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The Journal of Applied Communications

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- Peer-reviewed to ensure accuracy and quality.
- Indexed selectively in AGRICOLA; listed in Ulrich's International Periodicals Directory and ARL's Directory of Scholarly Electronic Journals and Academic Discussion Lists.

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While every effort is made to maintain an interval of no more than nine months from submission to publication, authors should be aware that publication dates are contingent on the number and scope of reviewer comments as well as response times during the review process.

All submissions are peer-reviewed (blind).

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Fear and Loathing in Britain: A Framing Analysis of News Coverage during the Foot and Mouth Disease Outbreaks in the United Kingdom

Karen J. Cannon and Tracy A. Irani

Abstract

Communicating science is a complex task filled with challenges for scientists and communicators. In the field of agricultural communications, some of the most complex and controversial topics covered in today's media are related to contagious animal diseases. The purpose of this study was to explore the use of frames in two daily newspapers, The New York Times in the U.S., and The Guardian in the U.K., during both the 2001 and 2007 outbreaks of foot and mouth disease (FMD) in Britain. The analysis showed that the primary frame used in articles published during the outbreaks was fear, followed closely by a connection of FMD to bovine spongiform encephalopathy (BSE, or mad cow disease) and the potential for human infection. Secondary frames included criticism of government and politics, and a military/war frame. This research shows that the use of frames in media has the potential to create unnecessary fear among consumers who already possess low levels of knowledge regarding agricultural production practices. Future research in this area should include an evaluation of headlines corresponding to newspaper articles, as well as a study of the sources of information and quotations used in such stories. Through the use of such framing analyses, agricultural communications scholars can begin to take a concrete step in exploring the ways in which the public interprets, creates meaning and values information related to agriculture.

Introduction

Communicating science is a complex task filled with challenges for scientists and communicators. Effective science communication requires an in-depth understanding of the issue being reported, a broader understanding of the science itself, and of the context in which the subject is important to readers. Agricultural communicators may have an even more complex and difficult task – in addition to communicating the science that may be involved, they must also communicate effectively about many aspects related to the food we eat, the changing nature of agriculture, and its impacts on the American economy (Lundy, Ruth, Telg, & Irani, 2006) due in part to growing concerns across the globe regarding food safety and risk (Tucker, Whaley, & Sharp, 2006).

In the field of agriculture, some of the most complex and controversial topics covered in today's media are related to contagious animal diseases, serious outbreaks of which have occurred both in the United States (U.S.) and around the world. With the exception of bovine spongiform encephalopathy (BSE, commonly referred to as mad cow disease), few animal disease outbreaks in the past 20 years have seen the intense level of coverage that foot and mouth disease (FMD) received during the outbreaks in Britain in 2001 and 2007.

In February 2001, the British government responded to a veterinary report indicating sows at a packinghouse near London were suspected of being infected with FMD. Over the next seven months, more than 6.5 million animals were destroyed due to infection or exposure to the disease and more than 10,000 premises had been affected (Gregory, 2005). The scale of the outbreak was unlike any previously recorded (Scudamore & Harris, 2002).

The 2001 outbreak of FMD was a major news event, in addition to being a major agricultural and economic crisis for the United Kingdom (U.K.). While FMD has not been found in the U.S. since the early 1900s, experts anticipated that an outbreak similar to the one in the U.K. would devastate the American agricultural industry and have significant effects on the overall economy. A subsequent outbreak of FMD in the U.K. in August 2007 once more triggered alarm bells and again appeared in both British domestic media outlets and in the U.S.

Literature Review

This study was designed to evaluate the use of framing in daily newspaper coverage of the U.K. FMD outbreaks in 2001 and 2007. Framing is a technique that categorizes information and refers to the way in which events and issues are organized and made sense of by mass media and their audiences (Reese, 2003). Since most adults encounter science-related information only from media coverage (Weigold, 2001) an examination of frames used in newspaper coverage of these outbreaks can offer an assessment of coverage, both in the U.K. and the U.S., and provide valuable insight to the quality of information available to audiences about a major agricultural science issue.

Foot and Mouth Disease Background

FMD is a severe, highly contagious viral disease of cattle, swine, sheep, and other cloven-hoofed animals. Signs of the disease often develop within three days of infection and include blisters followed by lesions in the mouth or on the feet, resulting in excessive salivation or lameness in affected animals. Animals, people, and materials that bring the virus into physical contact with susceptible animals can spread the disease; airborne transmission of the virus has also been reported (U.S. Department of Agriculture, 2007). Previous research indicates that airborne transmission of the virus may have played a role in the 2001 outbreak; however, scientists continue to debate the conclusiveness of such evidence (Gloster, Williams, Doel, Esteves, Coe, & Valarcher, 2007; Konig, Cottam, Upadhyaya, Gloster, Mansley, Haydon & King, 2009). Some research points to variation in transmissibility among livestock species, where the disease spreads faster among hogs and sheep than other animals (Valarcher, Gloster, Doel, Bankowski & Gibson, 2008). Regardless, the American Veterinary Medical Association considers FMD the most economically devastating livestock disease in the world and projects a worst-case scenario if an outbreak were to occur in the U.S. because of the variety of species involved and the difficulty in preventing the rapid spread of the virus over a large area (American Veterinary Medical Association, 2007).

FMD is not a fatal disease, however, and poses no threat to human health. The main effects of the disease on livestock include reduced milk yields in dairy animals, abortions of pregnancies in breeding stock, death of young animals due to lack of milk and sick mothers, lameness, loss of weight in growing animals due lesions in the mouth, and permanent foot, udder or thyroid damage (James & Ruston, 2002).

Because of its potential economic harm, FMD and its eradication measures are a hot topic outside the scientific community. There is currently no cure for FMD and measures used in eradication

affect how a country is classified for trade purposes.

FMD was first reported in 1514 in Italy (American Veterinary Medical Association, 2007). According to the World Animal Health Organization (OIE), the disease is endemic throughout the globe and is present in parts of South America, Africa, the Middle East and Asia (World Animal Health Organization, 2007). Although the U.S. experienced nine outbreaks of FMD between 1905 and 1929, it has been free of FMD since 1929 (American Veterinary Medical Association, 2007).

2001 FMD Outbreak in the United Kingdom

On February 19, 2001, sows at a packinghouse in Essex, England, outside of London, were suspected of being infected with FMD. The next day, the Ministry of Agriculture, Fisheries and Food (MAFF) confirmed the diagnosis. Investigations following the 2001 outbreak never conclusively determined the exact point of entry of the disease; however, the British government's final report indicated that the disease likely arrived via illegally imported meat from the Far East (Department for Environment, Food and Rural Affairs, 2008)

The outbreak, previously unparalleled in size and scope, eventually resulted in the slaughter of more than 6.5 million animals (Department for Environment, Food and Rural Affairs, 2002). In an assessment of lessons learned by the British government after the 2001 outbreak, Anderson (2002) noted that the crisis cost close to £8 billion (approximately \$12.8 billion) in lost tourism revenue and international exports, as well as compensation payments to farmers for animals destroyed due to infection or to prevent disease spread.

Coverage of the outbreak appeared in print and on television in both the U.K. and the U.S., with American television broadcasting images of slaughtered cattle, burning pyres and distressed farmers (Baxter & Bowen, 2004). While previous studies have been conducted analyzing frames used in conjunction with the 2001 FMD outbreak, they have primarily centered on the use of frames in conjunction with policy research and analysis of metaphors used in media coverage, choosing to focus on the metaphorical war that the British government waged against the disease (Nerlich, 2004). War references were heavily employed in conjunction with powerful photographic images of death and destruction, images that appeared daily in newspapers, on television, and on the Internet (Nerlich, Hamilton, & Rowe, 2002).

U.S. food and agriculture industry publications such as *Nation's Restaurant News* reacted to the images coming out from the U.K. "The pictures out of Europe are both horrifying and heartbreaking: piles of livestock carcasses smoldering to eradicate the wildly infectious FMD disease currently plaguing the European Union" (Nation's Restaurant News, 2001, para. 1). A popular science magazine, *The Scientist*, wrote that "the United Kingdom sagged under the weight of withering tourism, huge agricultural losses, and wholesale disruptions in the movement of people. Prime Minister Tony Blair called out the army and even postponed national elections" (Palevitz, 2001, p. 6).

2007 FMD Outbreak in the United Kingdom

On August 3, 2007, an outbreak of FMD was confirmed on a farm in Surrey, England. The first new outbreak in six years following the unprecedented outbreak in 2001, it was confirmed as the same virus strain as was used at an animal research laboratory by the Institute for Animal Health and Merial Animal Health in Pirbright, England. Subsequent investigations by the British authorities revealed that the outbreak did indeed originate from the Pirbright facilities (Department for Environment, Food, and Rural Affairs, 2008):

Defra was much better prepared for an FMD outbreak in 2007 than it was in 2001. This was reflected both in its speed of initial response to the detection of the first infected farm premises in Surrey and its success in containing the spread of the disease (p. 26).

Dixon (2007) noted various headlines used by the British media during the outbreak “The 30-mile shadow of fear,” “Virus leaked from U.K. lab” and “The foot and mouth suspect,” which appeared during three successive days above articles published in *The Daily Mail* in response to the August outbreak (p. R733). Dixon also noted that while the media covered much of the recent outbreak in a responsible fashion, there were significant mistakes, only one of which involved certain media outlets’ need to find scapegoats for the outbreak and place blame within a short period of time before the three concurrent investigations being conducted were able to draw conclusions. To date there are no known studies that analyze frames appearing in media coverage of the 2007 outbreak.

Message Framing

Political poll watchers have long known that a particular way of wording a question can help frame that issue in a specific manner (Tankard, 2003). Ruth, Eubanks, and Telg (2005) noted that the way an animal disease outbreak is framed in the national media has implications not only for future coverage of the issue, but also has the potential to impact public perception about the topic. Message framing provides a fruitful way of conceptualizing how media shape news and people’s perceptions (Miller & Reichart, 2001). According to Hertog and McLeod (2001), framing actually aids in structuring our understanding in a number of significant ways, helping us to determine what content is relevant to discussions of social concern, defining roles that varied groups play, and outlining ways in which our values are created. Iyengar (1996) explained that framing impacts the way in which an issue is judged based on its presentation, its frame. Schudson (2003) noted that journalists tend to select conflict frames for use in their stories, anointing individuals as opposing forces or antagonists and protagonists in a given situation. Framing research is often presented as an explanation for the influence of media coverage on issue related to risk communication (Palenchar, 2001).

Ruth, Eubanks, and Telg (2005) conducted a framing analysis of news coverage surrounding the 2003 Canadian outbreak of bovine spongiform encephalopathy (BSE) or mad cow disease, and found that Canadian and U.S. print media framed the outbreak as having devastating implications for both the cattle industry and humans who consume beef. Additionally, they determined that a health risk frame, more so than any other type of frame, included information that was conceivably out of proportion to the real health risk that the disease posed to humans.

Han (2004) conducted a longitudinal content analysis of news coverage of the 1996 BSE outbreak in Britain in both *The Guardian* and *The New York Times* newspapers. The results indicated that no significant differences existed in the dominant issue frames employed before and after the outbreak, and no significant differences existed in the kinds of sources used. However, a difference did emerge in the tone of coverage before and after the outbreak in *The Guardian*. Han determined that after the outbreak, coverage became increasingly negative in tone, due in large part to the British government’s withholding information from the press. This negative tone increased as coverage of the incident continued, criticizing the government in almost all aspects of handling the crisis.

According to Nerlich (2004), the 2001 outbreak FMD was framed in the media as an enemy in a war and the U.K.’s slaughter policy was depicted as the weapon of choice in defense of the enemy. The images of war, slaughter, and control became all too potent, as controlling the spread of FMD

led to the almost literal “killing of the countryside.” Nerlich et al. (2002) in their examination of metaphors used in media coverage of the outbreak found that while on one hand, the metaphors, narratives and images used during the outbreak heightened the sense of risk perceived by many in the U.K., on the other hand they helped the public, politicians, scientists and journalists comprehend a highly complex phenomenon.

Purpose

The purpose of this study was to explore the use of frames in mass media outlets during the 2001 and 2007 outbreaks of FMD in the U.K. The National Research Agenda (NRA) for Agricultural Education and Communication (Osborne, n.d.), a joint project of university agricultural education and communications professionals, has as one of its priorities the goal of aiding the public in effectively participating in agriculture-related decision-making. Specifically, the NRA encourages agricultural communications professionals to explore how the public interprets, creates meaning, and values information related to agriculture. A concrete step in addressing this task is examining and assessing the quality and adequacy of the information available for local, national and international public decision making concerning high priority agricultural issues.

Based on the literature presented, as well as the purpose of the study, the following research question was employed: *How was FMD framed in major daily newspapers in the U.K. and the U.S. during the 2001 and 2007 outbreaks in Britain?*

Methods

This study utilized quantitative content analysis methods to address the research question and identify relevant frames that emerged in the coverage. According to Tankard (2003), framing is a useful concept because it has the ability to pierce the surface of news coverage regarding an issue and expose hidden assumptions. However, Lockie (2006) notes that the use of framing in media does not guarantee that audiences will actually interpret the content in the manner intended. Tankard (2003) also notes that framing possesses a subtlety that makes it difficult to define and states “measurement will differ for each topic of discourse” (p. 97).

Regardless of these statements, Hertog and McLeod (2003) noted that framing analyses have risen to a place of prominence in media studies, evidenced by the diverse group of researchers using the method and the significant (and expanding) body of literature on the subject, combined with the wide array of theoretical approaches to the topic.

This particular study examined the manner in which outbreaks of FMD were framed in two major daily newspapers, *The Guardian* in the U.K. where the outbreaks occurred, and *The New York Times* in the U.S.. According to the Pew Internet & American Life Project (2006), 20% of Americans report getting their science news and information from the Internet, compared to 41% who report using television sources, and 14% who use newspapers and magazines as their main sources for such information. In the U.K., while no report was discovered with similar statistics about where Britons turn for the majority of their science information, some 60% of the British population reportedly uses the Internet on a regular basis, indicating the Internet perhaps plays an important role in obtaining information in the U.K. (Office for National Statistics, 2007). However, no evidence was discovered indicating that the Internet is a primary source of science news for British citizens.

In designing this study, the researchers determined that although online sources are most commonly used for scientific information in the U.S., the outbreaks of FMD were more than strictly a scientific issue; FMD had a huge economic impact, both in Britain and in other European countries,

and became an international concern. In addition, the first outbreak of the disease included in this analysis occurred in 2001, a time when the dominant source the public turned to for scientific information was newspapers (Blum, Henig, & Knudson, 2006).

These two newspapers were selected because they are viewed as major information gatekeepers in their respective countries and often have articles from their pages reprinted in other regional newspapers. *The Guardian* is given credit for its high ethical standards of conscience, criticism, and liberalism in covering issues, while *The New York Times* is believed to be the most influential newspaper in the U.S. due to its status as the country’s major source of international news (Chomsky, 1989). Importantly, “these two papers are comparable when considering the notion of the informed citizen. Comparing the coverage of two respected daily newspapers cultivates the notion of multiple perspectives and approaches” (Han, 2004).

Articles related to the 2001 outbreak were collected from the date of the first report of a suspected outbreak (before laboratory tests confirmed the presence of the disease) on February 21, until September 30 of that year when the OIE, the international body governing the matter, declared the U.K. free of FMD.

For the 2007 outbreak, articles were again collected from the date of the first report of a suspected FMD outbreak on August 3, through September 18, 2007, the publication date of the last mention of the outbreak in the U.S. paper.

The Lexis Nexis Academic online database was used to gather articles from both *The Guardian* and *The New York Times*. Articles from the following sections of the papers were included in this purposive sample: news, opinion and feature stories. Letters to the editor were not included because, due to their brevity, they often do not provide adequate material for analysis. Articles in the sample were limited to those with more than 500 words to eliminate shorter news updates that provide minimal context for framing analysis. The search yielded a total of 279 articles; 193 articles from *The Guardian* and 44 from *The New York Times* for the 2001 outbreak period, 31 articles from *The Guardian* and six from *The New York Times* for the 2007 outbreak period. The British paper reported the story approximately four times as often as the American paper, which was not unexpected due to the location of the outbreaks in England. While the sample of articles from *The New York Times* during the 2007 period is comparatively small (only six articles), these articles were included to answer the research question.

The researchers included all articles from *The New York Times* for both the 2001 and 2007 outbreaks ($n=50$) and drew a sub-sample of articles appearing in *The Guardian* using a random number generator to identify the remaining articles. Eighty six percent ($n=43$) of the remaining articles came from the 2001 group and to equalize the number of articles ($n=100$) the remaining 14 % ($n=7$) came from the group of articles published in 2007 (see Table 1).

Table 1
Total number of articles used in analysis for each paper during each outbreak period.

	<i>The New York Times</i>	<i>The Guardian</i>
2001	44	43
2007	6	7
Total	50	50

Units of analysis used for the study were individual articles. Each of the 100 articles was assigned an identifying number and coded using a standard coding sheet that recorded descriptive information for each article, including the date of publication, article headline, article type (news, editorial, opinion, etc.), word count, and author, as well as the overall frames utilized in the article. A coding training session was conducted and the articles were analyzed and coded for emergent themes relating to the outbreaks of FMD, and dominant themes appearing through the use of key words and phrases, metaphors, use of visual imagery, and catchphrases (Tankard, 2003). A second researcher coded a random 10% sample of the 2001 articles ($n=8$), four from each publication, and all of the articles in the 2007 sample. Following this process, the researchers met and determined that they were in agreement regarding the results. Consensus agreement for the 10% sample was 98%.

Results

Using the search and sampling procedures described above, a total of 100 articles were collected and analyzed from both newspapers during the outbreak periods in 2001 and 2007.

Three primary frames and three secondary frames were found across the sample of articles. Primary frames included fear, a comparison of FMD to BSE (or mad cow disease) and the possibility of human infection from FMD, and the economic impact of the outbreaks (see Table 2). Secondary frames that did not dominate coverage and which appeared in conjunction with at least one primary frame, included politics and the British government's handling of the outbreaks (and criticism surrounding it), and a war/military frame.

Table 2

Frequency of frames appearing in both The Guardian and The New York Times by outbreak year

Frame	<i>The New York Times</i>		<i>The Guardian</i>		Total
	2001	2007	2001	2007	
Fear	40	4	38	4	86
BSE/human infection	31	0	7	1	39
Economic impact	24	2	10	2	38
Politics/government*	6	2	16	1	25
Military/war*	8	2	7	0	17

Note. * Denotes a secondary frame.

Fear Dominates

Across the sample of articles drawn during the 2001 and 2007 outbreaks, the frame used most frequently by journalists was the provocation of fear. Articles in both papers predominantly depicted dread and doom in relation to the outbreaks, incorporating fear-inspiring words such as “danger,” “horror,” “panic,” and “dread,” describing the impact of the outbreaks as “nightmarish” and “medieval” during 2001. In 2007, published stories referred both to the 2001 outbreak devastation and the impending doom that farmers faced at this second major emergence of the disease in less than a decade. An article in *The Guardian* during 2007 quoted a local councilman saying:

I was speaking to a farmer who had come to my house and he was in tears. He was telling me about his cattle and he is really terrified that he would be next. He was desperate because he said he had done everything right since 2001 and he couldn't believe that it was something out of his control that has brought this back.

Stories in both papers revealed the speed with which the disease spreads, noting that farmers and rural residents were “terrified of leaving their homes and farms” in the British countryside during 2001. Characterized as the world's worst outbreak of FMD, the 2001 devastation spread to other countries in the British Isles and Europe. During the 2007 outbreak, articles recalling images of burning piles of carcasses depicted in the media during the 2001 outbreak were invoked repeatedly and depictions of total loss and devastation of farms were again the norm. Vivid language including phrases such as mass killing, funeral pyres, and burning carcasses were prevalent, describing the “destruction of the English countryside.” A mention of the crisis claiming its first human victim appeared in *The Guardian* and related the story of a farmer so devastated at discovering the infection of his herd that he committed suicide.

During both analysis periods, one of the most common fears reported among British farmers was not the loss of their herds to the disease; rather their concern was being responsible for spreading the disease to other farms, either through traveling to another property and carrying the disease on their person or through their own animals having contracted the disease. Argument still exists about the airborne transmission, but scientists do not argue that the virus is virulent and spreads rapidly regardless of the location of the outbreak. Regardless of whether their herds had been declared infected, farmers barricaded themselves on their own properties.

During the 2001 outbreak, *The Guardian* published slightly over half as many articles using the fear frame ($n=27$) as did *The New York Times* ($n=40$). Articles appearing in *The Guardian* initially used the fear frame in conjunction with the declaration that the disease would spread if not swiftly and properly stomped out. Stories detailed the inevitable ruin of British farmers should the worst happen. Not surprisingly, the disease did spread across the U.K. and to other European countries and farmers were faced with the complete destruction of their herds during the 2001 outbreak.

In 2007, articles from *The Guardian* ($n=4$) again used a frame of fear and reflected a similar threat of disease spread and almost unavoidable ruin for farmers. While significantly fewer articles used fear, stories mentioning burning carcasses and associated complications in disposing of them inspired a sense of fear that the devastation of 2001 might recur. “The bovine pyres of the 2001 outbreak were merely the most dramatic symbol of a wider devastation, which saw swaths of rural Britain closed down.” However, according to a *Guardian* article “there has been no repeat of the 2001 blunder...this time the ban [on moving animals] came immediately” and “there are other reasons to hope infections may not yet spread as far this time.”

Articles appearing in *The New York Times* during the 2001 outbreak used the fear frame ($n=40$), often relating the outbreak of FMD to BSE, and discussed the threat of human infection. An analysis by a member of *The New York Times* editorial board compared FMD to BSE and noted that while they are two distinct diseases “it's the resemblance between them that haunts us, not the dissimilarity, a resemblance that evokes other epochs, other epidemics when humans, not animals were the victims.”

In *The New York Times* articles fear also manifested itself in the threat of the disease spreading from Britain and Europe across the Atlantic Ocean to the U.S. Journalist Elizabeth Becker wrote

during the 2001 outbreak “In Washington, officials are drawing up detailed plans of what they will do if – some say when – the foot and mouth virus arrives in this country...they also have to grapple with one major problem that Europe was spared – wildlife.” A *New York Times* editorial noted:

It’s not just images of mass killing, however, that make foot-and-mouth so disturbing. It’s the fear of mass contagion, a fear that returns us, somehow, to a time of epidemics like smallpox or bubonic plague or Spanish influenza, a time when effective barriers against the spread of disease were almost nonexistent.

During the 2007 outbreak, articles in *The New York Times* again centered on the devastation and destruction caused by the 2001 outbreak noting that “British authorities burned the bodies of 60 cattle found infected with FMD on a farm...as they moved quickly to try to contain any spread of the disease, which devastated the British livestock industry in 2001” and that in 2001 “chaos gripped the farming industry.”

BSE and Human Health

Overall, the frame comparing FMD to BSE appeared in 39 articles, in both *The New York Times* and *The Guardian*. The majority of articles containing this frame appeared in *The New York Times* ($n=31$) during the 2001 outbreak. Articles in both newspapers noted the differences and similarities between the two diseases and while they often pointed out that BSE has a lethal human variant and no known cure, humans are at no risk of infection from FMD:

For years, there have been news reports about deaths from mad cow disease, or bovine spongiform encephalopathy. More recently, there were warnings to avoid contact with cows, pigs, sheep, goats and deer, particularly in England, because of foot-and-mouth disease. But many travelers fail to distinguish between foot-and-mouth, which poses no risk to humans, and mad cow disease, which can be transmitted to humans by eating beef infected with it.

Other phrases used in these articles included the disease rarely affects humans, is seldom harmful to humans, poses little or no danger to humans, and has a low risk of transmission to humans. A few articles mentioned the link between CJD and BSE and alluded to the idea that FMD could develop a similar human variant.

During the 2001 outbreak, *The Guardian* published a summary from the British health department noting, that while the risk of humans acquiring foot and mouth is extremely small, “disposal of carcasses on the scale now being undertaken cannot be carried out without some risk to human health.”

Comparisons between foot and mouth and BSE also appeared in concert with references to the economic devastation caused by these diseases. “The suspension [of transportation of animals] is a terrible blow to Britain’s livestock industry, already reeling from the prolonged crisis over mad cow disease.” “What these two diseases share is an aftermath – the slaughter of entire herds of infected and potentially infected farm animals.”

Articles published in *The Guardian* represented British citizens’ concerns about whether the government and scientists were trustworthy regarding FMD’s lack of contagiousness to humans, specifically recalling:

Britain has just recorded its 100th victim of CJD, the human form of mad cow disease. We no longer trust experts who say they can fully anticipate the consequences of accelerated change to natural patterns, or that our exposure is so limited the risks are too small to bother with.

Economic Impact

The second most common frame concerned the economic impact of the outbreaks ($n=38$). Articles reported the crippling of the British farming industry due to the relentless speed of disease spread. Following the initial weeks of the outbreak in 2001, articles began to report the economic troubles of the British tourism industry as a result of the closure of the British countryside. According to the Department for Environment, Food, and Rural Affairs (2002) the direct costs to the British government for the 2001 outbreak were more than £3 billion (approximately \$4.4 billion).

In *The Guardian* during 2001, articles containing this frame ($n=10$) initially discussed food shortages and damage to the livestock trade in the U.K. However, as the disease spread, the frame expanded to include concerns about the wider impact on the economy separate from agriculture such as rural businesses and tourism. Many articles described the damage to the tourism trade due to the virtual closing of the countryside, noting that “the fall-off in tourism has cost the industry millions.” A *New York Times* article noted:

The much bigger tourism industry stands to lose \$1.5 billion to \$5 billion this year – twice as much as the farmers. The deathly quiet that has fallen on many of the more beautiful parts of Britain has been caused not only by the much-cited “silence of the lambs,” but also by the silence of American tour buses and holidaying German cyclists.

Articles published in 2007 recalled the devastating economic impact of the previous epidemic, and announced the changes in British Prime Minister Gordon Brown’s summer vacation due to his eagerness to “avoid the economic disaster of the 2001 outbreak, when millions of cattle and other livestock were slaughtered and burned. Tourism also slumped badly that year.” One of two articles appearing in *The Guardian* during 2007 declared FMD as “essentially an economic sickness” and asserted that the British media over-reacted in its extensive coverage of the outbreak, “papers scream about a ‘deadly virus’ on the loose, but it isn’t even that...the press has no interest calming us down.”

Secondary Frames - Politics and Government

While appearing less frequently than the major frames, the researchers believe that the secondary frames were important to report, as they included vivid imagery and strong words relating to the political climate and government’s handling of the outbreaks and the use of references to war and the military.

A frame emphasizing politics and government included a wide range of words and phrases designed to reflect a sense that the British government was to blame for the size of the 2001 outbreak due to its mishandling of the situation. Using terms such as scapegoat and partisan politics, articles published in *The Guardian* during 2001 ($n=16$) increased their criticism of the government handling of the crisis as the outbreak progressed. Measures adopted by the government were seen as “frighteningly authoritarian and hopelessly ineffective, and advocated instead a policy of doing nothing. There is damn all that the government can do now to stop it, until it has run its course.” “The teams of epidemiologists...produced devastating confirmation that foot and mouth cannot be controlled by the government’s existing methods.”

In *The New York Times* during 2001, the political and government frame ($n=6$) included only two mentions of British politics and government. In the remaining articles, references were made to the American government's plans should an FMD outbreak occur in this country. "We were coming to the realization that state and local government would be overwhelmed and the U.S.D.A. would be overwhelmed if foot and mouth broke out," said an Agriculture Department official. Additionally, "American farmers and ranchers began lobbying their state agriculture chiefs for better [FMD] planning. Those officials recently urged Agriculture Secretary Ann M. Veneman to find out what the rest of the government could do to contain an outbreak."

War and Military Frame

A frame containing references to the military and war in *The Guardian* during 2001 ($n=7$) included references to imprisoned farmers unable to leave their properties due to movement restrictions implemented to stem the spread of disease. Articles also illustrated the military's heavy involvement in efforts to control disease spread and dispose of thousands of animal carcasses as a result of government eradication procedures. No articles containing this frame appeared in *The Guardian* during the 2007 outbreak.

Similarly, the articles appearing in *The New York Times* with the military/war frame depicted the disease as an enemy against which farmers, the military, and the government fought a battle, and included references to "waging war against the disease." None of the 2001 articles contained this frame.

Discussion and Conclusions

The results of this framing analysis clearly show that fear was the overriding emotion conveyed to readers in newspaper coverage appearing in *The New York Times* and *The Guardian* during both the 2001 and 2007 outbreaks of FMD in Britain. Article after article used different aspects of the outbreak to inspire fear in readers including the threat of human health concerns, economic devastation, and the idea of a war being waged against the disease. While a dominant fear frame emerged during analysis, it appears that each of the frame categories discovered in the coverage includes the shadow of fear. Certainly economic devastation (both potential and actual), threats to human health related to the disease, a lack of trust of the government's ability to handle the crisis, as well as perceived issues of credibility with government sources, and the discussion of the militaristic and war-like eradication measures all have the potential to inspire fear in readers.

Similarly to the health frame appearing predominantly in coverage of mad cow disease in Ruth, Eubanks, and Telg (2005), the BSE/human infection frame appearing in *The New York Times* coverage was out of proportion to the actual threat of the disease to human health. FMD is a disease that is strictly limited to infection of cloven-hoofed animals (American Veterinary Medical Association, 2007) and is neither a food-borne illness, nor an illness that threatens humans. Once fears of potential human infection were allayed and comparisons between BSE and FMD trickled out of the media coverage, the framing of fear messages shifted to economic losses and criticism of the British government's handling of the outbreaks.

Tankard (2003) likens the concept of media framing to that of a magician's sleight of hand – attention is directed toward one area or point and away from another. In this way, it is possible for journalists to use framing techniques that guide a reader's attention toward a certain argument, while ignoring another. Schudson's (2003) comment that journalists tend to select conflict frames for use in their stories is important to recall when considering this sample of coverage. It is this sense of conflict

that, combined with the use of images of destruction and devastation, created indelible images in the minds of readers that these outbreaks could have spelled the end of British farming.

The frames appearing in articles during the analysis periods in both 2001 and 2007 were intricately interwoven; few, if any, articles contained only one frame. Most often fear was linked with either the mention of BSE and the potential for human infection from animal disease or the economic impacts of the disease outbreaks. This connection of the disease to human health may have increased fear among consumers on both sides of the Atlantic initially, putting in their heads the idea that again here was a contagious animal disease that threatened the safety of the food supply, much like the outbreaks of BSE that had seen a great deal of coverage only recently. After articles in both newspapers clarified that FMD was not contractible by humans and posed no threat to food on the dinner table, fears shifted to the economic losses being sustained in Britain. Initially, monetary losses were thought to be restricted to farmers who had their herds condemned, either due to infection or on the grounds that they had been exposed to the disease through proximity to other infected animals. As the 2001 outbreak spread, however, the British tourism industry took a significant blow due to the “closure of the British countryside” to prevent the rapid spread of FMD.

It is possible that the fear frame dominated coverage so substantially because, especially in the U.S., consumer knowledge of the agricultural production chain is extraordinarily low, and that which we fear most is the unknown. Doerfert (2003) noted that public knowledge about agricultural practices diminish as our increasingly urbanized society moves further and further away from life on the farm. In addition, Ten Eyck (2000) noted that most often the public’s attitudes and perceptions about agriculture are based on media accounts. This lack of understanding about how food makes its way from gate to plate may have contributed to consumers’ alarm when receiving media messages indicating a huge problem existed (potentially) in the food production sector. In combination with concerns over “industrialized” farming techniques and the beginning of a movement in the popular media against animal confinement, the media appear to have played upon this fear of the unknown.

Han (2004) concluded that the British government’s mishandling of the 1996 BSE outbreak contributed substantially to the negative coverage of news during the time period surrounding that crisis. In light of this, it is possible that some residual effects exist in the mind of British citizens and that the fear and other frames employed in coverage of the FMD outbreaks described here brought back unhappy and difficult memories.

Additionally, echoes of the fear frame appeared in articles containing the secondary frames: references to the military and war and politics and government. Initially, fears surrounded potential human infection from FMD itself, and then shifted focus to disposal techniques of culled animals and the potential threat that poor planning of these methods might have an impact on human health. Images of war were invoked during 2001 when it became clear that the epidemic was beyond the control of the British government and the military was called in, which in turn sparked criticism of the government’s handling of the crisis. While criticism of the British government was confined to articles appearing in *The Guardian*, this secondary frame appeared in the *The New York Times* and centered on the sufficiency of the American government’s plans should an outbreak of FMD come to America. Ruth et al. (2005) acknowledged that the way in which frames were employed in the coverage of the Canadian BSE outbreak in 2003 may have provoked fear in readers, causing a sense of uncertainty.

The results of this study are limited due to the fact that significantly fewer articles were available for analysis during the 2007 outbreak from *The New York Times* than from *The Guardian*. This dearth

of articles during the more recent outbreak is likely due to the drastically reduced size and scope of the outbreak, in addition to the fact that it again occurred on the far side of the Atlantic Ocean. Additionally, as framing analysis is generally accepted as a qualitative research method and was used as such in this research study (with the exception of message frame frequency counts), it is important to acknowledge that the results of this study can only be used to describe coverage in these two publications and cannot be generalized to other media coverage regarding these outbreaks.

Implications and Recommendations

Framing analysis studies such as the one described here are important to illustrate the broad brush and dark strokes that were used to paint negative perceptions of agriculture during the periods of coverage analyzed in two major newspapers. Coverage of these two outbreaks can be categorized across both incident periods as fear inspiring, and provided readers a strong sense that there was cause for concern about the disease whether they resided in the U.S. or the U.K.

Today's consumers have a low level of understanding of the agricultural production process. We often fear what we do not know. Ruth, Eubanks, and Telg (2005) noted that "if journalists continue to cover only agricultural news that is problematic or associated with risk...then it can be expected that consumers will continue to lack accurate knowledge and understanding of agricultural and food related issues" (p. 20). Because frames determine what content is relevant to the discussion, "frames, as part of the deep structure of a culture, provide a significant portion of the shared meaning among society's members" (Hertog & McLeod, 2003, p. 141). Overall, frames used during the FMD outbreaks in Britain communicated to the public in both the U. S. and the U. K. that agricultural practices led to a situation that posed a threat to the human population. It is important that analyses such as this are used to inform the practice of agricultural communicators to aid in combating the negative associations the public has regarding certain aspects of agricultural production. Being aware of the use of such frames and the influence they have in creating an alarming picture of modern agricultural practices provides valuable information to practitioners about the quality of information available to the public regarding these issues. Through the use of framing analyses such as this study, a more comprehensive picture of mass media coverage regarding American agriculture can be created, paving the way for the important future work of agricultural communicators.

The results of this analysis illustrate that the use of frames in media have the potential to create unnecessary fear among consumers with already low levels of knowledge regarding agricultural production practices. Coming on the heels of the BSE controversy as it did, the implications of the 2001 outbreak heightened consumer concerns in both Britain and the U.S. regarding the safety of the food supply. Echoing the findings of Ruth, Eubanks, and Telg (2005) in their analysis of the coverage of mad cow disease, frames such as those used during the 2001 and 2007 outbreaks of FMD have the potential to further negatively influence consumer perceptions toward the livestock industry as well as the wider agricultural industry.

Beneficial future research utilizing framing analysis techniques may include an evaluation of the headlines accompanying the articles in the sample used for this study to determine if similar frames were used, and if those frames are indicative of the frames contained in the respective articles. It may also be of value to practitioners for researchers to analyze the use of sources quoted and cited in the articles included in this study to determine the roles that individuals, groups, organizations and institutions might have had regarding this phenomena (Hertog & McLeod, 2003).

As journalists bring their own experiences and paradigms to their writing, an examination of

articles published during the outbreaks, the frames contained therein and the journalists responsible for writing the articles may be helpful in illustrating any potential relationships among these three variables. Such a study may indicate to agricultural communication professionals that certain journalists are predisposed to use certain frames, pointing to targeting certain journalists with certain types of stories.

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foot and mouth, animal disease, framing, media, newspapers, Britain, agriculture

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Agricultural Legislation: The Presence of California Proposition 2 on YouTube

Joy Goodwin and Emily Rhoades

Abstract

Animal rights movements continue to be a threat to the livestock industry in the United States. In 2008 California voters passed a proposition (2) which outlawed the use of battery cages for laying hens, gestation crates for sows, and veal crates for veal calves by 2015. Similar measures have previously been passed in Florida, Arizona, Colorado, and Oregon. As animal rights activists continue to pressure the livestock industry, it is important to look at their information outlets, especially those targeted toward young voters. The researchers used content analysis to determine the message content and campaign for Proposition 2 posted on YouTube. By using the search term "proposition 2 California," a usable sample of 103 videos were identified. Results indicate that when dealing with political legislation, agriculture has very little web presence on YouTube. In addition, it indicates that those in favor of the proposition use appeals and biased examples to deliver their message. In order to be relevant to young voters, agriculture advocates must begin using technology to reach non-agriculture audiences. Educators must also be preparing future communicators to embrace such technology in campaigns.

Introduction

Animal rights activists and organizations are increasingly becoming a threat to the livestock industry. Ballot initiatives sponsored by these organizations are being seen all over the country. States like Florida, Arizona, and Oregon have passed successful propositions which have hindered safe livestock husbandry (Proposition 2 – Improving Animal Welfare?, 2008; What Proposition 2 Really Means for Agriculture., 2008; Shinn, 2007). Additionally, Colorado has voluntarily agreed to phase out veal crates and gestation crates to avoid having to place the issue on a ballot (Shinn, 2007). On August 9, 2007, animal rights groups continued proposing livestock housing legislation by filing another state petition. This petition proposed legislation regulating livestock production in California (Sumner, Rosen-Molina, Matthews, Mench, & Ritcher, 2008), including the "Treatment of Farm Animals Statute" on the November 2008 general election ballot (Sumner et al., 2008; California Farm Bureau Federation, 2008b). Proposition 2, as it is popularly known, includes limits on minimum space requirements for the confinement of veal calves, gestating sows, and laying hens (Sumner et al.).

The heart of the language included in the proposition is as follows:

In addition to other applicable provisions of law, a person shall not tether or confine any covered animal, on a farm, for all the majority of any day, in a manner that prevents such animal from:

- (a) Lying down, standing up, and fully extending his or her limbs; and
- (b) Turning around freely (Sumner et al., 2008, p. 11).

Agriculture is California's number one economic industry (Benson, 2008), and the passing of Proposition 2 poses economic concerns on the future of California's economy. California produces very little veal, their pork industry is small, but their egg industry is expected to be greatly influenced by Proposition 2 (Lee, 2008b). California produces 5 billion eggs per year from 20 million laying hens. The value of California's egg production was \$213 million in 2006, and \$337 million in 2007 (Sumner et al., 2008). Predictions have been made that Proposition 2 will cause a near complete elimination of egg production in California by 2015, when the Proposition takes effect (Sumner et al.). This elimination would cause a decrease in local and state revenue taxes, along with the loss of thousands of jobs (Lee, 2008a). Many California egg producers may be forced to relocate or go out of business; resulting in a decreased ability for California consumers to buy safe, affordable, fresh, and locally grown eggs (California Farm Bureau Federation, 2008c). Proposition 2 is changing how animal products are produced in California; concurrently it is influencing where animal products will be produced in the future (Sumner et al.).

During the campaign, opponents of the proposition attempted to tell their side of the story through television and radio interviews; talks to local boards of supervisors, chambers of commerce, and rotary clubs; forum debates with proponents; and farm tours (Lee, 2008a). In addition, opponents had support from numerous major California newspapers including the *Los Angeles Times* and the *San Francisco Chronicle*, the American Veterinary Association, and Governor Arnold Schwarzenegger (Lee, 2008a; California Farm Bureau Federation, 2008c; California Farm Bureau Federation, 2008a). Despite strong arguments, the opposing side failed to communicate its message clearly. The *No on 2 Coalition* stated that they were unable to overcome "an emotional, manipulative, dishonest and often deceptive campaign by the backers of Proposition 2" (Lee, 2008b, p.1). Additionally, Leland S. Shapiro, DVM, from L.A. Pierce College said "We failed as an industry to educate the public about how we care for our animals. We've also failed to produce sufficiently versed agricultural ambassadors in our major universities that are capable of telling our side of the story" (2008, p. 1).

This study thus aims to explore one popular medium and its use by opponents and proponents of the proposition. If those in the agriculture industry did in fact "fail as an industry," it is important to understand how the use of media as compared to the competition, contributed to that failure. One popular medium used during this election was Internet videos. It may be that the online presence and campaigning was where the opponents of Proposition 2 failed to relay their message.

Internet Usage and Young Voters

The 2008 election saw a record number of young voters participating in primaries and caucuses (Marcelo, Kennedy, Lopez & Barr, 2008). In addition, the advancements in communications and Internet technology along with the Get-out-the-Vote campaign targeted toward young voters predicted the 18-29 year old age group would be more involved in the 2008 election than ever before. Although the voting statistics for 2008 have not been made available, it is known that 44 million young adults between the ages of 18 and 29 were eligible to vote in the 2008 election, making up 1/5 of the total voting population (Marcelo et al.).

The voting trends for 2004 and 2006 among young voters were another supporting factor in the expected voter turnout for the 2008 election. Young voter registration and turnout increased in 2004

and 2006 (Marcelo et al., 2008). During the 2004 presidential election the young voter registration and turnout had the largest increase among all age groups (File, 2008). The 2000 presidential election recorded that 51% of all 18-29 year olds were registered to vote while 55% were registered in 2004 (Marcelo et al.). Of the 51% of 18-29 year olds registered to vote, 40% turned out to vote in 2000 while 46% of the registered 55% turned out to vote in 2004. Due to the increase in young voter populations, campaign strategists recognized the importance of young voters in the 2008 election. Strategists increased the number of campaign materials focused at persuading and mobilizing the young voter, especially online (Marcelo et al.).

In 2008, the Pew Internet and American Life Project reported that 42% of 18-29 year olds surveyed indicated that they learned about political campaigns from the Internet (Kohut, 2008). In that same year, it was reported that 46% of Americans used the Internet, email, and texting to access information about the election (Smith & Lee, 2008, Gueorgvieva, 2008). Additionally, 12% of 18-29 year olds surveyed reported that they had posted their own political information and opinions on the Internet (Smith & Lee).

In their book on millennial technology's impact on politics, Winograd and Hais (2008) discussed how the country would see the political process dramatically change through the millennial generation and its use of the Internet. This was evident in the 2008 elections. Candidates Clinton, Obama, Biden, and Edwards all announced their intentions to run through online video in 2007. During the primaries, Hillary Clinton used a weekly online podcast to engage her supporters by answering questions they posted to her site. By recruiting volunteers, raising money, and increasing their exposure at minimal costs, politicians and proponents of legislation have exploded onto the Internet (Gueorgvieva, 2008). A substantial section of the voting population is specifically turning to sites like YouTube to learn about political issues. Of Americans responding to the Pew study, 35% indicated watching online political videos on sites such as YouTube (Smith & Lee, 2008).

In 2006, Cornfield and Rainie from the Pew Internet and American Life Project stated that "YouTube is the new 'killer app' that will transform U.S. politics" (p. 3). The 2006 campaign delivered on that promise, with more politicians turning to the site to increase exposure. In fact, many lesser-known candidates came to the forefront due to the videos posted on YouTube (Gueorgvieva, 2008). Campaigns began hiring people to track such sites, as not only were positive videos going up for politicians and proponents of legislation, but critics and opposing viewpoints were posted as well. Due to this political video push, YouTube introduced YouChoose2008 as a sub-site for voter education on candidates and issues (Gueorgvieva).

The population's turn to YouTube for information is not surprising. YouTube has been referenced as one of the most popular sources for online videos in recent years (Rhoades & Ellis, 2008). In 2007, YouTube was identified as one of the most frequently accessed, fastest-growing sites on the Internet. YouTube contains over 40 million videos and is accessed by over 20 million people each month. Not only does the site make it possible for anyone to upload and share videos, but users can also build social relationships around common interests or political beliefs (Cheng, Dale, & Liu, 2007).

Theoretical Framework

Messaging Appeals

Messaging appeals have been referenced as the most important component in advertising (Srivastava & Sharma, 2008). Mueller (1986) defines an appeal as a "message designed to motivate the consumer to purchase" (p. 3). There are various different types of appeals; however, the appeals used

most often are feeling or emotion based appeals and logical or rational based appeals (Srivastava & Sharma; Zinn & Manfredi, 2000; Cronkhite, 1964). Srivastava and Sharma indicate that emotional appeals are “fallacies that persuade by appealing to emotions that are not relevant to the question at hand” (p.30). Emotional appeals are often used by advertisers as they have been proven to provide a connection with the consumer (Srivastava & Sharma). Emotional appeals tend to be subjective and very open to individual interpretation (Zinn & Manfredi). Advertisers can appeal to emotion through sexual imagery, fear, threats, promises, humor, and empathy (O’Guinn, Allen, & Semenik, 2003).

The sexual appeal is an appeal that grabs the attention of consumers (O’Guinn et al., 2003). These appeals are often arousing and often prompt the consumer to create a link between arousal and the given brand. Fear appeals are negative in context and often make consumers feel that if they do not take the recommended action then negative consequences will arise (O’Guinn et.al.). Threat appeals are often similar to fear appeals, but generally go one step further by illustrating the negative consequences that could arise. Messaging appeals that use promises promote feelings of assurance and positive outcomes. Humor is an appeal used to “create in the receiver a pleasant and memorable association with the product” (O’Guinn et al., p. 380). Lastly, the emotional appeal of empathy provides the consumers with the ability to identify with and understand the feelings or difficulties of others.

Logical appeals are focused on traditional message processing and are designed to influence a consumer’s beliefs about a message (Albers-Miller, & Stafford, 1990). These appeals are generally persuasive in nature and provide arguments in the advertiser’s favor. While not generally used in service advertising, product advertising has been known to frequently use logical appeals (Albers-Miller & Stafford). Logical appeals use reason to show that something can be gained or loss, ask a rhetorical question, show irony, social modeling, and to present information (O’Guinn et al., 2003)

The logical appeal of gain or loss is generally used to show consumers desirable or undesirable outcomes in order to promote a product or service. Rhetorical questions are used in advertising to promote consumer responses by providing an answer within the questions being asked. Irony is an appeal that creates discrepancy between what the message says and what the message means. The messaging appeal of social modeling is frequently used to give a product or brand meaning by relating it to a favorable social context (O’Guinn et al. 2003). Lastly, the informative appeal seeks to inform consumers and provide them factual information.

Social Cognitive Theory

Social cognitive theory is an example of an important theory that surfaces in political advertising research. The theory suggests that by observing others’ behaviors, people develop rules to guide their own actions or previously learned behaviors (Nabi & Oliver, 2010). Social influences develop an individual’s beliefs, emotions, and cognition. Additionally, social influences map standard emotional reactions through modeling, instruction, and social persuasion (Bandura, 1986). When social cognitive theory is applied to media such as YouTube, the viewer’s behavior is influenced when attractive images are present within the message that catches the viewer’s attention (Nabi & Oliver). Bandura (1989) once said, “Because of the bidirectionality of influence between behavior and environmental circumstances, people are both products and producers of their environment” (p. 4). The use of social cognitive theory is an efficient approach to looking at how consumers react to advertisements based on their environment and demographic background.

The consideration of demographics is an important key to successful advertising. William Lazer (1994) defines demographics as “the study of the human population dealing with size, composition, and distribution of populations” (p. 4). Effective advertising involves the use of demographic data to gain the competitive edge against other advertisements (Lazer). A popular trend in advertising is the use of celebrities (Kahle & Homer, 1985). Different celebrities attract different demographic populations; if a message portrayed by a celebrity’s presence is consistent with the product message, and the message is structured to fit the targeted demographic population, an effective advertisement will be produced (Kahle & Homer). By looking at demographics, advertisers are able to target certain populations and create messages that will appeal to the consumer’s social cognition.

Purpose

Due to its popularity, the Internet has increasingly become a venue for political advertisements by candidates and individuals. Because it reaches a multitude of people, it is important that communicators consider the Internet as a source of communication. Communicators and educators must be aware of competing messages and the sources used to reach the public. The goal of this research is to determine the agricultural presence in YouTube videos pertaining to Proposition 2. This information is critical to agricultural communicators and educators in order to establish the current effectiveness of agricultural campaigns. In addition, this information will provide agricultural professionals with the ability to improve their messaging techniques and resources. Having an understanding of how competing organizations use YouTube to interpret agriculture will provide a strategic outlook to promote agriculture and spread the agricultural message to citizens.

The following objectives directed this study:

- 1) To determine the origin and sponsorship of Proposition 2 videos on YouTube.
- 2) To determine the demographics used in Proposition 2 videos on YouTube.
- 3) To evaluate the messaging appeals used in YouTube videos surrounding Proposition 2.

Methods

Researchers used content analysis methods to determine the presence of Proposition 2 videos on YouTube. Content analysis is a research tool used to establish the content of communication in a systematic and quantitative description (Kaid & Wadsworth, 1989). Videos and computer files are often researched using content or document analysis (Ary, Jacobs, Razavieh, & Sorensen, 2006).

The study sample was collected by typing “Proposition 2 California” in the search bar on the YouTube home page. Collected in late-fall of 2008, the search resulted in 111 video clips. Of these 111 videos, 103 of them were deemed usable and were evaluated for the research. The eight videos excluded from the research were unusable due to unrelated content and removal of the video before coding. As the study was interested in the effect of the videos on voting, those posted after the election were also removed from the sample. Two coders coded videos over a three-week period.

Information collected prior to watching a video included the title of the video, author, length, how many times the video had been viewed, the video category assigned by the author, video rating rated by viewers, video sponsor and producer, and how long the video had been online. Following the pre-viewing data collection, the researchers then watched each video and coded the video for the following information: the side of the proposition that the video covered; the main topics covered (whether farmer, animal welfare, human health, food safety, animal rights, factory farms, the environ-

ment, or other); if the video was animated or not-animated; the presence of a celebrity's opinion; and the number of people and the demographics of those delivering the message. In addition, coders evaluated the presence of appeals, both emotional based and logical. The emotional based appeals coded for included guilt, emotion, promise, empathy, humor, threat, fear, pride, and sex. The logical appeals coded for included rhetorical questions, self-reference, gain-loss, information, social modeling, and irony (O'Guinn et al., 2003).

Two coders underwent coder training. The training consisted of the two coders coding the same 10% of the sample ($n = 10$). This established the coder's abilities to use a coding guide and accurately code a sample. As a result of the training, an inter-coder Holsti's reliability (North, et al., 1963) of 93% was obtained. A coding guide was used to insure that coders were coding accurately and consistently. After reaching coder agreement, the remaining videos were divided equally among the coders. Upon the completion of coding, data was entered into SPSS© and descriptive statistics were calculated.

Results

A content analysis was performed by researchers on a sample of 103 videos. The video clips were posted to YouTube an average of 39.69 (minimum = 1, maximum = 300) days prior to the November 4, 2008 election. Videos averaged a length of 1.73 minutes (minimum = 8 seconds, maximum = 10.2 minutes), and had been viewed an average of 4,161.74 (minimum = 31, maximum = 19,4712) times.

Of the 103 video sample, "Pets & Animals" was the most popular category the videos were posted to with 58 videos or 56.3% of the total sample. "News & Politics" followed with 23 (22.3%) videos, then "Non-Profits & Activism" with 15 (14.6%), "Entertainment" with 3 (2.9%), "People & Blogs" with 2 (1.9%), and "Education" and "Music" each with 1 video (1.0%).

The first objective of the research was to determine the origin and sponsorship of Proposition 2 YouTube videos. There were various authors who posted the analyzed videos. However, the most frequent authors were animal rights organizations. Humane California authored a total of 35 (33.98%) videos, while Farm Animal Welfare authored 21 (20.39%) of the videos. Other authors included Animal News, centgov, Doggy TV, haydenvegan-PETA, Farm Sanctuary, Human Society, The Marin Humane Society, veterinarycrops, and several other individual authors. Animal rights organizations were also the most frequent sponsors of the videos. Of the 103 video sample, 71 (68.9%) of the videos were sponsored by animal rights organizations. Videos classified as being sponsored by "other" made up 29 (28.2%) of the videos. The sponsors classified as "other" included individuals, blogs, universities, political organizations, religious organizations, California for Safe Food Coalition of Public Health and Food Safety Experts, and unknown sponsors. Only 1 (1%) of the videos were sponsored by a farming/commodity organization (See Table 1).

The second objective of this study was to determine the demographics used in Proposition 2 videos. Coders first looked at the position of the video and determined if animation was present. The videos were broken down as follows: 89.3% (92) supported the proposition 3.9% (4) opposed the proposition and 6.8% (7) of the videos held a neutral position. Those with a neutral position tended to be authored by news organizations. The majority of the videos coded were not animated ($n = 97$, 94.2%).

Table 1
Sponsors of Proposition 2 Videos on YouTube

Sponsor	<i>f</i>	%
Animal rights organizations	71	68.9
Other	29	28.2
Celebrity	2	1.9
Farming/commodity organizations	1	1.0

During the Proposition 2 campaign, many celebrities were seen speaking out in favor of the proposition; therefore, the researchers coded for the presence of celebrities’ opinions. If a known celebrity in the entertainment world was present in a video or if a celebrity’s position on the Proposition was discussed in a video then, the video was coded as containing celebrity influence. Results showed that 36.9% (38) of videos contained a celebrity’s opinions while 63.1% (65) did not possess celebrity influence.

Researchers coded for the demographics of the people delivering the message. Coders evaluated whether the message was delivered by a voice only, one person, more than one person, or no person (text). One person was featured delivering the message in 58 (56.3%) of the videos, 36 (35%) were delivered by more than one person, and 8 (7.8%) were delivered by a voice only. The age of the people delivering the message was also coded by the researchers. Videos that contained a variety of ages of people or those who did not contain people were coded as “none.” The age group of 40-50 year olds made up 36.9% (38) of the videos, the “none” category made up 34% (35) of the videos, and the 20-30 age groups composed 21.4% (22) of the videos. Researchers also coded for ethnicity. As with the age groups, researchers coded the ethnicity as “none” if more than one ethnicity was present amongst the people delivering the message or if no people were present in the video. People of Caucasian ethnicity were in 70 (68%) of the videos, 25 (24.3%) were coded as none, and 6 (5.8%) contained African Americans. Asian and Hispanic ethnicities were not represented in any of the videos. Gender of the people delivering the message within the video was also coded for. Females appeared 36.9% (38) of videos while males appeared in 32.0% (33), (See Table 2).

To evaluate what types of topics surrounding Proposition 2 were included in the sample, the researchers coded for the inclusion of topics such as farmers, animal welfare, human health, food safety, animal rights, factory farms, environment, and “other”. Coders marked all applicable topics for each video. For use in this study, animal rights was defined as giving humanistic rights to animals while animal welfare was defined as caring for animals properly, adequately, and without harm. Of the 103 video sample, 56 (54.4%) videos contained more than one topic. Animal welfare was included in 88 (85.4%) of the videos. In the sample, 27 (26.2%) videos covered food safety as a topic. Coded as “other” were 17 (16.5%) of the videos with topics including: characteristics of the proposition, fiscal impact, specialty meats, promotion, economics and job outlook affected by the proposition, religion, fraud, USDA & American Veterinary Medical Association, raising money for the proposition through an art show, proposition 8, and thanks for those who were supporting the proposition. Human health and the environment were both topic features in 16 (15.5%) of the videos in the sample. Animal rights were discussed in 5 (4.9 %) of the videos (See Table 3).

Table 2
Demographics of the People Delivering the Message

Demographic	<i>f</i>	%
Age		
40's – 50's	38	36.9
None (no person in video or multiple people)	35	34.0
20's – 30's	22	21.4
Young Children	4	3.9
Teens	2	1.9
60+	2	1.9
Ethnicity		
Caucasian	70	68.0
None (no individual or multiple individuals)	25	24.3
African American	6	5.8
Other	2	1.9
Asian	0	0.0
Hispanic	0	0.0
Gender		
Females	38	36.9
Males	33	32.0
Both genders	31	30.1
None	1	1.0

Table 3
Topics Covered by Proposition 2 Videos

Topic	<i>f</i>	%
Animal Welfare	88	85.4
Factory Farms	39	37.9
Food Safety	27	26.2
Other	17	16.5
Human Health	16	15.5
Environment	16	15.5
Animal Rights	5	4.9
Farmer	3	2.9

Note. Videos could be coded for multiple topics of the issue and thus could be counted more than once.

The third objective of this study was to evaluate the messaging appeals used in YouTube videos surrounding Proposition 2. Coders evaluated the messages for two different major categories of appeals including emotional/feeling based appeals and logical/rational based appeals. Each major category was coded for each video. All appeal types that were present in the videos were marked.

With 58.3% ($n=60$) of the videos using guilt as a tactic, the appeals used made viewers feel as if they did not vote for the proposition, animals would be mistreated. Similarly, the 48.5% ($n=50$) of videos that showed empathy reached out to viewers by showing images of sick and injured animals as well as cute chicks and goats to appeal to the emotions of animal lovers. Promises made by video narrators claiming if one voted for the proposition one would save animals and support family farmers were made in 44.7% ($n=46$). Humor and pride appeals both appeared in 8 (7.8%) of the videos, while the sex appeal was used once (See Table 4).

Table 4
Feeling/Emotional Appeals Used in Videos

Appeal	<i>f</i>	%
Guilt	60	58.3
Empathy	50	48.5
Promise	46	44.7
Threat	36	35.0
Fear	31	30.1
Emotional	26	25.2
Humor	8	7.8
Pride	8	7.8
Sex	1	1.0
Total	266	258.4

Note. Videos could be coded for multiple appeals and thus could be counted more than once.

The logical/rational based appeal that occurred most frequently in the video sample was gain-loss with 75 (72.8%) of videos. Videos using gain-loss tried to show viewers logically what might happen if the Proposition failed or passed. The videos using gain-loss frequently showed the loss of quality of life for animals on farms that would occur if certain farming practices were not banned by the proposition. Of the sample, 25 (24.3%) of the videos contained an informative appeal where they were trying to share the statistics behind the cause. Irony was the least used appeal, appearing in 3 (2.9%) videos (See Table 5).

Table 5
Logical/Rational Appeals used in Videos

Appeal	<i>f</i>	%
Gain-loss	75	72.8
Informative	25	24.3
Self-reference	16	15.5
Social modeling	16	15.5
Rhetorical question	7	6.8
Irony	3	2.9
Total	42	137.8

Note. Videos could be coded for multiple appeals and thus could be counted more than once.

Conclusions/Recommendations

Based on this study and previous research it is evident that YouTube is being used for all forms of politics, including campaigns toward legislation. Of the 103 videos, a large portion ($n = 42, 40.7\%$) were posted at least one month before the November 4, 2008 election. This gave voters adequate time to access the videos before the election, including those who may have voted by absentee ballot. It is important as agricultural professionals to know the period in which many competitors post their messages to YouTube. This will allow agriculture groups in the future to get a jump-start and reach voters before the competitors.

The landside difference between videos for and against Proposition 2 is a very pertinent finding to this study. As in the election results, support of the proposition outweighed the opposition. Agriculturalists should take note of this difference and evaluate what the industry can do differently to reach voters. Using online resources more efficiently, producing creative messages, and structuring messages to fit the voter audience need to be further researched in order to insure that the agricultural industry makes improvements in the near future. Animal rights groups, like the Humane Society of the United States (HSUS), will continue to fight for their cause. A statement released on January 22, 2009, from *Hoosier Ag Today* indicated that HSUS has acquired an office in Bloomington, Indiana, and is prepping to propose similar legislation there (Truitt, 2009). It is also important to note that of the few videos against the proposition, one contained a farmer providing negative commentary about the animal rights organizations, not a positive view that would make voters want to help such a farmer. If agriculturalists are going to use such venues they must help their constituents understand what is effective persuasion.

The most prominent author selected category for the YouTube videos in this sample was “Pets & Animals” ($n = 58, 56.3\%$). These results are surprising as it might be assumed that “News & Politics” or “Non-Profits & Activism” would be the leading categories for this sample. “News & Politics” would be the most logical category for most videos due to the legislative content surrounding Proposition 2. Due to the large abundance of animal rights organizations both authoring and sponsoring the majority of the sample, “Non-Profits & Activism” would also logically rise to the top. Agriculturalists should remember that animal rights organizations generally try to disguise their activist-like nature. For example, many people are under the belief that the Humane Society of the United States is the

same organization as the Humane Society in their town that shelters pets. On HSUS's website one of their FAQs is "How is HSUS affiliated with my local humane society?" (The Humane Society of the United States, 2008, p.1). The presence of this FAQ indicates that the difference between HSUS and local Humane Societies is a question that often arises. This misconception works in favor for the activists because their true identity is not given away. Additionally, "News & Politics" was used less than "Pets & Animals" because it may not be as attractive to the majority of the younger populations. In the future, communicators should remember to select categories that will appeal to their audience.

Demographics portrayed in a message can directly affect how a message is received by a target audience (Kahle & Homer, 1985). The demographics observed in this research indicate that Caucasian females between the ages of 40 and 50 might be the most appealing to the Proposition 2 voting audience. Although the Caucasian race was found to be prominent in the sample, researchers found it interesting that more videos did not feature other ethnicities like Asian or Hispanic. With the large Hispanic and Asian population in California, it would be assumed that video authors would also want to make a deep connection with those groups.

Females were more often portrayed in the messages than men. It may be predicted that the female gender poses a more emotional connection with an audience, therefore eliciting emotional responses. The presence of the 40-50 year old age group is logically expected. Generally, people feel that middle-aged adults have more experience and are more credible than younger or aging adults. Focusing on providing demographics that relate to the target audience will provide a strong connection and activate one's social cognition.

Video topics discussed in the YouTube videos had unpredicted outcomes. With the majority of videos being sponsored by animal rights organizations, animal rights video topics would be expected. However, the opposite is true. Only 5 (4.9%) videos featured an animal rights topic. The majority of videos contained an animal welfare topic. Farmers are generally known as being animal welfare activists. This shows that animal rights organizations may mask their true desire to catch more support. By masking their animal rights goals it was easily achievable for the voting population to agree with supposed animal welfare measures. As agriculturalists plan and prepare messages, they must learn to think like the competitors and cover topics that are important to the consumer.

Appeals used in advertising are important for reaching and connecting with an audience (Srivastava & Sharma, 2008). If the viewers see themselves in the ad or feel emotionally connected with the ad, they are more likely to connect cognitively with the product or cause (Nabi & Oliver, 2010). This study found that the majority of the videos used emotional appeals over logical appeals when discussing Proposition 2. With over 266 emotional appeals appearing in the videos, it is clear these authors feel that connecting to an individual by making them feel empathy or guilt will lead to their support. With the majority of videos being for the proposition, it is not surprising that so many videos played on guilt about not helping animals and empathy for farm animals. The promise of better lives for the animals if voting yes was used to draw in support for the proposition. Not many videos took a logical approach beyond showing the gain or loss for animals depending on how the vote went. Agriculturalists trying to make their message heard must work to combat these appeals and learn how to emotionally connect with users to share their message. Agricultural communicators need to incorporate more emotional appeals into their campaign messages to effectively persuade voters.

As the mode of politics evolves in today's technological age (Gueorgvieva, 2008), agricultural communicators must be up to the challenge when campaigning against larger groups like animal rights activists. Educators must prepare students in the communication and agricultural education

classrooms, teaching them how to deal with competitors and how to communicate with voting constituents. Political campaigns tend to vary from the typical commodity campaign. Tactics used by anti-agriculture organizations are ruthless and effective. Researchers must explore how to combat competing messages that are so convincing and appealing to individuals' emotions.

It is important to note that this study is limited by the search terms used and the ever-changing nature of the Internet. Videos can quickly be put online or pulled offline, and thus some videos discussing Proposition 2 could have been missed. Researchers tried other terms to ensure for a complete sample. Other search terms such as "prop 2" resulted in a similar list of subjects so the researchers used the original search term. In addition, the ethnicities and ages of those reported are limited by the design of the coding sheet as videos with "none" or "multiple" ages or ethnicities were coded the same. Future studies should improve the coding sheet to distinguish between "none" and "multiple." This study should be replicated for this and other issues posted on YouTube and other social networking sites.

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Improving Discoverability, Preventing Broken Links: Considerations for Land-Grant University Publishers

Mark Anderson-Wilk

Abstract

Publishers of online resources, including Extension publishing units at land-grant universities, are generally concerned about the discoverability of the resources they publish. Broken links create an obstacle between potential audiences and Extension resources, and thus reduce discoverability. This study examines the feasibility of Extension publishers using metadata (information about resources), digital object identifiers (instead of URLs), and/or institutional repositories (in combination with Extension catalogs) to improve the discoverability of their published resources. The use of rich, standardized metadata is recommended as a best practice in digital publishing. The Digital Object Identifier System provides publishers with tools to ensure persistent discoverability; however, the cost and time requirements may be impediments for some Extension publishers. Institutional repositories such as DSpace are underutilized and offer many benefits for Extension publishers to consider. In particular, using an institutional repository may be a low-investment option for Extension publishers to provide both access to and preservation of digital resources.

Introduction

A common interest among publishers of online materials is the discoverability of the resources that they publish (Schnittman, 2008; Stranak, 2006; Lossau, 2004). Land-grant universities, as major providers of public education materials, need to improve the discoverability of the resources developed by their communities, including their Extension Services charged with the mission of public outreach (Heatley, 2007). This study evaluates current and potential systems used to facilitate the discoverability of materials published by the communications offices that publish public education materials on behalf of Extension at land-grant universities.

The primary problem addressed by the current study is the reduced discoverability of Extension resources over time due to broken links, also known as link rot. Broken links commonly occur when resources are removed from a website or when a website is reorganized (Stranack, 2006; Paskin, 2006). Users encounter this problem when they either click on a hyperlink or enter an address in their web browser's address bar and they receive a "404 Not Found" error.

Link rot has been identified as a critical problem on the web. Markwell and Brooks (2002) documented the problem of link rot for distance education courses. Over a period of 13 months, 16.5% of the URLs cited in online courses ceased to exist. They concluded, "The progressive disappearance of materials presents a major problem for courses developed to utilize these resources extensively" (Markwell and Brooks, 2002, p. 107). Another study found that "nearly 20% of Internet addresses

in a web-rich high school science curriculum became inactive” in the course of seven months (Delavalle et al., 2003, p. 787).

When URLs are used as launching points for discovery, finding a broken link rather than the expected resource is a loss for both the resource seeker and the resource publisher (and potentially for the third-party referrer as well). As Hellman (2003) puts it, “linking is an activity that enriches both the linker and the linkee” (p. 181). Broken links also create an ongoing web maintenance burden for anyone wishing to keep their website’s links up to date into the future (Kiernan, 2002).

A number of solutions have been developed to help publishers reduce the problem of broken links and increase the discoverability of published resources. This study evaluates the potential for discovery-rich metadata, digital object identifiers (DOIs), and/or institutional repositories to address concerns Extension publishers have regarding the discoverability of the resources they publish. Specific research objectives include (1) assessing whether Extension publishers are using DOIs and/or institutional repositories and (2) determining whether it would be beneficial for Extension publishers to increase their use of discovery-rich metadata, DOIs, and institutional repositories.

Literature Review

A literature review was conducted to provide a foundation for understanding the potential of discovery-rich metadata, DOIs, and institutional repositories to enhance the discoverability of online published resources. The state of knowledge on resource discoverability and link persistence has been developed through years of research within the publishing industry, the library community, and information technologists.

Discovery-rich Metadata

Metadata is data about data. In the field of publishing, metadata usually includes key identifying and descriptive information about a published resource such as title, creator, description, publisher, date, and format (Kasdorf, 2003; Brand et al., 2003).

Over the years, a variety of communities have established metadata standards for specific purposes. For example, the Library of Congress’s Machine-Readable Cataloging (MARC) standard was created in the 1960s to help libraries classify and catalog documents (Moura et al., 1998). More recently, the Dublin Core Metadata Element Set of 15 metadata elements was developed as a common metadata vocabulary to facilitate interoperability and information sharing on the Internet (Brand et al., 2003; Awre, 2004; Stranack, 2006; Heatley, 2007).

Metadata has been described as “information that makes data useful” (Moura et al., 1998, p. 221), because a published resource’s metadata affects whether and how the resource is used. Metadata can improve the discoverability of a published resource and can facilitate the exchange of a variety of information related to the resource – for example, in rights management, e-commerce, and library services (Kasdorf, 2003; Brand et al., 2003).

In 2003, Salokhe et al. (2003) argued that if resources were consistently published with well-structured metadata, neither locators such as URLs nor identifiers such as DOIs would be necessary any longer. The metadata itself would be sufficient to allow for accurate search and retrievals of information.

A few years later, however, Ward (2006) bemoaned that common search engines such as Google do not use keyword metadata in their relevance rankings. Even so, Ward argues that we “need metadata not only to record and trace information objects, but to reaffirm their currency of trust, cred-

ibility and authority. . . Metadata provides the essential link between the information creator and the information user” (p. 2).

In the *Plan to Develop a Digital Information Infrastructure to Manage Land Grant Information*, Randall Heatley (2007) of Michigan State University recommends that land-grant universities develop metadata-rich institutional repositories. He recommends using the Dublin Core Metadata Element Set and metadata harvesting tools to facilitate sharing of resources among land-grant universities.

Digital Object Identifiers

The digital locators (addresses) and identifiers (names) associated with published resources on the web affect their ongoing discoverability and accessibility. Locators and identifiers are related, yet distinct in important ways (Paskin, 2005).

Locators are web addresses that are intended to point users to resources. The uniform resource locator (URL) is a widely recognized type of locator, often being used as a reference link or typed into a browser’s address bar. As noted earlier, URLs cannot always be relied upon to locate a resource because URLs commonly become broken links. A variety of solutions (such as OpenURL and the persistent uniform resource locator [PURL]) have been developed to create URLs that “resolve” through a service that redirects users to a resource’s current location (Rapple, 2004).

Identifiers, in contrast, are unique, permanent names given to resources (Paskin, 2005). The publishing industry has a long history of using identifiers for published works (e.g., the International Standard Book Number [ISBN]). In recent years, digital identification systems (such as the DOI System) have been developed to provide mechanisms for users to find the current web location of a resource using its identifier (its DOI).

Identifiers can be used for any digital media (publications, images, learning objects, etc.) and at any granularity (an identifier could be used for a whole book, for each chapter, or for any sized unit) (Powell, 2003; Paskin, 2006). To be effective, identifiers should have the following qualities: unique, persistent, resolvable, usable in web browsers, usable in nondigital environments (can be printed, dictated over the phone), simple to assign, transportable between locations, and free at the point of use (Powell, 2003). The DOI System provides these qualities and is widely used in digital publishing (Paskin, 2005, 2006).

The DOI System is managed by the International DOI Foundation. Registration agencies handle the registration of DOI names and provide a variety of related services to publishers (Paskin, 2005). A publisher’s choice of registration agency is based on which agency’s services best meet the publisher’s needs. The most widely used registration agency in higher education is CrossRef. CrossRef specializes in reference linking of scholarly works and supports rich metadata for the resources registered (Kasdorf, 2003). R.R. Bowker, the long-time ISBN agency, is now also a DOI registration agency serving the general publishing market.

The publisher works with its registration agency to use DOIs for its published resources. Publishers obtain a DOI name prefix and assign DOI names to resources following a system that ensures uniqueness. The publisher then submits the DOI along with current web location and metadata to the registration agency, which deposits the information in the DOI directory. If the location of the resource changes, the publisher updates the URL in one place (through their registration agency) (Pentz, 2006), as opposed to the URL needing to be updated in every place a URL reference exists, which of course is impractical.

The DOI resolution service can be used in two ways. A DOI name can be entered into the “Resolve a DOI Name” box at the International DOI Foundation website (<http://www.doi.org>) or the DOI can be written in URL form by appending the DOI name to <http://dx.doi.org/> and entering this into the address bar of a web browser. In either case, the user is immediately redirected to the current URL (Paskin, 2005, 2006).

CrossRef also provides a number of resolution and linking services geared toward the needs of researchers – for example, automated cross-publisher reference linking and a function called “forward linking,” which updates an article’s metadata into the future as new articles cite the article (this sometimes appears as a “this article has been cited by ...” feature) (Pentz, 2006).

The DOI System is an implementation of the Handle System (Kahn and Wilensky, 2006; Paskin, 2006). Another application of the Handle System is the DSpace institutional repository software, which refers to digital object identifiers as “handles.”

Institutional Repositories

Institutional repositories are digital asset management systems used to archive and provide access to digital materials produced by the members of a university community (Chan, 2003; Rogers, 2003). These systems are typically open, searchable, metadata-rich, interoperable (able to share information with other systems), and perpetual (Crow, 2002; Ware, 2004).

Institutional repositories have been heralded as revolutionary and transformative – “a new strategy that allows universities to apply serious, systematic leverage to accelerate changes taking place in scholarship and scholarly communication” (Lynch, 2003, p. 1).

Blythe and Chachra (2005) note the great variety of digital media that can be housed in and delivered through institutional repositories – not just text and PDFs, but also photos, audio, video, animations, data sets, session-captured recordings, and learning objects.

According to Clifford A. Lynch (2003), director of the Coalition for Networked Information, “an institutional repository is a recognition that the intellectual life and scholarship of our universities will increasingly be represented, documented, and shared in digital form, and that a primary responsibility of our universities is to exercise stewardship over these riches: both to make them available and to preserve them” (p. 2).

Lynch (2003) also framed the institutional repository as a mechanism for public universities to address their responsibilities to the public: “It is a new channel for structuring the university’s contribution to the broader world” (p. 3). This view of the institutional repository fits with the public service missions of land-grant institutions and the Extension Service in particular.

The value and utility of institutional repositories have been well documented. Foster and Gibbons (2005) interviewed faculty at their institution (University of Rochester) to identify the faculty needs and interests that might be served by an institutional repository. They concluded that the institutional repository function of providing users access to faculty work is the greatest value of repositories from the individual faculty perspective. Though information about the usability of institutional repositories from the information seeker perspective is limited (McKay, 2007), repository collections have been shown to be well discovered through Google searches (Organ, 2006).

Universities customize institutional repository software for their identity and needs. Smith (2002) explains that communities within an institution define what collections they would like to create, and each community defines the policies and procedures it will use to acquire material into its collections. The university library typically assumes asset management responsibilities (Tansley

et al., 2005). Most institutional repositories adhere to standards such as the Dublin Core Metadata Element Set and support the Open Archives Initiative protocol for metadata harvesting. Users can discover materials in institutional repositories through a variety of search mechanisms (Ware, 2004).

The most common institutional repository systems include DSpace developed at the Massachusetts Institute of Technology in 2002, EPrints developed at the University of Southampton in 2001, Digital Commons distributed by Berkeley Electronic Press since 2007, Fedora initially developed at Cornell University in 1997, and Greenstone developed at the University of Waikato in 2000.

The current study focuses primarily on DSpace, which is widely used in the United States (Kim, 2005) and which uses the Handle System to establish persistent identifiers (handles) for published objects (Chan, 2004). Many land-grant universities have DSpace institutional repositories.

Methods

Data were collected using two methods: (1) a survey of individuals working in Extension publishing, and (2) a review of current Extension publishing practices identifiable on the web.

Survey of Extension Publishers

A survey was used to gather information regarding the current practices and decision factors of Extension publishers. An online questionnaire with nine multiple choice questions and one short answer question was developed. The questions were as follows:

- 1) Confirm you have a professional connection to Extension publishing. (yes required to continue)
- 2) Indicate which of the following best represents your position. (unit head/management, editor/production, IT/web developer, or other)
- 3) What types of objects do you publish? (print publications, online publications, videos, images, audio files, including podcasts, websites, e-learning modules, and/or other)
- 4) What audiences do you serve? (public, practitioners, policy makers, researchers, and/or other)
- 5) Indicate your familiarity with DOIs and/or the Handle System. (very familiar, somewhat familiar, or unfamiliar)
- 6) Indicate which of the following best represents your organization's practices related to DOIs/Handle System. (use DOIs/Handle System, have considered but do not use DOIs/Handle System, have not considered using DOIs/Handle System, or don't know)
- 7) Describe your experience with DOIs or other permanent locator systems. (short answer)
- 8) Indicate which potential benefits of DOIs/Handle System are relevant concerns of your organization. (reduce broken links, provide an alternative to long URLs, content appears more prominently and accurately in indexes and search engines, persistent metadata, better management of digital assets and intellectual property, and/or don't know)
- 9) If the annual cost for a publisher to use DOIs were approximately \$500, would this cost affect your decision to implement the DOI system? (yes—would not implement DOIs because of the cost, perhaps—the cost would be a factor in our decision, no—the cost would not be a factor in our decision, or don't know)
- 10) Would the time and effort involved in implementing DOIs (one-time updating of links, entering of metadata into a database when items are published) affect your decision to imple-

ment the DOI system? (yes—would not implement DOIs because of the time and effort, perhaps—would need more information/consideration, no—the time and effort required would not be a factor in our decision, or don't know)

An email invitation to complete the questionnaire was distributed to members of the Association for Communication Excellence publishing and information technology special interest groups through their listservs. Targeted number of recipients was 76. The message stated, "This survey is intended to be completed by one person from units that publish Extension materials; please forward this request to the most appropriate person." The survey was completed by 21 individuals for a 27.6% response rate.

Review of Current Practices

The website of a publisher can be reviewed to determine whether the publisher uses digital object identifiers or an institutional repository to publish its online resources. In order to review the current practices of Extension Service publishers, a list of land-grant institutions was obtained from the Association of Public and Land-grant Universities. A search of the websites of these land-grant institutions found 75 sites with an Extension presence. Of these sites, 61 published digital materials online (through an online catalog database or web page listings) and the remaining 14 did not appear to publish materials online.

The 61 online publishing sites were reviewed to identify which types of online locators/identifiers were being used to direct users from a web page or list of search results to a resource when they click on the link to it. Specifically, the Extension publishers' use of the following was recorded: standard URLs, DOIs, DSpace institutional repository with handles, and/or other institutional repository software with persistent locators.

Findings

The survey asked respondents to confirm their position was in Extension communications/publishing. The responses showed that within Extension publishing the respondents represented unit head/management (38.1%, n = 8), editor/production (28.6%, n = 6), IT/web development (19.0%, n = 4), and other (14.3%, n = 3).

The respondents indicated that they publish the following types of objects: printed publications (85.7%, n = 18), online publications (81.0%, n = 17), websites (71.4%, n = 15), images/photographs (52.4%, n = 11), audio files (52.4%, n = 11), videos (47.6%, n = 10), and e-learning modules (28.6%, n = 6). The audiences served by the respondents' publishing efforts are presented in Table 1.

Table 1
Audiences served by Extension publishers responding to survey.

Audience	Number of respondents	Percent of respondents
Public	20	95.2%
Practitioners	17	81.0%
Policy Makers	16	76.2%
Researchers	14	66.7%

Note. The survey results included 21 responses from confirmed land-grant Extension publishers.

The survey and the review of current practices together provided data related to understanding of the problem, familiarity with and use of technologies to increase the persistence and discoverability of online resources, and decision factors related to cost, time, access, and preservation.

Understanding of the Problem

Extension publishers responding to the survey overwhelmingly identified the discoverability of the resources they publish as an issue of concern. Specifically, 90.5% (n = 19) identified broken links as a problem, 81.0% (n = 17) indicated a desire for their published resources to appear more prominently and accurately in indexes and search engines, and 71.4% (n = 15) acknowledged the need for information (metadata) about their resources to be more consistently available into the future.

The DOI System and institutional repositories are two solutions that can be used to minimize the problem of link rot and increase the discoverability of resources. Survey respondents were provided a list of specific problems that are addressed by the DOI System and/or institutional repositories and were asked to indicate which of the issues are relevant concerns of their organizations.

The responses confirm that the solutions offered by the DOI System and/or institutional repositories address multiple issues of common concern for Extension publishers (see Table 2).

Table 2

Issues of concern for Extension publishers at land-grant universities.

Issue of concern	Number of respondents	Percent of respondents
Reduce broken links	19	90.5%
Content to appear more permanently and accurately in indexes and search engines	17	81.0%
Persistent metadata	15	71.4%
Better management of digital assets and intellectual property	15	71.4%
Provide an alternative to long URLs	13	61.9%

Familiarity with DOIs and Institutional Repositories

Both the survey and review of current practices involved data gathering related to Extension publishers' familiarity with and use of DOIs and institutional repositories to increase the persistence and discoverability of online digital resources.

When asked to indicate familiarity with the DOI/Handle System, only 14.3% (n = 3) of survey respondents indicated they were very familiar. The remaining indicated they were either only somewhat familiar (42.9%, n = 9) or unfamiliar (42.9%, n = 9). One respondent stated, "We have not considered them before now because we were not familiar with them. However, thanks to your survey, I have read some background material, and based on this, am of the opinion that DOIs could be useful and solve a number of problems."

When asked whether they have considered using the DOI/Handle System, 14.3% (n = 3) of respondents indicated that they currently use the DOI/Handle System. Another 23.8% (n = 5) have considered but do not use the DOI/Handle System. In addition, 33.3% (n = 7) have not considered

using the DOI/Handle System, and 28.6% (n = 6) didn't know whether such a system had been considered.

The review of current practices provided data on how links to online published resources are currently handled by Extension publishers on their websites (see Table 3). As a general practice, Extension publishing websites provide links to published resources using standard URLs from a catalog database or web page listings. No sites were found to use DOIs.

Table 3

How links to online published resources are currently handled by Extension publishers.

Extension publisher practice	Number	Percent
Published objects linked using standard URLs from catalog database of webpage listings	61	100%
Published objects linked using DOI System	0	0.0%
Published objects linked using handles from DSpace institutional repository	9	14.8%
Published objects linked using persistent locators from other institutional repository software	3	4.9%

Note. The total sample of 61 websites includes those land-grant Extension websites that were found to publish digital resources.

While all sites used URLs through a traditional online catalog or webpage listings, some land-grant universities also provide some of their Extension materials through the university's institutional repository. The use of institutional repositories for Extension materials to date appears to focus on specific types of resources (e.g., historical publications and special collections). No Extension publisher exclusively uses an institutional repository for its entire online catalog.

Extension materials that are published using DSpace and its Handle System were identified in the following land-grant institutional repositories: Cornell University's eCommons, Ohio State University's Knowledge Bank, Oregon State University's ScholarsArchive, Texas A&M's Repository, the University of Hawaii's ScholarSpace, the University of Illinois's IDEALS, the University of Maryland's DRUM, the University of Minnesota's Digital Conservancy, and the University of Missouri's MOspace.

Extension materials were also found in other repository systems (e.g., using Berkeley Electronic Press's Digital Commons software) at other land-grant universities. Although these repositories do not use the Handle System, they do offer relatively stable URLs and rich, discoverable metadata.

Decision Factors Related to Cost and Time

Several survey questions asked respondents to assess whether the costs and time associated with implementing DOIs and institutional repositories would affect their decision to invest in the these technologies of discoverability.

The survey provided an estimate of the annual cost for an Extension publisher to use the DOI System (\$500). This estimate was a conservative projection of annual membership to a DOI registra-

tion agency and going-forward (not including past content) DOI deposit fees for an average-sized Extension publisher. When asked if this cost would affect their decision to implement the DOI system, 14.3% (n = 3) responded that they would not implement DOIs because of the cost, 57.1% (n = 12) responded that the cost would be a factor in their decision, 9.5% (n = 2) responded that the cost would not be a factor in their decision, and 19.0% (n = 4) responded that they didn't know whether the cost would affect the decision.

Survey respondents provided a number of specific comments regarding costs: "Due to recent budget cuts we are struggling to keep up with current demands but hope to move this up in our list soon." "Fees and work required looked like more than we wanted to deal with. We're trying to save money, this year especially." "I would say our Extension IT group is updating its e-publishing after about 10 years of almost standing still. Our group is also very conservative about perceived value of expenditures."

The survey described the time and effort required to implement the DOI/Handle System as follows: A one-time updating of links used on web pages and in publications catalogs and ongoing entering of metadata (title, description, location, etc.) into a system as items are published. (Note that within a university, installation and management of institutional repository software are typically handled centrally through its library and not the responsibility of participating university units/communities.) When respondents were asked if the time and effort required of them would affect their decision to implement the DOI/Handle System, 9.5% (n = 2) said they would not implement DOIs because of the time and effort, 66.7% (n = 14) said they would need more information to determine whether the time and effort would be worth it, 14.3% (n = 3) said the time and effort required would not be a factor in their decision, and 9.5% (n = 2) didn't know whether this would be a factor. One respondent indicated that DOI/Handle System implementation did not have high priority because it did not have a deadline.

Decision Factors Related to Preserving Resources versus Controlling Access to Current Information

Extension publishers face the challenge of at once providing a wide variety of audiences access to current research-based information and at the same time ensuring that the knowledge legacy of past investments are preserved. Survey respondents confirmed this dual demand by indicating that both discoverability (access to current information) and persistence (preservation of digital assets) are issues of concern.

One respondent explained his or her unit's experience as follows: "Our library has in the past assigned persistent URLs to born-digital extension publications for linking from the library catalog. Extension publications, however, have a review/revision cycle that takes many offline after their period of relevance has passed. We're still working out the kinks in a workflow to transition the publications from active distribution on the Extension website to digital archive and access from the library catalog. We use 'friendly URLs' on our website."

Discussion Cost and Time

The perceived cost and time required to implement the DOI System appear to be barriers to adoption. In particular, the benefits of the DOI System are generally not perceived to be great enough to justify the relatively modest investment necessary to benefit from the system.

While the cost of implementing the DOI System appears to be an impeding factor to implementation, using an institutional repository might be a more affordable option with the same benefits for Extension publishers. Investment in an institutional repository is typically made through the university library. The institutional repository approach involves a university community (in this case, Extension publishing units) partnering with the institution's library, with the library assuming some of the digital asset management responsibilities (Crow, 2002; Foster & Gibbons, 2005).

Preserving Resources and Controlling Access to Current Information

Inconsistent use of institutional repositories represents a missed opportunity to utilize the benefits of repositories to their fullest. For example, when institutional repositories are used only for historical resources, not current resources, the problem of link rot is perpetuated. That is, new resources are fated to initially be located using a URL in the Extension catalog/website, and then later be transferred to a new location with a handle identifier or persistent URL. All existing web links to the resource would thus become broken links unless they are manually updated.

Making resources permanently available could raise concerns within the Extension Service, especially regarding sensitive information that regularly changes as research findings and/or regulations change (e.g., pesticide application recommendations, food preservation practices). Although printed Extension materials have been preserved for perennial access in libraries for nearly a century, the openness and ease of access of institutional repositories could be cause for hesitation.

However, systems could be developed to minimize these potential problems. For example, Extension publishers could develop a model where Extension resources are initially published in an institutional repository and where the Extension catalog/website is used as a gate for users to access only the resources with current content, using the institutional repository's handle identifier (or persistent URL). Out-of-date resources in the repository could be tagged with a date and disclaimer for users who locate the resources through the repository interface rather than the Extension catalog/website.

Other Considerations

Extension publishers have many considerations to weigh in the decision-making process of whether to implement a discoverability technology, which one, or which combination.

For example, while most publishers are moving toward online digital content, some Extension publishers still have a number of resources whose full content is available only in physical print form. These publishers may be interested in publishing systems that can provide information about a product and how to purchase it without actually serving the product itself digitally through the web. The DOI System technically can be used to point to metadata for resources that are print-only as well as those that exist digitally. Institutional repositories, on the other hand, are designed specifically to hold digital resources; repositories generally are not used as indexes containing metadata without their associated resources.

Another consideration relates to charging access fees. The DOI System can be used with systems that charge users to access resources. Most institutional repositories, on the other hand, are designed to be open access and so are not well suited for resources that have access fees.

Non-exclusivity of Approaches

Discovery-rich metadata, the DOI System, and institutional repositories are not mutually exclusive. The use of standardized, harvestable metadata can be implemented using any approach,

including the DOI System, institutional repositories, and homegrown publishing systems. The DOI System itself is not a full publishing platform. It is a system to be used in conjunction with whatever mechanism is being used to publish resources. An institutional repository can serve as a publishing platform itself or in combination with a publisher's site. Users can access a repository from the repository's interface or through a separate search engine, index, or catalog system.

Conclusions

Extension programs at land-grant institutions have a strong tradition of publishing a great number of publications and other educational materials on the web. These resources are digital assets that should be managed both for discoverability and preservation. Scholarly publishers and university libraries have widely adopted the DOI System and institutional repositories, respectively, to preserve digital information and make it available on an ongoing basis. This study examines the applicability and feasibility of Extension publishers implementing harvestable metadata standards, digital object identifiers, and/or institutional repository collections to address the common concerns of discoverability and persistence.

The following conclusions and recommendations are drawn:

- Extension publishers recognize the importance of discoverability and the problem of broken links.
- Digital object identifiers and institutional repositories both provide solutions that can help Extension publishers address their concerns related to discoverability and persistence.
- Best metadata practices can be used with either the DOI System or an institutional repository.
- Most Extension publishing offices have not had great enough familiarity with the DOI/Handle System or institutional repositories to make informed decisions regarding their adoption.
- Extension publishers generally do not perceive the benefits of the DOI System to be greater than the financial investment required to implement it.
- Institutional repositories are being inconsistently used and underutilized.
- Extension publishers at land-grant universities with institutional repositories may find use of the repository to be a cost-efficient strategy for maintaining stewardship of digital resources.

Because "Extension publishing" is heterogeneous, a single discoverability strategy cannot fittingly apply to all Extension publishing units. Each publisher needs to make their decisions on how their digital resources are published based on their particular needs and conditions.

About the Author

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Keywords

access, digital asset management, digital object identifier, digital publishing, discoverability, institutional repository, metadata

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Measuring the Public Value of a Land-Grant University

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Abstract

Land-grant institutions are dependent on public funding to achieve their tripartite mission of teaching, research, and extension. This public support or the “public value” for land-grant institutions is crucial for the continued development and improvement of services and programs. The purpose of this study was to gather the perceptions and opinions of the University of Florida’s Institute of Food and Agricultural Sciences’ (IFAS) key stakeholders regarding its public value. The sample (N = 707) included community leaders and agricultural producers across the state. Nearly two-thirds had used IFAS programs or services and the majority reported being either very familiar or somewhat familiar with IFAS. Public value was measured using a constructed index. Results found that respondents who used IFAS programs or services provided a higher public value score than those who had not. Also, as respondents indicated higher levels of familiarity, the public value score increased. The type of respondent (i.e. producer or leader) was not a significant predictor of public value score. Overall, respondents indicated the most support for teaching, followed by research and extension. The results from this study provide justification for the continued support of IFAS programs and services. To ensure continued success, more must be done to encourage support for the three areas of IFAS among stakeholder groups. Future research should be conducted in other states to assess the public value of land-grant institutions and each component of the tripartite mission.

Introduction/Theoretical Framework

Agriculture has a long-standing tradition of valuing information and technology transfer – it is the basis of the land-grant system itself. But the dawning of the information age and the knowledge economy has changed the needs of rural citizens, stakeholders and society as a whole. In addition to safe and secure food production systems, members of the general public now must look to the land grant for solutions to a wide variety of complex problems, such as the growing need for information-literate citizens and globally-ready graduates, more sustainable agricultural production, environmentally sound stewardship of natural resources, ongoing development of rural citizens, and greater provision of economic opportunity. While many believe the land-grant system remains uniquely positioned to address these needs and provide innovative solutions, doing so today requires the ability to generate a sense of the value of its programs and services among its many publics—both traditional and nontraditional (Kellogg, 1999).

When land-grant institutions were first established by the Morrill Act of 1862, they were intended to provide education in common professions of the time such as agriculture, home economics, and mechanical arts. In following years, the establishment of agricultural experiment stations (Hatch Act of 1887) and the cooperative extension service (Smith-Lever Act of 1914) further emphasized the

role of land-grant institutions to provide teaching, research, and outreach. The integration of these three areas “is extremely valuable because of the linkages it can engender among science, learning, and public service and must therefore be renewed and strengthened” (National Research Council, 1996, p. 37). Herren and Hillison (1996) stated that the academic field of agricultural education has been influenced by its inclusion in the tripartite land-grant mission because educators and students have exposure to both agricultural researchers and extension professionals. Regarding the research component of the tripartite mission, Martin (2001) said land-grant institutions should be instrumental in acquiring public support and trust in research endeavors. Additional research in agriculture is essential to discover scientific answers that will further advance the industry and meet future food and fiber needs (Buchanan, 2007).

The extension component serves as the public outreach branch of land-grant institutions and is therefore often empirically investigated to determine how well its identified publics are being served. Historically, land-grant institutions have benefited from a close association to their stakeholders, but demographic changes have shifted the focus from primarily rural audiences to more urban and suburban populations. This change in audience demographics has decreased the awareness and understanding of the land-grant institution’s tripartite mission even among identified stakeholders (Kellogg, 1999). In a comprehensive evaluation of the U.S. Cooperative Extension Service, Warner and Christenson (1984) found that 40% of the U.S. population was aware of extension programs, with 27% of U.S. households utilizing these programs or services. Support for extension programs was positively influenced by several factors including clientele involvement, experience with extension programs, and level of satisfaction (Warner & Christenson, 1984). Warner, Christenson, Dillman, & Salant (1996) replicated this study and found an increase in public awareness from 40% to 45%, but a one percent drop in utilization with 26% of respondents saying they or a member of their immediate family had used extension services. Respondents valued all three aspects of the land-grant university with the most support for the teaching component, followed by extension, then research (Warner et al., 1996).

McGrath (2006) argued that land-grant institutions must integrate their teaching, research, and engagement activities to become excellent institutions of higher education. In the future, land-grant institutions need to balance the three components to guarantee the same level of positive public support traditionally garnered (Fribourg, 2005). As employees of public institutions supported through taxpayer support and governmental efforts, the goal of those who work in public higher education should be to create *public value* for the services and activities conducted. Public value is created when society as a whole finds value in a public service or program – this includes both those who directly benefit from the service and those who do not (Moore, 1995). The value a non-profit or governmental organization intends to produce is established by its mission. Although it may require financial resources to achieve this mission, that is not the sole motivation for the organization – the mission may be to feed the hungry, provide for the disadvantaged, or educate the young and old. The mission then defines the value of the organization and serves as the metric by which to measure past performance and set benchmarks for future goals (Bryce, 1992). As Moore (1995) explained, the term “public value” is difficult to define because the value of public programs is often ambiguous and difficult to measure.

Public value is derived from both the benefits created and the resources expended by the public institution. The benefits can be things people personally benefit from or things they value such as national pride, concern for the environment, fairness, or caring for the underprivileged. Resources can include money (i.e. taxes), time, materials and legal authority (through due process, habeas corpus,

freedom of information). Creating public value requires public organization leaders to find a way to maximize benefits using the available resources (Moore, 1995).

Moore (1995) outlined fundamental areas public organization leaders need to address in order to create public value, which Try (2008) categorized as: “(1) Services – cost effective provision of high quality services; (2) Outcomes – achievement of desirable end results; and (3) Trust – development and maintenance of a high level of trust between citizens and government” (p. 24). The Strategic Triangle Model (Moore, 1995, 2000) depicts three general tests organization leaders should use in order to develop a strategy for the public sector. First, is the strategy *substantively valuable*? This test is met when the clients, stakeholders, and administrators judge the products or services produced as valuable and at low cost. Second, is the strategy *legitimate and politically sustainable*? This question is addressed when the organization can draw funding and support from the governing entities to which it is accountable. Third, is the strategy *operationally and administratively feasible*? This final test is met when the organization can complete the proposed, valued activities or partner with other organizations to accomplish shared goals (Moore, 1995, 2000).

In Florida, the University of Florida (UF) is the land-grant university and UF’s Institute of Food and Agricultural Sciences (IFAS) comprises the tripartite mission of the land-grant enterprise. Recent state budget restraints have focused more attention on IFAS services in all three areas – research, teaching, and extension. As Putnam (2008) explained, the University of Florida needs to continue to support the land-grant mission on which it was founded. Annual customer satisfaction surveys of Florida Cooperative Extension indicate a high level of satisfaction, with 98% of clientele reporting being either satisfied or very satisfied with the service they received (Terry & Israel, 2004). However, this study focused solely on the extension component of IFAS, and was conducted only with those who utilized the extension service. It is currently unknown how well IFAS’ key stakeholders view the services and programs within all three components of IFAS.

Purpose/Objectives

The *National Research Agenda (NRA): Agricultural Education and Communication 2007-2010* (Osborne, n.d.) identifies the need to understand stakeholders’ views and perceptions of the agri-food system and agricultural and extension education. The purpose of this study was to gather the perceptions and opinions of key stakeholders, including those who may not utilize IFAS services. The objectives of the study were to: (1) determine the use or non-use of IFAS programs and services, (2) determine the level of familiarity with IFAS programs or services, (3) measure the impact of familiarity with IFAS and use of IFAS programs on IFAS’ public value, and (4) explore the level of support stakeholder participants were willing to allocate for each component of the land-grant mission.

Methods

The first step in the data collection process was to identify key stakeholder groups using a modified Delphi study. A purposive sample of IFAS administrators, unit heads, and senior faculty (N=48) were asked to identify key stakeholder segments that would then be sampled and surveyed for a subsequent environmental scan. Environmental scanning acquires and uses information about trends, events, and relationships in an organization’s external environment to assist management in planning the organization’s future course of action.

Findings identified four main audience segments: agricultural producers, community leaders (including city and county government professionals), local and regional media, and state legislative

aides. Once the audience segments had been identified, the next phase of the research effort focused on assessing perceptions of the top two ranked audience segments – agricultural producers and community leaders within Florida.

A population list for both producers and leaders was developed from a number of existing data sources. To obtain a representative group of producers, researchers utilized databases of commodity association members, stakeholders and clientele, supplemented with a purchased list of agricultural producers. For the leaders group, database sources included extension advisory councils, institutional stakeholders, city/county professional association members, and local chambers of commerce members drawn from 10 Florida counties. With a view toward representing the state's rapidly evolving population dynamics, urban rural interface and shifting agricultural base, county population rank, percent growth, total value of agricultural sales, agricultural sales rank and the ratio of average population to agricultural sales were used to rank counties. From these database sources, a total list of 2,452 producers and 2,030 leaders were identified. Care was taken to include all relevant representational groups and resulting respondent demographics were in accordance with statewide census data.

Data were collected using telephone survey methods, conducted by a market research firm using computer assisted telephone interviewing (CATI) system technology. The CATI system uses random digit dialing to extract random samples from the lists loaded into the system. CATI assists in preventing error by prompting the telephone interviewers to ask questions previously keyed into the system based on built in skip patterns so as to eliminate out of range responses. To address non-response error specifically, telephone numbers not answered on the first call are re-entered into the sample and callbacks are automatically programmed to be called at different times on weekdays and weekends up to a certain number of times in an effort to yield a completion.

Respondents provided information about their awareness, use, and perceptions of IFAS and its tripartite mission (i.e. teaching, research, and extension), as well as their familiarity with and use of its specific components and programs. Respondents also provided gender, age, education, and employment demographic information. Trained telephone interviewers followed a researcher-developed questionnaire that was the same for both sample groups. The instrument was adapted from a previous study of IFAS stakeholders and a national study of perceptions toward land-grant universities (Warner et al., 1996) to include items relevant to the state as well as items that have more national relevance. Before administration, the instrument was reviewed by a panel of experts for face and content validity.

Interviewers contacted agricultural producers from August 6-21, 2007. Each number was attempted four times. The producers' accessible sample had 1,411 usable numbers with 352 survey completions for a response rate of 24.9%. Interviewers contacted community leader respondents from August 21-September 4, 2007. The sample list had 1,766 usable numbers with 355 survey completions for a response rate of 20.1%. The resulting response rates, although low, were deemed acceptable for the purposes of this study, which are typical of non-incentivized samples from broad population groups. Recent public opinion research has established that response rates among such groups have been declining over time (DeLeeuw & DeHeer, 2002). Addressing this issue, several recent studies suggest that lower nonresponse rates do not necessarily indicate nonresponse bias in survey results (Groves, 2006; Curtin, Presser & Singer, 2000; Keeter, et al, 2000; Merkle & Edelman, 20020). Miller and Carr (1997) address this on the basis of the contention that those who responded were the actual target audience for the study and are therefore more valuable and accurate than nonrespondent responses would be. According to the American Association for Public Opinion

Research (AAPOR), studies on the topic show that the least bias may actually come from surveys with lower response rates, due to potential self selection bias in surveys with higher “cooperation rates.” When response rates are low, however, AAPOR advocates for additional measures of quality of data being reported, including low levels of missing data and conformity with other research studies (AAPOR, 2009).

Data were analyzed using descriptive statistics to determine means, standard deviations, and percentages. Factor analysis was employed to build an index for Public Value. In addition, multiple linear regression was conducted to explore the ability of several explanatory variables to predict public value for IFAS.

Dependent variables: Public Value Index, Funding Amount to IFAS Areas

The Public Value dependent variable was an index based on nine items. Respondents were asked to indicate their level of agreement (from strongly disagree to strongly agree) on three descriptors of the tripartite mission of IFAS: research, extension, and teaching. For each of these areas, respondents indicated their response to three descriptive adjectives or phrases – “high quality,” “valuable,” “something I would use.” The descriptive phrases were selected after reviewing the major aspects of public value theory described by Moore (1995, 2000) and Try (2000). Reliability analysis for these nine items had a Cronbach’s alpha of .94. Principal component analysis indicated that the items form a unidimensional construct, which accounted for 67.1% of the items’ variance. Table 1 displays the factor loadings that were used to compute the Public Value Index for IFAS.

Table 1

Factor Loadings for Items Measuring IFAS Public Value Index (N=617)

Items	
Research is of high quality	.78
Research is valuable	.84
Research is something I would use	.82
Teaching is of high quality	.78
Teaching is valuable	.84
Teaching is something I would use	.81
Extension is of high quality	.79
Extension is valuable	.86
Extension is something I would use	.84
Eigenvalue	6.04
Percent of Variance Explained	67.10
Cronbach’s Alpha	.94

Extraction Method: Principal Component Analysis

In addition to the construction of the Public Value Index, respondents were also asked to allocate \$100 between the teaching, research, and extension areas. The funding amount allocated to each area comprised another dependent variable. This question was asked on a previous study to measure the public value of the components of a land-grant university (Warner et al., 1996). In addition, this

type of question has been asked in previous studies for the purpose of determining how respondents would allocate public funds among a number of possible policy options (Ison, 2000) or public projects (Thorpe, Hills, & Jaensirisak, 2000).

Independent variables: Use of IFAS Programs or Services, Familiarity with IFAS, and Type of Respondent

The use of IFAS Programs or Services is a dichotomous variable in which respondents indicated if they had ever used IFAS programs or services (measured by responding yes or no). Familiarity of IFAS was assessed by asking how familiar respondents were as to the research, education, and extension work done by IFAS (measured on an ordinal scale of very familiar, somewhat familiar, or not at all familiar). Finally, the Type of Respondent refers to categorization as either a member of the producer or leader sample group.

Control variables: Demographics

Several demographic variables were collected including gender, ethnicity, age, years living in Florida, education, University of Florida alumni, College of Agricultural & Life Sciences alumni, and employment in the agriculture industry. These are not theorized to influence the dependent variables; therefore, they are considered control variables.

Results/Findings

Respondents ($N = 707$) were primarily male ($n = 464, 65.6\%$), white ($n = 638, 90.2\%$), with either a bachelor's ($n = 264, 37.3\%$) or graduate degree ($n = 151, 21.4\%$). Of those with a college degree, 110 (15.6%) are alumni of UF and 65 (9.2%) graduated from the College of Agricultural & Life Sciences (CALs). The average age was 54 years old and more than half ($n = 414, 58.6\%$) said they work in the agriculture industry. On average, respondents had lived in Florida for 40 years.

Descriptive analysis of the independent variables indicated 72.8% ($n = 515$) of respondents had used IFAS programs or services while 27.2% ($n = 192$) had not. When asked how familiar respondents were of IFAS, 30.3% ($n = 214$) said they were very familiar, 43.8% ($n = 310$) said they were somewhat familiar and 25.9% ($n = 183$) said they were not at all familiar or did not know. The type of respondent variable refers to which group a respondent belongs – producer (49.8%, $n = 352$) or leader (50.2%, $n = 355$). Chi-square analysis of the Use of IFAS variable found no difference by type of respondent ($X^2 = 1.276, df = 1, p = .259$). However, the groups were significantly different in their Familiarity of IFAS ($X^2 = 6.101, df = 2, p = .047$) with the leaders group reporting more very familiar ($n = 122$) responses compared to the producers group ($n = 92$). The producers group had more respondents who were somewhat familiar with IFAS ($n = 167$) compared to the leaders group ($n = 143$).

Based on 617 complete responses, initial descriptive analysis of the Public Value Index dependent variable found a mean score of 30.25 ($SD = 4.82$) with a minimum value of 13.16 and maximum of 36.84. A t-test was also used to determine if there was a significant difference in the Public Value Index score depending on respondent type, use of IFAS, and familiarity with IFAS. The two respondent groups differed significantly ($t = -5.47, p = .000$) in their IFAS Public Value Index scores with the leaders giving IFAS a higher score ($M = 31.42, SD = 4.20$) than the producers ($M = 29.37, SD = 5.07$). Results also found a significant difference between the two groups ($t = -15.58, p = .000$) with those who had used IFAS providing an average Public Value Index score seven points higher

($M = 31.52$) than those who had not used IFAS ($M = 24.95$). A one-way ANOVA conducted to explore the level of familiarity with IFAS on the Public Value Index score found the three groups were significantly different ($F_{2,614} = 154.72, p = .000$). Respondents who were very familiar provided the highest average Public Value Index score ($M = 33.03$), followed by somewhat familiar ($M = 30.11$), then not at all familiar ($M = 24.45$).

Simultaneous multiple linear regression was used to examine the predictive effects of Familiarity with IFAS, Use of IFAS, and Type of Respondent on the Public Value Index. Examination of variable residuals indicated five outliers that were removed for subsequent regression analysis. Table 2 displays the results of this analysis both with and without the outliers. The overall model is significant both with ($F = 128.526, p = .000$) and without ($F = 137.739, p = .000$) outliers. The adjusted R^2 value for the model indicates a substantial amount of the variance in Public Value Index score is explained using these predictors. The model with outliers explains 38.5% of the variance and the model without outliers explains 40.4% of the variance. The results indicate that respondents' scores of IFAS' public value was significantly and positively associated with more familiarity of IFAS and use of IFAS program or services. Respondents who use IFAS programs or services provided a higher Public Value Index score than those who have not. Also, as respondents indicated higher levels of familiarity, the Public Value Index score increased. The type of respondent (i.e. producer or leader) was not a significant predictor of Public Value Index score.

Table 2
Summary of Multiple Linear Regression Analysis for Variables Predicting Public Value Index Scores

Explanatory Variable	Public Value Index							
	With outliers (N=617)				Without outliers (N=612)			
	B	SE B	β	p	B	SE B	β	p
Familiarity w/ IFAS	2.690	.280	.379	.000	2.695	.267	.392	.000
Use of IFAS	3.955	.466	.321	.000	3.947	.446	.330	.000
Type of Respondent	.246	.325	.025	.450	.156	.311	.017	.617
Adjusted R^2				.385				.404
F				128.526				137.739
Model p value				.000				.000

Further analysis explored the demographic variables' correlations with the Public Value Index dependent variable. Although several variables are significantly correlated, only two had moderate correlation strengths with the Public Value Index: Familiarity with IFAS $r(612) = .563, p < .01$ and Use of IFAS $r(612) = .533, p < .01$. Demographic variables are either only weakly correlated or the correlation was not significant.

Additional simultaneous regression models were used to explore the possible predictive influence of the demographic variables on the Public Value Index. A regression model with the demographic variables (excluding ethnicity and UF Alumni) was significant ($F_{7,611} = .5487, p = .000$). As Table 3 displays, the addition of Use of IFAS, Familiarity and Type variables further improved the model ($F_{10,605} = 39.849, p = .000$).

Table 3

Summary of Multiple Linear Regression Analysis for Demographic Variables Predicting Public Value Index Scores.

Explanatory Variable	Public Value Index				Adjusted R ²
	B	SE B	β	Sig.	
Gender	.795	.417	.078	.057	.049
Age	-.007	.018	-.016	.713	
Years Living in Florida	.032	.013	.118	.014	
Education	.464	.215	.095	.031	
UF Alumni	.962	.820	.075	.241	
CALS Alumni	1.178	.949	.075	.215	
Work in Ag Industry	.757	.427	.074	.077	
Gender	.782	.334	.077	.020	
Age	-.011	.014	-.028	.445	
Years Living in Florida	.013	.011	.047	.227	
Education	-.273	.177	-.056	.123	
UF Alumni	.362	.654	.029	.581	
CALS Alumni	.529	.759	.034	.486	
Work in Ag Industry	.640	.408	.063	.118	
Familiarity with IFAS	2.539	.292	.358	.000	
Use of IFAS	3.910	.471	.317	.000	
Type of Respondent	.742	.400	.077	.064	

To further address the research purpose, participants were asked to allocate \$100 to each of the three areas within IFAS: teaching, research, and extension. The range varied from \$0 to \$100 in each area. Respondents allocated a similar amount to teaching ($M = 34.45$, $SD = 19.07$) and research ($M = 34.61$, $SD = 18.12$) while extension received the lowest amount ($M = 29.38$, $SD = 17.07$).

T-tests were conducted to determine if the amount allocated to each area of IFAS varied according to the type of respondent and their use or nonuse of IFAS programs and services. Comparison of funding amounts to each area of IFAS between producers and leaders (Table 4) indicated a significant difference between the two groups in their funding amounts for teaching ($t = -2.384$, $p = .017$) and research ($t = 3.266$, $p = .001$) while there was not a significant difference in the amount allocated to extension ($t = -.578$, $p = .564$).

Table 4

Comparison of Average Dollar Amount Allocated to IFAS Areas for Producers and Leaders

	Producers			Leaders			<i>t</i>	df	<i>p</i>
	N	Mean	SD	N	Mean	SD			
Teaching	352	32.74	19.301	354	36.15	18.712	-2.384	704	.017
Research	352	36.84	19.770	354	32.41	16.050	3.266	704	.001
Extension	352	29.01	16.252	354	29.75	17.870	-1.483	704	.564

Table 5 displays additional t-tests that explored the difference between respondents who had used or not used IFAS programs and services and the amount each allocated to the three IFAS areas. Results found that respondents who had used IFAS programs or services allocated a significantly different amount to each area of IFAS than nonusers. The amount allocated to teaching was higher for those who had not used IFAS than for those who had ($t = 3.22, p = .001$). However, those who had used IFAS allocated more money to research ($t = -2.47, p = .014$) and extension ($t = -4.01, p = .000$) than those who had not used IFAS.

Table 5

Comparison of the Average Dollar Amount Allocated to IFAS Areas for Those Who Have Used or Not Used IFAS Programs and Services

	Used IFAS			Not Used IFAS			<i>t</i>	df	<i>p</i>
	N	Mean	SD	N	Mean	SD			
Teaching	514	32.74	17.22	186	38.62	22.63	3.22	698	.001
Research	514	35.71	17.99	186	31.90	18.15	-2.47	698	.014
Extension	514	30.96	16.66	186	25.17	17.47	-4.01	698	.000

The respondents' allocations of funding to each of the three IFAS areas were further analyzed using one-way ANOVAs. Table 6 displays the means, standard deviations and sample sizes. Overall, respondents differed significantly in the allocation amounts depending on their level of familiarity with IFAS. Respondents who were not at all familiar with IFAS allocated the greatest amount to teaching and the least to extension. Respondents who were very familiar with IFAS allocated the most to research, followed by extension then teaching. The amount of money allocated to extension increased in conjunction with an increase in familiarity with IFAS.

Table 6

Average Dollar Amount Allocated to IFAS Areas by Level of Familiarity with IFAS

	Not at all Familiar			Somewhat Familiar			Very Familiar			F	<i>p</i>
	N	Mean	SD	N	Mean	SD	N	Mean	SD		
Teaching	181	38.85	23.89	310	33.96	17.14	213	31.34	16.40	7.89	.000
Research	181	31.96	18.65	310	35.10	17.50	213	36.33	18.33	3.03	.049
Extension	181	24.77	16.62	310	29.97	17.48	213	32.33	16.13	10.22	.000

Conclusions/Implications/Recommendations

For nearly 150 years, land-grant institutions across the nation have strived to meet the needs of their identified audiences. However, changes in demographics have created a decreased understanding and awareness of the original purpose of the tripartite mission of teaching, research, and extension among stakeholders (Kellogg, 1999). It was noted more than 10 years ago that colleges of agriculture at land-grant universities need to adapt to the challenges presented by a changing clien-

tele base, a multifaceted agricultural and food system, and the federal funding environment (National Research Council, 1996). As a public institution, public support or the “public value” for land-grant institutions is crucial for the continued development and improvement of services and programs (DeBord, 2005; McGrath, Conway, & Johnson, 2007). Moore (1995) said an organization’s public value can be difficult to measure, but it involves both people who benefit from the provided activities and those who do not. The current study sought to go beyond examining just the extension component of land-grant institutions and explore public perceptions and opinions of the entire enterprise, including teaching, research, and extension.

As Warner and Christenson (1984) previously found, respondents were overall more supportive of extension programs if they were involved, had experience, and were satisfied. In the current study, involvement and experience were jointly determined by asking if respondents had ever used IFAS programs or services and how familiar they were with IFAS. Results found that nearly three-quarters of respondents (73%) had used IFAS programs and were either very or somewhat familiar (74%). The current study did not explore the level of satisfaction with Florida Extension, which has been found to be very high in previous customer satisfaction studies (Terry & Israel, 2004).

To measure public value, an index was constructed based on scores regarding the quality, value, and usability of each area within IFAS – teaching, research, and extension.

Regression analysis indicated that Public Value Index scores increased as respondents’ level of familiarity increased and if they had used IFAS in the past. It is therefore important to continue to communicate what IFAS is and what it does throughout the state. Identified stakeholders need to be familiar with IFAS or utilize its sponsored services to continue to provide a positive Public Value Index score. This conclusion is in agreement with Putnam’s (2008) comment regarding the need for the University of Florida to provide continued support of the tripartite land-grant mission on which it was founded.

The second measure of public value was to examine how respondents allocated \$100 among the three areas within IFAS. Warner et al. (1996) found that respondents valued all three aspects of the land-grant university with the most support for the teaching component, followed by extension, then research. Respondents in the current study also allocated the greatest amount to teaching, but flipped the bottom two with extension receiving the lowest amount. Those who had not used IFAS programs and services allocated more money to the teaching aspect of IFAS than to research and extension. This choice may be based on the visibility of the University of Florida in the state as an education facility while the research and service aspects do not have the same recognition. Respondents who had used IFAS programs or services in the past were therefore more aware of what IFAS does and reflected that by allocating more money on the research and extension aspects. This is also supported by the data illustrating that respondents who were more familiar with IFAS allocated more money to extension than those who were not at all familiar. This indicates that increasing familiarity and use of IFAS programs should result in greater recognition and support of what IFAS does in all three aspects of the land-grant mission (teaching, research, and extension).

As looming budget cuts fuel concerns about the future of IFAS, the results from this study provide justification for the continued support of IFAS programs and services. Although having used IFAS services or being more familiar resulted in higher levels of public value, even those who were not identified as IFAS users or who were less familiar still demonstrated their support for what IFAS does. However, these findings do not support an attitude of contentment. To ensure continued success, more must be done to encourage support for the three areas of IFAS among stakeholder groups.

This study suggests that the land-grant system may be at a crossroads. Major changes in population demographics, technological systems, and resourcing of higher education have created major challenges that need to be addressed. Fribourg (2005) said in order to sustain governmental support, “the land-grant university needs to demonstrate that it cares about and is responsive to the needs and wants of people and their real-world problems. That is an integral part of the land-grant mission” (p. 41). It may be time for the land-grant university, so unique, responsive, and attuned to the needs of its clientele, to reinvent itself yet again so as to retain its public value with traditional stakeholders while actively engaging with, marketing to, and providing enhanced services for a greater segment of nontraditional constituents. As the population in rural communities declines and agricultural and natural resources production moves beyond traditional areas and issues, it becomes even more important for the land-grant system to proactively generate public goodwill and seek to create and maintain positive public value perceptions among its stakeholders.

Although this study does provide more explanation of how public value for a land-grant university can be measured, several limitations do exist. The low response rate introduces the potential for nonresponse bias. This study was based on a population of producers and leaders specific to Florida so care must be taken when generalizing to other states and populations. Although the demographics of respondents (primarily white, well-educated, older, and male) are restricted, they are similar to other studies of extension users and non-users (Boone, Sleichter, Miller, & Breiner, 2007; Radhakrishna, 2002).

Several recommendations can be derived from this study. Similar research should be conducted in other states to assess the public value of land-grant institutions and each component of the tripartite mission. Additional studies can also be used to further develop and refine the Public Value Index used in this study, with a view toward developing a standardized instrument that can be used broadly to measure public value in the land-grant context. Land-grant institutions should assess public value on a regular basis and utilize the findings to develop strategic plans aimed at enhancing public value perceptions. Finally, communicators at land-grant institutions should work to develop information/education strategies and materials for their audiences aimed at influencing perceptions of their land-grant’s public value. The finding that more familiarity with IFAS and the use of IFAS led to higher Public Value Index scores should serve as motivation to be even more proactive in communicating about land-grant activities that provide value to members of the public. Providing more information about land-grant institutions would help increase awareness, build support, and encourage use thereby strengthening the public value of land-grant institutions. Reinforcing the public value of land-grant institutions through continued and more strategic communication efforts would be especially beneficial in times of potential budget cuts and program closings and help land-grant institutions continue to meet the teaching, research, and extension needs of the future.

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