "flood", "flood awareness", and "flood preparedness" were used to measure search queries and interests. The limitation of this search was conducted between year of 2011-2018, and category of search was focused only on messages or new reports. In addition, to broaden the perspectives of flood awareness and preparedness, this study also compared the search queries on flood and disasters during 2011-2018. This comparison was conducted through the selection of all categories of its search on Google Trends.

RESULTS

The trend in flood in Thailand demonstrated a dramatic difference in temporal trend from the time series data for news reporting (Figure-1). Results found that the public attention or Thai citizens' interest of flood histrionically increased in October, 2011, which was the peak of historical flood events of Thailand. The Search Volume Index (SVI) for historical flood of Thailand dramatically plunged from 100 in October, 2011 to 49 in November, 2011 and 12 in December, 2011, respectively. However, when entered the term "flood awareness" and "flood preparedness" in Thai language to assess the level of search interest among Thai citizens, finings demonstrated no public queries on these topics. In conclusion, the interest in "flood" was peak in October, 2011, and then crashed. Although some parts of Thailand had been affected by great floods in the following years, level of search interest was very low and stagnant, according to Search Volume Index (SVI).

Fig-1: Level of Search Interests in Flood among Thai Citizens during 2011-2018

Figure-2 demonstrated Relative Search Volume Index (RSVI) when the term "disasters" was used to compare the level of search queries with flood. This study used the official word of "flood" in Thai language, namely "*Xuthkphạy*" to compare with "disaster". When used a different word of flood in Thai language, data showed that the peak of search queries was in November, 2011 with the RSVI of 100 while

disasters obtained RSVI of 57 in the same period of time. Thereafter, the peak of disasters' search interest slightly increased to 65 in April, 2012 and dropped in May and June, and increased again in July and August, 2012 before dropping to the average. Since 2013, the search of disasters was greater than flood despite lots of flood events occurred in Thailand every year since 2011.
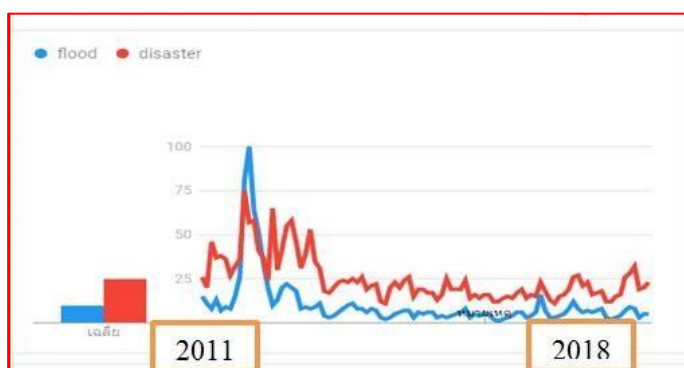
Fig-2: Level of Search Interests in Flood versus Disasters during 2011-2018

CONCLUSION, DISCUSSIONS, AND RECOMMENDATIONS

This present study aimed at investigating level of search interest in flood awareness during 2011-2018 among Thai people who used the Internet through Google Trends. This was the first study in disasters field in Thailand that utilized this analytical tool to measure search queries of Thai citizens. Although flood incidents were ranked as the most frequent disastrous incident of Thailand, search volume index retrieved from Google Trends in monthly basis indicated a lack of interest in this topic among Thai Internet users. The utmost searched interest related to flood was in October, 2011 when the historical flood affected Thai people in more than 65 provinces. The search volume index of this topic dramatically declined in the following months. While the term "disasters" was retrieved a lower interest by the searchers when compared to flood topic in the same period of time. However, since year of 2013, the search volume index of disasters topic demonstrated a greater interest and more attention from Thai people than floods. In addition, when used the term "flood awareness" and "flood preparedness" to measure level of search queries on Google Trends, data showed no people attention on this topic as indicated by search volume index (less than 1).

These findings provided very good information to related organizations and government to make consideration for and pay greater responsiveness on boosting public attention on flood awareness and preparedness. To minimize the impact of flood events, people awareness and preparation is a vital key to help ease the situation. The search volume indicated the interest of people in flood information, which was greater when they were directly involved with or affected by flood incidents as shown in year of 2011. The frequency of flood events in Thailand has constantly increased since the historical flood of Thailand in 2011, which presented a signal of devastation if not prepared properly. However, Thai citizens paid less attention on this topic or relevant topic such as disasters after the severe flood events of Thailand in 2011, which was perceived as the apprehensive issue of society that needed to be taken care at a fast pace. New curriculums and programs relating to these topics should be developed and added as part of educational programs in academic institutions and other organizations (both public and private). Social and traditional media should regularly provide features or documentary relating to flood and disaster events to call people attention on these topics over period of time.

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