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Jason D. Ellis
Kansas State University

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Abstract

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ACE Headquarters

Holly Young, Executive Director
59 College Road, Taylor Hall
Durham, NH 03824
(855) 657-9544
ace.info@unh.edu

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Not Just "Sustainable": Communicating Growing Practices in a Statewide Directory

Gretchen Perbix

Abstract

While food texts like labels and descriptions are considered persuasive, few are written by growers themselves, and thus growers have infrequent opportunities to influence consumers through written communication. This study seeks to discover how retail growers frame descriptions of themselves in a print and online directory. The study employed a qualitative textual analysis of 406 growers' 460-character directory listings to identify how they frame themselves and distinguish their operations from others' operations. Results indicate growers predominantly use three frames: a product frame, a process frame, and an experience frame. Frames are sometimes used in combination with each other, and some growers use particular frames intensively, Both practices provide differentiation opportunities for growers. Growers of the same type tended to use the same type of frame, so growers seeking differentiation opportunities could use frames not commonly used by growers of their type. Since growers are not often professional communicators, agricultural communicators and extension educators can use the findings from this study to help educate growers about how to communicate about their operations.

Key Words

Framing theory, textual analysis, grower-authored directory listings

Introduction

Retail-scale growers have limited opportunities to communicate with customers and prospective customers about their operations. Although opportunities exist for growers and customers to communicate directly at a farmers' market or a farm stand, those opportunities are constrained by time and the grower's need to attend to other customers. Yet these opportunities are important for growers and consumers alike as growers seek to educate consumers about their operations and as consumers seek information about how the food they are buying is grown. Communication between growers and consumers is all the more important at a time when consumers lack agricultural literacy (Goodwin, Chiarelli & Irani, 2011).

Growers can extend their communicative opportunities beyond face-to-face interactions through written formats like product labels, advertising, websites, and farm directories, among other options. These opportunities, if used by consumers, offer growers a powerful way to tell their own stories about their farms, their growing methods, their philosophies, and even personal information. Farm directories provide a communicative challenge in particular because in them — especially those distributed in print — space is constrained and growers need to describe their operations within particular character limits.

Based on presentations at the 2012 MOSES Organic Farming Conference and the 2013 ACE/NETC conference.

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However, growers are usually not professional communicators and so the challenge of conveying information about their operations in a way that is coherent and meaningful is significant. The opportunity to understand how growers view themselves and their work is also an entry point into this study. Since the internet has lowered barriers to publication, growers are able to do more communicative work to represent themselves – in directories, but also on their own websites and in social media. It is important to understand how growers are communicating on their own behalf because opportunities may exist for professional communicators to help growers better understand how to use these self-publication opportunities.

Literature Review/Theoretical Framework

Textual representations of farms, their products, and their growing practices give growers an opportunity to describe and promote themselves, which is particularly important for farms selling products in a local setting (Leopold Center, 2003; 2004). Texts such as websites and directories that represent products, their producers, and the site of production are particularly useful for customers who have never purchased a farm's products before. Growers should not underestimate the persuasive possibilities provided to them through textual venues; the power of language as applied to food has been convincingly demonstrated in a long tradition of consumer research, as summarized in this literature review.

Persuasive Food Texts

Armand Cardello and his co-authors are responsible for much of the tradition that demonstrates the power of food texts, and Cardello (1995) himself summarizes their findings in the following passage.

> Attitudes and information about food products create sensory and hedonic expectations for these foods. Subsequent perception and liking/disliking for a food is not simply a function of the intrinsic quality of the food. Rather it is a function of the expectations that a consumer has for the food and the degree to which the food matches or mismatches these expectations (p. 187).

In other words, the experience of a food's intrinsic qualities such as appearance, aroma, taste, and texture (Olson & Jacoby, 1972; Steenkamp, Wierenga & Meulenberg, 1986) does not comprise the entirety of the consumptive experience. When we consume food, we bring the whole of our background to bear on that experience. That background may include childhood memories, brand awareness, and label impression among a wide variety of other influences that may "evoke a rich range of associations … and affective responses" (Tuorila, Meiselman, Bell, Cardello, & Johnson, 1994, p. 232). This is not to say that the intrinsic qualities of a food do not matter; rather, one's perception of a food is largely a matter of how the intrinsic qualities of the food experienced in the moment of consumption match the extrinsic qualities of the food experienced prior to consumption.

Cardello calls product names, product information, brands, labels, packaging, and the nutritional information that can influence consumer expectations about food "informational variables" (1995, p. 187), and he and others have convincingly demonstrated that our consumptive experiences are heavily influenced by those variables. In general, descriptive and precise language is perceived more positively than general and imprecise language. This finding has been discovered in relation to labels (Cardello, Maller, Masor, Dubose & Edelman, 1985), menu items (Gueguen & Jacob, 2012; Hartwell & Edwards, 2009), branding (Cardello & Sawyer, 1992; Cardello, Bell, & Kramer, 1995;

Enneking, Neumann & Henneberg, 2007), and product origination information (Howard & Allen, 2006; Leopold Center, 2004; Loureiro & Hine, 2002).

Descriptions of how a product is grown also may influence consumer perception. Research has clearly indicated consumers are concerned about how the food they eat is produced (Howard & Allen, 2006; Hartwell & Edwards, 2009), specifically with regard to the use of synthetic pesticides. Citing a number of studies on consumer perception of synthetic pesticide, Govindasamy and Italia (1997) summarize "70-85% of consumers exhibit a medium to high degree of concern toward pesticide residues and pesticide usage" (p. 1).

Govindasamy and Italia cited these studies to support the concept of integrated pest management (IPM); however, their study and others have indicated consumers do not understand what IPM is (Zehnder, Hope, Hill, Hoyle, & Blake, 2003). After IPM is explained to them, consumers have a favorable attitude toward it by, for example, indicating that they would "preferentially purchase IPM or organic produce if labels/information were provided at the point of sale to reflect pest management practices" (Zehnder, Hope, Hill, Hoyle & Blake, 2003, Discussion section, para. 3).

Consumers' misunderstandings of the highly regulated term "organic" also have been documented. The actual attributes of organics as defined by the National Organic Program (NOP) pertain only to growing practices and not to the product itself. In other words, a product labeled "organic" means that it has been grown or raised without synthetic pesticides (for the most part), synthetic fertilizers (for the most part), genetically modified organisms (GMOs), irradiation, and unprocessed manure/sewage (USDA, 2013). As a regulated term, the definition of "organic" is necessarily limited, yet consumers misunderstand it to mean better nutritional value (Klintman, 2006; Klonsky & Greene, 2005), opposition to "corporate" food (Conner & Christy, 2004), and support for local food systems (Conner & Christy, 2004).

One explanation for why consumers misunderstand the organic label may be due to predominant media frames. As identified by Meyers and Abrams (2010), the most commonly emphasized frame is the ethical frame, which portrays organic food as environmentally and socially responsible. Other frames include the health frame, which identifies organic food as nutritious and pesticide-free; the production frame, which addresses costs, regulations, labeling practices, and the distinction between "organic" and "natural" food; and the industrial frame, which poses distinctions between industrial production and small-scale, family-operated, and local farms. In assessing the sources used in presenting these frames, Meyers and Abrams indicated media "perpetuate an ideology" rather than balancing their coverage of organic food with "scientific evidence or other viewpoints" (p. 33).

Due to the average consumer's lack of agricultural literacy (Goodwin, Chiarelli & Irani, 2011) and the gap that exists between food production and consumption (Blue, 2010), it can be challenging to communicate with consumers about growing practices, and the studies cited above about IPM and the NOP summarize some of those challenges.

Despite this lack of agricultural literacy, customers generally react favorably to information that indicates attempts to reduce synthetic inputs, regardless whether those attempts are part of a named or regulated pest management program. Anderson, Hollingsworth, Van Zee, Coli, and Rhodes (1996) point out the fallacy that "customers do not want to know how their food is grown and become extremely fearful at any mention whatsoever of pesticides" (p. 105). Instead, they offer the correction that consumers will "accept some pesticide use if they understand that efforts are being made to minimize that use" (p. 105). The Leopold Center (2004) has contributed further in this area with its discovery that consumers prefer locally grown foods with some pesticides over organic foods grown non-locally.

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Research suggests consumers may even react unfavorably to a lack of information about growing practices and production methods when contrasted to a product description that does include that information. For example, Golan, Kuchler, and Krissoff (2007) believe that "consumers learn to 'read between the labels' and make deductions about unlabeled products" (Companies Will Voluntarily Label if Their Benefits Outweigh Their Costs section, para. 7). They cite tuna labeling as an example. Confronted with one can of tuna labeled "dolphin friendly" and one with no such claim, consumers likely would assume the unlabeled tuna was caught with dolphin-endangering practices. In a competitive marketplace, the presence of a label is a signal of quality, and *the lack of a label on competing brands implies the absence of the quality attribute* (Companies Will Voluntarily Label if Their Benefits Outweigh Their Costs section, para. 7, emphasis added).

Just as the absence of a "dolphin-friendly" claim on a can of tuna can signal dolphin unfriendly practices, the absence of information about an attempt to reduce synthetic pesticide use — especially in comparison to other farms' descriptions of such efforts — could signal that no such attempts are made.

Some studies suggest consumers appear to be becoming more skeptical of certain sensory terms and general descriptions. Cook, Read, and Twiner (2009) discovered that focus group participants paid the "least attention to poetic descriptions, and preferred to assess factual statements" (p. 167). The word "succulent" in particular was identified as one that food marketers use with confidence but that consumers regard with caution. Goodwin, Chiarelli, and Irani (2011) found similar results in their study of agricultural messages. Phrases in messages that participants received unfavorably included "best management practices," "scientifically proven," and "best quality product" (p. 28). To counter participants' skepticism about such language, they recommended including "examples and explanations in conjunction with messages" (p. 29). Again, Cardello's finding that precise, descriptive language is perceived more positively than general, imprecise language is a useful correction to "poetic" descriptions of food.

Growers who are writing descriptions of their products also should be aware of the ways consuming food exceeds simple sustenance. Today, food consumption can be considered political, economical, social/cultural, technological, or environmental action (Alkon, 2008; Beer, 2008; Cook, Read, & Twiner, 2009; Howard & Allen, 2006). Whether explicit as in the form of a boycott or a "buycott" (Stolle, Hooghe, and Micheletti, 2005) or implicit as an action "embedded in a broader consumer politics" such as the purchase of organic milk cited by Blue (2010, p. 153), consumers purchase food for reasons that far exceed a food's intrinsic qualities.

Framing Theory

Framing theory is commonly used in mass communication research to understand how news media interpret and portray issues. Frames are a powerful concept in the context of mass communication, understood to determine the relevance and salience of some aspects of reality over others (Kuypers, 2010). Framing can occur consciously or unconsciously and serve as a "central organizing idea for making sense of relevant events and suggesting what is at issue" (Gamson, 1989, p. 157).

Frames also can be understood to operate outside of traditional mass media contexts. Goffman understands frames to be used to organize and make sense of everyday life experiences (1974), and Kuypers describes them as a "natural and normal part of the communication process" (2010, p. 301). Based on Burke's concept of terministic screens (1966), Kuypers advocates using framing theory as a tool of rhetorical criticism. He writes, "similar to much of the social scientific literature, a rhetorical version of framing analysis begins with the assumption that frames induce us to view issues and situ-

ations in a particular way" (2010, p. 301). In analysis, frames can be identified by looking for specific properties such as key words and phrases that appear consistently in texts and "convey thematically consonant meanings" (Entman, 1991, p. 7).

Purpose and Research Questions

The purpose of this exploratory study was to discover how growers frame their descriptions of themselves in a state-sponsored directory that is published online and in print. From that purpose, two research questions follow:

1. How do growers frame their directory descriptions?
2. Do growers have opportunities to further distinguish themselves from each other in their descriptions?

The findings from this project will indicate growers' predominant practices in describing themselves and opportunities for growers to author their directory listings to better distinguish themselves from similar operations. Since growers are not professional communicators, agricultural communicators and extension educators can use the findings from this study to help educate growers about how to communicate about their products.

Methods

This study employed qualitative textual analysis methods based on framing theory and analysis. In contrast to a quantitative framing study, a qualitative framing study is exploratory, tends to not use predetermined codes or categories, and offers an interpretation of the texts in question (Kuyper, 2010). Examples of this methodological approach in the Journal of Applied Communications include Meyers and Abrams' (2010) study of organic food media coverage and Barr, Irlbeck, and Akers' (2012) analysis of coverage of the 2008 and 2009 salmonella outbreaks, among others (Abrams and Meyers, 2012; Ashlock, Cartmell, and Kelemen, 2006; Cannon and Irani, 2011; Irlbeck, Akers, and Palmer, 2011; Ruth, Eubanks, and Telg, 2005).

The directory used for the project is known as Minnesota Grown (MN Grown) and is published by the Minnesota Department of Agriculture. It is similar to other state-sponsored directories such as the Indiana Agritourism and Farmers' Market directory, the Iowa Fruit & Vegetable Growers Association farm search, North Carolina Farm Fresh, and Arkansas Grown, for example. The directory is published annually online and in print and is a popular form of publicity for retail agricultural operations in the state. In 2012, there were 840 listings in the directory. More than 200,000 unique visitors used the online directory in 2012 (Minnesota Department of Agriculture).

Fruit and vegetable growers were identified through the directory's search. All of the growers' discrete data as published in the directory was logged, which included each grower's name, city, website, email address, phone number, up to five products that they could select from a pre-existing list, and a 460-word description of the grower's operation; however, it was the 460-word descriptions that provided the focus of analysis.

No pre-existing themes or frames were used in analyzing the directory listing descriptions. Instead, consistent key words and phrases emerged through analysis of the descriptions. After a thematic base was established through a preliminary analysis of the descriptions, all of the descriptions were subsequently analyzed based on the emergent frames that had been identified.

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Findings

Initially, 465 fruit and vegetable growers were identified through the directory's search but that number was reduced to 406 after nurseries, wineries, and duplicates were removed. Duplicates were removed because of directory errors and, in one case, because a grower with roadside stands in multiple locations used identical directory listing language to describe each roadside stands. Although nurseries and wineries were included in the search results for fruit and vegetable growers, they were excluded because nurseries and wineries do not sell fresh produce intended for immediate consumption.

Research Question #1: How do growers frame their directory descriptions?

Analysis of the descriptions indicated three dominant frames that growers used to describe themselves: a product frame, a process frame, and an experience frame.

The product frame was typified in descriptions that included the number of varieties grown or breeds raised. Alternatively, rather than quantifying varieties or breeds, their diversity was described as "abundant," "impressive," or "huge" or, in other cases, as "heirloom" or "heritage." Some listings included named varieties, which was a common technique for apple growers. "Fresh" and "local" were used frequently as were subjective terms like "beautiful," "best," "delicious," "finest," "flavorful," "luscious," "tasty," and so on. Additional descriptions typified by a product frame included evocative terms like "crisp" and "juicy." Other growers claimed "specialties" or to grow "your favorite."

The process frame was represented by key words or phrases in descriptions that referred to "organic," "natural," "sustainable," and variants of those terms were the most commonly used indicators of the process frame followed by "free of …" chemicals/pesticides/GMOs, hormones/antibiotics/herbicides/fungicides. Growers who also raised livestock described the livestock operations as "grass fed," "pasture raised," or "free range." Growers that could not claim the complete absence of pesticides added qualifiers like "if needed," "as a last resort," "infrequently used," and "try our best." While still speaking to an effort to reduce pesticide use, growers used even more indeterminate and varied means of describing their processes and growing philosophies. "Earth and people friendly," "intensive soil stewardship," "outside the traditional-industrial paradigm," and "grown in harmony with nature" are some examples of non-standard and non-regulated claims growers used in their process-oriented descriptions.

The experience frame was commonly typified by indicating the number of years the farm was in operation, the number of acres farmed, number of years in the family, or number of generations that had farmed. Following from those descriptions, "small" and "family owned" also were common indicators of the experience frame. Beyond the types of claims made for a limited-size family operation, descriptions framed by experience listed activities one could participate in if visiting the farm, activities like lunch, pick-your-own, hikes, or picnics; or attractions like hayrides, petting zoos, live music, or mazes. Some farms referenced their family- and child-friendliness as well as the affordability of a visit. Finally, farms listed natural features like meadows, ponds, and valleys or subjective descriptions of the farm like "scenic," "charming," and "picturesque."

The product frame was the most commonly used frame by growers, with 76% (f = 309) of them using that frame in their descriptions. 65% of growers (f = 263) used the experience frame. The least commonly used frame was the process frame, with only 42% (f = 169) using it.

Research Question #2: Do growers have opportunities to further distinguish themselves from each other in their descriptions?

Growers used multiple frames and different degrees of framing to represent their operations more distinctively; 49% (f = 199) represented themselves through product and experience frames; 32% (f = 128) represented themselves through product and process frames; and 25% (f = 101) represented themselves through experience and process frames. It was rare for growers to write descriptions framed by all three approaches; only 18% (f = 72) represented themselves through all three frames. It also was possible for growers to write descriptions that did not incorporate any of these three frames. Those descriptions focused on providing directions to the farm or indicating locations and hours of their operations.

Growers also used frames to different degrees. Since frames were identified through key words and phrases, the presence of more of those key words and phrases within a particular frame indicated a stronger emphasis on that frame. For example, 11% (f = 43) of growers used five key words or phrases representative of the experience frame; 5% (f = 19) of the descriptions used five key words or phrases representative of the product frame; and only 2% (f = 8) of the descriptions used five key words or phrases representative of the process frame. The presence of more keywords and phrases for each frame indicates a more intensive use of that frame, where each grower strongly distinguishes his or her operation in terms of a product, process, or experience orientation.

Discussion and Conclusions

The descriptions written by growers provided distinctive contrasts in terms of the three dominant frames they used. While these frames were used by a majority of growers, it was less likely for a grower to use multiple frames in combination or to use a more intensive degree of framing, which would be two means by which growers could distinguish their operations from other growers' operations.

It was noted that certain types of growers used particular frames predominantly. For example, apple growers uniformly used the product frame by listing the apple varieties grown. Operations that also raised livestock framed their farms in terms of process as they described their "grass fed" or "free range" operations. Agritourism operations, those with attractions like petting zoos and corn mazes, framed themselves in terms of experience. Since growers of the same type tended to use the same type of frame, growers seeking differentiation opportunities could use frames not commonly used by growers of their type; for example, vegetable growers could adopt the product frame that apple growers use by listing examples of varieties they grow.

Since many of the key terms relevant to the process frame are misunderstood, like "organic," or are contested or malleable, like "natural," and "sustainable," growers could provide examples or detailed descriptions of what the terms mean to them. Research has shown consumers react unfavorably to indefinite phrases like "best management practices," "scientifically proven," and "best quality product" (Goodwin, Chiarelli, and Irani, p. 28) and "poetic descriptions" (Cook, Read, and Twiner, 2009, p. 167). Encouraging growers to use precision, elaboration, and examples in their descriptions will help them refrain from moving into unfavorable marketing jargon. Precision, elaboration, and examples also will educate consumers while at the same time distinguishing one grower's operation from another.

There were some notable similarities between the process frame identified in this project and the four frames Abrams and Meyers identified in their work on media framing of organic food (2010). Their ethical frame portrayed organic food as environmentally and socially responsible; the health frame identified organic food as nutritious and pesticide-free; the production frame addressed costs,

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regulations, labeling practices, and the distinction between "organic" and "natural" food; and the industrial frame posed distinctions between industrial production and small-scale, family-operated, and local farms. Evidence of each of these four frames was found in the process frame within this study, which indicates that growers have adopted the media's framework for discussion of organic food in their representations of their own processes. This co-optation of predominant media frames signals either an internalization of those frames in the way that growers think about their own production or a savvy recognition that consumers are accustomed to organic food being represented in these ways by the popular press.

Growers producing food in any approach other than conventional would benefit from incorporating the process frame into their descriptions, particularly since it is the least-used frame of the three identified in this article and will serve as an important point of distinction for their operations. Anderson, Hollingsworth, Van Zee, Coli, and Rhodes remind growers that consumers will "accept some pesticide use if they understand that efforts are being made to minimize that use" (1996, p. 105). Additionally, Golan, Kuchler, and Krissoff's 2007 findings suggest consumers may react unfavorably to the absence of a process frame when contrasted to a description that includes that frame.

It is noteworthy to recognize that many of the retail-based farms represented in this study are small and thus are unlikely to have retained the services of professional communicators to write their descriptions. It is useful to have examples of communication authored by growers themselves to understand the gaps between how growers communicate and the practices that communication professionals would advocate. It is also useful to have these examples of written communication as a counterpoint to media representations of growers, their products, and their practices. Follow-up research could include grower interviews to understand the rationale behind the choices they make in writing their descriptions and how they decide which details to include and which details to omit.

Finally, it is important not to assume customers uniformly will find value in differentiated descriptions or detailed information about growers' products and processes in the directory. For future research, it would be useful to conduct focus groups or surveys with different consumer groups to understand their reactions to the differently framed directory listings.

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About the Author

Gretchen Perbix is an associate professor who teaches in the technical communication program at Minnesota State University, Mankato and studies Internet-mediated agricultural communications.

Research

The Impact of New Media on Policy Affecting Agriculture

Lauri M. Baker and Tracy Irani

Abstract

New media have changed the way people communicate and transfer information, but their effects on agenda-setting and the transfer of salience of objects and attributes have not been explored empirically. This study utilized a quantitative content analysis to determine how the blogosphere affects the agricultural policy agenda by analyzing a specific piece of policy that has the potential to effect agriculture. Results indicate a significant predictive relationship of the blogosphere agenda, media agenda, interest group agenda, and public agenda to the policy agenda. This adds new information on agenda-setting in an online environment by concluding agenda-setting occurs in new media environments similarly to traditional media environments. Future studies should consider the influence of the blogosphere on the political agenda.

Key Words

Agricultural policy, agenda-setting, new media, blogosphere

Introduction

In recent years, the general public has developed an increased concern for where their food comes from, how animals were treated prior to processing, and how agriculture is affecting the environment. As a result, public concern over policy that affects agriculture has increased (Blandford & Fulponi, 1999; Adams & Salois, 2010). During this same time, public understanding of the scientific complexities of agriculture has decreased (Vandermoere, Blanchemanche, Bieberstein, Marette, & Roosen, 2011), and the average American has moved farther away, literally and figuratively, from production agriculture (Kellogg Commission, 1999). Less than 1% of the American population claims production agriculture as its primary occupation, and only 2% are directly involved in it full time (U.S. Environmental Protection Agency, Ag 101, 2013). A population of people exists in the United States without a first-hand knowledge about food production who are voting and making policy decisions that affect all agricultural producers and, by extension, American consumers.

Agricultural policy is complex. Decisions made in United States' agricultural policies encompass multiple levels, from production agriculture to marketing and sales, which in turn affect markets in countries around the world. For example, when a change is made to the Farm Bill price set for a commodity like corn, this change will affect how much income is made on the farm, the cattle producers who purchase corn for feed, the food companies that use corn in their products, the consumers who purchase products made with corn, and the countries outside the United States that purchase corn on the world market. These economic effects are exacerbated when combined with the effects of agricultural policies on society, and "governments are being pressured to ensure that public concerns are addressed" (Blandford & Fulponi, 1999, p. 1). All of these difficulties come together to make agricultural issues arguably the most contentious of policy issues (Blandford & Fulponi, 1999). Consequently, it is no surprise why a concern over the lack of understanding of an industry that feeds and clothes so many is growing. These intensifying concerns make research related to agricultural policy both pertinent and imperative.

As the fastest diffusing technology in recent history, the Internet has significantly changed how people communicate and transfer information (Goodman et. al, 1998; Perkins & Neumayer, 2011). Its use continues to grow, in part because of the speed at which information can be transferred (Garrison, 2000). During a time when public understanding of agriculture has diminished, the American public's access to information has increased. Access to the Internet in the United States was reported at 5 million users in 1995, and 50 million Americans had access by 1999 (Stempel, Hargrove, & Bernt, 2000). The United States has 231 million Internet users (CIA World Factbook, 2013). This growth has resulted in increased use of online newspapers and blogs. The Newspaper Association of America reports that monthly traffic to online newspapers was 73.3 million unique visitors in 2009 (Langeveld, 2009), which results in 43.6% of Internet users visiting online newspapers at least monthly, a 10.5% increase from the same month in 2008 (Langeveld, 2009). In 2009, only 25% of Americans reported reading a print-only version of a newspaper, 5% reported reading print and online, and 39% said they read only an online newspaper (Pew Research Center, Newspapers Face a Challenging Calculus, 2009). Seventy-two percent of adults who are online use social networking sites (Pew, 2013). The blogosphere also is continuing to grow, with 42% of Internet users (representing 32% of all adults) reporting having read an online journal or blog and 33% reporting reading a blog on a regular basis (Smith, 2008).

In addition to access rates, the habits of those using the Internet have changed. Users are specifically seeking scientific- and policy-related information online (Schroeder, Caldas, Mesch, & Dutton, n.d.) and have formed an active policy network on the Web (McNutt, 2008). Political discourse plays an important role in the blogosphere, with bloggers and blog readers engaging in the exchange of ideas and actively seeking to shape the political agenda, encourage unified action, and initiate mobilization (Pole, 2010). Wallsten (2007a) determined the blogosphere is affected by the mass media and vice versa, thus implying an indirect connection between policy development and the Internet, but more research needs to be conducted to determine the exact relationship.

Studies have been conducted about the relationship among the mass media, public opinion, and political elections (McCombs, 2004). Although clear evidence shows information about policy and an active exchange of ideas about policies occurs through the Internet, how directly influential these information sources are on final policy development is unclear. This study seeks to fill these gaps in our knowledge of policy development and the online environment.

Political Agenda Setting Online

At the core of agenda-setting is the public's awareness of issues and the salience of these issues, which collectively represent the public agenda. The more often people hear about an issue, the more likely it is to be salient to them (McCombs, 2004). The measurement of salience can be divided into two levels: object salience and attribute salience. Object salience is simply a connection between a specific issue or object in the media agenda and in the public agenda. This is called the first level of agenda-setting (McCombs, 2004).

Attribute salience is the second level of agenda-setting in which "specific aspects of media content about public affairs are explicitly linked to the shape of public opinion" (p. 85); thus, these attributes are salient in the public agenda. This concept can be measured through comparing the themes and language appearing in media content, sometimes called a frame, and determining how often and for how long they appear in the mass media agenda. Often, the timeframe of the increases and decreases of public concern, or the public agenda, on a specific issue mirrors that of the mass media agenda (McCombs, 2004).

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Agenda-setting research has emerged to answer questions associated with how the Internet affects agenda-setting. The Internet combines mass communication and interpersonal communication in a single channel; Internet users can obtain information and send feedback without having to leave the same communication context. Interactivity, assumed as an inherent attribute of the Internet from its beginning, contributes tremendously to the promotion of audience activity to a higher level (Morris, & Ogan, 1996); moreover, new media transforms the way audiences use information from selecting among available resources to intentionally and actively searching for information useful to them. Audiences do not have to change their schedule to follow the agenda set by the media; instead, they have access to the information they need whenever and wherever Internet access is present.

Brubaker (2008) found that because of the Internet and people's ability to choose their own personal agenda, the Internet's effects on agenda-setting were minimized; however, other studies have determined that an agenda-setting effect exists online. A study by Lee (2009) concluded that online newspapers have agenda-setting effects, whereas Roberts, Wanta, and Dawo (2002) found an agenda-setting effect in electronic bulletin boards by analyzing five issues in 1996 fall political campaigns. Wallsten (2007b) found a bidirectional relationship in the political blogosphere, which was contrary to the previously accepted view that the relationship was unidirectional, as in traditional agenda-setting relationships (2007).

The actual political power of social media has been difficult to establish in an empirical way (Shirky, 2011), which indicates a need for more research in this area. However, Americans are participating in politics online, as 39% of all Americans took part in some sort of political activity on a social networking site during the 2012 campaign (Pew, 2013).

The Influence of the Blogosphere on Policy and Politics

The blogosphere has been credited as having major political influence, with numerous bodies of literature citing the blogosphere with the now-infamous political ousting of Senate Majority Leader Trent Lott in 2002 (Drezner & Farrell, 2004; Pole, 2010; Rigby, 2008). Some scholars in this field have gone so far as to say the blogosphere is responsible for fundamentally changing the entire political landscape in the United States (Pole, 2010). Bloggers primarily influence political discourse, which in some cases has initiated political action (Drezner & Farrell, 2004; Pole, 2010; Wallsten, 2007a). The majority of the research in this area credits the blogosphere's political influence to its ability to influence traditional media.

As the blogosphere continues to grow, an emergent hierarchical structure has developed in the political blogosphere, with a few political bloggers being well known and sought after by the public and the mainstream media. If a lesser-known blogger has a potentially big story, that blogger often contacts an elite political blogger. This mechanism allows the mainstream media to visit the few elite blogs easily and gain a sense of what is being discussed in the blogosphere (Drezner & Farrell, 2004) and has been the process for many breaking political stories that have had an impact on the U.S. political landscape. A study on the influence of blogs determined that 83% of journalists used blogs in story development, with 43% using blogs at least once a week (Farrell & Drezner, 2007). As such, the blogosphere has the potential to influence the content in mainstream media.

The blogosphere has had a significant impact through feeding important stories to the mass media, but this is not the only way the blogosphere has influenced U.S. politics. The blogosphere also has assumed the role of keeping the mainstream media in check (Drezner & Farrell, 2004; Pole, 2010). Political bloggers have become known for fact-checking the mainstream media and, if they deem the story worth telling, working to make sure the entire story is told (Drezner & Farrell, 2004;

Pole, 2010). Bloggers were famously responsible for forcing CBS News to admit that it could not substantiate documents about George W. Bush's National Guard service when bloggers were able to identify these documents were forgeries (Drezner & Farrell, 2004). In this same vein, the blogosphere often sheds light on issues that may have been passed over by the mainstream media, often pushing these stories through to the elite bloggers and eventually to the mainstream media (Drezner & Farrell, 2004; Pole, 2010). Because bloggers do not have an editorial board to answer to, they are often able to break stories or illuminate issues the mainstream media shies away from (Gill, 2004).

The blogosphere's influence is limited by the fact that the majority of bloggers are individuals without staff, support, or fact-checkers of their own. Bloggers must rely on the mainstream media's resources to find information about what is happening in the world, which restricts their ability to have mass reach on their own accord (Drezner & Farrell, 2004; Kerbel, 2009); however, even with its limitations, the mainstream media and policymakers may find the blogosphere difficult to ignore as an indicator of what Americans think about politics and policy (Drezner & Farrell, 2004).

Although some disagreements persist about how directly influential the blogosphere is on politics and the policy development process, there is no doubt that it has changed the face of American political discourse. Blogging has redefined access to the media, allowing for more people to be heard on political issues (Pole, 2010). Research indicates the mainstream media affects the blogosphere agenda and vice versa (Delwiche, 2005; Wallsten, 2007a), and in some situations these agendas overlap (Delwiche, 2005); however, no clear pattern has been determined for why or when this occurs. These circumstances may represent a decentralization of communication and a change in the flow of information (Delwiche, 2005), but how the blogosphere contributes to setting the political agenda remains unknown.

Policy that Affects Agriculture

Some policies can be explicitly defined as agricultural policies at the federal level, like the Farm Bill and Crop Insurance Legislation. However, a myriad of other policies affect agriculture, but they are not specifically developed and defined as agricultural policy. These policies include items such as animal welfare, which may affect groups like the Organization of People for the Ethical Treatment of Animals (PETA) and the Humane Society of the United States (HSUS), but also has implications for how production agriculture handles livestock. Another example of this type of policy is climate-change policy. On the surface, it may seem to only affect those with a passion for environmental issues; however, the implications for these policies affect the daily operations and long-term success of production agriculture.

Purpose and Hypotheses

The purpose of this study was to gain a greater understanding of the influences on development of public policy, particularly new media influences. Specifically, this study seeks to better understand the agenda-setting effects of new media. Based on what is known about the online political landscape related to agenda setting, we developed the following hypotheses:

H1: The blogosphere, elite media, specialized public, and interest group agenda will have a statistically significant predictive relationship on the policy agenda.

H2: A statistically significant two-way relationship will exist between all predictive agendas.

a. blogosphere and elite media
b. blogosphere and specialized public
c. blogosphere and interest group

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d. elite media and interest group
e. elite media and specialized public
f. specialized public and interest group

Variables are operationalized based on their role in the political process. The outcome variable was House Bill 2454, also called Cap and Trade legislation, which was a policy related to capping CO_2 emissions including those produced by agriculture. The blogosphere was represented by the top political blogs, and the elite media was represented by the top online newspapers. The specialized public opinion was represented by the comments on the elite media and blogosphere. The interest group agenda was based on hearing testimony related to the outcome variable.

Methodology

The researchers conducted a quantitative content analysis to assess the hypotheses and determine the influence of multiple factors on the outcome of a piece of policy. For the purpose of this study, the influencing factors of analysis were the elite media agenda, the blogosphere agenda, interest group agenda, and a specialized public agenda. Literature indicated a conceptual model with a two-way relationship between the blogosphere and the elite media, the blogosphere and specialized public agenda, the blogosphere and the interest group agenda, the elite media and specialized public agenda, elite media and the interest group agenda, and the specialized public agenda and the interest group agenda. H1 and H2 were tested using a confirmatory structural equation model (SEM).

Underlying assumptions for SEM (normality, sampling adequacy, and no extreme multicollinearity) (Byrne, 2009) were tested and confirmed to be acceptable before main hypothesis testing; however, the measured variable "time" for the interest group agenda had to be dropped from the model due to sampling inadequacies. To test the hypotheses in this study, structural equation modeling analysis was used with the method of maximum likelihood, AMOS 17 was used to perform the data analyses. The exogenous latent variable was the policy agenda, and the four endogenous latent variables were the blogosphere agenda, elite media agenda, specialized public agenda, and the interest group agenda. A breakdown of the latent and measured variables is in Table 1.

Table 1.
Latent and measured variables in structural equation model

Latent	Measured
Blogosphere Agenda	Custom dictionary attributes, tone master variables, comments, number of words, time
Elite Media Agenda	Custom dictionary attributes, tone master variables, comments, number of words, time
Specialized Public Agenda	Custom dictionary attributes, tone master variables, comments, number of words, time
Interest Group Agenda	Custom dictionary attributes, tone master variables, number of words, time*
Policy Agenda	Custom dictionary attributes, tone master variables

Note. *indicates variable removed due to sampling inadequacies

Sampling

The purposive samples selected for this study consisted of content derived from political blogs, elite media, the text of the H.R. 2454 as passed in the U.S. House of Representatives (1,400 pages of bill text), and the transcripts from the four days of committee hearings on H.R. 2454 (approximately 400 pages of text). The political blogs and elite media were chosen according to the top-ranked political blogs and online newspapers in 2009. The top five political blogs selected for this study were based on Wikio ranking in the political blog category for 2009. Determining the exact number of political blogs is difficult because many directories have different listings. Technorati, one of the largest blog directories, lists 11,638 political blogs; however, a study by the Pew Internet and American Life Project reported 1.4 million blogs that contain purely political information (Lenhart & Fox, 2006). Due to the hierarchical structure of blogs, the top bloggers often have the same or similar stories as other political bloggers. A blog's position in the Wikio ranking is determined by an algorithm that uses the number and weight of the incoming links from other blogs (Klein, 2009). Next, the top five online newspapers for 2009 were chosen to represent elite media; these were chose from an estimated 1,500 online newspapers (World Association of Newspapers, 2012). Then, the blogs and newspapers for content related to H.R. 2454 were searched. Search terms included "H.R. 2454," "climate change," "climate change policy," "energy policy," "Cap and Trade," "Waxman-Markey," "global warming," and "The American Clean Energy and Security Act of 2009." Human judgment was then used to determine if the content related to H.R. 2454 and fell in the specified time frame. The total amount of content derived from the blogs and newspapers was approximately 200 stories and/or posts from 400 words to 1,200 words with an average of five comments per post ranging in length from three words to 400 words, resulting in approximately 201,000 words total.

The specific time frame for the content analyzed from political blogs and elite media was 60 days prior to the passage of H.R. 2454 (March 16, 2009, through May 14, 2009). This time frame is well over the four weeks or more that previous empirical research (Winter & Eyal, 1981) established as the optimum time span for examining agenda-setting effects. The content generated during the first 30 days of this time frame was labeled Time 1 (March 16, 2009, through April 15, 2009), and the content generated during the last 30 days was labeled Time 2 (April 16, 2009, through May 14, 2009).

Content Analysis

This study was designed to follow Kaid and Wadsworth's (1989) suggested seven steps for implementing a content analysis: formulate the hypotheses or research question to be answered, select the sample to be analyzed, define the categories to be applied, outline the coding process and train the coders, implement the coding process, determine reliability and validity, and analyze the results from the coding process.

As previously discussed, the objectives and sampling have been established. The applied categories were established according to categories from agenda-setting, the theoretical basis for this study; as such, each variable in the study was coded for attributes, time-frame, and tone in an effort to determine what recurs in the output variable. Due to the large volume of text in this study and to aid in objectivity, a quantitative content analysis software was used, Diction, for analysis. Diction is a computer-assisted textual analysis (CATA) program that measures five standardized variables related to tone that have been proven to be independent of each other. These are certainty, activity, optimism, realism, and commonality. Diction uses 10,000 search words in 33 lists, called dictionaries, to determine the levels of each of these standardized variables (Hart, 2000). Additionally, Dic-

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tion allows for the creation of custom dictionaries for the ability to analyze more than tone. Custom dictionaries were developed based on the attributes of a random sample of content within the study. A panel of experts reviewed the sample content to determine attributes and to develop dictionaries from this sample. CATA has been used in agenda-setting and agenda-building studies that require sorting and coding of large bodies of text with detailed coding protocols (Kiousis, 2005; Ragas, Kim, & Kiousis, 2010).

As suggested by Kaid and Wadsworth's (1989) sixth step for implementing a content analysis, validity concerns in a content analysis were addressed in this study. First, face and content validity was measured by using good sampling techniques and determining that results were plausible (Kaid & Wadsworth, 1989). Additionally, in studies that use inferential statistics, other data-related, construct, and predictive validity should be considered (Kaid & Wadsworth, 1989). These threats were addressed in this study in the following ways. Data-related validity was addressed through ensuring enough data in each cell and through a large sample. Within data-related validity, another concern is for violation assumptions; thus, tests were conducted during the data analysis process to ensure that there were no violations. Construct validity is threatened by inadequate explanation of constructs (Kaid & Wadsworth, 1989), which was checked by the panel of experts' review of the custom dictionaries and the standardization of tone through the use of Diction. Predictive validity requires a correlation between measures and criterion construct of interest (Kaid & Wadsworth, 1989) and is threatened by untheoretically linked measures to criterion; thus, that this study uses a theoretical basis related to the measures and used successfully in the past is imperative. This study is an extension of research within the theoretical base of agenda-setting.

Data Analysis

All data were standardized using PASW Statistics 18. After standardization, structural equation modeling (SEM) tested the relationship between the multiple variables and tested hypotheses. AMOS, a plug-in for PASW Statistics 18, was used to build the SEM.

The latent variables or factors in this study are the policy agenda, media agenda, blogosphere agenda, interest group agenda, and a specialized public agenda. The measured variables within this study are the number of attributes within each agenda; the time frame in which the attributes or objects appear; the length of articles, blog posts, or comments; and tone (certainty, activity, optimism, realism, and commonality). In an effort to assess the agenda of each latent variable, a set of attributes were used that communicate the importance at a point in time (Dearing & Rogers, 1996). The hierarchy of the attributes of the agenda were determined by the salience of each. Salience was measured, as with previous agenda-setting research, by the frequency of attribute mentions in the analyzed content (Kiousis, 2005).

The coding scheme for this study was based on frequency counts of each attribute and attributes mentioned within the unit of analysis rather than a simple binary (present/absent) coding scheme, which allowed for more advanced data analysis. Some variables, however, had a limited number of options and a minimal number of choices within each category. Fortunately, SEM is designed to work with variables of multiple types within the same model, so data can be continuous, censored, binary, ordered categorical (ordinal), counts, or combinations of these variable types.

Results

The first step in the model testing was to estimate the goodness-of-fit for the hypothesized model. The X^2 test was significant, which suggested the estimated model did not fit well with the observed

data; however, the X^2 test is sensitive to sample size and often leads to model rejection. Therefore, researchers have suggested that if an X^2/degree of freedom ratio does not exceed five, the model fit is acceptable (Bollen & Long, 1993). Because the X^2/degree of freedom ratio of the current hypothesized model was estimated at 1.96 (X^2 = 1178.13, df = 550), CFI was .90, NFI was .82, and RMSEA was .68, it was concluded that the hypothesized model was acceptable despite the significant X^2 statistic. CFI, or Comparative Fit Index, depends extensively on the average size of the correlations in the data. If the average correlation between variables is not high, then the CFI will not be very high (Byrne, 2009). The CFI for the hypothesized model was near 1, at .90, which is considered high. RMSEA, or Root Mean Square Error of Approximation, is another test of model fit; good models are considered to have an RMSEA of .05 or less. Models with an RMSEA of .1 or more have a poor fit (Byrne, 2009). The RMSEA in the hypothesized model in this study was .68, which indicates this model may not be a good fit. NFI stands for Normed Fit Index and is another measure of goodness of fit. A value between .90 and .95 is considered acceptable, and above .95 is considered good. The NFI in the hypothesized model in this study is .82, which is not high enough to be considered a good fit. The goodness of fit statistics for the hypotheses were not consistent in determining the goodness of fit for this model.

Additionally, after examining the significance of the regression weights, eight of ten relationships in the model showed significant direct effects as expected ($p < .01$). The only two exceptions were the two-way relationship between the elite media and interest group agendas (H2d: $\beta = .16$, $p > .05$) and the relationship between specialized public opinion and interest group agendas (H2f: $\beta = .14$, $p > .05$). These relationships were not significant (Table 2 and Figure 1).

Table 2.
Slopes and p values for hypothesized structural equation model

Hypothesis	β	p
H2e. elite media and specialized public (two-way)	.82	.003*
H1: elite media (one-way)	.79	.005*
H2a: blogosphere and elite media (two-way)	.77	.003*
H2b: blogosphere and specialized public (two-way)	.72	.002*
H1: blogosphere (one-way)	.68	.004*
H1: interest group (one-way)	.67	.002*
H1: specialized public (one-way)	.43	.007*
H2c: blogosphere and interest group (two-way)	.41	.008*
H2d: elite media and interest group (two-way)	.16	.192
H2f: specialized public and interest group (two-way)	.14	.112

Note: * indicates a significant value at p<.001

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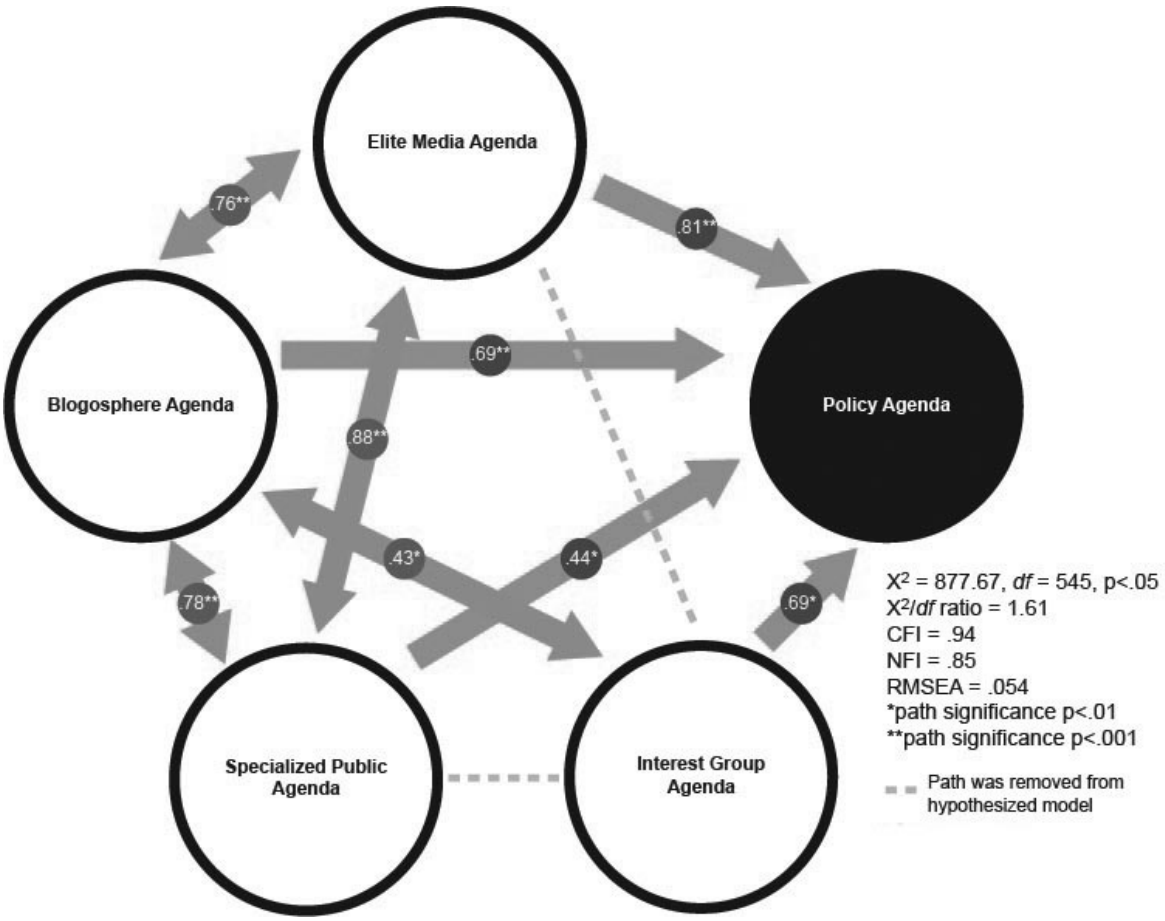

Figure 1. The hypothesized predictive relationship on the policy agenda

In an effort to improve the model and better explain the relationship between the agendas, the literature was again examined to determine if there was an indication of a different relationship between the agendas compared in H2d and H2f, none was found. Thus, the two non-significant relationships were removed from the model and it was tested again for goodness of fit. The standardized β coefficients were examined to evaluate the estimated causal relations. Six of eight relationships were significant at $p < .001$, and the other two were significant at the $p < .01$ level. As shown in Table 3 and Figure 2, the new model fit the observed data better than the previous hypothesized model, with statistical significance of the regression weights for all constructs ($X^2 = 877.67$, df = 545, X^2/df ratio = 1.61, CFI = .94, NFI = .85, RMSEA = .054). All of these goodness of fit statistics except NFI indicate this model is a good fit.

Table 3.
Slopes and p values for final revised structural equation model

Hypothesis	β	p
H2e. elite media and specialized public (two-way)	.88	.000**
H1: elite media (one-way)	.81	.000**
H2b: blogosphere and specialized public (two-way)	.78	.000**
H2b: blogosphere and specialized public (two-way)	.76	.000**
H1: blogosphere (one-way)	.69	.000**
H1: interest group (one-way)	.68	.002*
H1: specialized public (one-way)	.44	.005*
H2c: blogosphere and interest group (two-way)	.43	.001*

Note: * indicates a significant value at p<.01, **indicates a significant value at p<.001

The final model strongly supports eight out of ten relationships in the hypothesized model in this study. As Figure 2 illustrates, the blogosphere agenda ($\beta = .68$, $p < .001$), elite media agenda ($\beta = .81$, $p < .001$), interest group agenda ($\beta = .69$, $p < .01$), and specialized public agenda ($\beta = .44$, $p < .01$) all have a significant influence on the policy agenda, which confirms H1. Additionally, a two-way relationship is supported by this data for the blogosphere and elite media agenda (H2a: $\beta = .76$, $p < .001$), blogosphere and the specialized public agenda (H2b: $\beta = .78$, $p < .001$), blogosphere and interest group agenda (H2c: $\beta = .43$, $p<.001$), and between the elite media agenda and the specialized public agenda (H2e: $\beta = .88$, $p < .001$); however, this final model does not support a two-way relationship between the elite media agenda and interest group agenda (H2d: $\beta = .16$, $p > .05$) and the relationship between specialized public opinion and interest group agendas. (H2f: $\beta = .14$, $p > .05$).

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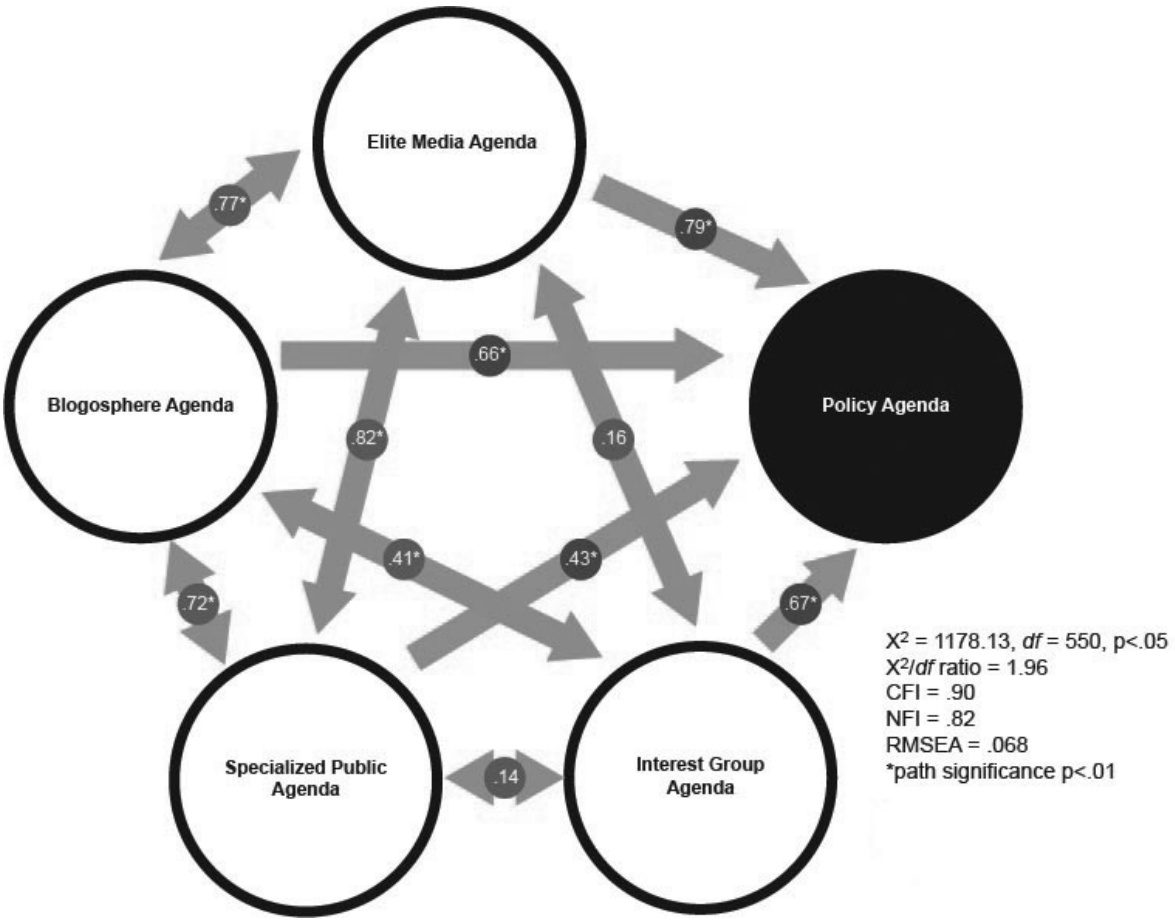

Figure 2. Final revised predictive relationship on the policy agenda

Conclusions and Discussion

The results of this study indicated a predictive relationship of the blogosphere agenda, media agenda, interest group agenda, and public agenda on the policy agenda. This conclusion adds new information on agenda-setting in an online environment by concluding that new media in fact shapes the policy agenda; specifically, this study determined that the blogosphere, online newspapers, and online public opinion shape the policy agenda. Our study also furthered research on the connection between the blogosphere and political agenda, which Wallsten (2007a) made, and offers empirical evidence that the blogosphere agenda has a predictive relationship on the policy agenda particularly when agricultural and environmental policy are concerned.

Our study confirmed a two-way relationship between the elite media and public opinion as determined in previous agenda-setting research (McCombs & Shaw, 1972; McCombs, 2004) and confirmed the two-way relationship of online media and the general public (Lee, 2009). This study also confirmed the conclusions of Wallsten (2007b) and other case studies (Drezner & Ferrell, 2004; Kerbel, 2009), that the blogosphere influences the elite media agenda, and offered additional empirical information indicating that the elite media has an influence on the blogosphere agenda, which has been assumed in case studies (Drezner & Ferrell, 2004; Gill, 2004). Additionally, this study offers evidence that the interest group agenda and the blogosphere agenda are related in a two-way relationship. This study failed to show there was a two-way relationship between the elite media agenda and the interest group agenda and the public agenda and the interest group agenda, which implies the media and the public may not be as closely aligned as the public and the blogosphere.

This study offered new empirical knowledge related to the predictive nature of new media agen-

das on the policy agenda, particularly related to policies affecting agriculture. The blogosphere, elite media, specialized public, and interest group agenda will have a statistically significant predictive relationship on the policy agenda. Through the testing of H1, it was determined that the blogosphere, elite media, specialized public, and interest group agendas have a statistically significant predictive relationship on the policy agenda. Although literature in these areas implied a predictive relationship, this study adds the first empirical knowledge that new media versions of the elite media and public agendas have a strong predictive relationship with the policy agenda. Prior to this study, multiple case studies indicated a possible predictive relationship of the blogosphere agenda on the policy agenda, but this study verifies a strong predictive relationship between these agendas.

Through the testing of H2 in this study, it was determined that a statistically significant two-way relationship exists between the blogosphere agenda and the elite media, public, and interest group agendas. These results confirm prior case studies that implied this relationship. Additionally, it was also determined that a significant two-way relationship exists between the elite media agenda and public opinion, which has been confirmed in previous studies; however, this test of H2 indicated no two-way relationship of statistical significance between the interest group agenda and the public agenda and the interest group agenda and the elite media agenda. This result diverges from the relationship indicated in previous studies, but multiple reasons explain why these relationships were not significant in this study. Absence of a strong connection between the interest group agenda and the elite media and public agenda in this study may be due to the new media format of the elite media and public agenda in this study, but this is because of the two-way relationship between the interest group agenda and the blogosphere agenda. The public agenda and interest group agenda do not always coincide in the literature, so perhaps it is less surprising that this relationship was not significant. That the interest group agenda and the elite media agendas relationship was not significant is surprising, because these agendas have been linked in previous research; however, the sampling inadequacies related to the interest group agenda possibly affected the significance of this relationship and the relationship between the interest group and public agendas.

Recommendations

These results indicate that agenda-setting occurs in new media environments in a way similar to traditional media environments. Specifically, the agenda-setting effects of the blogosphere are strong and should be considered in future agenda-setting research, especially in instances where agricultural and environmental policy is a factor. Due to the strong relationship of the blogosphere agenda and all other agendas in this study (elite media, public, interest group, and policy), future agenda-setting studies would be remiss not to at least consider the agenda-setting effect of the blogosphere on other agendas under investigation. Moreover, individuals or groups seeking to influence policy that affects agriculture should utilize new media channels like the political blogosphere.

Future research is recommended into the potential two-way relationship between the interest group agenda and the public and elite media agendas. This study did not show a significant two-way relationship between these agendas, but this is not conclusive evidence that a two-way relationship does not exist. Future research also should continue to look at the blogosphere agenda and other new media agendas, because this type of communication continues to increase. The measure of these agendas over time will offer stronger empirical evidence of the strength of the predictive relationship of these agendas on the policy agenda. Considering the influence of the lower-ranked blogs and online newspapers would be valuable to determine if these relationships hold true.

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Limitations

This type of study is limited to the nature of the texts themselves. One text may focus solely on a single issue and ignore another, which has a strong influence on the discussion of attributes and tone. This was addressed in this study by sampling multiple texts to get a large number of texts and overcome the issue. This study was limited in time frame due to the time constraints of the researchers and the available resources for analyzing such large amounts of text. Unfortunately, this limitation could not be overcome, but the large sample size helps limit its effects. This study also had a limitation in the sampling frame for the interest group agenda in that it included only four texts for analysis, which limited the use of advance statistics for comparison between attributes and tone. In hindsight, this approach may have been prevented by separating texts into each person's testimony instead of each day serving as a text (unit of analysis); moreover, there was a purposive sampling frame, which indicates a sampling limitation. This limitation was mitigated by the hierarchical nature of the blogosphere.

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About the Author

Lauri M. Baker is an assistant professor in agricultural communications at Kansas State University. Tracy Irani is a professor in agricultural communications at the University of Florida and the Director of the Center for Public Issues Education in Agriculture and Natural Resources.

Research

Participant Satisfaction Related to Social Presence in Agricultural Conversationsusing Twitter: Implications for Agricultural Communications

Kelly M. Pritchett, Traci L. Naile, Theresa P. Murphrey and Lauren F. Reeves

Abstract

Communication has evolved from predominantly face-to-face environments to include greater use of computer-mediated environments such as social networking sites for sharing information, meeting new people, and learning. Aspects of computer-mediated communication related to perceptions of social presence impact the way communication occurs in un-mediated environments. This study examined perceived social presence, participant satisfaction, and relationships between social presence and satisfaction among Twitter users during streaming conversations. Data were collected through an online questionnaire that was created using qualtrics.com and made available to respondents over a one-week period. Two groups of survey respondents agreed with 10 of 21 and 13 of 21 statements about social presence and 10 of 13 and 12 of 13 statements about satisfaction. Findings indicated that positive and negative relationships exist between social presence and satisfaction. Participants felt they were in close virtual proximity with other participants, and social presence can be fostered through text-based variables, such as emoticons, to compensate for lack of nonverbal or face-to-face cues. Therefore, agricultural communicators should use techniques that foster social presence to support virtual relationships and circulate agricultural information through chatting, messaging, and blogging.

Key Words

Twitter, social presence, agricultural communications, social media, computer-mediated communication

Introduction

Public use of the Internet has increased over the last several years, with nearly 78% of the current North American population using it regularly (Internet World Stats, 2011). Today, Internet media and social networking outlets have become key sources of news and information for many people (Prasarnphanich & Wagner, 2011) as well as a medium for social change (Bartter et al., 2009). Social networking and social media sites that act as these media for change are being used by 50% of young adults (Lewandowski, Rosenberg, Parks, & Siegel, 2011) and 72% of Internet-using adults (Brenner & Smith, 2013).

Through these Internet media, users engage in a variety of social interactions and create collaborative communities through which they actively contribute as a single entity (Prasarnphanich & Wagner, 2011). Through Internet use, users can network through various platforms by chatting, messaging, and blogging in forums related to specific topics (Bartter et al., 2009). One such topic is agriculture, as shown by the 98% of farmers and ranchers who have Internet access and the 76%

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of farmers and ranchers with Internet access who use social media outlets (American Farm Bureau Federation, 2011).

These Internet-based interactions are known as computer-mediated communication (CMC) (Spitzberg, 2006; Tu, 2002). According to Spitzberg, CMC is defined as any human symbolic text-based interaction conducted or facilitated through digitally based technologies. In CMC, users send and receive text-based messages via computers through "synchronous or asynchronous electronic mail and computer conferencing" (Tu). In synchronous communication, users communicate in real-time, while asynchronous communication allows users to send and receive messages at their convenience (Tu).

Several platforms are used for CMC, including Twitter, which has approximately 140 million active users globally (Twitter, 2012). Through Twitter, users communicate by sending and receiving text-based messages of 140 characters or less called tweets. These tweets can be made interactive by incorporating a hash tag, signified by the "#" symbol, followed by a phrase that relates to the topic of discussion. Hash tags identify tweets as part of an existing conversation that users can follow across the network by searching for specific hash tags, either on the Twitter platform or through various third-party tools that have been created in support of the Twitter platform (Twitter, 2011).

Communities of interactive users can be formed around hash tags, such as #AgChat and #GardenChat. In these agriculture-related communities, users share information about agriculture and gardening through scheduled, mediated interactions as well as spontaneous posts that include the relevant hash tags. The conversations using #AgChat were created for "people in the business of raising food, feed, fuel and fiber" (AgChat Foundation, 2011). With a mission to "empower farmers and ranchers to connect communities through social media platforms," #AgChat allows users of the hash tag as well as public Twitter users to view and interact in the conversation (AgChat Foundation). Like the #AgChat mission, #GardenChat is a network for users with interests in gardening to share their personal stories, pose questions, and network freely (Twitter, 2011).

While face-to-face contact and telephone communication are still the most dominant forms of communication with the most important people in individuals' social networks (Hampton, Sessions, Her, & Rainie, 2009), users of CMC platforms have created a virtual social presence to supplement and sometimes substitute for face-to-face contact (Zhao & Rosson, 2009). With this adaptation from reliance on face-to-face communication to an increased use of CMC for informal social interactions, social presence online has become an important area of focus (Zhao & Rosson). Research has shown this differentiation between virtual and face-to-face social presence can affect an Internet user's overall satisfaction with the social media network (Lowenthal, 2009). Without vital social cues such as eye movements, facial expressions, and even wardrobe, users are not able to connect through CMC as they would with face-to-face interactions and may feel a sense of depersonalization (Kupritz & Cowell, 2011; Spears & Lea, 1994).

Although research does exist regarding CMC and social presence, limited research discussing these factors within specific media platforms, such as Twitter, is available. This information is further limited when examining the discussion of agriculture across CMC networks, making further investigation into the differences between user perceptions of social presence and satisfaction within agriculture-related CMC platforms valuable to their use as agricultural communications tools. This study relates to two priorities of the National Research Agenda (Doerfert, 2011), "Priority 2: New Technologies, Practices and Products Adoption Decisions" (p. 8) and "Priority 4: Meaningful, Engaged Learning in All Environments" (p. 9), as it examined the workings of new technologies like Twitter in CMC with the purposeful exchange of agriculture-related information.

Literature Review/Theoretical Framework

Social presence and satisfaction within CMC was the focus of this study. Thus, the theoretical framework of the study was social presence. Social presence first was defined as the level of salience between two people using a communication medium (Short et al., 1976). Since then, many researchers have developed their own versions of social presence and applied them to CMC as a function of medium characteristics as well as a function of user adaptations to social context (Richardson & Swan, 2003; Walther, 1992). For example, to compensate for lack of social cues in CMC, a user may insert emoticons or personalize their messages (Picciano, 2002; Richardson & Swan, 2003; Rourke, Anderson, Garrison, & Archer, 2001; Taylor, Jowi, Schreier, & Bertelsen, 2011).

Social presence is a core concept in online learning and distance education. Studies have shown correlations between social presence and student satisfaction (Gunawardena, 1995; Gunawardena & Zittle, 1997; Richardson & Swan, 2003), social presence and learning communities (Rourke et al., 2001; Rovai, 2002), and social presence and perceived learning (Richardson & Swan). Some researchers have suggested learning online can be just as successful as learning in a classroom when nonverbal behaviors contributing to social presence are independent of learning in a student-teacher relationship (Taylor et al., 2011). Gunawardena and Zittle also found it important for instructors to develop skills to create social presence when providing feedback to individuals.

In studies about online collaborative learning, researchers found that learners placed high importance on feelings of "connectedness and belonging" (Hara, Bonk, & Angeli, 2000; Harasim, 1993; Johansen, Vallee, & Spangler, 1988; Kitchen & McDougall, 1998; So & Kim, 2005) and that structure is important in promoting interaction among participants (Vrasidas & McIsaac, 1999). Gunawardena and McIsaac (2004) found social presence affects distance learners' perceptions of psychological distance, or immediacy, with their teacher and fellow learners. This aligns with research in distance education that defines distance in terms of psychological aspects rather than physical proximity (Garrison, 2000; So & Brush, 2008).

Measuring Social Presence

Measurement of social presence has been an evolving practice that started with a survey instrument through which 17 learner reactions were captured on a range of bipolar scales, such as stimulating / dull, personal / impersonal, and sociable / unsociable (Gunawardena, 1995). After the GlobalEd conference in 1993, Gunawardena and Zittle (1997) developed a 61-item questionnaire that measured participants' responses to CMC, conference experience, and factors suspected to influence CMC satisfaction. The majority of the conference instrument included five-point Likert-scale items about nine different areas: "1) social presence; 2) active participation in the conference; 3) attitude toward CMC; 4) barriers to participation, which included technical problems and lack of access; 5) confidence in mastering CMC; 6) perception of having equal opportunity to participate in the conference; 7) adequate training in CMC at participant's site; 8) technical skills and experience using CMC; and 9) overall satisfaction with the GlobalEd conference (Gunawardena & Zittle, p. 14).

Some aspects of social presence have been deemed highly subjective and are thought to be measured best by self-report tools that indicate social awareness (Biocca & Harms, 2002). While self-report measures of social awareness such as eye fixation or body movement can be observed, these observed measures are difficult to collect and may not be directly related to social awareness (Biocca & Harms, 2002). Accordingly, Rourke et al. (2001) classified social presence into interactive, affective, and cohesive responses to conduct a qualitative study on computer-mediated conversation

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transcripts and found problems with observational tools that related to the challenges of accurately transcribing "real-time, face-to-face interactions" (p. 6). To overcome challenges such as these, some researchers turned to conferencing software that "automatically and faithfully records all online interactions in a machine-readable format" (Rourke et al., p. 6).

In 2002, Tu created the Social Presence and Privacy Questionnaire (SPPQ) to measure students' perceptions of social context, online communication, interactivity, and privacy. Tu collected data through interviews, direct observation, document analysis, and a survey. Finally, parts of the satisfaction scale by Gunawardena and Zittle (1997), SPPQ by Tu (2002), and previous research by Driver (2002) and Kitchen and McDougall (1998) were merged to form the Collaborative Learning, Social Presence, and Satisfaction questionnaire (Lowenthal, 2009; So & Brush, 2008). The CLSS questionnaire captures general demographic information, satisfaction, and social presence (So & Brush). Despite proposed alternative social presence scales (Kreijns, Kirschner, Jochems, & van Buuren, 2010) and arguments for multidimensional approaches (Russo & Benson, 2005), most researchers are comfortable with or adapt the instruments developed by Gunawardena and Zittle, Rourke et al. or Tu (Lowenthal).

Purpose and Objectives

Understanding social presence in the context of agricultural conversations in computer-mediated environments was the focus of this study, which consisted of two parts. The purpose of this paper is to report findings from the second part of the study, which focused on participants' perceptions of social presence and satisfaction during conversations about agriculture-related topics in a computer-mediated environment. The objectives that guided this part of the study included 1) describe #AgChat and #GardenChat users' perceptions of social presence during a Twitter conversation; 2) describe #AgChat and #GardenChat users' satisfaction with a Twitter conversation; and 3) describe relationships between perceptions of social presence and satisfaction during #AgChat and #GardenChat conversations.

Methods

Mixed methods were utilized for the entire study, which included seven weeks of #AgChat and #GardenChat conversations. However, the findings reported here focus on data collected from quantitative surveys administered to participants engaged in one week's conversations. Specifically, participants who contributed to the fourth of the seven conversations were asked to complete the survey. The fourth conversation was chosen to represent the midpoint of data collected for the complete study. The survey was available for one week after the respective conversations.

Survey Instrument Design

The survey instrument was adapted from the four sections and 56 items in the Collaborative Learning, Social Presence, and Satisfaction (CLSS) questionnaire to have 51 items (So & Brush, 2008). Section one of the questionnaire asked participants multiple-choice questions related to age, ethnicity, Twitter experience, and number of #AgChat or #GardenChat conversations in which they had participated. Sections two, three, and four of the questionnaire asked for responses on a scale that included strongly disagree (1), disagree (2), neutral (3), agree (4), and strongly agree (5). Section two of the questionnaire asked participants about their satisfaction with their ability to learn and understand during the conversation as well as their satisfaction with the diversity of topics in #AgChat and #GardenChat. The third section of the questionnaire asked participants to indicate the amount

of learning and sharing of ideas that took place during #AgChat and #GardenChat. Section four of the questionnaire asked participants about their perceptions of social presence dimensions during the conversation.

Validity of the survey instrument was established through previous studies that used similar instruments (Driver, 2002; Gunawardena & Zittle, 1997; Kitchen & McDougall, 1998; Tu, 2002). Data from items containing scaled responses were used to calculate Cronbach's alpha coefficients. The coefficient for #AgChat was 0.85, and the coefficient for #GardenChat was 0.92.

Quantitative Data Collection

Quantitative data collection took place following #AgChat and #GardenChat conversations held during the fourth week of August 2011. The moderators of each Twitter conversation sent Twitter messages with links to the questionnaires at the end of each conversation. Survey responses for #GardenChat were collected from Aug. 22, 2011, to Aug. 29, 2011. Survey responses for #AgChat were collected from Aug. 23, 2011, to Aug. 30, 2011.

The moderator of #GardenChat tweeted the survey link at 9:26 p.m., which was 26 minutes after the scheduled end of the #GardenChat conversation. The tweet said, "If anyone is interested check out [researcher's Twitter handle] Survey at http://ow.ly/6a2yo #GardenChat." The moderator of #AgChat tweeted the survey at 8:56 p.m., which was four minutes before the scheduled end of the #AgChat conversation. The tweet said: "Let's help [researcher's twitter handle] with her graduate thesis by taking this survey! http://ow.ly/69wNv #AgChat."

For each conversation, the researcher retweeted the moderators' original tweets immediately after the moderators posted the questionnaire links. The researcher also retweeted the moderators' tweets six times, eight hours apart, starting eight hours after the end of each conversation. The researcher also posted six original Twitter messages for each conversation, eight hours apart, starting at 9 a.m. the day after each conversation. Based on response rates, three days after the conversations took place, the researcher sent a series of five reminder tweets. The first two reminder tweets were posted eight hours apart, and the last three reminder tweets were posted 24 hours apart. To specifically target individuals that participated in #AgChat and #GardenChat on August 22 and August 23, respectively, the survey was available until the day of #GardenChat's and #AgChat's next scheduled conversation. In addition, reminder tweets asked for individuals who had participated in the most recent conversation. The accessible populations of #GardenChat and #AgChat users during the seven days that the survey was available were used to represent the target population of #GardenChat and #AgChat users who participated during the selected week's conversations. During the week of the survey, the #AgChat conversation contained 915 tweets from 148 users. Fifty-five of these users responded to the survey for a response rate of 37.16%. The #GardenChat conversation contained 1,452 tweets from 87 users. Nineteen of these users responded to the survey for a response rate of 21.84%. The numbers of tweets and participants appeared to be normal based on conversations during the weeks before and after the week that the survey was conducted. Low response rate and the potential for inclusion of respondents who did not participate in the selected conversations were limitations of the study. However, findings from this study can assist agricultural communicators in gaining a better understanding of social media and social presence.

The *Statistical Package for Social Sciences (SPSS®)* was used to calculate descriptive statistics, including means, standard deviations, medians, frequencies, percentages, and correlations, that were used to interpret participants' demographic information, perceived levels of satisfaction, perceived levels of social presence, and possible correlations among satisfaction and social presence. The scaled

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items used to gather participant responses on satisfaction and social presence were interpreted as 1.00 – 1.44 = strongly disagree, 1.45 – 2.44 = disagree, 2.45 – 3.44 = neutral, 3.45 – 4.44 = agree, and 4.45 – 5.00 = strongly agree. Pearson's product-moment correlation coefficients were used at the $p < .05$ level to analyze the relationships between social presence and satisfaction.

Findings

Eighteen states and two countries were represented by #AgChat respondents (n = 55). Multiple #AgChat respondents indicated they were located in either California (f = 4), Indiana (f = 4), Iowa (f = 3), or Wisconsin (f = 3). Other respondents were the only one or one of two people from their specified states. Eleven states and one country were represented by #GardenChat respondents (n = 19). Respondents for #GardenChat were the only one or one of two people from their specified states. Most participants were Caucasian. Each conversation had one Latino respondent. One respondent for #AgChat was Asian/Pacific Islander, while one respondent for #GardenChat was African American. Of the #AgChat respondents, 65% were female and 35% were male. Of the #GardenChat respondents, 72% were female and 28% were male. The majority of #AgChat respondents were between 26 and 45 years of age. The majority of #GardenChat respondents were between 36 and 45 years of age.

Participants rated their Twitter experiences as expert, intermediate, novice, or a user with no experience. Seven #AgChat respondents (20.60%) rated themselves as expert users, 70.60% as intermediate users, and 8.80% as novice users. None of the #AgChat respondents rated themselves as having no Twitter experience. Six #GardenChat respondents (40.00%) rated themselves as expert users, 6.70% as intermediate users, and 13.30% as novice users. None of the #GardenChat rated themselves as having no Twitter experience. When asked to indicate the number of discussions in which they had participated, the most frequent responses for #AgChat respondents were more than 10 (27.27%), two (9.09%), one (7.27%), and four (5.45%). The most frequent responses for #GardenChat respondents were more than 10 (47.37%) and six (10.53%). Twenty-two #AgChat respondents (40%) and 31.58% of #GardenChat respondents reported they had met in person any of the other participants in their respective conversations, while 21.82% of #AgChat respondents and 47.37% of #GardenChat respondents reported they had not met in person any of the other participants.

Many respondents reported more than one interest in agriculture. Marketing and communications were interests of 38.2% of #AgChat respondents and 46.7% of #GardenChat respondents. Other interests of #AgChat participants included production, farming, and sales/business. Other interests of #GardenChat respondents included home gardening, production, green living, sales/supplies, and public gardening.

Perceptions of Social Presence

Respondents who participated in #AgChat agreed with 10 of 21 statements about social presence. For example, respondents agreed CMC messages are social forms of communication (M = 4.27, SD = 0.45, Mdn = 4.00), CMC allows relationships to be established (M = 4.24, SD = 0.56, Mdn = 4.00), CMC messages convey feeling and emotion (M = 3.85, SD = 0.62, Mdn = 4.00), CMC allows building of more caring social relationships with others (M = 3.82, SD = 0.77, Mdn = 4.00), and CMC permits building of trust relationships (M = 3.79, SD = 0.60, Mdn = 4.00). Respondents were neutral about six social presence statements, including ease of expressing ideas (M = 3.33, SD = 0.96, Mdn = 4.00), large amounts of messages not inhibiting their ability to communicate (M = 3.24, SD = 1.06, Mdn = 4.00), and comfort in participating even when not familiar with the topics (M = 3.24, SD = .71, Mdn = 3.00). Respondents disagreed with five statements about social presence, such as CMC

messages are impersonal (*M* = 2.36, *SD* = 0.74, *Mdn* = 2.00) and that it is unlikely someone might obtain information about them from CMC messages (*M* = 2.30, *SD* = 1.01, *Mdn* = 2.00). See Table 1 for a complete list of #AgChat participants' responses.

Table 1

#AgChat Participants' Perceptions of Social Presence (n = 55)

Social Presence Dimension	*Mdn*	*M*	*SD*
Computer-mediated communication messages are social forms of communication	4.00	4.27	0.45
Computer-mediated communication allows relationships to be established based upon sharing and exchanging information.	4.00	4.24	0.56
I am comfortable communicating with a person who is familiar to me.	4.00	4.24	0.50
I am comfortable participating in computer-mediated communication, if I am familiar with the topic being discussed.	4.00	4.15	0.71
Using computer-mediated communication is a pleasant way to communicate with others.	4.00	3.94	0.75
Computer-mediated communication messages convey feeling and emotion.	4.00	3.85	0.62
Computer-mediated communication allows me to build more caring social relationships with others.	4.00	3.82	0.77
Computer-mediated communication permits the building of trust relationships.	4.00	3.79	0.60
The language people use to express themselves in computer-mediated communication is meaningful.	4.00	3.73	0.57
The language used by others to express themselves in computer-mediated communication is easily understood.	4.00	3.52	0.67
It is easy to express what I want to communicate through computer-mediated communication.	4.00	3.33	0.96
The large amounts of computer-mediated communication messages, including numbers of messages and length of messages, do not inhibit my ability to communicate.	4.00	3.24	1.06
I am comfortable participating, even though I am not familiar with the topics.	3.00	3.24	0.71
Where I access computer-mediated communication (home, office, computer labs, public areas, etc.) does not affect my ability or desire to participate.	3.00	3.12	1.05
I am uncomfortable participating in computer-mediated communication, if I am not familiar with the topic being discussed.	3.00	2.88	1.02
Computer-mediated communication is technically reliable, or free of system or software errors that might compromise the reliability of online messages reaching only the target destination.	2.00	2.55	0.71
Computer-mediated communication messages are impersonal.	2.00	2.36	0.74
It is unlikely that someone might obtain personal information about me from computer-mediated communication messages.	2.00	2.30	1.01
I am uncomfortable communicating with a person who is not familiar to me.	2.00	2.12	0.86
It is unlikely that someone else might re-send my messages.	2.00	1.94	0.70
Computer-mediated communication is private/confidential.	2.00	1.88	0.82

Note. Median scale. 1.00 – 1.44 = strongly disagree, 1.45 – 2.44 = disagree, 2.45 – 3.44 = neutral, 3.45 – 4.44 = agree, and 4.45 – 5.00 = strongly agree

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Respondents who participated in #GardenChat strongly agreed CMC allows relationships to be established (*M* = 4.47, *SD* = 0.74, *Mdn* = 5.00). Respondents agreed with 13 of 21 statements about social presence, including CMC messages are social form of communication (*M* = 4.33, *SD* = .072, *Mdn* = 4.00), comfort in participating even when not familiar with topics (*M* = 4.20, *SD* = 0.78, *Mdn* = 4.00), CMC messages convey feeling and emotion (*M* = 4.20, *SD* = 0.56, *Mdn* = 4.00), CMC allows building of more caring social relationships with others, ease of expressing ideas (*M* = 4.07, *SD* = 0.80, *Mdn* = 4.00), CMC permits building of trust relationships (*M* = 3.87, *SD* = 0.92, *Mdn* = 4.00), and large amounts of messages not inhibiting their ability to communicate (*M* = 3.80, *SD* = 0.94, *Mdn* = 4.00). Respondents were neutral on items related to technology being reliable (*M* = 3.33. *SD* = 0.90, *Mdn* = 3.00) and it is unlikely someone might obtain information about them from CMC messages (*M* = 2.53, *SD* = 0.99, *Mdn* = 2.00). Respondents disagreed with four statements, including CMC is private/confidential (*M* = 1.93, *SD* = 0.88, *Mdn* = 2.00), CMC messages are impersonal (*M* = 2.13, *SD* = 0.64, *Mdn* = 2.00), and respondents were uncomfortable communicating with unfamiliar people (*M* = 1.93, *SD* = 1.10, *Mdn* = 2.00). See Table 2 on following page for a complete list of #GardenChat participants' responses.

Satisfaction with Conversation

Respondents who participated in #AgChat agreed with 10 of 13 statements about satisfaction. For example, respondents agreed that as a result of their participation in #AgChat, they made acquaintances electronically in other parts of the country and/or world (*M* = 4.35, *SD* = .95, *Mdn* = 5.00), and that they were able to learn through the medium of computer-mediated communication (*M* = 4.03, *SD* = .79, *Mdn* = 4.00). Respondents were neutral about statements related to diversity of topics prompting them to participate in the discussion (*M* = 3.29, *SD* = 1.12, *Mdn* = 3.00), their level of learning being at the highest quality during the conversation (*M* = 3.21, *SD* = 0.81, *Mdn* = 3.00), and the amount of effort put forth in learning computer- mediated communication skills to participate in the conversation (*M* = 2.85, *SD* = 1.13, *Mdn* = 3.00). Respondents who participated in #AgChat did not "disagree" with any statements related to satisfaction. See Table 3 for a complete list of #AgChat participants' responses.

Respondents who participated in #GardenChat agreed with 12 of 13 statements about satisfaction. For example, respondents agreed that as a result of their experience they would like to participate in another discussion in the future (*M* = 4.40, *SD* = 0.83, *Mdn* = 5.00) and that they were stimulated to do additional readings or research about topics discussed during #GardenChat (*M* = 4.33, *SD* = .62, *Mdn* = 4.00). Respondents agreed least that their level of learning during the discussion was of the highest quality (*M* = 3.93, *SD* = 1.03, *Mdn* = 4.00). Respondents were neutral about the amount of effort put forth in learning computer-mediated communication skills to participate in the conversation (*M* = 2.93, *SD* = 1.22, *Mdn* = 3.00). Respondents who participated in #GardenChat did not "disagree" with any statements related to satisfaction. See Table 4 for a complete list of #GardenChat participants' responses.

Relationships among Social Presence and Satisfaction

For #AgChat respondents, the social presence item stating computer-mediated communication messages convey feeling and emotion showed a low to medium positive correlation with six other statements about satisfaction. The strongest of these correlations related to the level of learning that took place (*r* = .52), ability to learn through the medium of computer-mediated communication (*r* = .50), and the discussion as a useful experience (*r* = .48). Responses showed a low negative cor-

Table 2

#GardenChat Participants' Perceptions of Social Presence (n = 19)

Social Presence	*Mdn*	*M*	*SD*
Computer-mediated communication allows relationships to be established based upon sharing and exchanging information.	5.00	4.47	0.74
I am comfortable communicating with a person who is familiar to me.	5.00	4.40	0.74
Computer-mediated communication messages are social forms of communication	4.00	4.33	0.72
Using computer-mediated communication is a pleasant way to communicate with others.	4.00	4.27	0.80
I am comfortable participating, even though I am not familiar with the topics.	4.00	4.20	0.78
Computer-mediated communication messages convey feeling and emotion.	4.00	4.20	0.56
Computer-mediated communication allows me to build more caring social relationships with others.	4.00	4.13	0.91
It is easy to express what I want to communicate through computer-mediated communication.	4.00	4.07	0.80
The language used by others to express themselves in computer-mediated communication is easily understood.	4.00	4.00	0.85
The language people use to express themselves in computer-mediated communication is meaningful.	4.00	4.00	0.54
I am comfortable participating in computer-mediated communication, if I am familiar with the topic being discussed.	4.00	3.87	1.13
Computer-mediated communication permits the building of trust relationships.	4.00	3.87	0.92
The large amounts of computer-mediated communication messages, including numbers of messages and length of messages, do not inhibit my ability to communicate.	4.00	3.80	0.94
Where I access computer-mediated communication (home, office, computer labs, public areas, etc.) does not affect my ability or desire to participate.	4.00	3.60	1.06
Computer-mediated communication is technically reliable, or free of system or software errors that might compromise the reliability of online messages reaching only the target destination.	3.00	3.33	0.90
I am uncomfortable participating in computer-mediated communication, if I am not familiar with the topic being discussed.	2.00	2.73	1.45
It is unlikely that someone might obtain personal information about me from computer- mediated communication messages.	2.00	2.53	0.99
Computer-mediated communication messages are impersonal.	2.00	2.13	0.64
It is unlikely that someone else might re-send my messages.	2.00	2.07	0.84
I am uncomfortable communicating with a person who is not familiar to me.	2.00	1.93	1.10
Computer-mediated communication is private/confidential.	2.00	1.93	0.88

Note. Median scale. 1.00 – 1.44 = strongly disagree, 1.45 – 2.44 = disagree, 2.45 – 3.44 = neutral, 3.45 – 4.44 = agree, and 4.45 – 5.00 = strongly agree

relation between the social presence statement that computer-mediated communication messages are impersonal and five statements about satisfaction. The strongest of these correlations related to wanting to participate in another discussion in the future (r = -.46), overall satisfaction with the #AgChat discussion (r = -.45), and the discussion as a useful learning experience (r = -.44). A low to medium positive correlation also existed between the social presence statement related to computer-

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Table 3

#AgChat Participants' Satisfaction (n = 55)

Statement	*Mdn*	*M*	*SD*
As a result of my participation in #AgChat, I made acquaintances electronically in other parts of the country and/or world.	5.00	4.35	0.95
As a result of my experience with #AgChat, I would like to participate in another discussion in the future.	4.00	4.18	0.97
Overall, I am satisfied with the moderator's guidance during this discussion.	4.00	4.18	0.83
The discussion assisted me in understanding other points of view.	4.00	4.06	0.60
Able to learn through the medium of computer-mediated communication.	4.00	4.03	0.79
This discussion was a useful learning experience.	4.00	4.03	0.76
I was stimulated to do additional readings or research about topics discussed during #AgChat.	4.00	4.00	0.78
Overall, I am satisfied with what I learned in this discussion.	4.00	4.00	0.65
Overall, I am satisfied with the #AgChat discussion.	4.00	3.97	1.03
Able to learn from the #AgChat discussion.	4.00	3.97	0.87
The diversity of topics in this discussion prompted me to participate in the discussion.	3.00	3.29	1.12
My level of learning that took place in this discussion was of the highest quality.	3.00	3.21	0.81
I put in a great deal of effort to learn computer-mediated communication skills (e.g. how to use Twitter) to participate in this discussion.	3.00	2.85	1.13

Note. Median scale. 1.00 – 1.44 = strongly disagree, 1.45 – 2.44 = disagree, 2.45 – 3.44 = neutral, 3.45 – 4.44 = agree, and 4.45 – 5.00 = strongly agree

Table 4

#GardenChat Participants' Satisfaction (n = 19)

Satisfaction	*Mdn*	*M*	*SD*
As a result of my experience with #GardenChat, I would like to participate in another discussion in the future.	5.00	4.40	.83
I was able to learn from the #GardenChat discussion.	5.00	4.33	.98
This discussion was a useful learning experience.	5.00	4.33	.90
I was stimulated to do additional readings or research about topics discussed during #GardenChat.	4.00	4.33	.62
I was able to learn through the medium of computer-mediated communication.	5.00	4.27	.96
Overall, I am satisfied with the #GardenChat discussion.	4.00	4.27	.80
The discussion assisted me in understanding other points of view.	4.00	4.20	.76
As a result of my participation in #GardenChat, I made acquaintances electronically in other parts of the country and/or world.	5.00	4.13	1.25
Overall, I am satisfied with what I learned in this discussion.	4.00	4.13	.92
The diversity of topics in this discussion prompted me to participate in the discussion.	4.00	4.07	.80
Overall, I am satisfied with the moderator's guidance during this discussion.	4.00	4.00	1.00
My level of learning that took place in this discussion was of the highest quality.	4.00	3.93	1.03
I put in a great deal of effort to learn computer-mediated communication skills (e.g. how to use Twitter) to participate in this discussion.	3.00	2.93	1.22

Note. Median scale. 1.00 – 1.44 = strongly disagree, 1.45 – 2.44 = disagree, 2.45 – 3.44 = neutral, 3.45 – 4.44 = agree, and 4.45 – 5.00 = strongly agree

mediated communication being a pleasant way to communicate with others and six statements about satisfaction. The strongest of these correlations related to overall satisfaction (r = .53), ability to learn through computer-mediated communication (r = .51), and level of learning (r = .50). A low to medium positive correlation also existed between the social presence statement related to the language used by others to express themselves in computer-mediated communication being easily understood and six statements about satisfaction. The strongest of these correlations related to overall satisfaction with the #AgChat discussion (r = .59), overall satisfaction with the moderator's guidance during the discussion (r = .59), and the discussion assisting in understanding other points of view (r = .54).

For #GardenChat participants, a high to medium positive correlation existed between the social presence statement that computer-mediated communication messages are social forms of communication and 12 other statements about satisfaction. The strongest of these 12 correlations related to the level of learning that took place being at the highest quality (r = .80), the discussion as a useful experience (r = .80), overall satisfaction with what was learned (r = .79), and the discussion assisting in understanding other points of view (r = .76). A medium to high positive correlation existed between the social presence statement that computer-mediated communication permits the building of trust relationships and eight statements about satisfaction. The strongest of these eight correlations related to the level of learning being at the highest quality (r = .75) and the diversity of topics prompting respondents to participate (r = .70). A medium negative correlation existed between the statement that it is unlikely for someone else to re-send messages and nine statements about satisfaction. The strongest of these correlations related to overall satisfaction with the moderator's guidance (r = -.73) and overall satisfaction with what was learned during the discussion (r = -.72).

Discussion and Conclusions

Perceptions of Social Presence

Participants of both conversations appeared to sense a social presence and indicated they are communicating and interacting with other people. Participants in #GardenChat strongly agreed and participants in #AgChat agreed CMC allows relationships to be established based upon sharing and exchanging information. Participants in both conversations agreed CMC allows them to build more caring social relationships with others. Therefore, participants do not appear to feel a sense of de-individuation, as described by Taylor et al. (2011).

Based on the findings that participants in both conversations disagreed with the statement that it is unlikely someone else might re-send their messages and that participants disagreed with the statement that they were uncomfortable communicating with a person unfamiliar to them, it appeared participants have a sense other participants are in close virtual proximity. This conclusion aligns with previous research that says perceptions of social presence can influence psychological distance or felt immediacy during online communication (Gunawardena & McIsaac, 2004). This conclusion also aligns with research in distance education identifying a trend that defines distance in terms of psychological aspects rather than physical proximity (Garrison, 2000; So & Brush, 2008).

Satisfaction with Conversation

Based on findings in this study that participants in #AgChat and #GardenChat agreed with most statements about satisfaction, such as they would like to participate in another conversation in the future, they were stimulated to do additional readings, they were able to learn, and they were overall satisfied with the #AgChat and #GardenChat discussions, it appeared participants maintained attention and developed an attitude about their communication experience. Kupritz and Cowell (2011)

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reported how a person maintains attention and develops an attitude about communication is influenced by nonverbal cues found in face-to-face communication, such as eye contact, voice inflections, wardrobe, and facial expressions. Therefore, based on findings in this study and the study by Kupritz and Cowell, perhaps components within #AgChat and #GardenChat conversations compensate for the nonverbal cues found in face-to-face communication that influence how a person maintains attention and develops an attitude about communication. This conclusion aligns with previous studies that report social presence can be fostered through text-based variables, such as emoticons, to compensate for lack of nonverbal or face-to-face cues (Gunawardena & Zittle, 1997). This conclusion also supports previous studies that report missing social cues in CMC can be compensated for with response time; humorous or personalized message content; or paralanguage and emoticons, such as happy and sad faces (Picciano, 2002; Richardson & Swan, 2003; Rourke et al., 2001; Taylor et al., 2011).

Relationships among Social Presence and Satisfaction

Based on findings that participants in #AgChat and #GardenChat are more satisfied when their discussions convey feeling and emotion, it appeared it is important for users to craft their messages with sentiment and express their feelings as best as possible through text. These expressions could include special punctuation and the use of capital letters, emoticons, and descriptive language. This supports Tu's (2002) study, which indicated that emoticons and paralanguage made the conversation more comfortable for participants (Tu).

It appeared that for #GardenChat participants, the more they felt CMC messages were social forms of communication, the more satisfied they were with their level of learning, specifically in the realm of making acquaintances or connecting with people in other parts of the world. Therefore, it is possible that for some people, learning through a social form of communication, such as Twitter, may be more satisfying than other forms learning. This conclusion aligns with previous studies about online collaborative learning in which researchers found that learners placed high importance on feelings of connectedness and belonging (Hara et al., 2000; Harasim, 1993; Kitchen & McDougall, 1998; So & Kim, 2005).

Recommendations

While limited in application due to the small number of respondents and potential that respondents did not participate in the selected #AgChat and #GardenChat conversations, the findings and conclusions in this study suggested social presence, satisfaction, and the relationships between social presence and satisfaction influence satisfaction in CMC, specifically in Twitter conversations. When interacting or teaching in a computer-mediated environment such as Twitter, agricultural communicators should use responses that support components of social presence. Studies have shown correlations between social presence and student satisfaction (Gunawardena, 1995; Gunawardena & Zittle, 1997; Richardson & Swan, 2003), social presence and learning communities (Rourke et al., 2001; Rovai, 2002), and social presence and perceived learning (Richardson & Swan).

These recommendations are supported by previous studies that show introductions and salutations build social presence, and thus, trust and participation in online communications (Gunawardena, 1995; Johansen et al., 1988; Tu, 2002). These recommendations also are supported by Vrasidas and McIsaac (1999), who found that more structure in CMC led to more interaction. Agricultural communicators may notice more involvement in online conversations if they encourage users to reveal information about themselves, and to convey feeling and emotion.

Studies such as those described above can allow communicators to define the similarities and differences between face-to-face communication and CMC as well as to better understand how the level of structure in Twitter conversations relate to satisfaction levels of participants. To build on this study, additional research should be conducted using self-report mechanisms by participants. Digital scales allowing users to indicate their levels of agreement on a continuum in place of a five-point Likert scale may yield more accurate responses. Since many tweets in this study were sent by or related to the moderator of each conversation, the field of agricultural communications also could benefit from examination of the roles of moderators in Twitter conversations.

Implications

This study has provided insights about perceptions of social presence that exist during Twitter conversations about agriculture-related topics. Agricultural businesses can use these findings to better understand how to connect with existing and potential customers on Twitter, thus leading to the benefit of new or increased sales. For example, the finding that more than 50% of respondents in this study were female implies females may be more interested in and likely to recognize and support social presence dimensions. Therefore, businesses may search for female consumers on Twitter and connect with them through the use of appropriate social presence dimensions.

Insights about participants' perceptions of social presence and how those perceptions relate to perceptions of satisfaction could allow agricultural communicators and other social media users to implement Twitter strategies that are more satisfying. For example, a Twitter user or organization with the goal of educating its audience could achieve that goal by using affective responses, which express feeling and emotion. Thus, this study provided useful insights for professionals seeking to understand social networks as a business tool and how these social networks can be adapted to compensate for the lack of face-to-face social cues.

This study also revealed that agricultural communicators and other Twitter users not only feel comfortable with an increased use of text-based communication for their own purposes, but they also can guide populations across the globe as they increasingly rely on the Internet to support everyday activities. Though the Internet creates a unique social environment and has somewhat discouraged relational connections, agricultural communicators should apply the findings of this study to support virtual relationships to circulate agricultural information through chatting, messaging, and blogging.

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About the Authors

Kelly Pritchett earned a Master of Science in agricultural leadership, education, and communications from Texas A&M University in 2011. Traci Naile is an assistant professor of agricultural communications at Oklahoma State University. Theresa Murphrey is an assistant professor in the Department of Agricultural Leadership, Education, and Communications at Texas A&M University. Lauren Reeves is a Master of Science student in agricultural communications at Oklahoma State University.

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Are Alternative Farmers Yielding Success with Online Marketing and Communication Tools for Their Social Capital and Business Viability?

Katie M. Abrams and Abigail Sackmann

Abstract

To foster direct-to-consumer marketing, some alternative farmers are shifting to online tools like social media. What is unknown, however, is how they use them and what impacts use has on their business. The purpose of this study was to characterize and determine influences and outcomes of alternative farmers' use of various online communication channels to better understand what they stand to gain (or lose) from participation in these activities as it relates to their farm business viability and social capital. Through survey data of 82 alternative farmers, it was learned their personal use of social media was highly correlated with their business use. Most of their time on the Internet was spent finding farming information and finding and interacting with customers; these activities (along with several others) were positively correlated with online bridging social capital. Personal uses of Facebook were indicative of greater social capital, whereas business uses of any social media were not. For business viability, the more Facebook Page likes their farms had, the more revenue they had, but no relationships were found between their business use of social media and customer loyalty or customer relationship. In sum, alternative farmers' use of online communication tools was positively related to their social capital and their use of Facebook Pages was positively related to farm revenue. This study provides critical benchmark data to later determine the impact of effective use of these tools.

Key Words

Alternative farmers, online marketing, direct-to-consumer marketing

Introduction

Much of the literature in public relations tends to focus on medium and large enterprises often neglecting the significance and challenge of public relations of small businesses. The definition of a small business or small office varies according to the industry and may be based on number of employees or revenue (U.S. Small Business Administration, n.d.). These businesses often are so small that the role of public relations and marketing often falls on the shoulders of the business owners or other employees whose responsibilities are diverse (Stokes, 2000). While many industries contain small businesses in which public relations efforts could be examined, the agricultural sector offers an interesting angle on many fronts that seems comparable to others. The agriculture industry defines a small farm as having annual gross sales of less than $250,000 (USDA Economic Research Service, 2013), but this includes 91% of U.S. farms (Hoppe, MacDonald, & Korb, 2010). About 60% are considered "very small," having annual gross income of less than $10,000 with nearly half of the

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operators holding a job outside of farming, as well (Hoppe et al.).

Small-sized farm operations often choose direct-to-consumer marketing to reach customers, bypassing the loss of revenue from indirect sales and allowing a higher level of control of production practices (Payne, 2002). A unifying term used hereafter for these small farms using direct-to-consumer marketing is alternative farmers/farming. In this marketing model, the farms grow products as determined by a mix of their preferences and the market for those products and then find channels to sell directly to consumers through on-farm sales (including Internet sales), farm stands, farmers' markets, and other avenues that afford them access to customers directly. Farmers' markets and roadside farm stands can provide exposure to a potential customer base and then they may seek other avenues like Internet and on-farm sales. Government, nonprofit, and university Extension support is partly responsible for a steady increase in direct-to-consumer marketing during the last few decades. Examples of this growth are the number of farmers' markets in the U.S. has increased consistently from 1,755 in 1994 to more than 7,800 in 2012 (USDA, 2012) and a national study of organic farmers found 80% of those producing vegetables, herbs, flowers, mushrooms, or honey sold at least some of them through direct-to-consumer markets (Waltz, 2004).

Because of the growth of farmers' markets as a marketing channel, alternative farmers now face more competition and may benefit from public relations efforts that would expand their network and foster social changes that would help to create a more favorable business environment. In direct marketing, public relations becomes an important function for alternative farmers even if they believe they are too small to use the term to describe their communication efforts. However, in the face of few staff, a lack of expertise in public relations, and very little time, the public relations functions of these alternative farms must have unique characteristics and require an examination of whether and how inexpensive tools of the trade like websites, email, newsletters, blogs, and social media may impact these small businesses.

Direct-to-Consumer Marketing Online

Much of the literature examining communication functions of small-farm businesses does not use the term "public relations." Instead, researchers lump public relations activities into the concept of direct marketing despite delineations those within public relations and marketing would like to make between the two. Therefore, when referring to direct marketing activities, we are including public relations as a part of that but using the terminology from the base of literature that has examined alternative farm business communication efforts. Because relationships between farmers and consumers are at the heart of the direct marketing concept, the Internet in general and social media in particular have been encouraged in a wide variety of publications as effective tools for alternative enterprises because of their ability to facilitate communication between these two groups (Adam, Balasubrahmanyam, & Born, 2010; Gordon, 2010; Smith, 2011). Though a much-documented digital divide exists between urban and rural residents (Whitacre & Mills, 2007), the number of farmers using the Internet is steadily increasing, aided by the introduction of mobile technologies. In 2013, a 67% of U.S. farms had Internet access compared with 62% in 2011, and 14% of all farmers conducted agricultural marketing activities over the Internet, up from 12% in 2011 (USDA NASS, 2013).

However, very little empirical research has been conducted on small farmers and the effectiveness of online direct marketing, and existing studies tend to focus on direct marketing via a farm website rather than social media. For example, one 2006 study of small farmers across the U.S. found though a majority of the farms had no website, farms with websites generally had higher levels of gross farm sales than did farms without websites, and a higher percentage of farms with websites earned more

than 75% of their household income from the farm than did farms without websites (Brown & Baer, 2006).

The broad business and communications literature offers explanations of the outcomes of social media. Most often, social media is cited as affecting many non-financial outcomes that later foster financial ones for businesses. These non-financial outcomes often are described under the concept of customer engagement. Fostering customer loyalty is one commonly named impact of using social media (Blanchard, 2011; Sashi, 2012). Another is customer communication/interaction, which should, theoretically, foster customer loyalty and increase frequency and yield of purchases (Chu & Kim, 2011; Mangold & Faulds, 2009; Murdough, 2009; Sashi, 2012). Few studies, however, have shown correlations between social media and financial outcomes for businesses in general, let alone small-farm businesses.

Direct Marketing, Online Tools, and Social Capital

Previous empirical studies of farmers and their reasons for using direct marketing cite incentives were (1) control over their production and (2) higher profits for the same amount of production (Kirwan, 2004). Other potential benefits exist, both to direct marketing and social media use, beyond these two incentives. These benefits are the result of the cultivation of informal exchange relationships (both online and face-to-face) through what may be better described as public relations (as opposed to marketing) activities. Informal exchange relationships may not provide as immediate or measurable results but still offer avenues of support particularly for small farmers (Sutherland & Burton, 2011). Outcomes from these relationships can be direct, such as the ability to receive credit from local vendors or a loan from a family member to stay in business (Anderson & Jack, 2002; Gustafson & Nganje, 2006), or indirect, such as increased voter support for policy that effects small farms in a beneficial way (Sharp & Smith, 2003) or collective investment in the farming community (Flora, 1995).

These relationships and their outcomes may be understood and measured by applying the concept of social capital. Bourdieu (1986) situates social capital alongside economic and cultural capital as three exchangeable forms of capital that facilitate the movement of actual or potential resources; social capital is a collective asset made up of these resources created from the relationships between members in a group. Within the concept of social capital, Granovetter (1973) describes strong and weak ties, each associated with different kinds of benefits at the level of the individual. In his study of people looking for employment, he found those with more weak ties, associated with bridging social capital, tended to be more successful. Many other studies have supported his findings, and weak ties are generally understood to provide access to resources beyond a person's immediate network. Bonding social capital provides other benefits, including emotional or substantive support and the maintaining of resources (Williams & Durrance, 2008).

Some argue social capital is increasing, most often citing the Internet's role in facilitating communication and relationships (Lin, 1999). This is a broad literature and authors treat social capital in the context of the Internet differently. Hampton and Wellman (2003) found an online discussion group in a localized community enhanced weak ties and increased interaction among neighbors. Similarly, Kavanaugh, Reese, Carroll, and Rossen (2005) found for individuals with high levels of bridging social capital, using the Internet as a communication tool may enhance face-to-face interactions. Ellison, Steinfield, and Lampe (2007) found a strong positive relationship between Facebook use and both types of social capital, with bridging being impacted the most. Ko and Kuo (2009) found self-disclosure through blogging directly impacted bloggers' perception of their own bonding

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and bridging social capital levels, which in turn effected their subjective well-being.

No known study exists to date on the interaction between American small farmers' Internet use and social capital. However, a wide band literature exists on farmers' face-to-face relationships that create social capital, though most studies treat social capital as a variable determining farmers' willingness to adopt technological changes within a broader theoretical orientation of the diffusion of innovations theory. These studies are most often about the global South, influenced largely by the adoption of the concept as a development tool by the World Bank (Grootaert 2004; Sanjeev & Gangadharappa, 2010; Tu, Li, & Tsai, 2010; Woolcock & Narayan, 2000). Case studies in this area generally measure social capital as a trait of a community or village, mapping it to development measures, though some such as Wolz and colleagues (2010) measure it at the individual household level and relate it to business outcomes such as farm income. Wolz et al. also measured bridging and bonding separately, ultimately determining that bridging social capital was a significant determinant of farm income for small farmers in Ukraine. Studies conducted in the West are more likely to problematize the concept of social capital in rural development, though often they also cite its benefits to individual farmers. For example, Sutherland and Burton (2011) found social capital was important for small farmers in Scotland, particularly in access to labor, but also call into question its usefulness as a development strategy particularly due to questions of scale.

This study focused on the individual farmer level and sought to understand the potential benefits of social capital and how it relates farmers' use of different online tools and outcomes from that use.

Purpose and Objectives

Farmers are a unique and critical group to examine in terms of their use of online marketing and communication channels because they are likely to be living and/or working in rural areas. They likely are not accessing and using the Internet-based mediums in the same way as others in urban and suburban settings. Alternative farmers often have to handle their own marketing, whether that be direct-to-consumer and/or through facilitating relationships with wholesalers, retailers, schools, and restaurants and online communication tools are a way to achieve that. Also, from a variety of societal levels (i.e., consumers, state government, federal government, nonprofits), the push to foster local food markets further highlights the necessity to begin exploration of whether these tools provide tangible benefits for farmers in being able to market their business.

The purpose of this study was to characterize and determine influences and outcomes of alternative farmers' use of various online marketing and communication channels. The following objectives guided the research:

To determine what influences alternative farmers' adoption of online mediated communication channels, answering the following: What social media are they using for personal vs. business uses? What types of activities do they engage in online and for how much time?

To analyze how their use of and interactions in online communication channels (particularly social media) relates to social capital and business viability.

Methodology

Online survey methodology (using Qualtrics) was deemed appropriate since the questions this study addresses require farmers to have and use the Internet on at least a weekly to every other week basis. Previous recent surveys of farmers show most U.S. farmers have access to the Internet, use it on a weekly basis, and access it via mobile devices and laptops/computers (AgriCouncil, 2012; Hyde, Spaulding, Tudor, & Mahatanankoon, 2012). The online survey was optimized for taking on mobile

devices or laptops/desktops and for 56 kilobytes/second Internet connection speeds.

The instrument included questions about farm characteristics, use and motivations for use of online media for personal and business, use of marketing channels, social capital, farm business viability (revenue, perceived customer loyalty/communication), and demographics. Most of the measures were researcher-developed or adapted from literature in collaboration with a panel of experts that included an agricultural economist extension agent with expertise in direct marketing, an alternative farms extension agent, an entrepreneur for a start-up organization designing an online tool for farmers, and an educational director for an alternative farmers group (who also is an alternative farmer). The instrument was piloted with two alternative farmers who provided additional input.

Scales for social capital were used from Williams (2006) and had a reliability with the data in this present study of α = .88 for online bridging social capital, α =.77 for online bonding social capital, α = .71 for face-to-face bridging social capital, and α = .80 for face-to-face (FTF) bonding social capital. Measures for business viability included farm business revenue (entered as a whole number by respondent) from the previous year (because they should have it documented from filing their taxes in April), a customer loyalty scale adapted from Jones, Taylor, and Bansal (2008) (α = .82 in this study) and a customer relationship scale adapted from Thomson (2006) (α = .92 in this study). Their personal use of Facebook, Twitter, and blogs were measured with yes/no questions, and then they provided the number of friends, followers, and blogs followed. Their farm business use of these same tools plus email newsletters was measured with yes/no questions and then they provided the number of likes, followers, blog viewers, and email newsletter subscribers for their farm. With each question relating to Facebook or Twitter, they were encouraged to click a link to open those websites (opened in a new tab/window) to check the exact number. Their time spent engaged in various Internet activities was measured on an ordinal scale for each activity (1 = Never, 2 = 59 minutes a month or less, 3 = 1-3 hours a month, 4 = 1-3 hours a week, 5 = 4-7 hours a week, 6 = 8-14 hours a week, 7 = 15-21 hours a week, 8 = 22 or more hours a week). The same scale was used to measure time spent doing those activities on various online tools/services (email newsletter, forums, Facebook, Twitter, blogs, Pinterest, YouTube, and other). The survey was designed so only questions that applied to the respondents were shown to them. For example, if a respondent indicated he spent 0 hours on the Internet in an average week, then he did not answer the next series of questions measuring how they spend their time on the Internet in that average week.

Convenience sampling was employed by emailing the invitation to participate and survey link through eight alternative farmer organization listservs throughout Illinois and print newsletters. A modified version of the Dillman Tailored Design Method (Dillman, Smyth, & Christian, 2008) was used where an initial invitation with the link was sent, followed up by one reminder a week later. The survey was open for four weeks during July to accommodate varying initial invitation dates sent through the organizations, but for each group, the collection occurred over two weeks' time only.

Through email, the survey went to 2,006 recipients. Given the similarity of the organizations' audiences/members, it is also very likely for any given person to also belong to one or more of the other organizations included. Unfortunately, the listserv owners had no way to only include farmer subscribers when sending the survey and would not allow the researchers access to the data to eliminate duplicates across the groups. So although the number of recipients seems high, overlap between them probably existed and some may not have been farmers (therefore discouraged from taking the survey); therefore, response rate could not be accurately determined. Respondents were incentivized to participate by offering to enter their name into a drawing for one of two $50 pre-paid credit cards. Protection was put on the survey to block people from taking it more than once based on their IP

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address. The first two questions exited people who were not farmers or part of a farming operation with extensive knowledge about the business via family or other relationship. Questions on characteristics of their farm sorted non-alternative farmers.

In total, 120 farmers responded. After eliminating respondents who completed less than 40% of the survey (32 respondents) and respondents whose characteristics identified them as a conventional farmer by indicating they primarily produced commodity crops and nothing else (4 respondents) or more than 90% of their sales were to a grain elevator (2 respondents), 82 respondents were included in the analysis. The high dropout may be linked to the length of the survey; it took an average of 31 minutes (SD = 2.4) for respondents to complete. Low response also can be contributed to the timing (July) of the survey aligning with farming season for summer crops and farmers market season.

Results

Demographics consisting of respondents' age, gender, race, education, and farm characteristics aid in determination of generalizability of the results of this study. Respondents ranged in age from 19 to 82 years old, with an average age of 51 years (SD = 12.8). Sample gender breakdown was 43.9% (n = 36) female, 40.2% (n = 33) male, and 15.9% (n = 13) not responding. It was primarily white (80.5%, n = 66). Only one respondent each indicating African American, Native American, and other (3.6% total), and 15.9% (n = 13) not responding. Most of the sample had a college education: 32.9% (n = 27) 4-year college degree, 17.1% (n = 14) master's degree, 15.9% (n = 13) some college, and 7.3% (n = 6) 2-year college degree. Six (7.3%) held a high school/GED degree, and two (2.4%) held a doctoral or professional degree (JD, MD). Respondents' (n = 62) acreage ranged from 0 to 510 with an average of 75.6 (SD = 127.1).

With respect to time spent farming, the average (4.14, SD = 1.72) indicated most had farmed for 11 to 15 years or less (scale: 1 = less than 1 year, 2 = 1 to 5 years, 3 = 6 to 10 years, 4 = 11 to 15 years, 5 = 16 to 20 years, 6 = 21 or more years). The top agricultural commodities/products grown or produced were vegetables (61%, n = 43), fruits (53%, n = 37), poultry/egg (37%, n = 26), ornamental horticulture (nursery, greenhouse, Christmas trees, flowers) (27%, n = 19), grain/oilseed (23%, n = 16), beef cattle (21%, n = 15), hog (11%, n = 11.2), and goat (14%, n = 10). The farm revenue for the sample ranged from a net loss of $20,000 to a net gain of $30,000 with an average net gain of $568.59; notably, only 38% (n = 31) indicated they could provide an estimate of their net revenue for the previous year. The respondents represented 48 different counties in Illinois, which is about half of the total number of counties in the state. Most of the farms employed one or two to three full-time employees. About 35% (n = 27) owned a smart phone.

Objective 1a

Internet use was defined in the survey for respondents as "using an Internet browser, such as Internet Explorer or Firefox, or Internet-enabled phone or tablet computer to search, to look at websites, use social media, email, check markets or weather, and so on." Respondents' time spent per week on the Internet average was 16.86 hours (SD = 12.00).

Personal use and farm business marketing use of social media were fairly similar. Chi-square tests revealed significant associations between personal and business use with moderate to large effect sizes (see Table 1).

Table 1
Personal vs. Farm Business Marketing Use of Social Media

	N	%	*f*	X^2	Phi
Personal Facebook	78	60%	47	23.40**	.61
Business Facebook	71	61%	43		
Personal Blog	78	32%	25	11.98**	.45
Business Blog	71	31%	22		
Personal Twitter	78	10%	8	15.18**	.54
Business Twitter	70	19%	13		

Note. Personal use of blogs was framed as reading or posting to farm-related blogs, whereas business use was framed as using a blog to promote/market their farm/products.

Objective 1b

Respondents' indicated spending most of their time on the Internet seeking information about farming, interacting with customers, and finding customers (see Table 2).

Table 2
Internet Time Spent on Various Activities

	N	M	SD
To seek information about farming	81	3.53	1.24
To interact with customers or potential customers	81	3.19	1.63
To find customers or potential customers	81	2.94	1.60
To interact with people (non-farmers) who share my values about farming and food systems	81	2.56	1.47
To provide information about farming	81	2.51	1.25
To find information about political issues as it relates to farming	81	2.51	1.24
To find people (non-farmers) who share my values about farming and food systems	81	2.26	1.34
To interact with other farmers	81	2.16	1.04
To find other farmers	81	1.99	1.04
To engage in political issues as it relates to farming	81	1.84	1.01

Note. Scale 1 = Never, 2 = 59 minutes a month or less, 3 = 1-3 hours a month, 4 = 1-3 hours a week, 5 = 4-7 hours a week, 6 = 8-14 hours a week, 7 = 15-21 hours a week, 8 = 22 or more hours a week

Person Product-Moment Correlation revealed the only significant correlation between demographics and these online activities was age and interacting with other farmers (n = 62, r = -.29, p = .025), meaning the younger the respondent, the more time they spent on the Internet interacting with other farmers. Correlations between the different types of social capital and time spent on various Internet activities revealed online bridging social capital was most strongly, positively correlated with most of the activities (see Table 3).

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Table 3
Correlations between Social Capital and Time Spent on Internet Activities

	FTF Bridging	FTF Bonding	Online Bridging	Online Bonding
To seek information about farming	-.013	-.068	.176	-.013
To interact with customers or potential customers	.282*	.266*	.405**	.145
To find customers or potential customers	.197	.150	.402**	.139
To interact with people (non-farmers) who share my values about farming and food systems	.098	.037	.540**	.159
To provide information about farming	.104	.155	.345**	.193
To find information about political issues as it relates to farming	.170	.025	.344**	.152
To find people (non-farmers) who share my values about farming and food systems	.069	.039	.472**	.080
To interact with other farmers	.189	.251*	.361**	.310**
To find other farmers	.059	-.055	.196	.110
To engage in political issues as it relates to farming	.223	.137	.394**	.121

Note. * p < .05, **; p < .01

Objective 2

Social capital

Using independent samples t-tests, effects of online tools use on social capital were determined. Respondents who used Facebook on a personal level had a higher level of online bridging social capital, M = 3.70 (SD = .70), than those who did not, M = 3.25 (SD = .82), $t(74)$= -2.54, p =.01 (2-tailed). Effect size was moderate (eta squared = .08). Whether respondents used Facebook personally did not affect FTF bridging social capital, FTF bonding social capital, or online bonding social capital. Respondents who used blogs personally (reading or posting) had a higher level of online bridging social capital M = 3.90 (SD = .77), than those who did not, M = 3.35 (SD = .81), $t(74)$ = -2.99, p = .004 (2-tailed). Effect size was moderate to large (eta squared = .11). Effects of personal blog use on other types of social capital were non-significant. Personal Twitter use did not impact any of the types of social capital either.

The number of respondents' personal Facebook friends and Twitter followers did not correlate with any types of social capital. The number of blogs they followed, however, did significantly correlate with face-to-face bonding social capital (n =23, r = .545, p = .007), face-to-face bridging social capital (n = 22, r = .45, p = .04), and online bonding social capital (n = 23, r = .49, p = .02).

With respect to farm business use of online tools, respondents who used email newsletters for marketing had higher FTF bridging social capital, M = 4.15 (SD = .53), than those who did not, M = 3.82 (SD = .63), $t(66)$= -2.40, p =.02 (2-tailed). Effect size was moderate (eta squared = .09). They also had higher levels of FTF bonding social capital M = 4.01 (SD = .60), than those who did not, M = 3.68 (SD = .71), $t(68)$= -2.51, p =.02 (2-tailed). Effect size was moderate (eta squared = .06). Whether they used Facebook, Twitter, or blogs for business purposes did not impact any of the types of social capital.

Business viability

Independent samples t-tests were used to determine whether those who had a farm business website were different from those who did not in terms of three dimensions of business viability. About 63% (n = 52) had a website for their farm. The t-tests did not reveal any significant (p < .05) differences in business viability (revenue, customer loyalty, and customer relationship) whether they had a website or not.

Relationships between their personal and business online following and business viability were examined with Pearson Correlation analyses. Twitter and blogs were excluded because the numbers of respondents pairwise with revenue in particular were so low (less than 7). Personal and farm Facebook page friends/likes were both highly positively correlated with revenue, but email newsletter subscribers was not (Table 4).

Table 4

Correlations between Online Following and Farm Business Viability

	N	*M*	*SD*	Revenue	Customer Loyalty	Customer Relationship
# of personal Facebook friends[a]	49	4.51	3.52	.54*	.03	-.03
# of farm Facebook Page likes	31	4.11	788	.83**	.12	.12
Farm email newsletter subscribers	29	3.08	607	.38	.27	.11

Note. * p < .05, **; p < .01. [a]1= 50 or fewer at 50 friends increments through 11= more than 500 friends. [b]1=25 or fewer at 25 followers increments through 9= more than 350. [c]1= none at 3 blogs increments through 9= more than 20.

Conclusions and Implications

This research provided empirical evidence describing the relationships between alternative farmers' use of the Internet, social media, and email newsletters and their social capital and farm business viability. The relationships revealed offer implications for farmers, educators, and small enterprises considering the usefulness and effectiveness of these media for direct-to-consumer marketing.

The associations found between personal social media use and farm business social media suggest that personal and business use are intertwined. Given the low number of employees on these farms, those farming in the field are likely the same ones maintaining their farm's social media presence. Perhaps their drive to use it personally made adopting it for their business less of a barrier. They may combine their personal and business use during the same time sessions under the assumption that if they are already on the sites for personal reasons, it would not take much more time or effort to use or experiment with it for their business. It may be useful for extension agents and other educators to encourage these farmers to first adopt personal pages on social media to help them gain comfort and experiment with the tools. This can also be helpful in networking with their current, loyal customers who may identify the farmer more so than the brand/business. Then, when they launch their business social media sites, they can easily invite those friends and followers to their brand pages.

Considering the total average time respondents indicated spending on the Internet (nearly 17 hours/week), roughly half of that time was spent engaging in the 10 Internet activities measured in this study that related specifically to their farm business, but primarily that time was spent finding

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farming information and customers and interacting with customers. In sum, farmers are primarily driven to use the Internet to foster financial gratifications. It is unlikely these items captured every Internet-based activity they engage in for their farm, so how the other half of that time is spent is unknown. The only demographic relationship in these activities was age; younger farmers were more likely to spend more time interacting with other farmers online. This is likely because younger people are more accustomed to interacting in online space, both with friends and with unknown individuals (Thayer & Sukanya, 2006). Notably, interacting with other farmers online was also related to FTF bonding, online bridging, and online bonding social capital.

The more time respondents indicated spending on online activities related to their farm (except for seeking information about farming), the more online bridging social capital they had. This finding makes a case for the positive potential of online interactions because it demonstrates they are more likely to have relationships with different social groups, thus a greater number of weak ties. Previous work has shown bridging social capital to be linked to greater success (Granovetter, 1973; Wolz et al., 2010). As other studies have revealed, online interactions tend to have the biggest impact on bridging social capital (Ellison et al., 2007; Ko & Kuo, 2009).

Both FTF forms of social capital were correlated (albeit less strongly) with the time farmers spent interacting with customers online. These results support the findings in previous studies that the Internet, as a communication tool, may enhance FTF interactions (Hampton & Wellman, 2003; Kavanaugh et al., 2005). More positive outcomes on social capital were demonstrated from the personal use of online media tools than their business uses. Personal Facebook use was correlated with more bridging social capital. Neither the number of Facebook friends nor Twitter followers were related to social capital, leading to the conclusion that the quality of the relationships in these channels is more important than the quantity. The exception here is that the number of blogs they followed positively correlated with FTF bonding, online bridging, and online bonding social capital. Their business use of email newsletters was also positively correlated with FTF bonding and bridging social capital. These findings suggest that email and blog use are activities that these farmers carried out as an extension of their in-person relationships, rather than meeting new people through them, showing a fundamental difference between email and social media. The number of blogs followed was also correlated with bonding social capital, suggesting it is more of a space to interact with their communities than to bridge out to other communities, whereas Facebook and writing a blog tended to be more of a bridging activity. This suggests the farmers tend to follow the blogs of people they know (in fact, people they're close to), but meet new people through writing a blog, which again shows Internet interactions can promote and enhance FTF relationships (Hampton & Wellman; Kavanaugh et al.).

Business uses of Facebook or Twitter were not indicative of social capital. Social capital was measured as a personal trait, which may explain this finding; however, with such small farms, these farmers' social capital can directly affect the success of their business. This finding suggests that their business uses of social media are not as critical to their social capital as their personal uses.

With respect to farm business viability, few positive correlations were found between the size of their Facebook and e-newsletter networks and revenue, customer loyalty, or customer relationship. Notably, though, the number of Facebook Page likes they had was indicative of higher farm revenue, which may suggest those who effectively use Facebook and gain large followings of their Page are able to market better. Recall these characteristics of their business use were not correlated with any types of social capital. Social capital was primarily connected with their use of online media on a personal, individual level, meaning if these farmers are to create the best possible opportunities

for themselves and their farm business, using it in both ways (personal and business) seems ideal to foster social capital and revenue.

This study did not show relationships between the non-financial outcomes of customer relationship and customer loyalty that are typically touted as the intermediary and more easily affected variables for a business using social media (Chu & Kim, 2011; Mangold & Faulds, 2009; Murdough, 2009; Sashi, 2012). Perhaps this shows these farmers are not using the tools more effectively but instead grew their Facebook Page following through an existing customer base that has a high number of Facebook users and simply promoting their Pages well. Without examining more specifically how the businesses are using their Facebook Pages, we cannot know exactly why there is a direct relationship between number of Facebook Page likes and revenue and not the non-financial outcomes. The other issue to consider here is that we measured the farmers' perceptions of customer relationship and loyalty rather than as a characteristic of the customer. A more robust design would include measuring that from the customers directly. Still, the significant relationship between revenue and Facebook Page likes for farm businesses is evident of the potential of an effective Facebook presence for these alternative farm businesses.

Limitations and Recommendations

Generalizations from this study should be made with caution given the use of convenience sampling. To improve on the limitations of this research, the data should be collected again during a less busy time of year for this population (e.g., January-March) to improve response rate. Clearly, the survey should also be shortened to reduce the high dropout rate and/or greater incentives should be offered. Another consideration is the online survey mode means it more likely captured respondents who spend more time online than others. The findings suggest the next practical step would be providing training to these farmers so that they are using social media for their business more effectively. Then, characteristics of effective use for small, alternative farms selling direct to consumers could also be suggested if data show positive impact on their social capital and business viability.

With regard to recommendations for practice, this study suggests alternative farm businesses and perhaps other small enterprises should:

- Spend more time online to achieve bridging social capital, which is associated with business success (Wolz et al., 2010).
- Use social media personally (rather than just for business) to achieve greater social capital.
- Use Facebook Pages and Facebook Profiles for potential higher revenue.
- Use blogs and email newsletters to enhance face-to-face relationships that exist with customers.

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About the Authors

Katie Abrams, an assistant professor in the Department of Journalism and Technical Communication at Colorado State University, researches how people make sense of and participate in communication about food and agricultural issues. Abigail Sackmann has her Master of Science from the University of Illinois Graduate School of Library and Information Sciences. She has a strong passion for studying and promoting local food systems.

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Research

A Little Learning is Dangerous: The Influence of Agricultural Literacy and Experience on Young People's Perceptions of Agricultural Imagery

Annie R. Specht, Billy R. McKim, and Tracy Rutherford

Abstract

Agricultural knowledge gaps are forming between American agricultural producers and the consumers they feed and clothe. These divides in agricultural literacy and firsthand experience in the food and fiber industry may affect how consumers perceive images of modern production practices presented in the news media and, subsequently, the industry itself. In a quantitative study, researchers surveyed students at a large public university about their agricultural literacy — knowledge and awareness of and familiarity with agriculture-related issues — and agricultural experience, their firsthand interactions with agricultural production. The students also responded to images taken from a television news broadcast about antibiotic use in livestock production. Using these three variables, an analysis of variance was conducted that revealed significant differences between students experienced in agricultural production and those somewhat inexperienced, indicating that those with minimal exposure to agriculture may have done so in a context related to traditional, rather than modern, production. A regression analysis also revealed agricultural literacy was a significant predictor of reaction score. The researchers suggest, given the ability of agricultural literacy to influence perceptions, agricultural literacy initiatives should be promoted, while experiences with agriculture may be enhanced by hands-on learning at agritourism sites and agricultural fairs and expositions.

Key Words

Television, agricultural literacy, knowledge gap theory, public perceptions

Introduction

In the past decade, American audiences have consumed news stories focused on elements of modern agricultural production with which audiences are largely unfamiliar. In 2012, serious charges of livestock mistreatment, environmental degradation, and abuse of non-therapeutic antibiotics have been levied against the food industry: In August, federal officials shut down a Fresno, California, slaughterhouse after the release of a video showing visibly impaired cattle being stunned by "bungling" employees, raising fears that meat from sick animals entered the food supply (Cone, 2012). Meanwhile, a study conducted by the U.S. Government Accountability Office found the Environmental Protection Agency failed to regulate pollution caused by the nation's livestock operations, leading to the degradation of vital waterways like the Chesapeake Bay (Webber, 2012). Citing pressure from consumers "[focused] on where their food comes from and how it is raised," the U.S. Food and Drug Administration (FDA) announced new guidelines for the use of antibiotics in food-animal produc-

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tion in May: The FDA called for a voluntary moratorium of antibiotic use for growth promotion and increased veterinary oversight (Miller, 2012; Jordahl, 2012).

Stories and related images of industrial farming and modern animal husbandry methods violate long-held stereotypes of agriculture as a tranquil, bucolic "lifestyle," and the outcomes of this confusion may be exacerbated by a lack of agricultural awareness among members of the public. Agricultural literacy stands as one of the primary tenets of the American Association for Agricultural Education's (AAAE) 2011-2015 National Research Agenda: "Arguably, an understanding of agriculture's history and current economic, social, and environmental significance, both domestically and internationally, is important for all Americans" (Doerfert, 2011, p. 11).

Per Doerfert (2003), Americans are increasingly removed from the nation's agricultural base, leading to potentially negative effects on how U.S. citizens view the food and fiber industry: "Limited knowledge … makes [the public's] views uncertain and malleable" (p. 12), opening the door for media portrayals of the industry to heavily influence public perceptions.

Purpose and Objectives

The purpose of this study was to investigate the impact of agricultural literacy — operationalized here as knowledge and awareness of the U.S. food and fiber industry — and firsthand experience with agriculture on college students' perceptions of television coverage of issues in modern livestock production. This study addresses AAAE's National Research Agenda Priority 1: Public and policy maker understanding of agriculture and natural resources. Within this research area, special focus should be placed on "members of the agriculture industry [increasing] their understanding of various stakeholder group needs and/or behaviors" (Doerfert, 2011, p. 8), an attitude reflected in this study.

To fulfill the purpose explicated above, the researchers developed a series of objectives. The objectives of this study were to

- Describe college students' reactions to images taken from agriculture-related television news stories;
- Describe college students' perceived agricultural literacy and self-reported agricultural experience; and
- Identify possible explanations for college students' reactions to agriculture-related television news stories.

Conceptual Framework

Knowledge Gap Theory

Knowledge gap theory posits the infusion of mass-mediated information into a society causes certain groups to acquire knowledge at a faster rate than others, leading to "knowledge gaps" between informational haves and have-nots (Tichenor, Donohue, & Olien, 1970; Tran, 2013). Seminal work in knowledge gap theory positions socioeconomic status as the primary variable in the development of these (Ettema, Brown, & Luepker, 1983; Tichenor, Donohue, & Olien, 1970), but other factors, including audience motivation and perceived message usefulness, may contribute to the formation of informational divides among social groups (Ettema & Kline, 1977; Kwak, 1999). Ettema, Brown, and Kline (1983) contend motivation for attention is perhaps the most important element of unequal knowledge gains among social segments, noting that "gaps widen when there is a difference in motivation" (p. 519); Viswanath et al. (1994) agree, stating education-based knowledge gaps are exacerbated by a lack of perceived informational functionality. Audiences may limit their exposure to information they deem not useful (Knobloch, Carpentier, & Zillman, 2003) but will attend closely

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when motivated by factors like perceived risk (Ho, 2012).

The agrarian information divide between farmers and consumers is growing: As more Americans move farther from the farm, both geographically and generationally, the necessity for and salience of agricultural knowledge decreases, leading to the potential development of an agricultural knowledge gap that could increase the incidence of negative or unrealistic perceptions of the industry taking hold in society (Rumble & Buck, 2013). To counter the division between agrarian-knowledge haves and have-nots, agricultural literacy has become an increasingly important initiative among agricultural educators and communicators alike.

Agricultural Literacy

Before the agricultural industrial revolution of the post-World War II decades, the United States was a nation built upon — and reliant upon — a strong shared agrarian tradition: "A close identification with a common agrarian culture and heritage resulted in a shared sense of agricultural literacy, arising from intimate familiarity with the production, distribution, and use of agricultural products" (Powell, Agnew, & Trexler, 2008, p. 87). Increasing urbanization and the movement of the workforce toward white-collar employment gradually led to the decline of the agriculture industry as a focal point of American life, and the latter decades of the 20th Century ushered in growing concern regarding the U.S. population's disconnect from the sources of its food and fiber (Brewster, 2012; Doerfert, 2003).

In 1988, the Committee on Agricultural Education in Secondary Schools released a series of recommendations related to agricultural literacy, noting that an agriculturally literate person should have a firm grasp of the industry's "current economic, social, and environmental significance to all Americans" (National Research Council, 1988, p. 9). The committee concluded few Americans possessed a keen grasp of contemporary agricultural issues: Fewer than 30 percent of Kansas students at the elementary, junior, and senior school levels who were surveyed as part of the study were able to correctly answer basic questions about food and fiber production (Horn & Vining, 1986; National Research Council, 1988).

Many of the questions raised by the National Research Council Report remain unaddressed. Pense and Leising (2004) questioned the efficacy of agricultural literacy programs for K-12 students the following year, especially after discovering high-school students in an agricultural education track fared worse than their suburban and urban counterparts on an agricultural literacy instrument. How students performed on agricultural literacy instruments after high school remains largely unreported: In a 2003 study of the agricultural literacy research conducted since the 1988 report, Doerfert found only four studies investigated the agricultural literacy of university students.

Experience and Experiential Learning

An element of agricultural literacy that is not well-studied in non-agricultural populations is first-hand experience with the food and fiber industry. The concept of experiential learning was developed by D. A. Kolb, an organizational scholar who applied the teachings of Dewey, Lewin, and other progressives in his education research (Battisti, Passmore, & Sipos, 2008). Piaget, a forerunner of Kolb and a powerful influence on his theories of experiential learning, believed that "an act of intellectual adaptation requires a balance or equilibrium between assimilation and accommodation. Intelligence is thus the result of the dialectic integration of internal cognitive organization, reflective abstraction, and external adaptation, involvement in experience" (Mainemelis, Boyatzis & Kolb, 2002, p. 7). Kolb's model is based on the premise that people learn best by doing, rather than by rote memorization and regurgitation of facts (Kolb & Fry, 1975).

Learning in a real-world context deepens the educational experience, leading to improved understanding of material and the mechanisms of the real world. In a study of preservice music teachers, Haston and Russell (2011) found authentic context learning improved students' knowledge retention and performance and, more interestingly, diminished or erased preconceived notions the students held about teaching. In her testimony, one study participant expounded on this phenomenon, stating teaching in a real-world context better informed her understanding of "why some things happened in our classrooms that I never really liked. I can understand why they happened and what the problems were" (Haston & Russell, 2011, p. 383). Experience, therefore, may help mitigate the negative effects of misconceptions and establish new ways of thinking about previously unfamiliar topics.

Methods

To investigate how agricultural literacy and industry experience influence young people's perceptions of agricultural production practices, students enrolled in two agricultural communications and journalism courses at a large southwestern public university were selected as a sample of the larger university population. Students in these courses traditionally represent a diversity of agricultural experiences.

These students were shown a series of screen captures, or still images, taken from a broadcast news story (Couric, 2010) about antibiotic-resistant bacteria and their possible link to nontherapeutic antibiotic use in livestock as part of a class exercise on visual communication and rhetoric (see Figure 1). The fifteen images were selected from an extensive collection of screen captures from the broadcast because they presented imagery related to livestock production and contained no textual evidence (i.e., captions or headlines) that directly revealed the topic of the story to the survey participants.

Figure 1. Images taken from broadcast news story on antibiotic use in livestock in the order shown to survey participants.

Based on the instrument developed by Specht (2010), an electronic questionnaire was created using Qualtrics online survey software and distributed in both paper and electronic format. To ensure every student was able to complete the questionnaire, students enrolled in a class held in a large lecture hall received the paper version, while those enrolled in a computer-lab-based course received the electronic version.

The questionnaire was used to gather demographic data and information pertaining to students'

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agricultural knowledge, awareness, and experience. Each image was followed by a five-point Likert-type attitude scale participants used to indicate their affective response — or reactions — to the photo, with 1 indicating a "very negative" and 5 a "very positive" response. After viewing the series of images, the participants were asked to identify the subject of the news story based on what they had seen and to describe the visual cues that led them to choose those particular topics. Participants also explained their affective response to the topic they had chosen.

To measure participants' agricultural awareness, respondents addressed statements along a numeric rating scale and were asked to rate their knowledge, experience, and beliefs related to agricultural and animal husbandry practices on a scale of 1-5. A score of "1" indicated no knowledge, awareness, or familiarity, and "5" indicated firsthand knowledge of the industry. The self-reported constructs of agricultural knowledge, agricultural awareness, and agricultural familiarity were collapsed into a single variable, agricultural literacy, while a grand mean of the four items related to agricultural experience — the participants' level of involvement in the food and fiber industry — was calculated to provide an agricultural experience score for each respondent.

Specht (2010) reported reliability estimates (Cronbach's α) that ranged from .71 to .98 (n = 66). Because Specht's (2010) study collected data in a similar manner, with a similar undergraduate student sample, using the same items and scales used in this study, a pilot test was not conducted. However, post hoc Cronbach's alpha coefficients were calculated for the scales reaction, agricultural literacy, and agricultural experience, which yielded coefficients of .86, .94, and .90 respectively (n = 93).

Results

Of the 122 students enrolled in both courses, 93 (76.2%) returned usable responses. The resulting data were analyzed using SPSS® version 20.0 for Windows™ computers. Using SPSS, new variables were created to represent the grand means of the reaction, agricultural literacy, and agricultural experience scores. The grand means of respondents' agricultural literacy and agricultural experience scores were then re-coded into categorical variables with four levels (see Table 1).

Table 1

Category Labels for Recoded Categorical Variables

Variable	Score Range	Label
Agricultural literacy level	1.00-2.00	Illiterate
	2.01-3.00	Somewhat illiterate
	3.01-4.00	Somewhat literate
	4.01-5.00	Literate
Agricultural experience level	1.00-2.00	Inexperienced
	2.01-3.00	Somewhat inexperienced
	3.01-4.00	Somewhat experienced
	4.01-5.00	Experienced

Descriptive Statistics

Descriptive statistics were calculated on the continuous variables reaction score, agricultural literacy score, and agricultural experience score. The respondents reported an overall moderately negative reaction to the images presented in the survey instrument (M = 2.52, SD = .55). The grand mean of agricultural literacy scores indicated students considered themselves neither strongly literate nor illiterate (M = 3.38, SD = 1.05), with similar findings for agricultural experience (M = 3.35, SD = 1.12).

Frequencies were calculated for the categorical variables agricultural literacy level and agricultural experience level (see Tables 2 and 3). Self-assessed agricultural literacy was relatively evenly distributed among the four categories, though more than half (57.00%) rated themselves as at least somewhat knowledgeable about and aware of agricultural issues.

Table 2

Frequency of Agricultural Literacy Scores by Literacy Level

Category	Frequency	Percent	Cumulative Percent
Illiterate	21	22.60	22.60
Somewhat illiterate	19	20.40	43.00
Somewhat literate	27	29.00	72.00
Literate	26	28.00	100.00

The respondents were slightly more positive in their self-assessment of agricultural experience, with one-third of survey participants rating themselves as experienced in the agriculture sector, though a significant portion also reported that they were somewhat inexperienced.

Table 3

Frequency of Agricultural Experience Scores by Experience Level

Category	Frequency	Percent	Cumulative Percent
Inexperienced	15	16.10	16.10
Somewhat inexperienced	26	28.00	44.10
Somewhat experienced	21	22.60	66.70
Experienced	31	33.30	100.00

Analysis of Variance (ANOVA)

Using the continuous variable reaction score and the categorical agricultural literacy and agricultural experience variables, the researchers conducted an analysis of variance to determine if differences existed among the levels of the categorical variables. The result of the Levene's test was not significant (.22), indicating that the assumptions of homogeneity were not violated. The results from the one-way ANOVAs are presented in Table 4.

Pairwise comparisons of reaction score resulted in no significant differences between the levels of agricultural literacy. For agricultural experience, however, pairwise comparisons discovered significant differences between respondents who rated themselves as "somewhat inexperienced" (M = 2.31; SD = 0.42) and those who rated themselves as "experienced" (M = 2.82; SD = .62). This slight but significant difference, nonetheless, failed to reach the 0.80 threshold for statistical power (.69), indicating that significant results could have been due to chance or error.

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Table 4

One-Way Analysis of Variance for the Effects of Students' Self-Perceived Level of Agricultural Literacy and Agricultural Experience on Students' Reactions to News Images of Agriculture

Scale	*df*	*SS*	*MS*	*F*	*p*	η^2	1 - β
Level of Agricultural Literacy							
Between	3	6.64	2.12	8.80	< .001	.23	.99
Within	89	21.46	0.24				
Total	92	27.82					
Level of Agricultural Experience							
Between	3	5.33	1.78	7.03	< .001	.19	.98
Within	89	22.45	0.25				
Total	92						

Regression Analysis

To determine if either construct was a significant predictor of students' reaction scores, the grand mean for students' agricultural literacy score and the grand mean for students' agriculture experience score were used as independent variables in a stepwise regression analysis, where the primary variables of interest were regressed on the variable students' reaction score. The results indicated students' agricultural literacy score was a significant ($p < .001$) predictor of students' reaction score ($B = .251$; $SE\ B = .048$; $\beta = .477$; $R^2 = .219$; $\Delta R^2 = .227$).

Conclusions

The first research objective — to describe young people's reactions to images from agriculture-related television news stories — produced relatively predictable results. Overall, the 93 respondents reported largely negative responses to the images taken from the CBS Evening News broadcast about antibiotic use in livestock production agriculture. Whether intentional or not, the program's choice of visuals reflected negatively on animal production methods, even among those students who reported higher levels of agricultural literacy and experience in the food and fiber industry. This finding coincides with the results of framing and visual rhetoric studies that focus on the news media's tendency to shock audiences into belief or action (Allen, 1996; Finnegan, 2004; Olson, 2007).

Results for the second objective supported the use of the convenience sample of students in two agricultural communications and journalism courses. Students' self-reported agricultural literacy and agricultural experience scores trended toward the middle, and further investigation into the breakdown of students' self-assessments revealed they were relatively evenly distributed among the four levels of agricultural literacy and industry experience. This distribution allowed the researchers to investigate differences among these categorical groups, though a relatively small cell size may be a confounding factor necessitating further analysis with a larger sample of participants.

Objective 3 — identifying possible explanations for young people's reactions to agriculture-related television news stories — may be explicated by the results of the ANOVA and regression us-

ing the categorical variables level of agricultural literacy and level of agricultural experience and the continuous variable reaction score. The ANOVA demonstrated differences exist between reactions from students who assessed themselves as somewhat inexperienced and those who considered themselves experienced in the food and fiber industry. This finding may give credence to Alexander Pope's (1709) idiom that "a little learning is a dangerous thing," meaning those who lack substantial information about a subject may feel qualified to make judgments on that subject. In this case, students who have minimal experience in agriculture may make critical judgments about modern livestock production due to their limited exposure to that type of agricultural activity and preconceived attitudes and beliefs related to more traditional conceptualizations of agriculture, such as county fairs and small family farms.

The regression analysis, on the other hand, indicated a predictive linear relationship between students' perceived agricultural literacy and their reaction to the images from the broadcast news story. Based on the regression results, students who report higher levels of agricultural knowledge and awareness of and familiarity with agricultural issues will, on the whole, report more positive scores than those with lower levels of agricultural literacy. This finding supports the supposition that agricultural literacy influences individuals' perceptions of the U.S. food and fiber system (Hess & Trexler, 2011a).

Implications and Recommendations

Based on the results of this study, agricultural literacy and experience have the potential to impact young people's reactions to negatively skewed visual material related to modern production agriculture. Within the context of this study, agricultural literacy was shown to be a successful predictor of respondent reaction, indicating increased literacy lessens the likelihood of audiences reacting with knee-jerk negativity toward news stories and images related to the food and fiber industry. This outcome corroborates the agriculture sector's belief in the power of agricultural literacy programs, such as Agriculture in the Classroom, being undertaken across the country (Lieszkovszky, 2012; Schulte, 2012). Given the plethora of information regarding the lack of agricultural literacy among the nation's youth (Balschweid, Thompson, & Cole, 1998; Hess & Trexler, 2011a; Hess & Trexler, 2011b; National Research Council, 1988; Terry, 2013), these programs should be continued and, when possible, expanded.

The study also revealed hands-on experience may influence students' reactions to pictorial news content associated with agriculture. Agricultural experience's association with reaction is somewhat problematic, eliciting the widest contrast of responses between those who believe themselves to be experienced and those who rank themselves as somewhat inexperienced. This dichotomy suggests those who have minimal experience with agriculture may be gaining their agrarian understanding from contexts that present agriculture in a more traditional manner, such as county fairs and livestock shows, and reveal little about the practices of large-scale modern production. These environments, therefore, should consider incorporating digital tours of production facilities and other educational visual aids to better familiarize visitors with the realities of today's agricultural methods. Agritourism may offer another solution: The United States Department of Agriculture (USDA) offers agritourism as a method of sustaining family farms while bringing in additional income with the added benefit of building relationships with consumers (Mahoney, Spotts, & Edwards, 1999). The agritourism model has been adopted by producers across the continent in efforts to boost profits and educate consumers (Brooks, 2012; Knill, 2012).

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Because this study was limited in scope and scale, further research should be conducted to elucidate the impacts of agricultural literacy and experience on consumer perceptions of and attitudes toward agriculture. The researchers relied on student self-assessment to develop the independent variable agricultural literacy; a more comprehensive study could employ a knowledge-based test of agricultural topics and issues to determine respondents' literacy level. Survey items related to agricultural experience were broad and could be narrowed to better describe the types of industry-related activities in which respondents engage. Finally, the research should be expanded to other populations beyond the scope of this particular study to gauge the far-reaching effects of literacy and experience on consumer perceptions.

Though the study results are not generalizable beyond the population sampled, they provide additional evidence that audiences' knowledge of and familiarity with the food and fiber industry influences their perceptions of industry-related information in mass-mediated news contexts. For agricultural communicators, educators, and producers, this research may serve as a call to action to better inform the U.S. populace about its food and fiber system through formal education programs, industry-based communications efforts, and agritourism.

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About the Author

Annie R. Specht is an assistant professor of Agricultural Journalism in the University of Nebraska-Lincoln's Department of Agricultural Leadership, Education, and Communication. Billy McKim is an assistant professor of Agricultural Communications and Journalism in Texas A&M University's Department of Agricultural Leadership, Education, and Communications. Tracy Rutherford is a professor of Agricultural Communications and Journalism and Associate Department Head for Undergraduate Programs in Texas A&M University's Department of Agricultural Leadership, Education, and Communications.