

Department of Homeland Security Websites Uncoupled: An Evaluation of Online Counterterrorism and Security Information across Agencies

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Abstract. The purpose of this paper is to describe the content focus and hyperlink structure of the Department of Homeland Security (DHS) websites. This exploratory research is the first phase of a long-term effort to assess the degree to which information provided by DHS websites reflects the communication and information requirements of U.S. citizens. The present study uses content analysis and web link analysis methodologies to examine nine primary DHS websites. The findings reveal there are differences among the primary DHS agency websites in the use of hyperlinks and the coverage of national security topics.

Keywords: Department of Homeland Security, national security, content analysis, hyperlink analysis, information sharing, usability, communication, cyber security.

1 Introduction

With heightened concerns about terrorism, the current national security landscape requires that U.S. Federal agencies communicate efficiently, effectively, and accurately with agency stakeholders. Consequently, the World Wide Web (WWW) is one of many mediums available for facilitating government-citizen communication. The WWW enables government agencies to provide personalized e-governance services to citizens [1]. Moreover, citizens require information about policies, procedures, and current issues related to counterterrorism and national security in order to assist the government in vigilance and to preserve personal safety. Because ICT has the potential to improve government transparency through relevant and timely information distribution [2], government websites are salient mechanisms for communicating with citizens.

The U.S. government's interest in using the WWW is demonstrated by its estimated 11,013 Federal websites [3]. The Federal government recognizes that successful agency websites have the potential to create "a more citizen centered government" [4]. Furthermore, Federal agencies are required to improve customer service and

efficiently manage their websites by addressing information dissemination mandates such as information quality, objectivity, utility, and integrity [5].

The purpose of this exploratory study is to determine the nature and extent of terrorism, counterterrorism and national security information presented on the Department of Homeland Security (DHS) websites. The DHS, an agency tasked with preserving the nation's security, safety, and resiliency, has approximately thirty-six Federal websites under its purview. DHS websites are intended to satisfy critical citizen information needs, especially during high-uncertainty situations. However, it is unclear whether 1) DHS-generated website content is designed to meet citizen national security information needs and 2) It conforms to government information usability standards [6].

Past studies have focused on important issues: Cyber warfare and security [7], terrorist network identification [8, 9], agency information sharing [10], interoperability [11], and information assurance [12]. And with regard to U.S. government websites, the literature has focused considerably on usability and accessibility assessments of websites [13, 14, 15, 16].

There is a dearth of literature, however, characterizing the content of government websites. Furthermore, no studies were found that evaluated the DHS website semantic structures from usability, communication, and hyperlink structure perspectives.

In the present study, content analysis, a quantitative method for systematically studying the characteristics of communication content, is applied to a sample of DHS websites. The objectives are: 1) Identify the occurrence frequency of citizen-focused national security information presented via DHS agency websites, 2) Identify information inconsistencies in the web content across DHS websites, and 3) Articulate the hyperlink structure of the DHS websites in reference to each other.

2 Methodology

2.1 Sample

A sample of nine websites was selected from an estimated population of thirty-six DHS websites (See Table 1). The sample selection was based on the DHS' designation of the following websites as primary: www.dhs.gov, www.fema.gov, www.fletc.gov, www.ice.gov, www.secretservice.gov, www.tsa.gov, www.uscg.mil, www.uscis.gov, and www.cbp.gov [17]. All nine sampled DHS websites were analyzed for patterns across content themes and the agency-to-agency hyperlink structure within the context of citizen-focus and agency purpose.

2.2 Content Analysis

A content-analysis methodology was used to examine the sample of nine primary DHS websites. The data comprised web page content, which incorporated all file formats (e.g., .pdf and .doc), on the primary DHS agencies' websites. The data collection was performed in February 2013. The content was analyzed using a coding

scheme that was created to classify national security issues from a citizen perspective. The coding scheme centered on four primary categories: Communication, proactive measures, threats/incidents, and post-incident response. Google Advanced Search was used to conduct queries of each website for each national security topic listed in the coding scheme in Table 2.

Table 1. DHS website sample

DHS agency	Daily	Abbreviation	Agency purpose
U.S. Department of Homeland Security	www.dhs.gov	DHS	To ensure U.S. homeland is safe, secure, and resilient against terrorism and other hazards
Federal Emergency Management Agency	www.fema.gov	FEMA	Support U.S. citizens and first responders to prepare for, protect against, respond to, recover from, and mitigate all hazards
Federal Law Enforcement Training Center	www.fletc.gov	FLETC	Interagency law enforcement training for 91 Federal agencies
U.S. Immigration & Customs Enforcement	www.ice.gov	ICE	Homeland security and public safety through criminal and civil enforcement of border control, customs, trade, and immigration laws
U.S. Secret Service	www.secretservice.gov	SS	Protects national and visiting foreign leaders, and conducts criminal investigations
Transportation Security Administration	www.tsa.gov	TSA	Maintains security of the traveling public and sets transportation security standards
U.S. Coast Guard	www.uscg.mil	USCG	Maritime military enforcement along rivers, ports, littoral regions and on high seas
U.S. Citizenship and Immigration Services	www.uscis.gov	USCIS	Provide accurate and useful information, grant immigration and citizenship benefits, promote citizenship awareness and understanding, and protect the immigration system
U.S. Customs & Border Protection	www.cbp.gov	CBP	Safeguard the U.S. borders and homeland and protect the American public against terrorism

2.3 Web Link Analysis

Web link analysis is a network analysis method used to articulate the structure among web nodes that associate with each other via hyperlinks. This study applies an approach used to evaluate the web link structure of the web space occupied by the American Library & Information Science field [18]. Essentially, the hyperlink data between sites are mined and analyzed for directional patterns.

The data consisted of hyperlinks identified from the primary agencies' websites under the umbrella of the Department of Homeland Security. The in- and out-link data were gathered from the nine websites using Google Advanced Search. Google Advanced Search was designed to collect such hyperlinks to external domains. The data collection was performed in February 2013.

Table 2. DHS coding scheme

National security topic categories	
Communication	Emergency procedures
	Warning system
	Progress reporting
	Emergency information
	Citizen hotline
	Crime reporting
	Safety information
Readiness	Action plan
	Disaster preparedness
	Emergency preparedness
	Emergency plan
	Emergency kit
	Safety plan
	Workplace plan
Threat/ incident	Pandemic
	Fire
	Crime victim
	Terrorist weapon types (e.g., chemical, biological)
Post-incident response	Returning home
	Help survivors
	Emergency assistance
	Casualty

3 Results and Discussion

The national security topics addressed by the primary DHS websites showed some commonalities. As shown in Table 3, topics of focus across many DHS websites included emergency procedures, emergency information, safety information, emergency preparedness, and emergency assistance. Because DHS agencies are tasked with protecting the nation and its citizens, it follows that considerable web content would relate to emergency communication, readiness, and response. However, many agency websites completely neglected or weakly provided content in numerous categories.

Table 3. DHS content analysis results

National security topics		DH S	FEM A	FLET C	ICE	SS	TS A	USC G	CI S	CB P
Communication	Emergency procedures	1090	2980	330	418	35	479	2390	0	389
	Warning sys	568	20300	61	251	16	239	955	0	310
	Progress report	975	2010	25	236	951	108	1220	0	279
	Emergency information	3420	56400	514	977	61	1430	6220	0	2510
	Citizen hotline	114	329	2	97	10	6	68	0	94
	Crime reporting	815	283	24	500	52	33	402	0	170
	Safety info	2120	21400	751	2510	79	667	6920	0	1960
Readiness	Action plan	1710	3940	56	424	44	278	3320	0	577
	Disaster preparedness	942	2180	5	20	2	39	416	0	19
	Emergency preparedness	1300	38700	277	38	14	102	752	0	45
	Emergency plan	2490	83000	325	506	43	359	4300	0	544
	Emergency kit	140	19800	5	238	0	69	341	0	72
	Safety plan	1380	2030	458	851	59	231	3410	0	410
	Workplace plan	388	2030	20	94	20	78	812	0	108
Threat/ incident	Pandemic	339	533	0	7	1	6	11	0	9
	Fire	1440	140000	255	562	33	74	6360	0	930
	Crime victim	334	89	95	250	35	8	191	0	49
	Terrorist weapon types	1520	1560	0	1	0	3	5	0	0
Post-incident response	Returning home	210	906	32	247	6	33	739	0	305
	Help survivors	238	10200	0	13	2	7	855	0	18
	Emergency assistance	1170	28700	146	361	34	171	1960	0	493
	Casualty	157	1460	1	11	2	3	2970	0	64

Primary examples are the U.S. Secret Service (SS) and the U.S. Citizenship and Immigration Services (CIS). The SS exhibited minimal content in every category, except progress report. Although this may mirror its reputation for covertness, it fails to comport with the Federal government's conception of an open digital government. Similarly, the CIS website failed to exhibit content in every category. The complete absence of information is a concern especially for new citizens or those in the process of becoming citizens, who may lack knowledge about other government agency websites. Notable content deficits existed for TSA in the areas of citizen hotline, crime reporting, and terrorist weapon types. Again, when considered within the context of a citizen focus, many agencies failed to empower citizens; DHS websites frequently exhibited gaps in relevant information.

In addition to the differences found in DHS website content, there was variance among the DHS website hyperlinks. Given the Federal directive to improve information sharing, it is interesting to note the vast differences in hyperlinking among the primary DHS websites (See Table 4). The DHS website accounts for 48.64% of the links to www.dhs.gov from other primary DHS websites and 26.56% of the links to primary DHS websites. Because DHS is the parent agency for the other primary DHS agencies, it follows that DHS would possess the greatest number of in- and out-links. Contrastingly, www.fletc.gov, the website of a training facility/school, exhibited marginal in- and out-links accounting for less than 1% in both cases. Because FLETC's relevance to the general public is limited, the low hyper linkage to other DHS websites is not a concern. The remaining agencies, however, may improve citizen service by increasing linkages to related content at relevant agency websites. It is anticipated that strategic hyperlinking will facilitate information sharing among citizens.

Table 4. Descriptive statistics of Department of Homeland Security websites' in- and out-link asymmetric matrix data

Organization website	(A) In-links from other DHS sites		(B) Out-links to other DHS sites		(C) Total (A + B)	
	Frequency	Ratio	Frequency	Ratio	Frequency	Ratio
DHS	1412	48.64%	771	26.56%	2183	37.6%
FEMA	382	13.16%	686	23.63%	1068	18.39%
FLETC	24	.83%	6	.2%	30	.52%
ICE	231	7.96%	113	3.89%	344	5.9%
SS	28	.97%	10	.34%	38	.65%
TSA	257	8.85%	128	4.41%	385	6.63%
USCG	131	4.51%	303	10.44%	434	7.48%
CIS	249	8.58%	765	26.35%	1014	17.46%
CBP	189	6.51%	121	4.17%	310	5.34%
TOTAL	2903		2903		5806	

4 Future Research and Limitations

This study provided an initial assessment of the content subject matter of primary DHS websites and the agency-to-agency hyperlink structure. The magnitude of the DHS websites presented a feasibility issue. It was difficult, if not impossible, to assess with certainty all of the citizen-focused website content. In future project stages, the researcher will address this issue and will code the content after sorting by file format (e.g., .pdf, .ps, .dxf, .kml, .kmz, .xls, .ppt, .doc, .rtf, and .swf). In the present study, the site architecture and sheer volume of website pages demanded reliance on automated search tools. Although such tools were effective, some error was likely produced due to a tool's inability to capture the qualitative dimension of information. Furthermore, it was beyond the scope of the current project to confirm whether or not the content location and type as citizen-focused were consistent. Future research will investigate this issue. Additionally, it would be informative to evaluate the primary agency-to-agency hyperlink structure within the context of citizen-focused topic areas to determine whether interagency connections appropriately support citizen-focused communication of information. Finally, a questionnaire will be developed 1) to identify salient topics which remain absent from the DHS websites and 2) to assess citizen perceptions of the utility of the information.

5 Conclusion

This study analyzed the semantic structure of national security information presented via DHS agency websites, identified information patterns in the web content, and described the hyperlink structure of agency-to-agency directed links. Based on the results of the aforementioned analyses, the national security topics addressed by the primary DHS websites shared commonalities in the content themes, but also fundamental differences. Furthermore, as indicated by the preliminary results of the hyperlink analysis, a refocusing of the content and structure toward citizen users may be warranted to achieve improved information sharing with the public.

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