

320. The Content and Frame of News Coverage about Global Warming in Taiwan

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Abstract. The news media is a major source of science information for the general public. The purpose of this study was to understand what are and how the newspapers in Taiwan cover news reports related global warming. Keywords searching and systematic sampling was used to select 548 newspaper reports on global warming from the three most widely read newspapers in Taiwan published from 2005 through 2009. A content analysis was conducted to analyze the content and frame of news coverage. The results showed that the main issues of news reports related to global warming were environment policy, green industry, climate change, green consumption, and global warming. The environment policy, green consumption, and green industry issues often appeared in conjunction with each other, and global warming and climate change often appeared in conjunction together as well. Reports on global warming were usually presented as a rational appeal style; as reports on climate change were often contained fear appeal messages, whereas, reports on environment policy, green industry, and green consumption usually contained information of reward appeal. This study suggests that for improving audience's knowledge about complex environment issues and problems, news reports on global warming should provide more links between related concepts. The practical implications of these findings and directions for future research are addressed.

Keywords: Global warming, News, Science communication, Content analysis

Introduction

The media is a public instrument of society, and one of its functions is education. According to the cultivation theory, long-term influence of the media would deeply affect the perception, attitudes, and behaviors of the public (Morgan & Signorielli, 1990). Mass media is an important source of environmental knowledge for the public, and is an important channel for the government and its people to engage in communications regarding environment policy (Wakefield & Elliott, 2003). For the perspective of science communication, what are and how the newspapers cover news reports related environment problem is an important issue.

Through analysis the new reports regarding global warming, the study was aimed to understand the contents, news sources, and reporting frames of news reports regarding global warming on domestic newspapers in Taiwan. Get an insight of the contents and frames of news coverage regarding global warming can help us understand the information received by the public through the news. In turn, the insight of these news reports can also be used government to carry out communication regarding environment policies, and for journalists to produce news reports regarding environmental science.

Methods

Sample

The three most widely read newspapers in Taiwan were chosen for this study. According to the survey by Nielsen Media Research, the three most widely read newspapers in 2008 were Apple Daily, Liberty Times, and United Daily News. The sampling period was from January 1, 2005 to December 31, 2009.

Based on literature review, 29 terms related global warming were used as search keywords which used "or" as a Boolean operator. The keyword searching was conducted from the electronic databases of the three newspaper companies. If the article lowly correlated with global warming, it was deleted. A total of 3653 articles were retrieved. These articles were sorted by their published date, and systematic sampling was applied to extract 15% as the sample.

Finally, 548 news reports were selected as samples for analysis of this study. Table 1 shows the published newspaper and year of the population and sample news reports. The Chi-square test results show that the amounts of reports from three newspapers are no significant difference between the population and the sample.

Of the total news reports, 57.7% (n=316) were featured in United Daily News; 27.6% (n=151) were in Liberty Times; and 14.8% (n=81) in Apple Daily. There is a significant increase in the amount of reports regarding global warming at 2007.

Table 1. The published newspaper and year of the news reports

Year	United Daily News		The Liberty Times		Apple Daily	
	N	n	N	n	N	n
2005	183	28	112	15	75	
12	370(10.1)	55(10)				
2006	172	30	130	15	95	
15	397(10.8)	60(10.9)				
2007	556	80	382	58	153	
25	1091(29.9)	163(29.7)				
2008	504	82	169	21	122	
17	795(21.8)	120(21.9)				
2009	624	96	287	42		
89	12	1000(27.4)	150(27.4)	2039		
316	1080	151	534	81		
3653	548					
(%)	(55.8)	(57.7)	(29.6)	(27.6)	(14.6)	

(100) N: the number of news reports of the population.
n: the number of news reports of the sample.

Coding scheme

Each news report was coded for 6 variables.

Five issue categories were developed including global warming, climate change, environment policy, green industry, and green consumption. One news story may include one or more issues. The main topic and sub-topic were coded based on their weight in the story.

The source of news was coded. The category items included government or official institutions, academic institutions or experts and scholars, non-government organizations, private corporations, and other media or without sources. Reports that source of news unknown were classified under the fifth category. Location of sources of the news was coded as domestic or foreign.

Report style referred to the style of the report was published on the newspaper. It was divided into five categories including straight news, commentary, special theme report, op-ed, and translation reports.

The attribute of reports can be divided into six categories including composite report, policy story, knowledge story, research story, consumption story, and economic story.

When the report contained anti-warming information and was in an attempt to convince the audience, it can be analyzed for the appeal strategy. Category items included fear appeal, reward appeal, emotional appeal, rational appeal, authority appeal, and no appeal. One story may contained one or more appeal strategies. Only the main was coded.

Data analysis

Three coders were trained before analysis. The training involved 30 articles not used in the sample. The training articles were coded and discussed by all three coders until they felt comfortable with the coding scheme. Among all categories, the intercoder agreement ranged between 0.677 and 0.982. The whole intercoder agreement among three coders ranged between 0.847 and 0.868. The average intercoder agreement was 0.835, and the reliability was 0.938.

Results

Issues of news reporting

Of the total 548 news reports regarding global warming, 51.1% (n=280) concerned environment policy issue,

20.1% (n=110) concerned green industry issue mainly (Table 2). With respect to sub-topic, green consumption (34.1%) and global warming (33.8%) comprised the majority. It is worth noting that 10.2% of the stories only concerned an

issue but did not implicate another related issue as sub-topic.

In one news story, the issues of main topic and sub-topic are presented on table 3. Environment policy most often appeared with green consumption (29.7%), followed by global warming with climate change (16.3%), then environment policy with green industry (13.2%), green industry with green consumption (13.0%), and followed, global warming with environment policy (12.0%). It is notable that climate change only appears often with global warming, but rarely with other issues.

Table 2. Main topic and sub-topic of the news reports

	Main topic	n (%)
Sub-topic Issues		n (%)
Environment policy	280 (51.1)	
Green industry	110 (20.1)	
Climate change	92 (16.8)	
Green consumption	52 (9.7)	
Global warming	13 (2.4)	
No sub-topic	0 (0)	
Totals	548 (100)	
548 (100)		

Table 3. The cross tab of multi-issues within one reports

Issues n(%)	Climate change	Environmental policy	Green industry	Green consumption
	80(16.3)	59(12.0)		
Global warming	23(4.7)			
Climate change	4(.8)	3(.6)		
Environmental policy	146(29.7)			
Green industry				

Sources of news

Table 4 presents the details of the news coverage. Of the total, the largest percentage for source of news is government institution (32.3%), and the second is academic institution (23.7%), the sum of both comprise over half of the total. Global warming and climate change reports mostly came from academic institution (53.8%, 44.6%), environment policy reports mostly came from government institution (50.0%), while green industry news mostly came from private corporation (40.0%). There are 71.5% reports came from domestic sources totally. But climate change reports mostly came from foreign sources (58.7%).

Attribute of reports

Of the total, the majority of the attribute of reports is straight news (53.5%), follows by translation reports (25.7%). The percentages of op-ed (6.9%) and commentary (1.6%) are the lowest. Separate by issues, translation reports account for over half of the reports for global warming (61.5%) and climate change (51.1%). Reports on environment policy (61.4%), green industry (49.1%), and green consumption (64.2%) tend to be presented as straight news mostly.

Style of reports

Of the total, the majority of the styles of reports are composite report (29.0%) and policy story (29.0%). Reports on global warming and climate change are generally in research story (53.8%, 73.9%). Environment policy reports are primarily in policy story (50.0%) and composite reports (40.0%). Green industry reports generally appear in economic story (36.4%), and composite reports (20.0%), while green consumption reports generally appear in consumption story (35.8%) and composite reports (34.0%).

Table 4. Coverage of global warming relevant issues in newspapers

	Global warming	Climate change	Environment policy	Green industry	Green consumption	Totals
Category		n(%)	n(%)	n(%)	n(%)	
n(%)	n(%)		n(%)	n(%)	n(%)	Source of news
Government		1(7.7)	16(17.4)	140(50.0)		12(10.9)
8(15.1)		177(32.3)	Academic institution	7(53.8)		41(44.6)
49(17.5)		21(19.1)	12(22.6)		130(23.7)	Media
4(30.8)	21(22.8)	38(13.6)		29(26.4)		14(26.4)
106(19.3)	Private corporation		0(0)	2(2.2)		18(6.4)
44(40.0)	13(24.5)	77(14.1)				
Non-government organization	1(7.7)	12(13.0)	35(12.5)		4(3.6)	
	6(11.3)		58(10.6)			
Location of source						
Domestic source		8(61.5)	38(41.3)	219(78.2)		79(71.8)
48(90.6)	392(71.5)	Foreign source		5(38.5)		54(58.7)
61(21.8)	31(28.2)	5(9.4)		156(28.5)		
Attribute of report						
Straight news		3(23.1)	30(32.6)	172(61.4)		54(49.1)
34(64.2)	293(53.5)	Translation report		8(61.5)	47(51.1)	
54(19.3)	27(24.5)	5(9.4)		141(25.7)	Special report	
1(7.7)	9(9.8)	16(5.7)		28(25.5)	13(24.5)	
67(12.2)	Op-ed		1(7.7)	5(5.4)	30(10.7)	
1(1.1)	1(1.9)		38(6.9)	Commentary		0(0)
1(1.1)	8(2.9)		0(0)	0(0)		9(1.6)
Style of report						
Composite report		1(7.7)	6(6.5)	112(40.0)		22(20.0)
18(34.0)	159(29.0)	Policy story		2(15.4)	5(5.4)	
140(50.0)	9(8.2)	3(5.7)		159(29.0)	Research story	
7(53.8)	68(73.9)	7(2.5)	6(5.5)		2(3.8)	
90(16.4)	Consumption story	0(0)	6(6.5)		9(3.2)	
18(16.4)	19(35.8)		52(9.5)	Economic story		0(0)
3(3.3)	7(2.5)		40(36.4)	0(0)		50(9.1)
Knowledge story		3(23.1)	4(4.3)	5(1.8)		15(13.6)
11(20.8)	38(6.9)	Appeal strategy				
Reward appeal		0(0)		0(0)		130(46.4)
54(49.1)	38(71.7)		222(40.5)	Rational appeal		7(53.8)
12(13.0)	70(25.0)		46(41.8)	11(20.8)		146(26.6)
appeal		5(38.5)	75(81.5)	17(6.1)		4(3.6)
1(1.9)		102(18.6)	Authority appeal		1(7.7)	0(0)
55(19.6)	2(1.8)		2(3.8)		60(10.9)	Emotional appeal
0(0)	1(1.1)		6(2.1)		1(1.9)	
9(1.6)						
No appeal		0(0)		4(4.3)		2(7)
3(2.7)	0(0)		9(1.6)			

Appeal strategies

Among the news texts of this study, there are many appeal strategies used to convey the concept of anti-warming. On the whole, reward appeal holds the largest ratio, and emotional appeal is the least utilized. However, different topics utilize different appeal strategies. Global warming topics generally use the rational appeal, followed by fear appeal; climate change news generally uses fear appeal; environmental policy, green industry, and green consumption topics generally use the reward appeal followed by the rational appeal.

Discussion

From the perspective of learning, display the related concepts and their relationships simultaneously can assist in establishing conceptual connections for audiences. News reports concerned environment policy issue often

accompanied by green consumption issue. It shows that when news media deal with global warming issue, they tend to convert policy level information into personal level. The distance between policy and audience is long. However, consumption information implicates audience's personal actions. Mentioning environment policy and green consumption in the same news story is beneficial in helping audiences establish connections between policies and themselves. However, while "climate change" only appears often with "global warming" but rarely appears with another issues. Audiences can't establish connection between climate change and other related issues such as environmental policy, green industry, and green consumption through reading the news reports..

In terms of news source, most news stories on global warming and climate change were from academic institutions or experts and scholars, which indicate the cognitive characteristic of such science news. Approximately

30% of the total news and 50% of climate change news came from foreign sources. In addition, global warming and climate change reports are mostly translation reports. It shows that there is greater reliance on foreign media for these two issues. Global warming is an international issue. News from overseas can present the global climate change conditions and the developmental trends in fighting global warming in other nations. It is helpful in establishing an international perspective for this issue. But high frequency uses of translation reports may have a negative effect on the comprehensiveness and depth of domestic science news (Huang & Jian, 2006).

In terms of news attribute, op-ed and commentary account for less than 10%. Environment issues are not merely scientific, but are closely related to social domain. Environment policies especially demand exchanges of opinions from different departments of society in order to gradually form the consensus. News reports regarding global warming rarely appeared in commentary, meaning that the journalists in Taiwan may not engage in discussion such issues. The paucity of op-ed also means that the people participate less in such issues. In addition, it usually does not appear in special reports. Special reports are usually more breadth and depth, and are good to communicate the high density knowledge and complexity of science news. However, the low percentages of these types of news mentioned above should be improved upon in the future.

In order to motivate audience to engage in anti-warming, it may rely on the rise of environment consciousness and emotional love for the planet. However, this study discovers that only 4 news stories assumed an emotional appeal. In the future, the emotional appeal strategy can be used more.

Limitations

The analytical sample in this study was taken from the three most widely read newspapers. However, they do not represent all newspapers published in Taiwan. The samples were obtained through electronic database of newspapers; thus, the content was only textual, and without images and color. Electronic newspapers also have a different layout from paper newspapers. In addition, the characteristics of television, broadcasting, and newspapers are different, thus, the results of this study cannot be generalized to other news media.

Implications

The study findings suggest that when write global warming news reports, more related issues can be put in one story. It would help the audience establish connections between issues through reading. It is suggested that commentary and op-ed could be used more often to strengthen discourse on environment policy, and to achieve the communication with the public.

Future studies can deal with audiences, to explore how the public interprets news reports on environmental issues, and how reading news reports affects the audience's knowledge of, attitude toward, and behavior for anti-warming.

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