ONLINE MEDIA EVALUATION OF DISASTER MANAGEMENT

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ABSTRACT

Purpose - *Nowadays, natural disasters happen increasingly and create severe damage worldwide. Being prepared and responsive is of great necessity. Therefore, this study aimed to analyze the capacity and efficiency of the public sector in disaster management, especially regarding online media.*

Design/methodology/approach - *The National Disaster Warning Centre (NDWC) in Thailand was the online media selected as a case study. The website was measured by criteria of the W3C (World Wide Web Consortium). The concept of content analysis was used to analyze the information on Twitterand Facebook during the worst flooding ever in Thailand during October, 2011.*

Findings - *The online media in this study could be considered as a critical and useful tool for developing disaster management. However, the website concerned could not achieve the W3C standard, and Twitter could not interest people in society, due to its content. This fact is confirmed by Twitter having only 11,142 followers, while another NGO; #Thaiflood, had 107,680. Facebook faced the same problem as Twitter of drawing little attention or interaction from society.*

Practical implications - *There are large gapsin the development of online media in the public sector. All media should be improved to meet the required standard, and be considered a reliable source for disaster management.*

Originality/value - *Most e-government in Thailand, for example e-disaster, lacks evaluation of its capacity. This study provides and suggests insightful information for development. If the media could be improved, preparation for disaster would be better, and responses to it prompt.*

Keywords: Disaster management, eDisaster, Online media, Website, Facebook, Twitter

INTRODUCTION

During the past decade, the world has witnessed several natural disasters that took a number of lives and caused severe damages to the infrastructure and economy. For example, Hurricane Katrina, which hit the northern Gulf coast of the USA in August 2005, was 'the costliest and one of the five deadliest hurricanes to ever strike the United States', leaving 1,833 fatalities and estimated damage worth US$ 108 billion (Knabb*et al.*, 2005). Recently, the earthquake of March 2011 in Japan triggered a tsunami that caused 15,854 deaths and over US$ 200 billion worth of damage (as of March 2012) [I]. Also, Thailand suffered greatly from the tsunami in December 2004, which was described as 'the worst natural

disaster ever in Thailand' [II]. It killed 5,395 people and caused approximately US$ 365 million worth of damage in the country [III]. In 2011, Thailand also experienced its worst flooding in half a century, with 657 fatalities and estimated damage worth US$ $75 billion.

In response to such natural disasters, governments have employed information and communication technologies (ICTs) increasingly, in order to prepare well before disasters occur, or be more effective in responding to them and their aftermath. For instance, various early warning systems or simulation models have been developed for tsunamis (e.g. Harjadi 2008; Teh and Koh, 2011); while an attempt was made to use radio frequency identification (RFID) wireless network technology for emergency evacuation (Chatfield *et al*., 2010). Online media such as twitter and Facebook also have been used increasingly in emergency management (e.g. Murphy, 2013; Sakaki*et al*., 2010).

After facing the 2004 tsunami in Thailand, the Thai government established the National Disaster Warning Center (NDWC) in 2005, in order to provide the public with information and early warning of disasters. Like other government agencies involved in disaster management, the NDWC employs online media as one of its communication channels to disseminate disaster information. Its online media were used recently during the 2011 flood. This provided a great opportunity to explore online media for use in disaster management in the Thai public sector context. Therefore, this paper aimed to evaluate use of the NDWC website, twitter and Facebookduring the aforementioned disaster, andfocus on the period of October 2011 [IV].

RELATED WORK

Heeks (2008) stated thate-government is "the use of information and communication technologies (ICTs) to improve the activities of public sector organizations." Thus, government use of online media can be viewed as part of this e-government movement. Government agencies have relied increasingly not only on their websites, but also online media for disseminating information to the general public. For example, many state public health departments in the USA are using Facebook, twitter and You Tube (Thackeray et al., 2012), while use of online media by agencies concerned with fire services has been reported as well (Murphy, 2013).

In the context of disaster management, Lindsay (2011)outlined that online media can be employed by government agencies concerned with such issues as public safety information, emergency warnings, and requests for assistance. Apart from its use as channels of communication between the agencies concerned and general public, online media can be employed also as a tool for 'knowledge exchange between crisis management experts' during an emergency (White, 2012). Although online media have gained currency in disaster management, Keim and Noji (2011) pointed out that its use in this context still faces some challenges such as accessibility compared to traditional media, potential to spread misinformation and rumor, and risk of privacy rights violation. Furthermore, issues like security of information, robustness of the system (e.g. reliability), and overreliance on online media also pose concerns (White, 2012).

In relation to the above work, online media seem to have both advantage and disadvantage, asthe system depends on the provider, user and situation. However, more room still exists to

investigate the influence of online media in disaster management. For a developing country such as Thailand, this study intended to ask the question, 'How does the public sector apply efficient online media for disaster management?'

RESEARCH METHODOLOGY

The data for this study were collected in October 2011 from the NDWC website (www.ndwc.go.th) as well as its twitter and Facebook. The providedInformationand design of the website were evaluated accordingto World Wide Web Consortium (W3C) standards by using the websites:www.validator.w3.org and www.jigsaw.w3.org/css-validator/validator.html.en.The criteria for regulatingaccess to public ICTs for disabled peoplewere shown accordingto ministerial regulations issued in 2011 by using the website:www.thaiwebacessibility.com.

Regarding NDWC twitter and Facebook, the data comprised tweets derived from #NDWC_Thai and messages posted on NDWC Facebook. In total, there were 358 tweets and 59 messages. The data collected were analyzed by means of content analysis. The number of re-tweets, favorites, and replies from each tweet was counted daily. All tweets were categorized into seven groups based on the disaster information provided, which included, 1) preparedness for flood, 2) evacuation warnings, 3) information on natural disasters occurring in Thailand, 4) information on how to follow flood situations, 5) flood relief (requests for relief or information on where to obtain it), 6) information on how to contribute to flood relief, and 7) information unrelated to flood. The sources of information from tweets were classified into nine groups, including online radio stations, online news agencies, online newspapers, the general public, government agencies/NGOs, NDWC, academics/experts, reporters, and others.
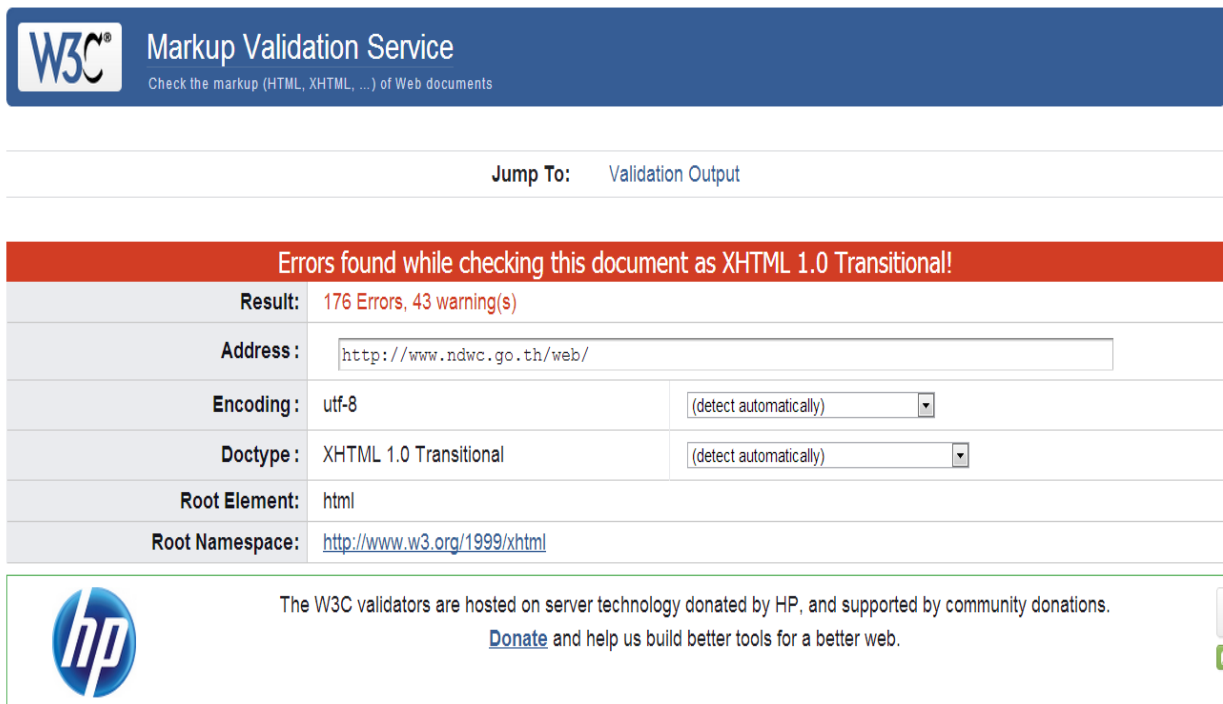
Similarly, the number of Likes, Comments and Shares were counted on each NDWC Facebook message. The Facebook messages also were categorized into groups, based on the disaster information they disseminated, including 1) preparedness for flood, 2) information on natural disasters occurring in Thailand, 3) flood relief (requests for relief or information on where to obtain it), 4) requests for information on flood situations, and 5) information unrelated to flood. The sources of messages posted on Facebook were classified into different groups, as with those of tweets.

RESULTS AND DISCUSSION

1. Analysis of the NDWC website

Website design and the information provided on the NWDC website were analyzed according to W3C standards; and the criteria set by ministerial regulations on access to public ICTs for disabled people were shown using standard evaluation websites, as mentioned in section 3. Evidently, the NDWC did not meet W3Cstandards and the criteria stipulated in ministerial regulations were found wanting. For example, 176 errors and 43 warnings were found when testing for 'Markup Validation Service' in the W3C standard (Figure 4.1). Regarding accessibility of ICTs for disabled people, the evaluation found 82 problems on accessibility, 254 items causing incomplete access, and 709 items that would improve accessibility (Figure 4.2). The substandard NDWC website apparently caused difficulties for online media users

trying to follow its information.For instance, the web links provided could not be accessed, and some online media users, particularly disabled people, could not utilize disaster information fullybecause the website was not user-friendly for them.

Figure 4.1 Results of NDWC website evaluation regarding the Markup Validation Service.
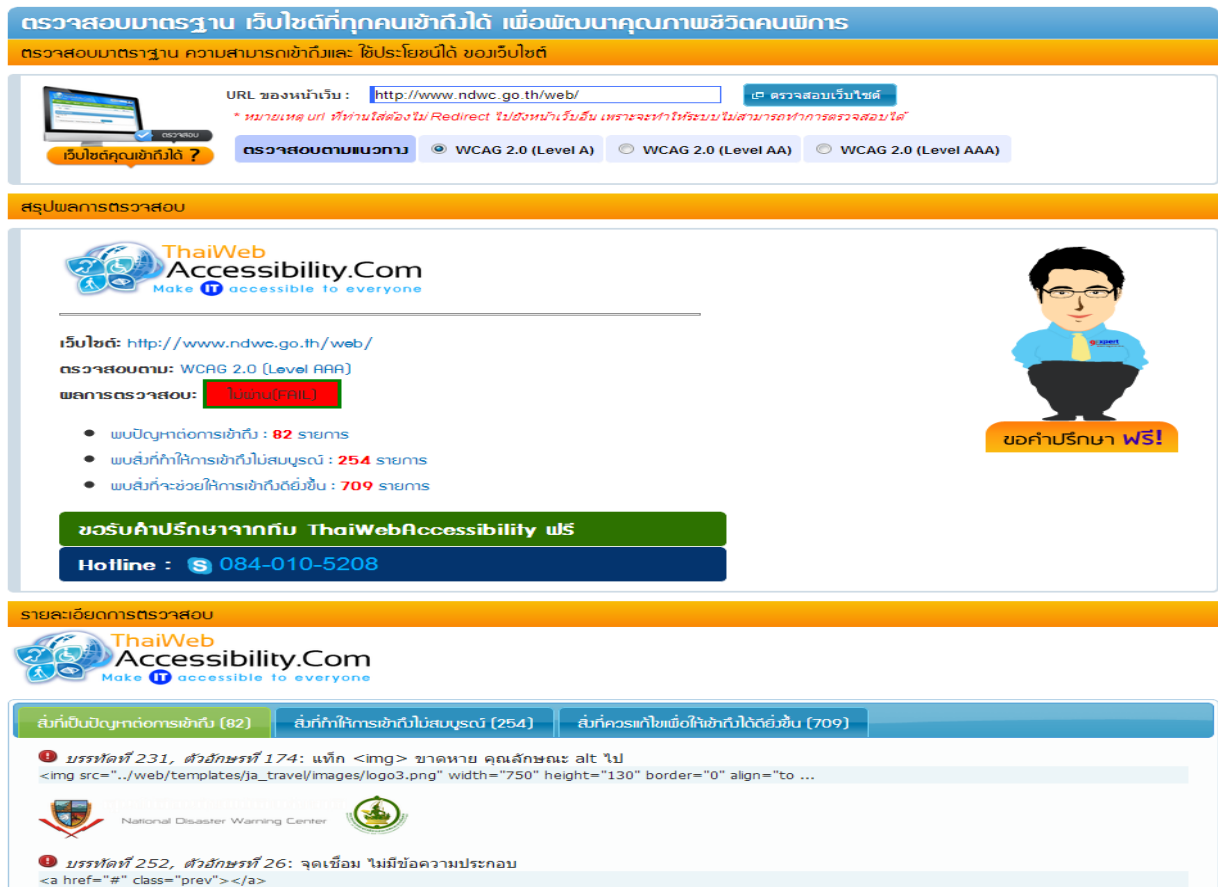
Figure 4.2 Results of NDWC website evaluation regarding the disabled people's accessibility by Thaiwebacessibility website

2 Analysis of NDWC twitter

In October 2011, NDWC twitter was monitored together with hash tag#NDWC_Thai. It was found that NDWC twitter was active for only 11 days during that month, with 11,142 followers. In total, there were 358 tweets, with 121,267 re-tweets, 640 favorites and 16 replies (Table 4.1). On average, there were only 32 tweets and 1,106 re-tweets/day. Apparently, the NDWC attracted very little attention from outsiders. This was confirmed by the fact that twitters fromhash tag #Thaiflood, an NGO working on floods, had 107,680 followers, while NDWC had only 11, 142. Notwithstanding, it could be seen that collected tweets generated a rather high number of re-tweets. Thus, the NDWC twitter may be less active overall.

Table 4.1 NDWC tweets in October 2011

Date	Tweet	Re-tweet	Favorite	Reply
3 October 2011	8	1	0	0
10 October 2011	55	1,145	43	5
11 October 2011	64	2,051	70	3
12 October 2011	63	2,719	54	2
13 October 2011	35	869	39	2

Date	Tweet	Re-tweet	Favorite	Reply
14 October 2011	17	255	26	2
15 October 2011	56	2,404	324	1
18 October 2011	29	901	34	1
19 October 2011	10	1,034	30	0
20 October 2011	12	249	5	0
21 October 2011	9	539	12	0
Total	**358**	**12,167**	**640**	**16**
Average/Day	**32**	**1,106**	**58**	**2**

The contents of NDWC tweets were concerned mostly with flood and flood relief, accounting for 150 and 96 tweets, respectively (Table 4.2). A relatively small number of tweets dealt with flood preparedness (28 tweets), channels for making contributions to flood relief (22 tweets),following the flood situation (22 tweets), and evacuation announcements (5 tweets). The rest contained information unrelated to flood. Despite the small number of tweets, they still covered important corresponding issues that phased in with the disaster management cycle (Carter, 1992). That is to say, tweets providing information on a flood situation, channels to follow it and preparedness for a flood can be considered as phases of *prevention, mitigation and preparedness*, while tweets on flood relief, evacuation announcements, and channels for making contributions to flood relief are in the *response* phase.

Table 4.2 Types of NDWC tweets

Date	Types of Tweets						
	PD	EV	FS	CFS	FR	CCF	OT
3 October 11	5	0	0	0	0	0	3
10 October 11	5	2	22	2	15	5	4
11 October 11	5	1	18	11	15	7	7
12 October 11	6	0	35	5	8	3	6
13 October 11	1	2	22	1	5	1	3
14 October 11	1	0	9	1	4	0	2
15 October 11	1	0	13	0	32	4	6
18 October 11	2	0	14	1	10	1	1
19 October 11	1	0	4	1	2	1	1
20 October 11	0	0	7	0	5	0	0
21 October 11	1	0	6	0	0	0	2
Total	**28**	**5**	**150**	**22**	**96**	**22**	**35**
Average/Day	**2**	**0.4**	**13**	**2**	**8**	**2**	**3**

Note: PD – Preparedness, EV – Evacuation, FS – Flood Situation, CF – Channel to Follow Flood Situations, FR – Flood Relief, CCF – Channel for MakingContributions to Flood Relief, and OT - Others

The last aspect regarded the source of information from tweets inhash tag #NDWC Thai, and not surprisingly, it was found that most of the messages tweeted were from the NDWC, which accounted for 92 tweets, followed by reporters and government agencies/NGOs, with 60 and 52 tweets, respectively. It should be noted that sources of information from public

figures (e.g. movie stars and signatories, classified under the 'others' groups) accounted for only 10 tweets, but their chances of being re-tweeted were far greater than those of the NDWC and government agencies/NGOs, due to public status.

Table 4.3 Sources of information from NDWC twitter

Date	Sources of information								
	RD	NP	GO/NGO	GP	EX	NDWC	NS/TV	RP	OT
3 October 11	0	0	0	0	0	8	0	0	0
10 October 11	1	1	5	10	1	18	9	8	2
11 October 11	2	6	12	9	6	11	10	7	1
12 October 11	4	6	10	5	4	12	8	13	1
13 October 11	2	2	6	2	2	1	5	13	2
14 October 11	2	0	3	0	1	4	3	4	0
15 October 11	1	2	8	3	6	25	4	4	3
18 October 11	2	3	4	3	1	7	4	4	1
19 October 11	0	1	1	2	0	0	3	3	0
20 October 11	0	0	1	1	1	6	2	1	0
21 October 11	0	0	2	0	1	0	3	3	0
Total	**14**	**21**	**52**	**35**	**23**	**92**	**51**	**60**	**10**
Average/Day	**1**	**1**	**4**	**3**	**2**	**8**	**4**	**5**	**0.9**

Note: RD – Radio Stations, NP – Newspapers, GO/NGO – Government Agencies/NGOs, GP – General Public, EX – Experts, NDWC – National Disaster Warning Center, NS – News Agencies/ Television Stations, RP – Reporters, and OT - Others

3 Analysis of NDWC Facebook messages

In October 2011, NDWC Facebook was found to have 19 messages posted on Facebook studies during the course of seven separate days (Table 4.4), with 2,474 followers. Reactions to the comments posted were 149 Likes and 83 Shares. Clearly, the NDWC attracted little attention from the others group. The fact that Thaiflood Facebook and NDWC Facebook had 67, 937 and a mere 2,474 followers, respectively, helped to paint a clear perspective. When considering that 16 messages from a total of 19 were posted by the NDWC itself (Table 4.5), Facebook interaction in this regard was even more marginal, with one message each from an online newspaper, government agency/NGO, and the general public.

Table 4.4 NDWC Facebook messages in October 2011

Date	Number of Messages	Number of Likes	Number of Shares	Number of Comments
5 October 2011	1	8	-	1
7 October 2011	4	41	34	7
11 October 2011	4	9	13	13
12 October 2011	6	47	6	32
13 October 2011	2	24	1	2

Date	Number of Messages	Number of Likes	Number of Shares	Number of Comments
18 October 2011	2	11	24	5
24 October 2011	3	9	5	1
Total	**19**	**149**	**83**	**61**

Table 4.5 Users posting messages on NDWC Facebook

Date	Source of Information							
	RD	NP	GO/NGO	GP	EX	NDWC	NS/TV	OT
5 October 11	-	1	-	-	-	-	-	-
7 October 11	-	-	1	-	-	3	-	-
11 October 11	-	-	-	-	-	1	-	-
12 October 11	-	-	-	1	-	5	-	-
13 October 11	-	-	-	-	-	2	-	-
18 October 11	-	-	-	-	-	2	-	-
24 October 11	-	-	-	-	-	3	-	-
Total	**-**	**1**	**1**	**1**	**-**	**16**	**-**	**-**

Note: RD – Online Radio Stations, NP – Online Newspapers, GO/NGO – Government Agencies/NGOs, GP – General Public, EX – Experts, NDWC – National Disaster Warning Center, NS – Online News Agencies/ Television Stations, and OT – Others

When looking into the contents of messages posted, most messages (11 messages, see Table 4.6) were categorized as others, which referred to 'other information unrelated to flood' (see section 2), while seven messages dealt with flood situations and one with preparedness for a flood. Evidently, NDWC Facebook achieved very little in providing flood information.

Table 4.6 Types of Comments on NDWC Facebook messages

Date	Types of Messages					
	PD	EV	FS	RI	OT	Total
5 October 11	-	-	1	-	-	1
7 October 11	-	-	3	-	1	4
11 October 11	-	-	1	-	-	1
12 October 11	1	-	2	-	3	6
13 October 11	-	-	-	-	2	2
18 October 11	-	-	-	-	2	2
24 October 11	-	-	-	-	3	3
Total	**1**	**-**	**7**	**-**	**11**	**19**

Note: PD – Preparedness, EV – Evacuation, FS – Flood Situation, RI – Request for Information, and OT – Others

CONCLUSION

With the number of online media users continuing to rise, together with continual development of related technologies (e.g. internet network and new applications), the potential use of new channels to disseminate information as part of disaster management also increases. However, the capacity to use these channels effectively, particularly by the public sector, needs to be evaluated. As illustrated by the NDWC, a large gap needs to be filled in order to improve the use of online media by government agencies. In turn, this would improve disaster management, and thus enhance preparedness for and responses to disasters. Ultimately, loss of life and damage to infrastructure and the economy would be minimized.

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