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Abstract

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The Journal of Applied Communications

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Research

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Productive Pinning: A Quantitative Content Analysis Determining the Use of Pinterest by Agricultural Businesses and Organizations

Jessie Topp, Scott Stebner, Lana A. Barkman and Lauri M. Baker

Abstract

In recent years social media sites have experienced rapid growth among users, specifically the image-based site Pinterest. The purpose of this study was to investigate how agricultural producers and businesses were using Pinterest. A sample of 428 Pinterest users were evaluated using a quantitative content analysis to determine basic information about how Pinterest was used and the presence of four possession rituals: personalizing, claiming, sharing, and storing and hoarding. The research objectives of this study included (1) determining the number of businesses and organizations using Pinterest, (2) identifying what possession rituals are most prominently utilized by agribusinesses and agricultural organizations on Pinterest, and (3) determining what segment of the agricultural industry is represented on Pinterest the most. The results indicated agricultural producers and businesses are utilizing Pinterest but progress is still warranted. More specifically, the results revealed agriculture's use of Pinterest is highly personalized, with the most room for improvement being in the area of sharing content agriculturists generate themselves.

Key Words

Pinterest, social media, advocacy, possession rituals, agri-marketing

Introduction

Social media sites and the Internet are effective tools for sharing information and creating lasting relationships with consumers (Graybill-Leonard, Meyers, Doerfert, & Irlbeck, 2011); however, the agricultural community is less than effective in implementing such strategies to reach mass-media coverage (Ruth-McSwain & Telg, 2008). Much interest exists in implementing social media advocacy campaigns by younger generations of farmers and ranchers. This group believes if they do not fight for their industry now, it will be their children who are adversely affected by agriculture's inability to successfully advocate (Graybill-Leonard et al.).

Many agriculturists want to create a social movement to cause a change in their society's perception of agriculture (Graybill-Leonard et al., 2011). By creating a mixed-media strategy with an identifiable target market, it is likely the positive coverage of agriculture will increase in the media and in social movements (Ruth-McSwain & Telg, 2008).

The lack of a strong and coordinated network of agricultural advocates is a considerable weakness in mobilizing messages to impact social change and political action (Holt-Giminez, 2010). As such, in today's social media environment, farmers and ranchers who are not integrating successful online advocacy campaigns in addition to grassroots campaigns to improve their public image are putting their organizations and industry at a tremendous disadvantage (Meyers, Irlbeck, Graybill-Leonard, & Doerfert, 2011). Some agricultural producers have begun utilizing social media as a

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way to improve direct-to-consumer marketing, which can lead to both non-financial and financial outcomes for businesses (Abrams & Sackman, 2013).

Social Media

Social media is a networking platform that engages Internet users. Boyd and Ellison (2008) describe social networking sites as:

> Web-based services that allow individuals to (1) construct a public or semi-public profile within a bounded system, (2) articulate a list of other users with whom they share a connection, and (3) view and traverse their list of connections and those made by others within the system (p. 210).

Social networking sites have evolved greatly since the beginning of their use in 1997. Boyd and Ellison (2009) reviewed the history of social networking and determined SixDegrees.com was the first social networking site. Although other websites had previously allowed different components of the social networking site to be created, such as creating a personal profile, SixDegress.com was the first to combine all three characteristics: personal profile, list of friends, and the ability to develop a personal network (Boyd & Ellison). From 1997 to 2001, a few emerging websites had similar characteristics of social networking sites, such as AsianAvenue, BlackPlanet, MiGente, LiveJournal, and Cyworld. However, these sites were not that impactful. In 2001, the next generation of social networking sites emerged. These included Ryze, Tribe.net, LinkedIn, and Friendster. Three sites deserve credit for developing social media as we know it today: Friendster, MySpace, and Facebook. Kaplan and Haenlein (2010) credit the availability of high-speed Internet access as leading to the growth of MySpace and Facebook.

The growing use of social networking sites has been attributed to the voice and recognition users feel they receive through these sites (Brogan, 2010). Today, Internet users between the age of 18 and 32 are using the Internet as a communication tool to interact with family and friends (Jones & Fox, 2009). This is part of the participatory culture of social networking users. This culture engages users and gives them the feeling that their contribution to the site matters. Additionally, users feel a sense of connection with others (Mazali, 2011). These connections offer a platform for users to advocate for issues of importance to them.

Pinterest

One popular social networking site is Pinterest. The "virtual pinboard" website continues to experience rapid growth. Since its launch in March 2010, the social networking website has grown to 70 million users (Smith, 2013). Men and women of all ages use the site; however, it is estimated 82% of the active users on Pinterest are female (Finch, 2012).

As with any social media website, Pinterest gives users an opportunity to create a sense of community by connecting individuals with both people they already know as well as people who share similar interests (Sundar, 2012). The ability to repin or like other pins on Pinterest increases the number of potential connections individuals have (Sundar). With more than 500,000 businesses on Pinterest, businesses also take advantage of the power of Pinterest to connect with consumers (Smith, 2013). Because the content of a pin can take a user anywhere, the amount of knowledge access a user seeks is increased (Sundar). This provides businesses with the opportunity to create pins to take users to important information, which allows businesses to be very intentional with information pinned.

With its combination of social and collecting capabilities, Zaro and Hall (2012) refer to Pinterest as a "social collecting" website. The ability to share images provides users a sense of ownership (Schiele & Hughes, 2013). Exploratory research by Schiele and Hughes (2013) defines the way Pinterest users collect, organize, and categorize images they find. This research identified a framework of four primary possession rituals: claiming, storing and hoarding, personalizing, and sharing collections (Schiele & Hughes).

Schiele and Hughes (2013) discovered consumers spend a significant amount of time on image-sharing sites, such as Pinterest. Much of the time consumers spend on these sites is spent creating personal collections and utilizing possession rituals (Schiele & Hughes). According to Schiele and Hughes (2013), claiming involved Pinterest users asserting they own the images they pin; personalizing was demonstrated by pinners reformatting images they have collected and placing them in a larger collection; storing and hoarding was described as the excessive collection of images; and sharing was characterized as the way in which users wanted to be perceived by others. These four possession rituals are helpful for businesses because it allows them to better understand how users view content on Pinterest. With a growing number of businesses and organizations taking an active role on social media, it is important to understand how these entities are represented.

Purpose and Objectives

While Pinterest has been researched on an individual level, a gap in knowledge exists related to how businesses and organizations use Pinterest. Specifically, little is known about how agricultural sectors use Pinterest on behalf of businesses and organizations. The purpose of this study was to determine how agribusinesses and agricultural organizations use the social media website Pinterest. Additionally, the study aimed to identify recommendations for agribusinesses and agricultural organizations interested in utilizing Pinterest for businesses or organizations. The following research objectives guided this study:

1. Determine the number of agricultural businesses and organizations using Pinterest.
2. Determine the most represented segment of the agricultural industry on Pinterest.
3. Identify what possession rituals are most prominently utilized by agribusinesses and agricultural organizations on Pinterest.

Methods
Design of the Study

This study used a quantitative content analysis to determine how agribusinesses and agricultural organizations use Pinterest. To create the study sample, researchers conducted a series of searches on Pinterest. A list of agricultural commodities and products was obtained from the Agricultural Marketing Resource Center, which is a group of cooperating universities operating under the U.S. Department of Agriculture's Rural Development grant. A total of 135 commodities and products were included on the list, which was divided among eight categories. These categories included nuts, specialty crops, vegetables, fiber, fruits, grains and oilseeds, livestock, and aquaculture.

The list of commodities and products was divided among the three researchers. The researchers entered the commodity or product names in the Pinterest search box and selected pinners for inclusion in the study sample based off the search results. Producers, businesses, or organizations who turned up in the search were added to the sample on the condition they had a connection to agriculture. The research team came to a consensus that a connection to agriculture would mean the pin-

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ner was involved in producing, processing, transporting, marketing, or promoting a raw agricultural commodity or product. To determine if pinners met these conditions, researchers considered the pinner's name and read the description of the Pinterest account. However, due to the complex nature of the agricultural industry, retailers and restaurants were excluded from the sample. For this study, the researchers wanted to focus on producers of raw commodities or products as well as businesses or organizations who promoted a particular commodity, product, or livestock. At this time, researchers also collected initial information on pinners, such as name, Pinterest url, number of boards, number of pins, and number of followers.

A codebook and codesheet were developed to determine a variety of factors for each pinner. Descriptive information such as name of organization, number of boards, number of pins, and number of followers were coded using numerical values. In addition, pinners were examined for their presence of possession rituals. Possession ritual was divided into four categories: personalizing, storing and hoarding, claiming, and sharing based on Schiele and Hughes' (2013) research.

Based on Schiele and Hughes' (2013) findings and description of the four possession rituals, the researchers came to a consensus on how to assess the presence, or absence, quantitatively of the four possession rituals on individual Pinterest accounts. For this study, claiming was demonstrated when individual pins on a Pinterest account led users to the representing organizations' website, blog, or social media site. A business or organization that had a profile picture, description, or links to its blog, website, or social media on its account was said to exhibit personalizing. Storing and hoarding was present when individual pins led users to sites not associated with the representing business or organization's website, blog, or social media. Finally, sharing was evident when individual pins had be re-pinned by other users.

The codebook was reviewed by a panel of experts for face content and validity. Three coders were trained to use the codebook and codesheet. Coders were trained using the codebook on two Pinterest accounts that were not included in the study sample. After initial training, a random sample of 10% (n = 42) of the sample population was coded to determine intercoder reliability. All coding for the initial 10% was conducted during the same 24-hour time period to reduce the chance that additional pins or boards were being created, which would have altered the coding results.

Cohen's Kappa was used to determine intercoder reliability. A score of .825 was obtained between coders 1 and 2. A score of .764 was obtained between coders 1 and 3, and a score of .762 between coders 2 and 3. The overall intercoder reliability was .762, which indicated an acceptable level of agreement among all three coders. These scores were well above the lowest accepted level of reliability of .40 for Cohen's Kappa (Landis & Koch, 1977).

To ensure a strong interrater reliability, all three coders proceeded to code another 10% (n = 42). Following the coding of the final 10%, the initial 10% was grouped with the additional 10% for a total overlap of content at 20% (n = 84) of the sample. Cohen's Kappa was again used to determine intercoder reliability. A score of .825 was obtained between coders 1 and 2, .764 between coders 1 and 3, and .762 between coders 2 and 3. An overall interrater reliability of .762 was obtained, which indicated an acceptable level of agreement among all three coders.

Following these results, the remaining Pinterest accounts were divided among the three researchers and the rest of the content was coded. Data were analyzed using the Statistical Package for the Social Sciences 20 (SPSS) to obtain descriptive statistics and make comparisons between Pinterest accounts.

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Results

Objective 1. Determine the number of businesses and organizations using Pinterest.

As part of this content analysis, a total of 428 Pinterest accounts were analyzed. Of the total, 59.1% (*n* = 253) represented local farmers, ranchers, or other producers of agricultural products. Sixteen-point-four percent (*n* = 70) of the Pinterest accounts represented state-level livestock or commodity organizations. An additional 13.1% (*n* = 56) were accounts representing national-level livestock or commodity organizations. The remaining 11.4% (*n* = 49) did not fit in any of these three categories based strictly off of their account name and account description and were coded as none of the above. Table 1 shows the frequency of pinners based on the four organization types.

Table 1

Frequency of pinners by organizational type

Organization Type (*N* = 4)	Frequency (*f*)	Percent (%)
Local producer	253	59.1
State level	70	16.4
National level	56	13.1
None of the above	49	11.4

Objective 2. Determine what segment of the agricultural industry is represented on Pinterest the most.

In terms of the number of actual pinners, the fiber industry was represented the least. Of the pinners evaluated, 0.9% (*n* = 4) represented the fiber segment of the agricultural industry. The segment with the greatest number of Pinterest accounts was livestock, and 53.7% (*n* = 230) of pinners represented this segment. The number of times each segment was represented on Pinterest is shown in Table 2.

Table 2

*Number of times each industry segment is represented on Pinterest (*N = 428)*

Industry Segment (*N* = 8)	Frequency (*f*)	Percent (%)
Aquaculture	20	4.7
Fiber	4	0.9
Fruits	29	6.8
Grains and Oilseeds	22	5.1
Livestock	230	53.7
Nuts	20	4.7
Specialty Crops	39	9.1
Vegetables	64	15

In terms of the amount of content generated, the segment of the agricultural industry that had the most pins was livestock with 86,432 pins. The industry with the greatest number of followers was specialty crops, which had 87,872 followers. The fiber industry had the lowest quantity of pins, boards, and followers. The number of pins from all industry segments ranged from 49 to 86,432. The number of boards from all segments ranged from 25 to 2,826. The number of followers from all segments ranged from 228 to 87,872. The total and mean of pins, boards, and followers for each segment is shown in Table 3.

Table 3

Number of pins, boards, and followers for each industry segment

Industry Segment	Number of Pins		Number of Boards		Number of Followers	
	f	Mean	*f*	Mean	*f*	Mean
Aquaculture	3679	183.95	156	7.80	1721	86.05
Fiber	49	12.25	25	6.25	228	57.00
Fruits	5662	195.24	262	9.03	4255	146.72
Grains and Oilseeds	4915	223.41	228	10.36	2561	116.41
Livestock	86432	377.43	2826	12.29	60048	262.22
Nuts	3982	199.10	184	9.2	2090	104.50
Specialty Crops	15290	392.05	505	12.95	87872	2253.13
Vegetables	18549	289.83	777	12.14	14980	234.06

Objective 3: Identify what possession rituals are most prominently utilized by agribusinesses and agricultural organizations on Pinterest.

Of the 428 pinners evaluated, 427 exhibited the personalizing possession ritual to some degree (exhibited this ritual at least once), making it the most utilized possession ritual. A total of 344 pinners exhibited storing and hoarding. Three-hundred-twenty-seven pinners exhibited the claiming possession ritual. The possession ritual least utilized by agribusinesses in this study was sharing, which was exhibited by 324 pinners. Table 4 shows the possession rituals used by each industry segment.

Table 4

Possession rituals used by each industry segment

Industry Segment	Possession Ritual			
	Personalizing (*N* = 426)	Sharing (*N* = 324)	Claiming (*N* = 327)	Storing and Hoarding (*N* = 344)
Aquaculture (*n* = 20)	20(*n*), 100%	17(*n*), 85%	17(*n*), 85%	14(*n*), 70%
Fiber (*n* = 4)	4(*n*), 100%	3(*n*), 75%	3(*n*), 75%	4(*n*), 100%
Fruits (*n* = 29)	29(*n*), 100%	23(*n*), 79.3%	23(*n*), 79.3%	26(*n*), 89.6%
Grains & Oilseeds (*n* = 22)	22 (*n*), 100%	17(*n*), 77.3%	13(*n*), 59.1%	16(*n*), 72.7%
Livestock (*n* = 230)	228(*n*), 99.1%	176(*n*), 76.5%	175(*n*), 76.4%	185(*n*), 80.5%
Nuts (*n* = 20)	20(*n*), 100%	14(*n*), 70%	15(*n*), 75%	18(*n*), 90%
Specialty Crops (*n* = 39)	39(*n*), 100%	26(*n*), 66.7%	31(*n*), 79.5%	29(*n*), 74.4%
Vegetables (*n* = 64)	64(*n*), 100%	48(*n*), 75%	50(*n*), 78.1%	52(*n*), 81.3%

Conclusions

The results of this study indicate the agricultural industry actively uses Pinterest. However, considerable differences exist in the degree of use, possession rituals utilized, and volume of pins generated between agricultural industry segments and between the individuals within those segments. Local farmers, producers, and ranchers were the most active participants on Pinterest, accounting for more than half of all businesses evaluated in this study. This aligns with previous work that suggests local producers are indeed seeking to implement online advocacy campaigns to further their farms and avoid putting their organization and industry at a disadvantage (Meyers et al., 2011).

Analysis of Pinterest accounts revealed personalizing was the most prominently exhibited possession ritual across all industry segments. The use of personalizing by all pinners showed value is placed on adding additional content to the business or organizations' Pinterest account. This possession ritual is also the easiest to complete, part of the account creation process, and requires no additional effort once initially set up. This could explain why even passive accounts that did not display any of the other possession rituals still exhibited personalization.

Claiming was the next lowest possession ritual utilized by pinners. The void of claiming pins could demonstrate a lack of desire to inform the user where the pin originated. An alternative explanation could be agriculture's use of Pinterest as an effective marketing tool is still in its infancy. Since many of the accounts were created by local farmers and producers who may not have marketing backgrounds, a general lack of knowledge in using social media to market their products or socially advocate exists that could be remedied through education and training. Researchers recommend developing training programs to help agriculturists use Pinterest effectively.

Storing and hoarding was exhibited by a majority of pinners. This demonstrates that, in addition to creating original content, agricultural pinners use a variety of other sources to share their story with the public. While this behavior does not have as many implications for building a business's brand or name with its target audience, it may help a business or organization advocate on behalf of its industry or product. Storing and hoarding behavior can be time consuming and may not be effective as a stand-alone strategy because the organization or business is not directly claiming this content. However, when it is combined with other possession rituals, it may create a quality experience for the end user.

Although the livestock industry represented more than half of all businesses represented in this study and created the most pins, they did not have a large number of followers. The specialty crops segment averaged the most pins and boards per user and enjoyed the greatest following of any other industry segment. However, the specialty crops market segment had the fewest pinners exhibiting sharing. This indicates the specialty crops industry excels at actively posting material and reaching the greatest number of followers when compared to other segments, but the gathered users remain passive in sharing the uploaded content. In other words, although the specialty crops industry is seen by the greatest number of people, their content is not as effective in generating conversation by re-pinning the content. Moreover, this research provides support for Schiele and Hughes (2013) definitions of possession rituals and indicates these rituals are indeed transferable to agricultural businesses and organizations on Pinterest.

Implications

This study provided introductory explanations to the current efforts of agricultural digital advocates on Pinterest and characterized the methods in which producers and organizations use this collection by means of possession rituals. Pinterest is a rapidly growing social network. This study provides additional support for previous social media studies that indicate farmers and ranchers who are not taking advantage of social media's ability to reach a large number of users with online advocacy campaigns in addition to their local efforts put their organization and industry at a disadvantage (Meyers et al., 2011). However, if producers and organizations are going to use Pinterest to advocate and market products and commodities, they must understand what possession rituals are successful in generating an engaged target audience. Furthermore, by identifying which market segment is most successful on Pinterest, we can begin to identify successful strategies and best practices to implement for both producers and organizations.

Research

Recommendations For Future Research

One primary limitation in this study is the selection of agribusinesses, agricultural organizations, and producers. Future research should include retailers, restaurants who serve fresh produce, and additional processors. Another limitation in this study was search terms used to create the study sample. To create the sample for this study, the researchers used a list of 135 commodities and products; however, the researchers realize various products directly related to agriculture were not included on the list.

Future research should expand upon the current list to gain more accurate representation of the entire agricultural industry. Including general terms such as agriculture, farming, and ranching as well as other common agricultural identifiers could create a more heterogeneous sample that accurately reflects the current state of the industry. Future studies should also develop a scale to rate the presence and degree of each possession ritual to provide a more accurate portrayal of the possession rituals observed. This study only analyzed content from a public view. Future research should consider analyzing the perceptions of rituals content by the end user. Future studies should seek to identify a correlation between the possession rituals and active participation of readership (followers, shares, and comments). Lastly, this study did not seek to identify the presence or effectiveness of promoted pins. Future research should seek to determine the impacts of promoted pins.

Recommendations For Practitioners

Agricultural businesses and organizations seeking to utilize Pinterest to promote their business and/or advocate for their industry should consider implementing the possession rituals of claiming, storing and hoarding, personalizing, and sharing as defined by Schiele and Hughes (2013). These rituals align with how users of Pinterest are consuming content, which should allow for a more palatable transfer of information from business and organization to the intended audience. As Pinterest grows in popularity, it is advantageous for agricultural businesses and organizations to explore its use in overall marketing and promotion strategies. Pinterest offers the opportunity for businesses and organizations to make themselves more visual, which may help consumers connect to the agricultural industry.

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Knowledge and Perceptions of Agricultural Communications Pilot Curriculum in Arkansas Secondary Agricultural Classrooms

Carley Calico, Leslie D. Edgar, Don W. Edgar and Don M. Johnson

Abstract

The purpose of this mixed-method study was to assess the effectiveness of agricultural communications curriculum developed and incorporated into a semester-long agricultural leadership and communications course for secondary agricultural education programs in Arkansas. Students (N = 297) participated in newly developed instructional modules addressing four categories of agriculture-themed curricula predetermined by a committee of agricultural education and communications faculty at the University of Arkansas (careers, writing, design, and multimedia). Student agricultural communications knowledge change was assessed using pre- and post-test instruments in each module of study. Additionally, content analysis of participating teachers' journals was used to identify emergent themes related to teachers' experiences teaching the curriculum throughout the semester. Overall, the findings from this study indicated students' knowledge increased after instruction for each curriculum module: careers (16.2%), writing (23.1%), design (35.7%), and multimedia (31.3%). Lack of time, limited technology, teacher training, and curriculum content were the most common emergent themes among teachers. Based on findings from this study, it was concluded future efforts should be made to provide technology for agricultural education instructors to improve agricultural communications program effectiveness and reach.

Key Words

Agricultural communications, agricultural communications curriculum, pilot study, curriculum in secondary agricultural education programs, technology

Introduction

A 2005 USDA-CSREES report projected 13% of graduates with expertise in agriculture, food, or natural resources would be employed in the education, communications, or government service fields. Seven thousand annual job openings will occur in this job cluster (NRC, 2009); however, a shortage of qualified graduates are prepared for these positions. Based on 2007 enrollment data (FAEIS, 2009), 1,323 students majored in agricultural communication / journalism at 27 institutions; of those 1,301 were awarded bachelors' degrees in 2006/2007 (FAEIS). Four institutions reported graduate degrees in agricultural communications/journalism with 52 students enrolled at the master's

level and 20 at the doctoral level (all doctoral students were enrolled at one institution). Growth of these programs may be constrained due to small faculty numbers and the widespread geographical locations of land-grant institutions. The development of cooperative partnerships and innovative instructional designs may be necessary to meet the growing employment opportunities and enhance the quality, effectiveness, and cost-efficiency of the academic programs (Calico & Edgar, 2014).

The document Understanding Agriculture: New Directions for Education (NRC, 1988) became one of the most cited documents in relevant agricultural education publications until the early 21st century. The Executive Summary of the Reinventing Agricultural Education for the Year 2020 (RAE 2020) initiative, A New Era in Agriculture (National Council, 1999) provided additional information from New Directions about how agriculture, as an industry, should be viewed:

> Agriculture is a field that encompasses the production of agricultural commodities, including food, fiber, wood products, horticultural crops, and other plant and animal products. The terms include the financing, processing, marketing, and distribution of agricultural products; farm production, supply and service industries; health, nutrition and food consumption; the use and conservation of land and water resources; development and maintenance of recreational resources; and related economic, sociological, political, environmental, and cultural characteristics of the food and fiber system. (p. 2)

Agriculture can be promoted through marketing, which uses writing, design, and multimedia strategies (Akers, Vaughn, & Lockaby, 2001). By educating students in these areas and introducing them to possible career fields in agriculture, we can prepare secondary students to assist with agricultural promotion, or at the least, improve their overall perceptions of agriculture.

Today's high school agricultural science educators are required to teach a breadth of disciplines related to agriculture. As a result, high school agriculture teachers have reported a need for specific skill development enabling them to improve teaching, especially in the areas of agricultural leadership, agricultural communications, and agricultural career development (Calico, Edgar, Edgar, Jernigan, & Northfell, 2013; Roberts, Dooley, Harlin, & Murphrey, 2006) and in communications-based technologies (Calico et al., 2013). Moreover, Calico et al. (2013) noted teachers reported 45.2% of students have a high degree of interest in learning new communications-based technologies and 47.9% have a medium degree of interest. All respondents reported students were interested in learning new technologies, specifically those used in communication.

According to the National Research Agenda, a need exists to "systematically identify and develop instructional systems to meet industry needs" (Doerfert, 2011, p. 19) through curriculum development. Therefore, it is critical for university faculty and high school teachers to build collaborative relationships to educate and prepare high school students for a future in, or as a supporter of, agriculture. By capitalizing on curiosity piqued through innovative technology presented to secondary students, high school teachers and university faculty can present knowledge and skill development activities to engage students in more meaningful learning (Torp & Sage, 1998).

Experiential learning combined with authentic learning can create the ideal learning environment for agricultural education (Knobloch, 2003). Agricultural education courses are built on a foundation of constructivism and experiential learning, which opens the door for students to gain understanding and knowledge about agriculture and use new technologies before entering degree programs or the workforce (Newcomb, McCracken, Warmbrod, & Whittington, 2004). According to a study conducted by McKenzie, Morgan, Cochrane, Watson, and Roberts (2002), authentic learning prepares

students for the job the student will pursue post-graduation. The agricultural communications curriculum created for this study combined all three learning elements to create a learning experience that not only opens doors to college and career opportunities but also prepares the student to be successful in both ventures.

Agriculture continues to diversify and change, aiming to meet the needs of producer and commodity groups. This change and diversification has brought about the need to communicate and promote agriculture more effectively to an audience often uninformed about agriculture and its practices. "As agricultural education enters the twenty-first century, [education and agriculture] must change with emerging trends in society and the agricultural industry" (Talbert, Vaughn, & Croom, 2005, p. 61).

Today, agricultural education provides training for students, including those who will not be involved with farming or entering the agricultural industry (Talbert et al., 2005). With change and agricultural diversification ever-present, agricultural education teachers, specifically those in secondary education, struggle to keep abreast of changes with emerging trends in society and the agricultural industry (Barrick, Ladewig, & Hedges, 1983; Newman & Johnson, 1994). However, agricultural education teachers provide critical links between secondary students and agriculture. Further, it has been posited the teacher is the single most important variable in educational effectiveness (Goodland, 1983).

In 1999, the National FFA Organization, a student organization associated with agricultural education in secondary and post-secondary schools, organized the first career development event (CDE) for agricultural communications. Subsequently, the National FFA Organization gathered resources for agricultural science teachers to use when teaching students about agricultural communications. The national organization's website contains links to numerous resources, including The Guidebook for Agricultural Communications in the Classroom. The guidebook, which outlines basic materials for teaching a course or unit as well as training a team, begins with:

> Agricultural communicators play a vital role in the world of agriculture. Representing agriculturalists across the world, these individuals possess the skills to effectively communicate agricultural messages to publics involved and not involved in agriculture. Because a large percentage of the population lacks agricultural understanding, it's important for agricultural communicators to provide timely, accurate information on current issues and events. (Hartenstein, 2002, p. 1)

Although secondary educators recognize the importance and need to educate students about agriculture, technologies, and promotion of agriculture while improving English and writing skills, these educators usually do not have the time and/or skills to create programs focused on agricultural communications (Calico et al., 2013). This is a concern, especially in light of the fact the average American consumer is more than three generations removed from the family farm (Arkansas Farm Bureau, n.d.) and enhancing agricultural literacy has been an increasing need as stated in Priority Area One of the National Research Agenda (Doerfert, 2011). Instruction in agricultural communications allows high school students to use their English, mathematics, and science knowledge to understand and communicate about complex problems and issues impacting agriculture today (Hartenstein, 2002). Subsequently, secondary students can apply their English and language arts knowledge, competencies, and skills to agricultural communications content that will assist them with the understanding of electronic technologies and their potential to promote agriculture as a

whole. In Arkansas, there is a lack of secondary school curriculum in agricultural communications, which would improve student knowledge and skills in written and oral communications, literacy, and electronic technologies. In fact, only two states nationally have agricultural communications curriculum in high schools (E. Irlbeck, personal communication, January 16, 2012).

Theoretical / Conceptual Framework
The theoretical framework for this study was based on constructivist and experiential approaches to teaching and learning. Learning is an active process where the learner uses sensory input to construct meaning with the content based on previous experiences (Hein, 1991; Mazurkewicz et al., 2012; Newcomb et al., 2004). Kolb (1984) proposed a theory of experiential learning that involved four principal stages: concrete experiences (CE), reflective observation (RO), abstract conceptualization (AC), and active experimentation (AE). These teaching methods allow students to reach application, analysis, synthesis, and evaluation, the higher tiers in Bloom's Taxonomy of learning (Bloom & Krathwohl, 1956). Students are expected to apply skills they are learning (Edgar, 2012) and should be able to move beyond rote memorization to application of knowledge.

According to Knobloch (2003), agricultural teachers should model their instruction after experiential learning aligned with authentic learning standards to create a complete psychological structure for learning. The five standards that collectively create authentic learning included (1) higher-order thinking, (2) depth of knowledge, (3) connection to the world beyond the classroom, (4) substantive conversation, and (5) social support for students' achievement (Newmann & Wehlage, 1993).

As agricultural communications becomes a more prominent area of the industry, it is important for post-secondary institutions to work with secondary agricultural education programs to build student interest in agricultural communications. The agricultural communications curriculum was developed to incorporate the theory of constructivism along with experiential and authentic learning to foster an engaging classroom environment. Through class discussion, group projects, and evaluation, students lead research. Presentation opportunities allow students to learn real-world skills that can create college and career opportunities post high school graduation.

The most recent National Research Agenda identified priority areas important to visual communications curriculum and training in secondary education programs: (a) sufficient scientific and professional workforce that addresses the challenges of the 21st century (Priority Area Three), (b) meaningful, engaged learning in all environments (Priority Area Four), and (c) efficient and effective agricultural education programs (Doerfert, 2011). The need for agricultural communications curriculum is evident and supported by teachers and student in Arkansas (Calico et al., 2013). Quality instructional material made available to instructors will create interest and career opportunities in agricultural communications for students in the future (Doerfert, 2011).

The Visual Communications on the Road in Arkansas: Video and Photo Creative Projects to Promote Agriculture, currently in phase two, focuses on the integration of additional agricultural communications curriculum into state high school programs. This phase was used to expand the initial program to include an 18-week, semester-long agricultural communications course for secondary agricultural science programs.

Instructional modules in (a) careers, (b) writing, (c) design, and (d) multimedia were developed. The careers module expanded content from the agricultural careers instructional unit and focused on agricultural history and careers. The writing module was built on content in the original writing lessons, providing an overview of journalistic writing, introducing students to stylistic concepts, and differentiating between news writing and feature writing styles. The design module expanded

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content from the original photography lessons and incorporated graphic design. The multimedia module expanded content from the videography lessons.

Purpose and Research Questions

The purpose of this mixed-methods study was to assess the effectiveness of newly developed agricultural communications curriculum in secondary agricultural education programs through student knowledge gained and teachers' perceptions of the curriculum. The following research questions guided the study:

1. Did knowledge of agricultural communications competencies increase in students who completed the agricultural communications curriculum?
2. What are agricultural teachers' perceptions of agricultural communications curriculum?
3. Were the assessment instruments an effective measure of students' knowledge?

Methods

The population of this study, which was part of a larger study, consisted of students from six high school leadership and communications agriculture classes in Arkansas during the spring 2013 semester (N = 297). Schools were selected from a convenience sample of interested teachers in the state. Prior to beginning this study, teachers gained permission from their administration to teach the content. The research had IRB approval, and parents of student participants were required to sign and return a consent form. Each of the four curriculum modules was piloted individually by one of four high school agricultural science programs. Additionally, the curriculum was taught in its entirety at two high school agriculture programs. Sample sizes for the individual modules were as follows: careers (n = 130), writing (n = 131), design (n = 20), and multimedia (n = 16). Participating teachers received binders containing the complete agricultural communications curriculum and support material as well as electronic copies of all curriculum and materials on a USB flash drive. Teachers also were provided the opportunity for one-on-one training as needed.

Secondary teachers were responsible for teaching their students all curriculum units as assigned by the post-secondary institution. Each unit within the four modules consisted of lesson plans, instructional PowerPoint files, handouts, worksheets, answer keys, grading rubrics, and additional support materials. Supplemental resources were provided to assist the teachers as they taught the Adobe Creative Suite skills-based activities and projects. Resources accompanied each lesson to assist teachers with facilitating the curriculum. Instructors administered a content specific pre-test to the students prior to the beginning of each of the four (writing, design, multimedia, and careers) curriculum modules. Students were given a researcher-created post-test after the completion of each module. The post-tests were structured like the pre-test that accompanied each module.

Prior to beginning each module, teachers administered a module-specific pre-test containing true/false, multiple-choice, and short-answer questions. Students were given a post-test after the completion of each curriculum module. The post-tests were structured like the pre-test that accompanied each module. A panel of faculty members (from agricultural education and communications) examined the instruments and judged them to possess face and content validity.

Preceding statistical analysis, various questions from the pre- and post-test assessments were removed to increase the reliability of the instruments. Initially, the careers module pre- and post-test contained 11 questions and assessed students' knowledge of the history of agricultural communications and opportunities to pursue agricultural communications degrees after high school. One short

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answer question was removed from the data and not included in the statistical analysis. The writing module pre- and post-test contained 10 questions and assessed students' knowledge of journalistic writing, AP Style, and editing. When the teachers returned the assessments, researchers found one question repeated and, therefore, was removed from the statistical analysis. The design module pre- and post-test contained 10 questions pertaining to photography, graphic design, and web design. Of those 10 questions, three short-answer questions were removed from the statistical analysis. The multimedia module pre- and post-test contained 10 questions pertaining to videography, digital audio broadcast, and social media. Of those 10 questions, five were removed, including three fill-in-the-blank items.

The alpha coefficients for the pre-test assessments ranged from .30, .26, .15, and .37 for careers, writing, design, and multimedia. (Note: low alpha coefficients on the pre-test assessments may have reflected a reliance on guessing by the students.) The alpha coefficients for the post-tests increased to .45, .55, .67, and .54 respectively. Nunnally (1967) stated a modest reliability of .60 or .50 is sufficient during early stages of research. Additionally, teacher-made tests usually have reliabilities around .50 (Frisbie, 1988). Data were analyzed using descriptive (means and standard deviations) statistics.

In addition to the pre- and post-test assessments, the creative projects designed and produced by the students using the skills they learned were returned to the researcher for analysis. These projects included plant sale fliers and short agricultural videos. The participating secondary agricultural teachers also kept reflective journals about their experiences as they taught the curriculum. Four of the six participating teachers returned journals to the researcher. The researcher performed a content analysis for emergent themes within the journals returned at the end of the study. Following Lincoln and Guba's (1985) constant comparative method, passages were coded in their original context (Creswell, 1998), and key themes emerged that characterized the teachers' perceptions related to their personal and students' experiences with the agricultural communications curriculum. Credibility of the findings was achieved through member checking and the use of the teachers' own reflections (via their reflective journals).

Trustworthiness and dependability were established through purposive sampling, the use of thick description, and the use of an audit trail supporting the key findings. Participating programs were selected based on teachers' ability, confidence, and willingness to teach the concepts covered in the agricultural communications curriculum. Teachers were asked to journal at the conclusion of each day the curriculum was taught. They were asked by the researcher to include a brief description of the lesson, all positive outcomes the students experienced, and all negative aspects of the curriculum completed for that day of instruction. Additionally, the researcher contacted the participating teachers on a bi-weekly basis to monitor the progress of the students and teachers. The phone correspondence was documented and referenced when analyzing the reflective journals returned to the researcher.

Results and Findings

The agricultural communications curriculum was piloted in six schools across Arkansas. These schools varied in size and geographical location. Of the six teachers who participated in the study, three were male and three were female. The programs also displayed different levels of technology availability and support. Students from 9th through 12th grades participated in this study. Four schools piloted one curriculum module each, and two schools attempted to pilot the curriculum in its entirety. Of those two schools, one only completed the careers and writing modules and the other did not provide feedback; therefore, no data was included in this study from that school.

Overall, the participants' (*n* = 130) scores significantly increased between the careers pre-test (*M* = 43.3%, *SD* = 14.8%) and post-test (*M* = 59.5%, *SD* = 15.6%), *t*(129) = 10.39, *p* < .0001. Specific content questions that received the greatest increase in correct answers between pre- and post-test evaluation where career ethics (pre-test: *M* = 51.5% *SD* = 50.1%; post-test: *M* = 82.5%, *SD* = 38.9%) and college preparation (pre-test: *M* = 46.9%, *SD* = 50.1%; post-test: *M* = 80.8%, *SD* =39.6%). Table 1 illustrates knowledge changes between the careers pre- and post-test assessments.

Table 1

Student Test Scores from the Careers Module (n = *130*)

Question	Pre-test (%)		Post-test (%)	
	M	*SD*	*M*	*SD*
History of agricultural communications	57.7	49.6	76.2	42.8
Dissemination of information	87.7	33.0	93.8	24.1
Career salary	1.5	12.4	20.0	40.2
Career ethics	51.5	50.1	82.5	38.9
College preparation	46.9	50.1	80.8	39.6
Funding college	7.7	87.7	2.3	15.1
Résumé writing	66.9	47.2	84.6	36.2
Non-verbal communication	1.5	12.4	17.7	38.3
Visual communication	75.4	43.2	78.5	41.3
Total	43.3	14.8	59.5	15.6

Note. Questions coded as 0 for incorrect and 1 for correct.

The participants' (*n* = 131) scores on the writing pre-test (*M* = 27.7%, *SD* = 13.8%) significantly increased on their post-test assessment (*M* = 52.8%, *SD* = 18.9%), *t*(130) = 13.46, *p* < .0001. Specific content questions that received the greatest increase in correct answers between pre- and post-test evaluation were news writing styles (pre-test: *M* = 6.1%, *SD* = 24.0%; post-test: *M* = 52,7%, *SD* = 50.1%) and writing – Five Ws and H and Purpose of the Lead (pre-test: *M* = 64.1%, *SD* = 48.1%; post-test: *M* = 96.9%, *SD* = 17.3% and pre-test: *M* = 4.6%, *SD* = 21.0%; post-test: *M* = 30.5%, *SD* = 46.2%), respectively. Table 2 illustrates knowledge changes between the writing pre- and post-test assessments.

Table 2
*Student Test Scores from the Writing Module (*n = 131)

Question	Pre-test (%)		Post-test (%)	
	M	*SD*	*M*	*SD*
News writing style	6.1	24.0	52.7	50.1
Feature writing style	67.2	47.1	67.2	47.1
Journalistic writing	0.0	0.0	16.0	36.8
Five W's and H	64.1	48.1	96.9	17.3
Purpose of a lead	4.6	21.0	30.5	46.2
AP Style	40.5	49.3	72.5	44.8
Elements of news	0.0	0.0	3.8	19.2
Boilerplate	19.8	40.0	51.9	50.2
Journalistic ethics	64.9	47.9	84.0	36.8
Total	29.7	13.8	52.8	18.9

Note. Questions coded as 0 for incorrect and 1 for correct.

Overall, the participants (n = 20) scores on the design pre-test (M = 37.9%, SD = 11.6%) significantly increased on their post-test assessment (M = 73.6%, SD = 24.6%), $t(19)$ = 6.24, p < .0001. Questions pertaining to layout received the greatest increase in correct answers between pre- and post-test evaluation: white space (pre-test: M = 25.0%, SD = 44.4%; post-test: M = 70.0%, SD = 47.0%) and pull quotes (pre-test: M = 0.0%, SD = 0.0%; post-test: M = 50.0%, SD = 51.3%). Table 3 illustrates the knowledge changes between the design pre-and post-test assessments.

Table 3
Student Test Scores from the Design Module (n = 20)

Question	Pre-test (%)		Post-test (%)	
	M	*SD*	*M*	*SD*
File formats	95.0	22.4	95.0	22.4
Characteristics of color	85.0	36.6	75.0	44.4
Body text font size	0.0	0.0	60.0	50.3
White space	25.0	44.4	70.0	47.0
Pull quotes	0.0	0.0	50.0	51.3
Pixels	55.0	51.0	70.0	47.0
CMYK vs. RGB	05.0	22.4	95.0	22.4
Total	37.9	11.6	73.6	24.6

Note. Questions coded as 0 for incorrect and 1 for correct.

The participants (n = 16) scores on the multimedia pre-test (M = 52.5%, SD = 20.5%) significantly increased on their post-test assessment (M = 83.8%, SD = 22.2%), $t(15)$ = 5.42, p < .0001. Specific content questions that received the greatest increase in correct answers between pre- and post-test evaluation where ethics (pre-test: M = 31.3%, SD = 47.9%; post-test: M = 75.0%, SD = 44.7%) and videography (pre-test: M = 0.0%, SD = 0.0%; post-test: M = 92.8%, SD = 25.0%). Table 4 illustrates the knowledge changes between the Multimedia pre- and post-test assessments.

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Table 4

Student Test Scores from the Multimedia Module (n = 16)

Question	Pre-test (%)		Post-test (%)	
	M	*SD*	*M*	*SD*
Copyright laws	31.3	47.9	75.0	44.7
Tripod use	75.0	44.7	87.5	34.2
File formats	62.5	50.0	87.5	34.2
Three phases of videography	0.0	0.0	92.8	25.0
Social Media effects on agriculture	93.8	25.0	75.0	44.7
Total	52.5	20.5	83.8	22.2

Note. Questions coded as 0 for incorrect and 1 for correct.

Seven emergent themes were common among all six teachers as captured in their reflective journals. Lack of time, limited technology, and curriculum content were the most common themes. Teachers also commented the students enjoyed the projects and activities the most. A summary of the remaining emergent themes with supporting quotes from the participating teachers can be found in Table 5.

Conclusions and Recommendations

Today's employment market requires skill in many technology areas. Based on the findings of the pre-test assessment, student knowledge of agricultural communications and communication based technologies was relatively low and students may not be gaining skills in present areas of emerging technology. This may be because the current agricultural leadership and communication class is primarily leadership with the only communications focus being public speaking (Don Edgar, personal communication, December 19, 2013). Therefore, as a vocationally based program, findings of this study do not agree with Akers (2001) that preparation of students, especially based in current and emerging technologies associated in agricultural communications, is present. Participating in the agricultural communications curriculum modules resulted in the gain of agricultural communications knowledge and skills. This may be attributed to the presentation of the lessons through experiential learning and authentic instruction methods, as recommended by Knobloch (2003), Newmann and Wehlage (1993), and Kolb (1984).

When analyzing the pre- and post-test assessments, the researcher eliminated various questions from each module assessment to increase reliabilities. However, according to Nunnally (1967), the reliabilities reported are sufficient during early stages of research. The researcher can assume the extensive and detailed concepts covered in the modules exceeded the learning capacity of the students in the time allotted for knowledge gain. This was also verified in teacher reflective journals. Because of this, more emphasis should be placed on various content areas in the future to ensure maximum knowledge gain has occurred. Areas that need further emphasis include agricultural communications history, feature writing, web design, digital audio broadcast, and social media. However, it is of equal importance to note value existed in the original curriculum as noted in the knowledge increase in each module: careers (16.2%), writing (23.1%), design (35.7%), and multimedia (31.3%). That being said, all curriculum can be improved to better meet the needs of students and teachers.

Before continuing research regarding this study, researchers should revise the pre- and post-test assessments to eliminate weak questions in an effort to increase reliabilities. The pre- and post-tests

should be administered before and after each unit opposed to each content module. This will reduce knowledge retention lost due to maturation. Furthermore, teachers should be advised to review unit concepts before and after each learning opportunity to reinforce the material taught during each unit.

The creative pieces submitted by the students provided evidence application of design and video production skills had been achieved. As stated in one instructor journal (in reference to the plant sale fliers created during the design module), "The final activity … was a good way to tie all the material together and show the students how [agricultural communications] is used" (T3). In future studies, activities such as this should be included at the end of each unit, rather than the end of each module, to increase discovery learning (Bruner, 1961), experiential learning (Kolb, 1984), and authentic learning (Newmann & Wehlage, 1993) as well as to create the complete psychological structure for learning as outlined by Knobloch (2003).

When the participating secondary teachers' journals were reviewed, several emergent themes were discovered. The curriculum may have been too detailed and covered too much content. Before making the curriculum available to the entire state, it should be revised to include only overarching agricultural communication and communication technology knowledge and skill development so students can simply be introduced to the overarching agricultural communications concepts and spark interest in pursuing similar opportunities after high school. In addition, the content should be reduced and revised to allow students to comprehend the concepts and create quality projects to showcase the skills and knowledge they have learned.

Although teachers had positive comments regarding the projects and activities, lack of technology and software in the classroom posed a problem when executing student assignments. Because it is unlikely that funds can be secured to purchase all secondary agriculture programs the software and technologies needed to adequately teach agricultural communications in the classroom, all curriculum should be revised so that activities utilizing software and technology are optional depending on the level of technology available to students and teachers. Additional activities should be included in each unit to allow students to apply skills and concepts learned without equipment and technology. Perkins activity forms should be created and included in the units to assist secondary teachers in purchasing equipment and software needed to more effectively teach agricultural communications curriculum.

Teachers reported the students were "interested and excited to start the lessons … and learn much better through the [activities] than the notes" (T1). Curriculum revisions should include the addition of more real-world application in the lecture portion of each curriculum unit to spark student interest in the content, which may in turn increase future career and college opportunities within agricultural communications. This could be achieved by including interviews and biographies of individuals currently working in the agricultural communications career field.

Although detailed teacher delivery instructions were included in each module, teachers did not necessarily follow the guidelines or even teach the lessons the way they were developed. When analyzing the teachers' journals, it was evident their own abilities with skill level in agricultural communications and technology were low. If students and teachers are to move toward an active process as touted by Hein (1991), then further education and experience (Kolb, 1984) must be gained to avail these abilities from the teacher to the student.

The participating teachers in this study were willing to teach the agricultural communications curriculum but expressed the need for training in the content areas and technology used in the agricultural communications curriculum. This was supported by Calico et al. (2013) research that found

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cooperation with the state Department of Career and Technical Education, teacher in-service training should be scheduled to introduce teachers to necessary agricultural communications curriculum, software, and equipment, in addition to increasing their confidence in teaching the content.

Additionally, institutions of agricultural science teacher preparation should evaluate student need for skills in agricultural communications areas and incorporate education for future candidates in teacher education. As reported by numerous researchers (Bigge & Shermis, 1999; Edgar, 2012; Gredler, 2005; and Schunk, 2004), perceptions of students must be taken into account to explain learning. If educators do not use technology, education may not impact students at a level where student learning is maximized. It is further recommended professional development be implemented for participants in the state where this study was conducted. Based on the findings of this study, limited proficiencies in agricultural communications technologies were found.

Furthermore, researchers should investigate the acceptance of technologies by educators in Arkansas to further impact the professional development of teachers. Also, secondary agricultural communications curriculum will be provided in Arkansas and should be shared with other states interested in adding this curriculum into high schools.

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Using Reflective Journals to Compare an International Faculty-led Study Tour and Student Internship Experience

Amanda N. Northfell and Leslie D. Edgar

Abstract

The globalization of society presents the need for intercultural communications skills. International experiences impact students' global perceptions, which affect the agricultural industry's future. This study sought to determine agricultural students' values and how these values influenced their perceptions regarding their unique international experiences. Students from four universities who participated in a three-week faculty-led study tour (N = 11) were compared to University of Arkansas students who participated in a six-week internship (N = 5) in Ghent, Belgium. Students used reflective journals to record their perceptions, and a content analysis was conducted to identify emergent themes. Students from both experiences struggled most when communicating with researchers, but they gained confidence as they successfully served an international client. Host families were the most pressing concern for students, but those family stays were impactful in exposing students to Belgian culture. Students sought normalcy by comparing Europe to America and stepped up as leaders when faculty guides were not present. Regardless of whether students were led by a faculty member (study tour) or navigated the international experience predominately on their own (internship), each found value in studying internationally. Previous research recommended placing students in international settings to increase students' knowledge of global agriculture, and this concept is reinforced by this study.

Key Words

Reflective journals, international internships and study tours, agricultural communications.

Introduction

Since the last half of the 20th Century, the structure of American agriculture has changed significantly through the introduction of new technologies and growing integration of agricultural sectors into national and global markets (Dimitri, Effland, & Conklin, 2005). Globalization and consolidation have accelerated the pace of business and diversified populations, thus increasing the need for agricultural businesses to adapt (Farm Credit Council, 2006) in an effort to better connect and maintain relationships with new international consumers, competitors, and collaborators (Dimitri et al., 2005). Further, technological advancements continue to reduce communication barriers, making partnerships with distant nations much easier. The United States is involved in a "global era," and

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education is needed to train individuals for the responsibility of living in a progressively interconnected world (Nehrt, 1993).

Because those possessing global competence are becoming a necessity in this worldwide environment (Association of American Colleges and Universities, 2007), colleges have been advised to modify curricula to provide students with tools to not only "contribute to knowledge, but also to comprehend, analyze, and evaluate its meaning in context of an increasingly globalized world" (Association of Public and Land-Grant Universities, 2004, p. 2). In a survey of 302 employers, 67% of respondents desired a greater emphasis on training college students to recognize the "global context of situations and decisions" (Hart Research Associates, 2010, p. 1). While greater attention has been paid toward globalization and cultural diversity in higher education (Roberts, Conner, & Jones, 2013), agricultural graduates lack the global competence employers expect (Chang et al., 2013). Further complicating the issue, fewer agricultural students are participating in global experiences (Bunch, Lamm, Israel, & Edwards, 2013).

Between 2010 and 2012, the field saw a -5.7% change in the number of study-abroad agricultural students from the United States (Institute of International Education, 2014). To overcome this skill deficiency, U.S. employers spend millions of dollars on intercultural training annually (Hunter, 2004). Agricultural programs must observe and adapt curricula to ensure they provide competitive skills for graduates (Doerfert & Miller, 2006; Irlbeck & Akers, 2009).

To better meet employer needs, the National Academy of Sciences (NAS) in 2009 recommended broadening a student's undergraduate experience to include student development of transferable skills, participation in research, outreach and extension, internships, and exposure to international perspectives. Research has reinforced the need to offer global experiences to agricultural students (Edgar & Edgar, 2009; Northfell, Edgar, Miller, & Cox, 2013; Place, Irani, Friedel, & Lundy, 2004; Zhai & Scheer, 2004). This call is addressed by universities when providing globally focused courses, travel courses, and study-abroad opportunities (Gouldthorpe, Harder, Stedman, & Roberts, 2012). Agriculture students who study international agriculture policy, products, peoples, and culture may increase their international competence through these unique experiential learning opportunities and be better suited for careers in the global era.

Theoretical / Conceptual / Operational Framework

In 2011, broad research needs for agricultural education, agricultural communications, leadership education, extension education, and international agriculture were outlined in the National Research Agenda (NRA): Agricultural Education and Communications 2011-2015 (Doerfert, 2011). This study responded to "Priority 4: Meaningful, Engaged Learning in All Environments," which notes the need for areas of scientific focus to "examine the role of motivation, self-regulation, metacognition, and/or reflection in developing meaningful, engaged learning experiences across all agricultural education contexts" (Doerfert, 2011, p. 9). Meaningful experiences actively involve students in experiencing a person, surrounding, or situation (Bruening, Lopez, McCormick, & Dominguez, 2002). These meaningful learning opportunities are available to students through experiential learning opportunities. Experiential learning theory maintains learning is constructed consciously and adapted through experiences over time (Kolb, 1984). Engaging students in meaningful activities that model prospective duties and challenges (Paper, 1991) and presenting opportunities for involvement, challenges, support, structure, feedback, application, and integration (Blocher, 1978) create an ideal learning environment. Individuals must exhibit intercultural competence and sensitivity while living in increasingly diverse environments to be successful communicators (Braskamp, Braskamp, &

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Merrill, 2009; Chen & Starosta, 1996). Intercultural communicative competence can be enhanced through cultural awareness or an understanding of each other's cultural conventions that affect the way people think and behave (Chen & Starosta, 1996). "Based on some of the universal commonalties of human behavior, … an individual can begin to understand how people from diverse cultures adapt such universal behaviors to the unique expectancies of intercultural communication settings" (Chen & Starosta, 1996, p. 365). Students who participate in international experiences are introduced to new ideas and practices that shape the way they will work within the global era.

Subsequently, while the learner may fully experience a person, surrounding, or situation, one must take part in a reflection for experiences to take hold (Bruening et al., 2002). According to Thorpe (2004), reflective journals are an important tool in fostering active learning. Zhao (2003) defined reflective practice as the "ability to reflect on experiences, to employ conceptual frameworks, and to relate these to similar and dissimilar contexts to inform and improve future practice" (p. 2). Reflection allows individuals to analyze and create perceptions about experiences differently than one might have done without reflection (Brockbank & McGill, 1998). Reflective exercises not only provide insight for trip coordinators but also allow participants to identify expectations (Gouldthorpe et al., 2012). International experiences, such as this research study, have the potential to help students obtain knowledge about international agricultural policy, practices, production, and products, thereby assisting them with enhanced out-of-country opportunities.

Purpose and Objectives

The purpose of this study was to determine agricultural students' values and how these values influenced student perceptions regarding their unique international experiences. Researchers assessed students' journal entries from the same organization experience in Ghent, Belgium, which used two varying program structures, a faculty-led study tour and an international internship, during the summers of 2012 and 2013. Through this assessment, researchers sought to (a) identify supporting key values revealed by students in journal entries throughout the experience, (b) assess students' experience in Ghent, Belgium, and (c) compare student perceptions between the faculty-led and internship international experiences.

Methods
2012 Faculty-Led International Study Tour

Agricultural students (*N* = 11) from the University of Arkansas, University of Florida, New Mexico State University, and Auburn University were selected to participate in a three-week intensive summer study tour in Ghent, Belgium. The goal of the study tour was to assist the Institute for Agricultural and Fisheries Research (ILVO), working in cooperation with Ghent University (GU), to plan, organize, and evaluate a large community event. During the faculty-led study tour, 10 undergraduate students (three with prior international experience) and one graduate student worked directly with agricultural researchers to create consumer-friendly messages for various digital and print media. Messages and creative pieces developed by students were used by ILVO to help the Belgian public better understand the science behind where and how their food is produced, processed, and marketed at an open house event known as Open Enterprise. During the study tour, students also toured food and animal production facilities and participated in faculty-planned and guided weekend trips to Brugge, Paris, and London.

During the faculty-led study tour, advisers maintained organizational stability by creating a formal schedule for students in the workplace. Each week, students worked 37.5 hours in their groups to

complete projects for Open Enterprise. Student groups worked from 8:30 a.m. to 4:30 p.m., Monday through Friday. From 8:30 a.m. to 9 a.m., all participants met as a single group to debrief and share successes and struggles from the previous workday. After this session, students met with ILVO's researchers for 30 minutes to ask questions and pose issues concerning projects. Following the second meeting, students worked in their assigned research area until 4 p.m. to complete their portion of creative pieces. Two students acted as group leaders and were responsible for overseeing and directing two of the four student groups. These student leaders had prior experience in leadership positions and acted as a safety net for those with less experience. Both leaders remained in Ghent for a total of 12 weeks to complete student work and returned to Belgium in October to assist with Open Enterprise. Students concluded each day at ILVO by reflecting using their journals for 30 minutes. This experience was highly structured with little free time for students.

2013 International Internship Methods
Agriculture students (N = 5) from the University of Arkansas were selected to participate in a six-week summer internship in Ghent, Belgium. Five interns (four with prior international experience) were selected based on their qualifications by the program director through an application process with one student having participated in the previous 2012 experience (R3). The program director traveled with four students at the beginning of their internships and remained in Belgium for three days. The goal of the internship experience was to assist ILVO in conducting research and creating communication pieces for the public. Student interns were assigned specific research disciplines to assist according to individual expertise: (a) animal science and fisheries; (b) plant science; and (c) food pilot. Of the five interns, three students worked directly with researchers to create short, consumer-friendly messages for print and digital media, including a video for food pilot and a brochure for plant science. Media were tailored to help the general public better understand the science behind where and how their food is produced, processed, and marketed. The remaining two interns worked with agricultural experts within fisheries and poultry disciplines to assist ILVO with data collection.

Students were responsible for creating a personal work schedule that met the needs of their ILVO adviser and generally worked 37.5 hours weekly. Student interns reported only to their assigned research supervisors periodically, and no formal meetings occurred for interns to meet as a group. During the internship, students also toured food and animal production facilities in the country planned by ILVO and participated in weekend trips planned on their own. This experience was highly unstructured with lots of free time for students.

Data and Data Analysis
Before each program, participants attended eight to 10 weekly meetings with University of Arkansas faculty and program director. These meetings provided students with skills and information needed to be successful in the international setting. Meetings included an introduction to course expectations, travel information, guest speakers, and discussions regarding ILVO, GU, and Belgian agriculture, research, and culture. Meetings were used to help students complete research projects as well as gain or improve communications skills in campaign planning, graphic design, videography, and photography. Students participated in pre- and post-trip reflection activities and were required to maintain a journal throughout the entirety of their time abroad. They were prompted to summarize pros and cons of their experience at the end of their study tour/internship. Daily journal entries were determined predominately by each student. Journals served as a portion of students' final grade along with formal evaluations of work and performance from project supervisors and program director.

Following each program, journal entries and reflective activities were transcribed and analyzed to identify emergent themes related to the students' personal and professional development values and international experience. The two coders for this study had each traveled abroad once for vacation purposes prior to analyzing data but had never taken part in an international learning opportunity with the University of Arkansas. These researchers initially read through all data to gain a general sense of the information and reflect on its meaning through note taking (Creswell, 2009). Following Lincoln and Guba's (1985) constant comparative method, passages were then coded in their original context (Creswell, 1998; Strauss & Corbin, 1998), and entry topics were clustered and consolidated into key categories or themes (Creswell, 2009; Tesch, 1990). Themes were then listed according to occurrence and used to guide analyses on remaining journal entries (Creswell, 2009; Tesch, 1990). Adjustments were made to themes if new categories emerged from remaining data (Creswell, 2009; Tesch, 1990). These themes were validated through member checking with the project director who communicated with participants and collaborated with ILVO supervisors to assign final grades. Credibility of the findings was increased through triangulation of these sources (pre-reflection, journals, and post-reflection activities) as well as the use of students' own written journal reflections. Trustworthiness and dependability were increased through purposive sampling, the use of thick description, and the use of an audit trail supporting the key findings (Lincoln & Guba, 1985).

Findings and Results

Nine shared themes emerged from the 2012 faculty-led study tour (*N* = 11) and 2013 internship (*N* = 5): (a) host families; (b) food and beverage; (c) confidence; (d) seeking normalcy; (e) working with researchers (clients); (f) student relationships; (g) safety; (h) student mentoring; and (i) career decisions. These themes were addressed by participants of both experiences to varying degrees in their daily journal entries. In addition to the mentioned themes, independence emerged as a new theme from the 2013 internship. In the narrative below, students (respondents) are noted as R1-R11, 2012 and R1-R5, 2013 to indicate experience.

Host Families

Since students lived with host families for the entirety of the international experience, it was initially the most pressing concern for participants. Before departure, students were optimistic about what homestays had to offer but were nervous about fitting in with their new families. Students' nervousness stemmed from fear of rejection, being rejected by [their] host families, feeling "intrusive" (R2, 2012), sharing nothing in common with their host families, host family expectations, and living conditions. As students learned more about their host families and the experience, nerves subsided. Host families had a significant impact on exposing students to the Belgian culture and were a source of comfort.

> I realized it takes a special person to take in someone they don't know and treat them like their own family … [The host families] were all so kind, generous, and very, very supportive. Without them, spending two months in another country away from your family and friends would have been impossible. (R4, 2013)

At the end of each experience, students noted their host family as one of their favorite aspects of the experience and expected to maintain a relationship with their host families after returning home. One participant of the faculty-led tour noted during his final days in Belgium, "I have been wonder-

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ing what I will miss most about Belgium, and I know that I will miss [host father's] friendship the most" (R3, 2012). R3 did maintain a relationship with his host father and even paid him a visit when participating in the 2013 internship.

Food and Beverage

Meals shared among students and host families were often noted in both experiences as a chance to bond and learn about the Belgian culture. A student of the 2013 internship reflected, "… I believe that food is a big part of traveling. Just like when you go to Chicago, you have to eat a Chicago-Style hot dog … You have to eat the local food to experience a place" (R2, 2013). Students recorded differences in Belgian meals from typical American ones and used these opportunities to reflect on their lifestyles and relationships with those around them. "Cooking with [host father] is fun and an educational experience. I try to keep an open mind about food so I try everything he suggests, and to my surprise, most of them are good" (R3, 2012). Bonding with classmates over meals was a source of comfort and noted as a "much needed" opportunity to relax after work. "We all had some drinks, and I do believe that was the best time I have had on the entire trip. The little moments like sitting at the café are the ones I crave" (R4, 2012).

Confidence

Levels of self-confidence increased steadily for participants of both international experiences. At the beginning, students were insecure regarding their skills and role within their assigned work group at ILVO. In preparing for the 2012 study tour, one student noted:

> I don't really feel like I have a good grip on what we'll be asked to do by whom and for whom — and I feel like those things are things that I, as a student, will have to just figure out when I get there. (R5, 2012)

This outlook remained true for 2013 internship participants. As students' roles were shaped, participants slowly gained confidence with highs and lows unique to each student. Experiences that contributed most to student confidence for both programs were related to realizing they could contribute to their teams and successfully serve a client in an international setting. "I had never worked with strictly researchers or anyone that was foreign. I wondered if my skills would be up to par, and when I found that they exceeded expectation that was an amazing feeling" (R1, 2013). As students recognized both their group and ILVO could benefit from their skillsets, their positivity regarding their participation in the experience increased. Students were most appreciative and satisfied after successfully completing something they had never tried before and proving their independence in an international setting.

Seeking Normalcy

In all aspects, participants of both experiences constantly sought normalcy and compared their experiences to home. Students struggled with homesickness and unfamiliar situations, so they were comforted when they found constants. These comparisons also helped students improve intercultural communication skills and deepen their appreciation for home. One student reflected on her interactions at ILVO:

> I think for the American students, we came in as collaborators with a common goal to get

the projects done. We also had the mentality of solving small problems on our own and just getting things done quickly. From the researcher's point of view, I think they expected us to act like students do in Belgium. They look to the mentor for instruction, and do exactly what they say and how they say to do it. (R4, 2013)

Students also noted similarities between Belgian and American agricultural practices in their journals and identified ways in which practices could be improved on both ends.

Arriving at the [poultry] layer farm was quite a bit of a shock. I have never seen such a clean poultry farm. The grass was cut and there was cement paving. The houses were solid walls with fans on the top. The grower seemed to be well-educated about the poultry business in Belgium as well as internationally. (R3, 2012)

While students found Belgian poultry farms to be more modern and controlled than those in the United States, they also wrote other Belgian practices could be improved. "I found the Belgian Blue cattle fascinating because I come from a beef cattle background. I really like the gait measurer and found it interesting that the Belgian people were so far behind in terms of spraying with GPS" (R7, 2012).

Working with Researchers (Clients)

Working for clients was intimidating for all students and the most difficult part of both programs. This theme proved to be an even greater challenge for the 2013 student interns as they did not have a faculty guide to help soften the communications barrier. Students struggled to communicate with clients and accept feedback without involving emotions. Not only did students have to learn to communicate with nonnative English-speaking clients with differing customs, but they also had to learn how to translate complex research terminology into understandable and meaningful messages for the general public.

One student reflected, "The researchers made it clear that they wanted to present their research without dumbing it too far down … It seems as though ego will be a big factor when dealing with researchers" (R6, 2012). This continued to be a conflict for student interns as researchers, rather than agricultural communicators, oversaw and directed student work.

Professionally, I think I have learned that in the politics of life and the workforce, working hard is sometimes not enough. It is important to understand the dynamics of certain situations, people, and environments and to act accordingly … Sometimes you have to cater to the whims of your client, boss, or mentor to keep them happy and give them the feeling of a sense of control. (R4, 2013)

In fear of rejection and prompting further revisions, students were apprehensive of sharing their work with the researchers and struggled to accept feedback without compromising the aesthetic and communications knowledge they had gained in the classroom. Though the job was challenging, successfully serving clients proved to be very satisfying for students.

Student Relationships

Journals revealed students of both experiences bonded and built lasting relationships with fellow

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participants. In spite of the fact students of the 2012 experience attended four different universities and participants of the 2013 internship were not centrally located or from the same department, the international experience presented an opportunity for students to grow closer as colleagues and friends. "I could tell [R4] was having fun! I'm so glad we have each other. [R4] is amazing and I'd be sad without her here. We make a great team, and I know [R1] will love her too" (R5, 2013). Although students of both experiences built friendships, there were noticeable divisions among the student groups of the larger study tour in 2012. One student explained, "I see that our group has its divisions. People quickly understand who they want to hang out with … It's not that I don't like the others; it's just that these are the ones I seem to fit with best" (R4, 2012). Participants recorded the desire to continue developing friendships upon returning home.

Safety
Safety was a common concern throughout both programs. Not only were students in an unfamiliar country, but also they were sometimes left alone to navigate the cities where they visited and worked. A few participants got lost and reflected in their journals.

> At one point we ended up getting on the wrong tram and had to backtrack our way home …
> It was a little scary not having our bearings or knowing where we were, but I think that's all part of the trip—to be lost and find our way home. (R1, 2012)

Students especially showed concern for their safety upon gaining unwarranted attention from strangers. A student who participated in both summer experiences reflected:

> Once we were walking away that was when it all hit me, "Wow I just got pickpocketed and still have my wallet." The guy was twice as big as me. That could have turned ugly. It was hard to sleep on Saturday because the scene kept playing over and over in my head. (R3, 2013)

Students who did not participate in the faculty-led study tour felt especially vulnerable when traveling in another country for the first time and navigating to and from work on their own. "[I was] trying to remember which way I had come before, I began arbitrarily going down streets in what I though was the direction of home … Finally, I made it home safe and sound" (R4). Despite being outside of their comfort zone, graduate students in both experiences stepped up to ensure the safety of others on outings and in the workplace.

Student Mentoring
Just as students were protective of each other, students with more experience became student mentors. These students willingly accepted the responsibility of teaching classmates skills, such as using Adobe© Creative Suite software, taking photos, and recording video footage, to help classmates succeed in their communications tasks. One student of the faculty-led tour surrendered her leadership position to keep the peace within work groups.

> … I am stepping back and letting her take the lead, not as a coward, but because I know she has had more courses than I, and I could definitely learn things from her. I'm trying to not speak as much and just observe, process, and only if something is wrong, speak. (R8, 2012)

Students learned from each other and made adjustments to ensure all projects were completed and prepared for ILVO by the end of the experience. Because students of the 2013 experience did not have a faculty guide present for the majority of the internship, graduate students defended undergraduate students during conflicts in the workplace. "Towards the middle of the internship, there were some communication barriers. The largest issue was that I felt that [R4] wasn't being treated fairly, and as the graduate student I needed to protect her" (R1, 2013). Graduate students freely took on the leadership role when faculty guides were not present and sought additional assistance from the program director via Skype conferences.

Career Decisions

Finally, students reflected deeply on their career path as a result of their international work. Students gained a greater understanding of their capabilities and limits, and some made decisions about the kind of work they do *not* want to do in their future careers.

> Sometimes I really wonder if I will ever make it in this industry. I just don't know if I have it in me to work at a computer or be in meetings all day long. I love to write, but not like that. (R4, 2012)

Others found they were able to survive an international setting and discovered that the experience enriched their marketability when pursuing a career in agricultural communications.

> … I am much more confident in my skillset and marketability for my future career. I also think it was important and, ultimately positive, to experience work culture abroad. By comparison, it has given me a lot of perspective on work culture in the United States and, I think, has made me a more, well-rounded future employee. (R1, 2013)

Independence

Along with the nine themes identified as similar between the 2012 and 2013 international participant groups, 2013 interns uniquely recorded their anxieties about working independently. Without the aid of a faculty guide, students felt overwhelmed and unqualified for the task ahead.

> This week I am feeling overwhelmed … I've always had a touch of anxiety, undiagnosed of course. However, I know myself and I can feel it creeping into the edges of my brain like a soft black vignette. Sometimes it creeps in when my home is not spotless. Other times it is after a feeling of imperfection. Often it comes with separation. (R1, 2013)

On top of being overwhelmed by projects, working independently for six-weeks in a foreign environment felt isolating. After a work-related party, an intern reflected, "Well people didn't really talk to [R1], [R4] or me, but it was still ok … We were like the kids that no one wanted to sit by at lunch" (R3, 2013). Students relied on host families and each other for support both inside and outside the work environment.

On the other hand, students also saw their independence as an opportunity to flexibly explore Europe. "I went to Antwerp on a whim one day and only brought my train pass and pocket change because I needed to save money…" (R2, 2013). Independent travel exposed students to mishaps along the way but improved the way they planned and managed their time and resources. Student

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confidence was greatly affected by their successes and failures as they independently solved problems.

Experience Summary

Overall, students of each international experience found the opportunity to be meaningful in developing them as professionals. Beyond the challenge of working in a foreign country, many appreciated the opportunity for the skills they acquired or sharpened. "I'm glad that I am learning so much on this trip. It is like a class but accelerated and more practical" (R3, 2012). Participants of the 2013 internship shared this perspective and discovered a new source of confidence. A 2013 intern reflected, "One thing that was extremely positive for me was to be able to show my skills to an international audience. I found new success professionally when I was able to impress foreign researchers with my communication skills" (R1, 2013). Students also valued the friendships made on the trip. "I realized today that the only thing that makes this trip (if not life in general) worth anything is the people. I love spending time with these people I have grown to love" (R4, 2012). Each student clearly gained something from the experience.

While students did find educational value in the experience, they also voiced criticisms in their journals. A student from the 2012 faculty-led tour who struggled being away from home wrote, "I am proud of myself, and I am so glad I challenged myself to be a part of this. I would never do it again, but I am glad I did it" (R1, 2012). In addition, students from both international experiences were unhappy with the time it took for them to understand their role and responsibilities at ILVO. An intern who participated in the 2012 faculty-led tour reflected on his 2013 internship, "I feel that being the second year that this internship has occurred, there should be more organization …" (R3, 2013). Another student wrote, "… I would absolutely advocate finding another opportunity within Belgium for students" (R1, 2013). These perspectives remained consistent for all 2013 internship participants.

Conclusions and Recommendations

The findings of this study support conclusions and recommendations of previous research urging educators to offer international agricultural experiences to students to increase global perspective and gain cross-cultural competencies needed for a diverse and global workplace (Edgar & Edgar, 2009; Northfell et al., 2013; Place et al., 2004; Zhai & Scheer, 2004). According to student journal entries, all participants found the international experience to be meaningful. For most, this was their first internship/study-tour experience as well as their first time traveling outside of the United States. Students found the experience offered a unique opportunity to gain practical intercultural and general communications skills quickly in a real-world setting. Students played an active role in learning at ILVO as suggested by Bruening et al. (2002), creating a meaningful learning opportunity. These experiences helped students see how theory and skills learned in their college classrooms would be utilized in a work environment.

Values that emerged from student reflections indicate important considerations related to international programs. Building relationships was especially important to students and was the root of their social concerns. Though students initially had anxieties regarding their host families, most students from both programs noted their host family as their favorite aspect of the experience. Meals and weekend outings proved valuable in creating or strengthening relationships with host families and classmates. Opportunities to relax and build supportive relationships were essential in maintaining morale while working abroad. These outings helped students build lasting friendships that each hoped to continue after the study tour was completed.

Additionally, students sought to build professional relationships. Working in groups allowed stu-

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dents to learn from each other's strengths and solve problems as done in the workplace. Students at times became self-appointed leaders. This created power struggles among group members, especially those who were placed in leadership positions by advisers. There is a need for international program directors to work with students prior to international leadership positions to assist them with understanding group dynamics, team roles, and peer interpersonal relationships. Though internship participants worked independently and directly with researchers at ILVO rather than as small student groups, they still experienced conflicts with co-workers. Students of both experiences learned to overcome these conflicts and focus on completing the project. Working collaboratively and with a client from another country created an opportunity to present multiple perspectives to students and enhanced their understanding as encouraged by the fourth RPA of the NRA (Doerfert, 2011). Students gained skills from each other as fellow participants assisted in educating classmates to ensure project completion.

In many instances, the experience pushed students outside of their comfort zones. Students sought normalcy in both the workplace and at home by comparing the Belgian and American cultures. To help overcome the unpredictability of visiting another country, the faculty-led study tour introduced formal schedules to create stability within the foreign environment. In hindsight, this preparation eased students' transitions personally and professionally. In addition to adding organization, having familiar faculty guides helped soften communication barriers between students and ILVO researchers including project criticism and misinterpretation of student responsibilities. In contrast, participants of the 2013 internship had to independently seek solutions to conflicts as done in the real world. While this taught students valuable professional skills, the absence of a faculty guide also exposed students to real-world stresses that distracted students from the internship's focus. In addition, the absence of faculty made it difficult for the project director to resolve conflicts at a distance as student journals and online communication only revealed the experience through their personal perspective.

Furthermore, working for clients was intimidating for all students and was the most difficult part of each program. Although working with clients was challenging, participating in international internships or work-related study-tour opportunities is recommended to provide global competencies for careers in agriculture. Students struggled to accept feedback from clients because they were not yet comfortable with their own competence in design software, videography, and photography. These internal and external conflicts tested student confidence as participants sought their purpose at ILVO and worked to live up to researcher expectations. While it is encouraged that students with existing communications skills be selected for experiences such as these, mastery of every skill in the discipline is not required. All participants gained valuable communications skills that will prove invaluable when working with agricultural communicators in their future careers. In addition, students who lacked necessary skills were motivated to adapt and pick up abilities along the way, which strengthened student confidence. It is suggested that project directors of similar experiences select a workplace with an existing communications department. ILVO does have a communications department; however, they seldom worked with the students since they had other tasks to complete. Participants struggled to work directly with researchers as they were not familiar to adapting information for the public.

Finally, using journal entries to gain insight into student perceptions proved not only valuable for the researchers but also for the students. Other studies have noted the value of using journaling to strengthen, deepen, and enhance learning (Brockbank & McGill, 1998; Gouldthorpe et al., 2012; Zhao, 2003). Journal entries provided an outlet for students to record events and realize the big

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picture as discussed by Brockbank and McGill (1998). Future international study tours/internships should continue to require daily reflections to encourage meaningful and engaged learning experiences as discussed by the NRA (Doerfert, 2011). Although student journals of the faculty-led study tour focused on the social aspect, intern journals from the following summer possessed in-depth reflection regarding their work with ILVO. Because the two tours had differing reflection themes, it would be interesting to see if a faculty guide's presence impacts the time and effort students spend reflecting on the professional experience in their journals. Students may use faculty guides as an outlet for voicing concerns rather than their journals. In addition, it would be valuable for researchers to interview participants post-graduation to see how their views on the international experience have changed.

Though these findings cannot be generalized, they provide insight for future international internships/study tours about possible benefits and limitations. The findings also prove the value of experiential and international opportunities for offering meaningful learning opportunities to students as requested in the fourth RPA (Doerfert, 2011). Furthermore, this study adds insight into internal and external barriers students may face in the presence or absence of a faculty guide. It is recommended future international study tours/internships continue comparing student perceptions of these experiences to help craft an opportunity to maximize students' development of communications skills and to take risks in a safe, supportive international setting. While international internships do provide students with a sense of independence, participants risk vulnerability in a foreign work environment.

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The Critical Target Audience: Communicating Water Conservation Behaviors to Critical Thinking Styles

Laura M. Gorham, Alexa J. Lamm and Joy N. Rumble

Abstract

Although water covers approximately 70% of the planet, only a fraction is fresh water, and even less is used as a major source of drinking water. With the continuous increase in the amount of water used in modern standards of living, the quantity of water available is decreasing. The public is beginning to understand water needs to be conserved and they must play a role in water conservation. While previous literature examined how the majority of messages were catered toward the cost-effectiveness of conserving water, this study proposed how using a specific audience attribute could affect behaviors. The purpose of the study was to determine if critical thinking style can be used in the development of future communication strategies to improve water conservation behaviors. The findings of this study provided evidence of a relationship between critical thinking style and the level of engagement in water conservation behaviors. Recommendations suggested targeting the two constructs of critical thinking style, information seekers and engagers, in two different ways. Since the seekers prefer to gather information by seeking the sources themselves, communicators should focus on developing quality information about water conservation and placing it in easily accessible communications channels for the information seeker. On the other hand, a different communications approach should be taken with the engagers, who prefer to learn through their environment. Communicators should focus on communicating to the engager through the environment in word-of-mouth situations using traditional means such as opinion leaders as well as social media.

Key Words

Water conservation, behavior, critical thinking style, and communication

Introduction

Water is a crucial part of life, needed every day for human survival. The development of the human race has depended upon the use of clean water and societies' ability to create clean water (Watkins, 2006). Societies have been dependent upon natural resources, such as rivers, lakes, wetlands, and aquifers, to supply water to support cities, farms, and industries for centuries (Flint, 2004).

Although water may seem plentiful in the United States due to the vast number of lakes, rivers, and surrounding coastline, the majority of the available water supply is not fresh or fit for human consumption (Flint, 2004). Although water covers approximately 70% of the planet, only a fraction is fresh water (Adler, 2002). Of the fresh water available, less than three-tenths of the Earth's fresh water serves as a major source of water (Adler, 2002).

The amount of water to support life, in addition to the increased amount of water used in modern standards of living, continually has increased the demand for water globally. Additionally, the

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amount of water available is being stressed by irrigation, industrial, and other residential demands (Bartlett, 1999; Flint, 2004). With a world population of more than 7 billion and an expected world population of more than 9 billion in 2050, it is crucial that individuals learn to conserve water or the amount of water available may not support the world population in the future (Reba et al., 2013; U.S. Census Bureau, 2013).

The demand for water in the United States has more than doubled since the 1950s (Flint, 2004), and water consumption is expected to increase by 50% in developed countries, including the United States, by 2025 (United Nations Environment Programme, 2007). It has also been found Americans use a large amount of water, more than most other countries (Hart, 2008). As concern rises due to shortages of this essential resource, the American public and agricultural stakeholders are realizing the need to engage in water conservation. To ensure water conservation behaviors are most effective, agricultural communicators can select a target audience and then appeal to that selected audience by understanding how they think and developing approaches that will influence individuals with specific characteristics, such as their critical thinking styles (Monaghan, Ott, Wilbur, Gouldthorpe, & Racevskis, 2013). By using this approach, communication messages and strategies can be catered directly to the particular target audience (Monaghan et al., 2013). Thus, the purpose of this study was to determine if critical thinking style can be used in the development of future communications strategies to improve water conservation behaviors.

Literature Review
Water Conservation

The practice of water conservation is a growing trend in many parts of the United States. With a growing population, excess water pollution, and extreme weather, Americans are experiencing a decline in the amount of water available for human consumption (Jorgensen, Graymore & O'Toole, 2009), and, therefore, are willing to take some action. Many bodies of water already are experiencing a decrease in the water level due to weather conditions, such as lack of rainfall, or over extraction of water (United Nations Environment Programme, 2007).

For example, the High Plains aquifer runs below 450,000 km² in the central United States and serves as a principal source of water for irrigation and drinking water (Konikow, 2013). High evaporation rates, low precipitation rates, and substantial pumping of water has resulted in large water table declines and ground-water depletion (Konikow, 2013). Additionally, issues affecting water availability in the Lower Mississippi Water Basin are related directly to the decline in the quantity of groundwater available. The decreases are caused by water withdrawal rates that are greater than recharge rates (Reba et al., 2013).

Due to the decline in water available nationally, water conservation practices must become common practice for residential water users as well as agricultural and water distributors or suppliers (Olmstead & Stevens, 2009). Throughout the literature, the public shows an understanding that water needs to be conserved and individuals must begin to play a central role in water conservation (Monaghan et al., 2013). However, although the recent research shows residents are willing to support water conservation practices, some are unwilling or unable to partake in water conservation habits or behaviors (Delorme, Hagan, & Stout, 2010; Lamm, 2013). To change these behaviors, agricultural communicators need to inform individuals and stakeholders on how they can engage in water conservation behaviors. Communicators suggested communicating conservation strategies such as employing best management practices, including installing water-efficient fixtures, avoiding watering or irrigating during drought periods or the summer, and minimizing shower durations

(Theodori & Fox, 2009). Additionally, to provide individuals with information about water conservation practices, many government and private organizations are implementing water conservation programs. For example, the U.S. Environmental Protection Agency's partner program, Water Sense, provides resources for state agencies and residents to conserve and recycle water (Water Sense, 2013).

Willis, Stewart, Panuwatwanich, Williams, and Hollignsworth (2011) determined water conservation strategies are related to attitudes and behaviors of environmental issues, such as water issues. Those who valued water as an important issue indicated they took an interest in how much water was being used (Corral-Verdugo, Bechtel, & Faijo-Sing, 2003; Hassell & Cary, 2007). Thus, the previous literature suggested an individual's preconceived notions or perceived values about water would influence their water conservation practices (Corral-Verduge, Becthel & Faijo-Sign, 2003; Hassell & Cary, 2007; Willis et al., 2009;).

Monaghan et al. (2013) suggested Extension personnel use a social marketing approach when dealing with conservation and sustainability programming. Through the social marketing approach, an audience analysis revealed important differences in the target audience (Monaghan et al., 2013), emphasizing the importance of knowing your audience. Understanding the differences in the target audience was shown to be of assistance when Extensions agents were working to cater their programs toward a particular segment of the population (Monaghan et al., 2013). For example, previous research suggested residents residing in Home Owner's Association (HOA) communities tended to hire contractors and lawn maintenance companies to cut and irrigate their lawns and thus would not be interested in learning science-based information about landscaping such as mowing, fertilizing, and turf grass health (Monaghan et al., 2013). In this study, we examined how understanding the target audience could allow for informational messages to be catered toward the correct audience that then would influence behavioral change.

Critical Thinking

Previous literature has examined how the primary focus of water conservation education and programming has emphasized the cost-effectiveness of partaking in water conservation (Geller, Erickson & Buttram, 1983; Michelsen, McGuckin, & Stumpf, 1999). In addition, other research has examined how environmental conservation behaviors and actions are dependent upon how an individual values an issue (Dietz, Fitzgerald & Schwom, 2005).

While the previous examples of water conservation education and programming have used methods such as emphasizing cost effectiveness, catering to specific values an individual may hold, or even social marketing techniques to get individuals to engage in water conservation behaviors, other influences on decision making may impact an individual's level of engagement in water conservation behaviors. Cognitive styles, or an individual's preferred way to process, organize, and retain information (Keefe, 1979), may be one way to target messaging so individuals are more likely to engage in water conservation behaviors. Cognitive styles often are used to explain how individuals prefer to gain knowledge or find a solution to a problem and to describe a particular method individuals use to processes information (Glaser, 1941; Lamm et al., 2011; Lamm & Irani, 2011; Kirton, 2003).

The cognitive style of critical thinking explains how an individual prefers one particular method to another when processing information, or critically thinking about a particular topic. There is not a single definition of critical thinking, but rather, a range of definitions from simple to complex (Lamm & Irani, 2011). Glaser (1941) first defined critical thinking as the "(1) attitude of being disposed to consider in a thoughtful way the problems and subjects that come within the range of one's experiences, (2) knowledge of the methods of logical inquiry and reasoning, and (3) some skill

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in applying those methods" (p. 5-6). In 1988, Chaffee defined critical thinking as "our active, purposeful, and organized efforts to make sense of our world by carefully examining our thinking, and the thinking of others, in order to clarify and improve our understanding" (p. 29). Halpern (1989) defined critical thinking as "thinking that is purposeful, reasoned and goal directed. It is the kind of thinking involved in solving problems, formulating inferences, calculating likelihood, and making decisions" (p. 5). Paul (2007) further defined critical thinking as the "art of analyzing and evaluating thinking with a view to improving it" (p. 4).

Paul (2007) discussed core skills of a critical thinker, showing the critical thinker will (1) raise clear questions and problems, (2) gather and analyze relevant information, (3) come to conclusions though reasoning and testing, (4) be open to different opinions, and (5) communicate effectively about key findings and solutions. Irani (2006) stated, "critical thinking, and especially the core skill of explanation, is directly related to communication and expression" (para. 4). Thus, individuals will express their thoughts about a specific issue through communication (Irani, 2006).

Communication directly relates to an individual's critical thinking style, as a specific critical thinking style will lead to a different viewpoint on a topic or issue (Irani, 2006). As individuals process certain situations, critical thinking allows individuals to explain "what they think and how they arrived at the judgment" (Facione, 1998, p. 5).

Critical thinking style represents the "way critical thinking is expressed, or performed, or done by an individual" (Lamm & Irani, 2011, p. 6). The University of Florida Critical Thinking Inventory (UFCTI) is an instrument that measures an individual's critical thinking style based on two constructs: seeking information and engagement (Lamm & Irani, 2011, p. 6). The UFCTI measures critical thinking style based on a specific score on an inventory; individuals exhibiting a high score are seekers and those exhibiting a low score are engagers.

Individuals possessing the seeking information style are "aware of their own predispositions and biases, recognizing current opinions and positions have been influenced by who he is, his environment, and experiences;" in addition, these individuals actively seek information through reading, research, and questioning (Lamm & Irani, 2011, p. 7). Individuals possessing an engagement style are aware of their environment and surroundings and often are found using reasoning to solve problems and make decisions. Often, engagers gain information through conversation and engagement in a conversation. Engagers then will use their reasoning abilities to arrive at a decision or communicate a solution to a problem (Lamm & Irani, 2011).

Seekers and engagers gather and process information in two different ways (Lamm & Irani, 2011). The seeker prefers to think critically about information they actively have sought out; whereas, the engager gains information from their environment, such as information gained through word-of-mouth communication, and then cognitively processes this information (Lamm & Irani, 2011).

Although previous literature has examined how individuals seek health information (Brodie, Kjellson, Hoff, & Parker, 1999; Cotton & Gupta, 2004), the same process can be used with water conservation behaviors. Broadly, it has been found individuals rely on traditional modes of communication, magazines, newspapers, television, and radio to name a few (Brodie et al., 1999). In addition, the Internet has provided a fast and convenient way for individuals to search and seek new information to help them in their daily lives (Cotton & Gupta, 2004). Due to the vast amount of information that can be found on the Internet, individuals have a tendency to seek sources of information from a variety of sources including websites and online newspapers (Cotton & Gupta, 2004).

Print media, static webpages, and other forms of one-way communication may be suitable for the seeker; however, the engager prefers to engage in conversation through two-way communication

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to think critically about a particular topic (Lamm & Irani, 2011). Social media has been considered the new or modern word-of-mouth as social media "describes a variety of new sources of online information that are created, initiated, circulated and used by consumers intent on educating each other about products, brands, services, personalities, and issues" (Blackshaw & Nazzaro, 2004, p. 4). Previous literature explains how word-of-mouth communication was observed during oral communication: in small groups, over back-yard fences and on the telephone (Blackshaw & Nazzaro, 2004). However, through the use of the Internet and the consumer-generated content in social media, the Internet has turned word-of-mouth behavior into content that can be seen by the masses (Blackshaw & Nazzaro, 2004). Similarly to media content designed and developed by practitioners and journalists in print materials, social media has become a major influence in consumer behavior (Mangold & Faulds, 2009). Through the various word-of-mouth forums, such as blogs, social media network sites, consumer email, forums, and email, social media has allowed for the creation of conversation on the web and, ultimately, an impact on "consumer awareness, information acquisition, opinions, attitudes, purchase behavior, and post purchase communication and evaluation" (Mangold & Faulds, 2009, p. 358). Communicators can use this information to tailor water conservation messages and message strategies to reach both critical thinking styles to change behavior more broadly (Monaghan et al., 2013).

Purpose and Objectives

The purpose of this study was to determine if critical thinking style can be used in the development of future communications strategies to improve water conservation behaviors. The following research objectives guided this study:

Objective 1.   Describe respondents' critical thinking style.
Objective 2.   Describe respondents' level of engagement in water conservation behaviors.
Objective 3.   Identify the relationships between critical thinking style and levels of engagement in water conservation behaviors.

Methods

The study presented here was descriptive and correlational in nature. It used a web-based survey design to collect data on a variety of water-related topics from residents in the State of Florida. The study was limited to Florida residents because of the stressed importance of engagement in water conservation behaviors due to a rapidly declining water supply. The decrease in available water is largely due to the rapid population growth Florida has experienced over the past several decades (Delorme et al., 2010). While residents of Florida are becoming more aware of the need to conserve water, adoption rates for these practices are low (Lamm, 2013; Stanford, 1996; Syme, Nancarrow, & Seligman, 2000) and communicators may be able to target their intervention strategies by using residents' natural cognitive style. Therefore, the two sections of the survey instrument germane to the findings of this study were water conservation behaviors and critical thinking disposition score.

The water conservation behavior questions were adapted from the 2012 RBC Canadian Water Attitudes Study (Patterson, 2012). To measure respondents' engagement in water conservation behaviors, respondents were asked to indicate whether or not they had engaged in 11 water conservation behaviors. Four of the behaviors could be deemed as negative (e.g. letting sprinklers run when it is raining and hosing down their driveway) and the other seven could be deemed as positive (e.g. shutting water off when brushing their teeth and limiting shower time to five minutes). If a re-

spondent indicated they engaged in a negative behavior, they received a score of zero for that item. If a respondent indicated they did not engage in the behavior, they were assigned one point. In addition, if a respondent indicated they engaged in a positive behavior they received a score of one for that item. If the respondent indicated they did not engage in the positive behavior, they received a score of zero for that item. Therefore, a respondent could receive a total water conservation score ranging from zero to 11, with an 11 indicating they engaged in all of the positive behaviors and did not engage in any of the negative behaviors and a zero indicating they did not engage in any of the positive behaviors and all of the negative behaviors.

To measure respondents' critical thinking score, the University of Florida Critical Thinking Inventory (UFCTI) was used (Lamm & Irani, 2011). The UFCTI is an instrument that measures critical thinking disposition on a continuum between engagement and seeking information. The UFCTI requires respondents indicate their level of agreement with 20 items on a five-point Likert-type scale that ranges from 1 = Strongly Disagree, 2 = Disagree, 3 = Neither Agree nor Disagree, 4 = Agree, 5 = Strongly Agree. Each respondent was assigned a seeking information score based on their responses to 13 items that ranged from 13 to 65 and an engagement score based on their responses to 7 items that ranged from a 7 to 35. The raw engagement score then was altered by transposing each item result, summing the result, and then multiplying the summed score by 1.866 (Lamm & Irani, 2011). The altered engagement score then was added to the seeking information score to achieve the overall UFCTI score. Respondents receiving a score of 79 or higher were considered seekers while those with a 78 or lower were considered engagers (Lamm & Irani, 2011). Reliability was calculated a priori with the overall UFCTI resulting in a Cronbach's a of .95, the engager construct a Cronbach's a of .89, and the seeker construct a Cronbach's of .92.

A panel of experts with a background in water quality and quantity issues, public opinion research, and survey design were used to validate the survey instrument. The panel of experts included the director of the UF/IFAS Center for Public Issues Education, the director of the UF Water Institute, the director of the Center for Landscape Conservation and Ecology, and a professor with a specialty in survey design.

A sample of Florida residents, 18 years and older, were recruited through non-probability opt-in procedures. Non-probability sampling is commonly used as a sampling method for public opinion research and is regarded acceptable for population estimates (Baker et al., 2013). To overcome the limitations of non-probability sampling, including selection, exclusion, and non-participation biases (Baker et al., 2013), post-stratification weighting methods were used (Kalton & Flores-Cervantes, 2003). Through post-stratification weighting procedures, the respondents' demographics were balanced to ensure the sample was representative of the population. The demographics were weighted according to the 2010 census statistics for gender, race, ethnicity, age, and community size.

A total of 516 individuals were invited to take the survey by a public opinion research company. Complete and usable data were collected from 469 individuals, resulting in a 90.9% response rate. The data were analyzed with descriptive and correlational statistics using Statistical Package for the Social Sciences® 21.0. A significance level of $p \leq .05$ was established a priori.

To find a relationship between respondents' level of engagement in water conservation behaviors and critical thinking style scores, a correlation coefficient (r) was developed (Kotrlik, Williams, & Jaber, 2011). The correlation coefficient (r) measured the effect size between the two parameters of water conservation behaviors and critical thinking style scores. The correlation coefficients were interpreted using Davis' (1971) set of descriptions for correlation coefficients.

A complete description of the demographic breakdown of respondents can be found in Ta-

ble 1. The respondents represented an equal distribution of gender with 240 (51.1%) females and 229 (48.9%) males. As for race, the respondents were primarily Caucasian/White (Non–Hispanic) (77.1%, n = 362), followed by African American (17%, n = 80). When asked about ethnicity, 22.5% (n = 106) of the respondents reported they were Hispanic. Over half of the respondents reported being between the ages of 20 and 59 (52.7%, n = 247) and the vast majority (96.3%) resided in a metropolitan area when their ZIP code was compared to the rural/urban continuum code system as a representation of community size (United States Department of Agriculture Economic Research Service, 2013).

Table 1

Demographics of Respondents

Characteristic	*n*	*%*
Sex		
Female	240	51.1
Male	229	48.9
Race		
African American	17	17.0
Asian	14	3.0
Caucasian/White (Non–Hispanic)	362	77.1
Native American	1	0.2
Hispanic Ethnicity	106	22.5
Age		
18 - 29	66	14.1
30 - 39	57	12.2
40 - 49	67	14.2
50 - 59	63	13.5
60 - 69	52	11.1
70 - 79	35	7.4
80 and older	23	4.9
Rural–Urban Continuum Code Classification		
1 million or more metropolitan area	296	63.1
250,000 to 1 million metropolitan area	121	25.7
Few than 250,000 metropolitan area	23	4.8
20,000 or more, non-metro area	16	3.5
2,500 to 19,999 non-metro area	12	2.6
<2,500 completely rural non-metro area	1	0.3
Political Affiliation		
Republican	113	24.3
Democrat	188	40.7
Independent	142	30.6
Other	20	4.3

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Results

Objective 1: Describe respondents' critical thinking style.

Each respondent was assigned a UFCTI score between 26 and 130 based on their responses (see Table 2). A score of 79 or higher indicated the respondent was an information seeker, or an individual who tended to seek out information on their own and use reasoning to understand the information sought out. A respondent with a score of 78 or lower indicated the respondent preferred to engage in word of mouth communication and then critically think about the topic at hand and was considered an information engager. Respondents' overall critical thinking style scores ranged from 58 to 91 (M = 78.45, SD = 4.21). When construct scores were reviewed, the mean information seeking score was 52.50 with a standard deviation of 7.80 (f = 459). The mean engagement score was 25.80 with a standard deviation of 8.00 (f = 460).

Table 2

Respondents Critical Thinking Styles

Critical Thinking Style	n	M	SD
Overall UFCTI Score	451	78.5	4.2
Seeker Score	459	52.5	7.8
Engager Score	460	25.8	8.0

Objective 2: Describe respondents' level of engagement in water conservation behaviors.

Respondents were asked to respond to sets of specific positive and negative water conservation behavior statements by indicating whether or not they engaged in the particular behavior (see Table 3).

Table 3

Respondent Water Conservation Behavior

Behavior Items	f	%
Positive		
I turn off the water while brushing my teeth	307	65.4
I have low-flow shower heads installed in my home	247	52.6
I have water-efficient toilets installed in my home	243	51.8
I avoid watering my lawn in the summer	224	47.8
I shower no more than five minutes each time I bathe	184	39.2
I have low-water consuming plant materials in my yard	155	33.0
I use rain barrels to collect water for use in my garden/lawn	87	18.7
Negative		
I leave the water running in the kitchen when washing and/or rinsing dishes	276	59.5
I let my sprinklers run when rain is predicted in the forecast	109	23.8
I hose down my driveway	105	22.6
I let my sprinklers run when it has rained or it is raining	82	17.8

The results indicated that respondents were most likely to engage in positive water conservation behaviors that require minimal effort. More than 65% of the respondents turned off the water while

brushing their teeth ($f = 307, 65.4\%$). In addition, respondents indicated they used bathroom fixtures to conserve water as 52.6% of respondents reported having low-flow shower heads installed in their homes ($f = 247$), and 51.8% reported having water-efficient toilets installed in their homes ($f = 243$).

Positive water conservation items were each assigned a point for engagement and negative water conservation items were assigned a point for lack of engagement. The total water conservation scores, which could have ranged from zero to 11, had a mean score of 5.86 with a standard deviation of 2.23, indicating a moderate level of engagement in water conservation practices.

Objective 3: Identify the relationships between critical thinking style and levels of engagement in water conservation behaviors.

Upon examination of the results, the correlation between the respondents' level of engagement in water conservation behaviors and the respondents' seeker, engager, and overall critical thinking style scores were interpreted using Davis' (1971) description of correlational strengths (see Table 4). The overall UFCTI score was positively correlated with the respondents' level of engagement in water conservation behaviors ($r = 0.11$, $p = .02$). This result indicated the higher the UFCTI score (the stronger their tendency to seek information when thinking critically), the more the individual engaged in water conservation behaviors (see Figure 1).

Table 4

Relationship between water conservation and critical thinking style

Critical Thinking Style	Water Conservation		Interpretation of effect size (Davis, 1971)
	r	p	
Overall UFCTI Score	0.11	.02*	Low Association
Seeker	0.31	.00**	Moderate Association
Engager	-0.24	.00**	Low Association

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

Relationship between UFCTI Score and Level of Engagement in Water Conservation Behavior

Lower Level of Engagement in Water Conservation Behaviors

Higher Level of Engagement in Water Conservation Behaviors
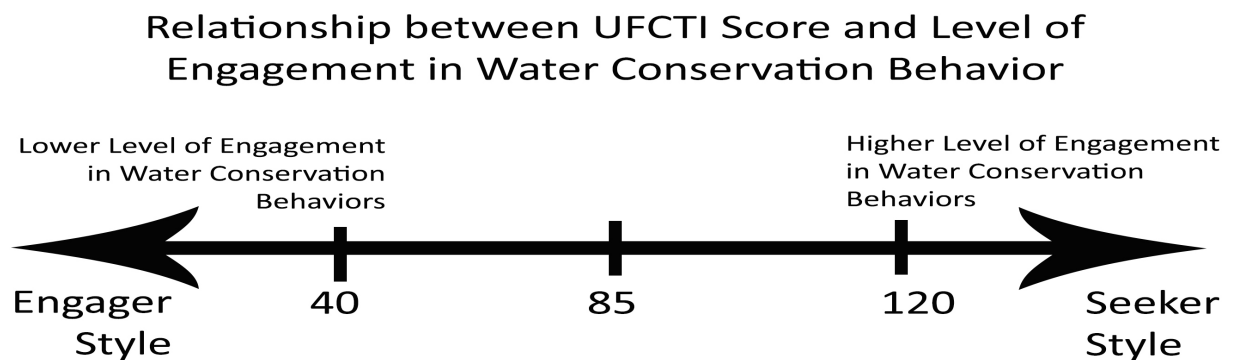
Engager Style   40   85   120   Seeker Style

Figure 1. Relationship between UFCTI score and level of engagement in water conservation behavior

In addition, the seeking information score also was positively correlated with the level of engagement in water conservation behaviors ($r = 0.31$, $p < 0.01$) and was statistically significant. This result indicated the stronger tendency an individual had for seeking information, regardless of their interest in engagement when thinking critically, the higher their level of engagement in water conservation behaviors.

The critical thinking style of engagement had a negative correlation ($r = -0.24$, $p = .00$) with the level of engagement in water conservation behaviors. This result shows the more a respondent indicated they engaged when thinking critically, the lower the respondents' level of engagement in water conservation behavior.

Conclusions

This study identified Florida residents' level of engagement in water conservation behaviors. It also provides communicators with an indication of where further communication needs to be directed to improve water conservation behaviors. Although the majority of respondents indicated they are participating in some water conservation behaviors, such as turning off the faucet when brushing their teeth, installing low-flow shower heads, and installing water-efficient toilets, communication may be beneficial in the promotion of additional water conservation behaviors respondents were less likely to engage in, such as limiting shower times to less than five minutes, using low water consuming plant materials in their yards, and using rain barrels to collect water for use in their garden or lawn. This study supports Jorgensen, Graymore, and O'Toole's (2009) study that found residents are willing to partake in some actions to reduce the amount of water they use.

In addition to identifying the level of engagement of Florida residents in water conservation behaviors, this study determined the critical thinking styles of respondents. The overall critical thinking score determined approximately half of the respondents were information seekers and the other half of respondents were engagers. In addition, the results of the study indicated a relationship between an individual's critical thinking style and his or her level of engagement in water conservation behaviors. The results indicated the higher the respondents UFCTI score (the stronger their tendency to seek information when thinking critically), the more the individual engaged in water conservation behaviors. In addition, the result also indicated the more a respondent indicated they engaged when thinking critically the lower the respondents' level of engagement in water conservation behaviors. In this study, the correlations fell into the low to moderate association category according to Davis' (1971) convention. Frequently, in the social sciences, researchers are unable to find perfect relationships as they do in the physical sciences; however, relationships are observed (Steinberg, 2011). Other variables such as motivation or prior knowledge may come into play. Therefore, individuals who express an engager style may have the extreme motivation to participate in water conservation behaviors. Similarly, an individual who expresses a seeking behavior may not participate regularly in water conservation behaviors due to lack of conservation motivation. These findings support previous literature that stated seekers and engagers process information in two different ways (Lamm & Irani, 2011) and a specific critical thinking style will lead to a viewpoint on a topic or an issue (Irani, 2006). As found by the results in this study, a different critical thinking style will lead to a different level of engagement in water conservation behaviors.

Implications and Recommendations

This study was developed to address how an individual's critical thinking style could be used in the development of future communications strategies to improve water conservation behaviors. The

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study's findings provided evidence of a relationship between critical thinking style and the level of engagement in water conservation behaviors. Throughout the previous literature, it was found an audience analysis might reveal important differences in a target audience (Monaghan et al., 2013). Lamm and Irani (2011) stated informational seekers and engagers gather and process information in two different ways: seekers prefer to critically think about information they have actively sought out; engagers gain information from their environment. Communicators can use information about the audience, such as critical thinking styles, to tailor communication methods to each audience (Monaghan et al, 2013), further impacting potential behavior change.

The literature indicated information seekers prefer to gain information by seeking the sources themselves (Lamm & Irani, 2011). To acquire information, the public has relied on traditional forms of mass media (such as magazines, newspapers, advertisements, and radio) and Internet references to educate themselves on a particular topic (Brodie, Kjellson, Hoff, & Parker, 1999). Individuals use these types of media to search and seek new information on the topic of their choice (Cotton & Gupta, 2004). To satisfy the needs of the informational seeker, communicators should place information about water conservation in traditional forms of mass media as well as on the Internet. As the informational seekers find this information, they will begin to process the information and then think critically based on what they have found and how it fits into their previous notions about the topic (Lamm & Irani, 2011). The information seekers will judge the quality of the information they find and evaluate it before developing a behavioral change. Communicators should focus on developing quality information about water conservation and placing it in easily accessible communications channels for the informational seeker.

While the informational seeker prefers to seek their own information, a different communications approach should be taken with the engagers, who prefer to learn through their environment. Communicators should focus on communicating to the engager through the environment in word-of-mouth situations using traditional means such as opinion leaders and also through the use of social media. According to Blackshaw and Nazzaro (2004), social media has become the online form of word-of-mouth and has become an instrumental force in influencing an individual's behavior. The development of social media as a communications tool has become a realm where communicators can engage individuals in a conversation (Mangold & Faulds, 2009). In fact, communicators can use social media networks, consumer email, and forums to impact individual information gathering, opinions, and attitudes (Mangold & Faulds, 2009). Since individuals' possessing the engagement critical thinking style prefer to gather information from their environments (Lamm & Irani, 2011), communicators should use opinion leaders and social media as platforms to send water conservation information to individuals with the engager style.

Although barriers still will exist when using communications to influence a positive change in the level of water conservation behaviors, communicators should continue to apply different communications strategies to cater to different audiences. Further research should be conducted to solidify the link between critical thinking style and behavior. The study could be performed with a particular audience, such as high water users, to determine if the link still exists between critical thinking style and water conservation behaviors. As another example, a study could be conducted to determine if the link exists between critical thinking styles and other conservation behaviors. Since the recommendations for this study suggested using different message strategies for the seeker and the engager to communicate, a future study could test potential message strategies with both seekers and engagers to evaluate if the messages cause a behavioral change.

This study was specific to residents in the State of Florida and generalization beyond this population should be done with caution. Future studies should be conducted to determine the relationship between critical thinking styles and level of engagement in water conservation behaviors in other states or in a national scale to allow for a greater generalization of the results.

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College Students' Perceptions regarding Sensory Aspects of Conventionally Produced and Unconventionally Produced Foods: Implications for Marketing to the Millennial Generation

Christina M. Crowder, Catherine W. Shoulders and K. Jill Rucker

Abstract

Every day consumers vote which products line the shelves of grocery stores, co-ops, and niche markets by use of their dollars. Public unrest with regard to the environment, animal welfare, food purity, and human health impacts of agricultural production practices have led to the rise of alternatively produced food products. While the sales of alternatively produced foods are increasing, studies regarding the qualities of such products impact consumer purchases have yielded inconsistent results. This study examined students' perceptions of sensory aspects of conventionally produced and alternatively produced foods to better understand how sensory aspects impact decisions to purchase. Students reported consistent perceptions regarding the favorability of each sensory aspect of chicken and apples; the alternatively produced versions of the products yielded higher mean scores on every sensory aspect. However, students' perceptions of the sensory qualities of chocolate, milk, and beef were not consistent; for example, they reported more favorable perceptions of the appearance and smell of conventionally produced milk, but perceived a more favorable texture and flavor from the alternatively produced milk. The results of this study imply when making purchasing decisions, consumers may value specific sensory attributes over others. An alternative approach to marketing alternatively produced products is to focus on valued extrinsic aspects designed to attract consumers to purchase products in spite of their perhaps less valued perceptions of sensory aspects.

Key Words

Marketing, organic foods, sustainability, sensory aspects, millennial generation

Introduction

Consumers vote every day on which products line the shelves of grocery stores by use of their dollar. Previously, consumer preferences spurred the creation of convenient and health-conscious food products (Drache, 1996). However, as agricultural technologies enable more people to work in areas outside of agricultural production, public concern regarding production practices has increased (Dimitri, Effland, & Conklin, 2005). Public unrest with regard to the environmental, animal welfare, food purity, and health impacts of agricultural practices have led to the rise of niche food products, which boast the use of unconventional production practices on the label (Laux, 2013; GRACE Communications Foundation, 2013). These alternatively produced (AP) products are labeled with messages such as organic, grass fed, locally grown, antibiotic free, hormone free, pasture raised, free range, and cage free (GRACE Communications Foundation, 2013), but they are delivered to the consumer in retail products comparable to conventionally produced (CP) products. For example, consumers can purchase both CP and AP whole apples, chicken breasts, cartons of milk, and bars of chocolate.

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The power of consumers' choices regarding CP and AP food products has had a direct impact on agricultural production. Since 1997, sales of organic food have risen from $3.6 billion to $31.5 billion, suggesting heightened consumer awareness about their foods' sources and production methods (Organic Trade Association, 2012). From 2009 to 2010, the production of organic foods rose 7.7%. Currently, organic food constitutes 4% of all food sold in the United States, with organic fruits and vegetables making AP 11% of all fruit and vegetable sales (Organic Trade Association, 2011). The availability of AP foods in mainstream retail locations also has increased, enabling consumers to make their purchasing decisions without sacrificing convenience (Dimitri & Richman, 2000; Jargon, 2013; Organic Trade Association, 2011).

In spite of the growth within the AP food industry, marketers lack a solid plan for advertising AP foods to potential consumers, partially because individuals' interpretation of the terms associated with AP foods varies (Hughner, McDonagh, Prothero, Schults II, & Stanton, 2007; Yiridoe, Bonti-Ankomah, & Martin, 2005). Through a review of research, Hughner, et al. (2007) found consumers could not distinguish organic from conventional food and recommended marketers work to "better convey relevant information to consumers" (p. 106). With consumers making purchasing decisions based on their subjective experiences and perceptions of specific AP and CP foods, a better understanding of how consumers perceive these foods can help marketers advertise products accordingly (Hughner, et al., 2007).

While the current market for AP products appears to be made of older individuals (Roddy et al., 1996; Schifferstein & Ophius, 1998; Cicia, Del Guidice, & Scarpa, 2002), studies have shown the millennial generation to be more health and environmentally conscious while paying special attention to the ethical standards of food production (Pelletier, Laska, Nuermark- Sztainer, & Story, 2013). Within higher education, students in the millennial generation are exposed to frames of universalism through green movements, sustainability degree programs and consortiums, building construction and sustainability-based retrofits, and student sustainability awareness groups (Office for Sustainability, n.d.). Surveys have shown the completion of a postsecondary degree is a consistent attribute among all consumers of unconventional products, but there is little data on the likelihood of those pursuing postsecondary education to purchase AP foods before the expected associated increase in income (Byrne, Toensmeyer, German & Muller, 1991). What data is available suggests the increased price of AP foods may prevent those otherwise willing to purchase from doing so until they reach higher income brackets following graduation (Hughner, et al., 2007; Magnusson, Arvola, Hursti, Aberg, & Sjoden, 2001). The trends within the millennial generation to invest in aspects of sustainability, partnered with their rise in post-graduation employment in the upcoming years suggest marketing CP and AP products according to the subjective perceptions of this population can impact CP and AP sales in the future.

Theorectical Framework

This study was guided by the Total Food Quality Model (Grunert, Larsen, Madsen, & Baadsgaard, 1996), which depicts the combination of factors that influence a consumer's perceptions regarding food quality and, in turn, intentions to purchase. While the overall theory is a holistic approach to addressing the time and inference-making aspects that influence future purchases (Grunert, et al., 1996), this study focused strictly on the sensory aspects that influence perceived quality. The Total Food Quality Model incorporates a means-end approach to explain how the perceptions of food quality influence consumers' intention to purchase the product (Grunert, 2005). Intrinsic cues, which refer to the physical properties of the product like smell, appearance, taste, and flavor (Olson

& Jacoby, 1972), are evaluated both before a purchase and after a purchase. Before a purchase, experienced intrinsic quality cues are limited to appearance and smell, while the remaining sensory-based intrinsic cues of taste, texture, and the like are expected. These cues are experienced after a purchase, during the eating experience. Partnered with extrinsic quality cues, cost cues, and aspects of meal preparation and the eating situation, intrinsic cues influence future purchasing decisions. Research has shown intrinsic cues can be utilized by marketers to influence consumers' perceptions of product quality (Grunert, Bredahl, & Brunso, 2004). However, the intrinsic cues marketers use must be those in which consumers feel confident (Cox, 1967). For example:

> When asking consumers which information about a piece of meat they believe to be predictive of taste and tenderness, many consumers believe information about breed, age of animal, and slaughtering date are predictive of these qualities, but few consumers feel confident in using them, i.e., making the right inferences based on this type of information. Thus, consumers end up making inferences based on cues with which they feel confident, such as colour of meat and visible fat content, even though they may be aware of the fact these characteristics are not always highly predictive of taste and tenderness (Grunert, 2005, p. 376).

Therefore, the intrinsic cues used by marketers to influence consumer perceptions regarding product quality can focus on sensory characteristics, as these are intrinsic cues about which the consumer feels confident using to evaluate quality. Cox (1967) stated consumers prefer intrinsic cues to align with the product quality they want to evaluate, suggesting an examination of the intrinsic cues millennials value when considering the consumption of CP and AP products can aid marketers in determining appropriate cues to use in their marketing.

The use of sensory aspects to better understand the intrinsic cues valued by consumers is not new; however, the role sensory aspects play in consumers' decisions to purchase CP or AP products is inconsistent (Bourn & Prescott, 2002). In 1989, Jolly, Schutz, Diaz-Knauf, and Johal reported flavor was less important to consumers than the extrinsic cues of safety, freshness, general health benefits, nutritional value, and effect on environment when purchasing organic foods. Further, studies have shown dissatisfaction with the appearance of organic foods has led consumers to perceive it to be of poor quality (Hack, 1993; Jolly & Norris, 1991; Roddy, Cowan, & Hutchinson, 1994). With regard to specific foods, consumers did not perceive differences in organic and conventional oranges, grapefruits, bananas, mangos, white grapes, tomatoes, spinach, carrots, or sweet corn (Basker, 1992). However, trained panelists were able to consistently report CP carrots had better taste than ecologically grown carrots, which had a bitter flavor (Haglund, Johansson, Berglund, & Dahlstedt, 1999). Organic apples have been previously found to be sweeter and less tart than CP apples, but they did not differ in overall acceptance (Reganold, Glover, Andrews, & Hinman, 2001). Zhao, Chapbers IV, Matta, Loughin, & Carey (2007) did not find significant differences in consumers' overall liking and intensity of overall flavor between a variety of organic and CP vegetables, but they did find a significant difference in consumers' perceptions of flavor intensity between organic and CP tomatoes. Further, they noted age was a significant covariate in consumers' perceptions of organic and CP cucumbers. They recommended "further studies … confirm and investigate the extent to which consumer segments have higher preference for organic products" (para. 22).

Purpose and Objectives

The purpose of this study was to evaluate millennial generation members', as accessed through a

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university setting, perceptions regarding the sensory characteristics of selected CP and AP foods. To achieve this purpose, the following objectives were developed:

1. To describe students' preferences regarding CP and AP foods.
2. To describe students' perceptions regarding specific CP and AP foods.
3. To determine whether significant differences exist in how those who prefer a CP product perceive qualities of that product versus its AP alternative.
4. To determine whether significant differences exist in how those who prefer an AP product perceive qualities of that product versus its CP alternative.

Methods

This study utilized a nonexperimental comparative design. A convenience sample of undergraduate students at the University of Arkansas ($N = 20,350$) was recruited to participate via face-to-face methods at a central location on the campus from 5 p.m. to 7 p.m. during a publicized "food tasting" event. Sample size was calculated according to Israel (1992) and was determined to be 100 for a 10% precision level and confidence level of 95%. Students were offered samples of conventional and non-conventional foods, as was indicated on the food labels (see Table 1).

Table 1
CP and AP Foods Offered

	Conventionally Produced	Alternatively Produced
Milk	2%	Organic 2%
Chocolate	Milk	Organic Milk
Beef	Conventionally raised	Grass-fed
Chicken	Conventionally raised	GMO-Free, Pasture-raised
Apple	Pink Lady	Organic Pink Lady

Upon completion of the food sampling, participants were offered a paper-based, researcher-developed questionnaire. The questionnaire included 23 Likert-type items asking participants to indicate their level of agreement with statements that expressed favorability with regard to food appearance, smell, texture, and flavor. Participants then were asked to select whether they preferred the CP or AP produced variety of each food. The survey was reviewed by a panel of experts in survey construction for face and content validity. Because responses were dependent upon the food tasted, the calculation of test-retest reliability was not deemed appropriate. Data were analyzed using SPSS. Frequency, means, and standard deviations were calculated for the first and second objective, which are descriptive in nature. The third and fourth objectives were carried out through the use of dependent samples t-tests. The following null hypotheses were tested:

H0[1]: There is no significant difference in perceptions of CP and AP milk, chocolate, beef, chicken, and apple appearance, smell, texture, or flavor among students who prefer CP products.

H0^2:   There is no significant difference in perceptions of CP and AP milk, chocolate, beef, chicken, and apple appearance, smell, texture, or flavor among students who prefer AP products.

Effect sizes were calculated and interpreted using Cohen's (1988) recommendations.

Findings

Objective 1 was to describe students' preferences regarding specific CP and AP milk, chocolate, beef, chicken, and apples. Results are displayed in Figure 1. Sixty-four percent (f = 64) of students favored AP apples over CP apples, while only 7% of students (f = 7) preferred CP apples. Twenty-eight percent (f = 28) were neutral in their preference. With regard to chocolate, the largest number of students (39%, f = 39) preferred AP, while 27% (f = 27) preferred CP. One-third of students (f = 33) were neutral in their preference. In comparing CP and AP chicken, almost one-half of students (46%, f = 46) preferred the AP chicken (f = 46), while 28% (f = 28) preferred CP chicken. Approximately one-fourth (f = 25) indicated they had no preference. Preferences with regard to beef were even between CP (33%, f = 33) and AP (33%, f = 33), with an equal number of students indicating they had no preference (33%, f = 33). With regard to milk, more students preferred CP milk (24%, f = 24). Twenty-one percent (f = 21) students preferred AP milk, while more than one-half (f = 53) indicated they had no preference.
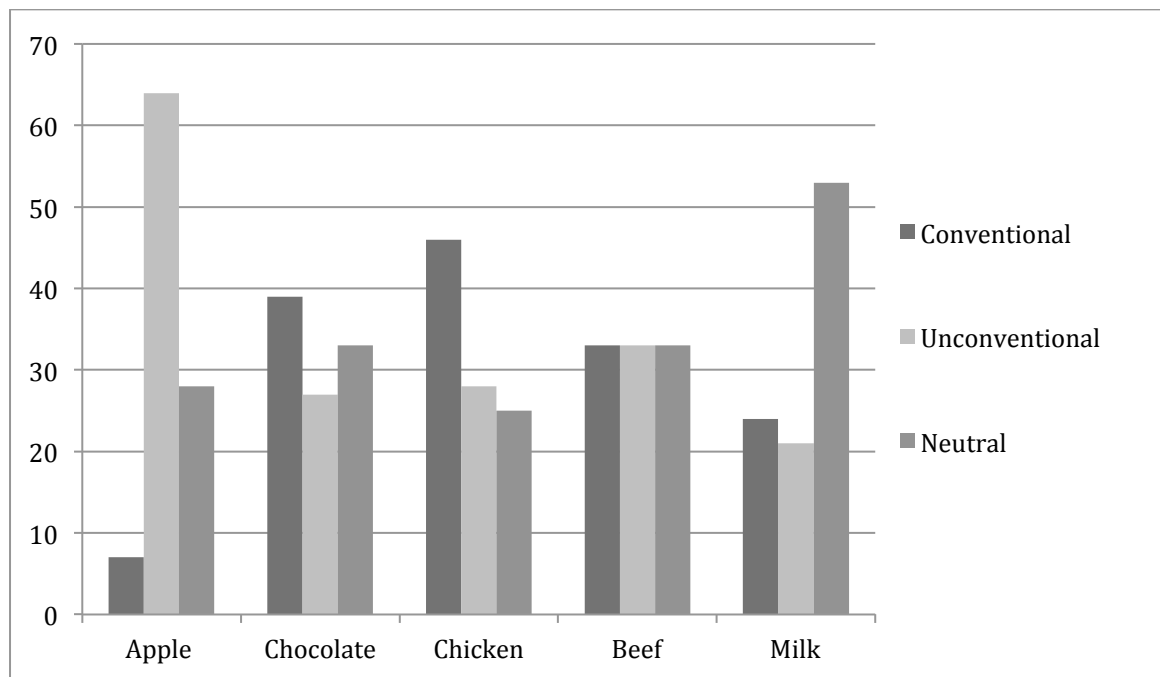
Figure 1. Respondents' preferences with regard to conventionally and AP milk, chocolate, beef, chicken, and apples

Objective 2 was to describe students' perceptions regarding specific qualities of CP and AP foods (see Table 2).

Table 2

Mean Perceptions Scores Regarding Specific Qualities of CP and UP Foods

Item	Conventionally Produced		Unconventionally Produced	
	M	*SD*	*M*	*SD*
Milk				
Appearance	3.90	0.83	3.77	1.01
Smell	3.73	0.79	3.70	0.93
Texture	3.79	0.81	4.01	0.85
Flavor	3.68	0.87	3.90	0.87
Chocolate				
Appearance	3.76	0.96	4.18	0.93
Smell	3.83	0.97	4.13	1.00
Texture	3.63	1.08	4.24	0.93
Flavor	3.79	1.13	4.35	0.92
Beef				
Appearance	3.48	1.05	3.04	1.13
Smell	3.49	0.97	3.39	1.05
Texture	3.31	1.04	3.58	1.02
Flavor	3.38	0.98	3.35	1.12
Chicken				
Appearance	3.76	0.96	4.18	0.93
Smell	3.83	0.97	4.13	1.00
Texture	3.63	1.08	4.24	0.93
Flavor	3.79	1.13	4.35	0.92
Apple				
Appearance	3.29	1.20	4.27	0.74
Smell	3.65	0.99	4.27	0.71
Texture	3.67	1.04	4.37	0.68
Flavor	3.88	1.05	4.46	0.73

Students had higher mean perceptions of the CP milk's appearance (*M* = 3.90, *SD* = 0.83) and smell (*M* = 3.73, *SD* = 0.79) than the AP milk's appearance (*M* = 3.77, *SD* = 1.01) and smell (*M* = 3.70, *SD* = 0.93). However, students perceived a more favorable texture (*M* = 4.01, *SD* = 0.85) and flavor (*M* = 3.90, *SD* = 0.87) from the AP milk over the CP milk (*M* = 3.79, *SD* = 0.81, *M* = 3.68, *SD* = 0.87, respectively). When tasting CP and AP chocolate, respondents held more favorable views of the CP chocolate's appearance (*M* = 4.33, *SD* = 0.84) and texture (*M* = 4.32, *SD* = .086) over the AP chocolate's appearance (*M* = 4.28, *SD* = 0.83) and texture (*M* = 4.30, *SD* = 0.86). However, respondents held more favorable views of the AP chocolate's smell (*M* = 4.31, *SD* = 0.84) and flavor (*M* = 4.19, *SD* = 0.98) when compared to their views of the CP chocolate's smell (*M* = 4.15, *SD* = 0.88) and flavor (*M* = 4.04, *SD* = 0.97). With regard to beef, respondents held more favorable views toward the CP beef's appearance (*M* = 3.48, *SD* = 1.05), smell (*M* = 3.49, *SD* = 0.97), and flavor (*M* = 3.38, *SD* = 0.98) when compared with their views of the appearance (*M* = 3.04, *SD* = 1.13), smell (*M* = 3.39, *SD* = 1.05), and flavor (*M* = 3.35, *SD* = 1.12) of AP beef.

However, they rated the texture of the AP beef (*M* = 3.58, *SD* = 1.02) higher than the texture of the CP beef (*M* = 3.31, *SD* = 1.04). When indicating favorability toward the qualities of CP and AP chicken, respondents displayed higher mean scores on the AP chicken's appearance (*M* = 4.18, *SD* = 0.93), smell (*M* = 4.13, *SD* = 1.00), texture (*M* = 4.24, *SD* = 0.93), and flavor (*M* = 4.35, *SD* = 0.92) than on the CP chicken's appearance (*M* = 3.76, *SD* = 0.96), smell (*M* = 3.83, *SD* = 0.97), texture (*M* = 3.63, *SD* = 1.08), and flavor (*M* = 3.79, *SD* = 1.13).

With regard to CP and AP apples, mean scores indicated respondents held more favorable views toward the AP apple's appearance (*M* = 4.27, *SD* = 0.74), smell (*M* = 4.27, *SD* = 0.71), texture (*M* = 4.37, *SD* = 0.68), and flavor (*M* = 4.46, *SD* = 0.73) when compared to the CP apple's appearance (*M* = 3.29, *SD* = 1.20), smell (*M* = 3.65, *SD* = 0.99), texture (*M* = 3.67, *SD* = 1.04), and flavor (*M* = 3.88, *SD* = 1.05).

Objective 3 sought to determine whether significant differences exist in how those who prefer a CP product perceive qualities of that product versus its AP alternative. Students who preferred CP milk (*f* = 24) reported higher mean scores on CP milk's appearance, smell, texture, and flavor than AP milk's appearance, smell, texture and flavor (see Table 3). The difference in their mean scores of the milks' appearance was statistically significant, *t*(23) = 2.22, *p* = 0.36, *d* = .45. The effect size was found to be medium (Cohen, 1988).

Table 3

Perceptions of Qualities of CP and AP Milk among Students who Prefer CP Milk

	CP Milk		AP Milk				
	M	*SD*	*M*	*SD*	*t*	*p*	*d*
Appearance	4.13	0.90	3.50	1.32	2.22	.036	.45
Smell	4.04	0.69	3.63	1.10	2.00	.057	
Texture	3.79	0.72	3.75	1.03	0.189	.852	
Flavor	3.79	0.72	3.29	1.12	1.86	.076	

Students who preferred CP chocolate (*f* = 28) reported higher mean scores on CP chocolate's appearance, smell, texture, and flavor (see Table 4). The difference in their mean scores of the chocolate's flavor was statistically significant, *t*(26) = 3.79, *p* = .001, *d* = .73. The effect size was found to be medium to large (Cohen, 1988).

Table 4

Perceptions of Qualities of CP and AP Chocolate among Students who Prefer CP Chocolate

| | CP Chocolate | | AP Chocolate | | | | |
	M	*SD*	*M*	*SD*	*t*	*p*	*d*
Appearance	4.41	0.84	4.15	.91	1.27	.215	
Smell	4.37	0.93	4.19	1.00	.795	.434	
Texture	4.48	0.70	3.67	1.70	1.99	.057	
Flavor	4.52	0.75	3.67	1.07	3.79	.001	.73

Students who preferred CP beef (*f* = 33) reported higher mean scores on CP beef's appearance, smell, texture, and flavor (see Table 5). The difference in their mean scores of the beef's appearance, *t*(32) = 3.60, *p* = .001, *d* = .63, and flavor, *t*(32) = 3.23, *p* = .003, *d* = .56, were statistically significant. Effect sizes were found to be medium (Cohen, 1988).

Table 5

Perceptions of Qualities of CP and AP Beef among Students who Prefer CP Beef

| | CP Beef | | AP Beef | | | | |
	M	*SD*	*M*	*SD*	*t*	*p*	*d*
Appearance	3.67	0.92	2.73	1.13	3.60	.001	.63
Smell	3.64	0.93	3.24	1.17	1.58	.125	
Texture	3.67	0.96	3.30	1.13	1.53	.136	
Flavor	3.76	0.75	3.00	1.09	3.23	.003	.56

Students who preferred CP chicken (*f* = 28) reported higher mean scores on CP chicken's smell, texture, and flavor (see Table 6). However, they reported higher mean scores on the AP chicken's appearance. Differences in mean scores were not statistically significant.

Table 6

Perceptions of Qualities of CP and AP Chicken among Students who Prefer CP Chicken

	CP Chicken		AP Chicken				
	M	*SD*	*M*	*SD*	*t*	*p*	*d*
Appearance	4.14	0.93	4.21	1.07	0.26	.795	
Smell	4.07	1.02	3.82	1.12	1.02	.316	
Texture	4.32	0.82	4.11	0.99	0.86	.396	
Flavor	4.32	0.98	4.00	0.98	1.20	.240	

Students who preferred CP apples (*f* = 7) reported higher mean scores on the CP apple's texture and flavor (see Table 7). However, they reported higher mean scores on the AP apple's appearance and smell. Differences in mean scores were not statistically significant.

Table 7

Perceptions of Qualities of CP and AP Apples among Students who Prefer CP Apples

	CP Apples		AP Apples				
	M	*SD*	*M*	*SD*	*t*	*p*	*d*
Appearance	3.71	1.13	4.14	0.69	.891	.407	
Smell	3.71	1.13	4.14	0.69	1.16	.289	
Texture	4.57	0.79	3.86	1.07	1.51	.182	
Flavor	4.71	0.49	3.86	0.90	2.21	.078	

Objective 4 sought to determine whether significant differences exist in how those who prefer an AP product perceive qualities of that product versus its CP alternative. Students who preferred AP milk (*f* = 22) reported a higher mean score on AP milk's appearance, smell, texture, and flavor (see Table 8). Differences in mean scores of the milk's smell, $t(21) = 3.309$, $p = .003$, $d = .71$, texture, $t(21) = 3.521$, $p = .002$, $d = .75$, and flavor, $t(21) = 4.482$, $p < .001$, $d = .96$, were statistically significant. Effect sizes were found to be medium and large (Cohen, 1988).

Table 8

Perceptions of Qualities of CP and AP Milk among Students who Prefer AP Milk

	CP Milk		AP Milk				
	M	*SD*	*M*	*SD*	*t*	*p*	*d*
Appearance	3.82	0.80	4.18	0.85	1.63	.119	
Smell	3.45	0.86	4.09	0.92	3.31	.003	.71
Texture	3.59	0.91	4.23	0.69	3.52	.002	.75
Flavor	3.32	1.00	4.27	0.77	4.48	.000	.96

Students who preferred AP chocolate (*f* = 38) reported higher mean scores on all four of the AP chocolate's qualities (see Table 9). Differences in mean scores of the chocolate's appearance $t(37) = 3.33$, $p = .002$, $d = .54$, smell $t(37) = 2.66$, $p = .012$, $d = .43$, texture $t(37) = 2.90$, $p = .006$, $d = .47$, and appearance $t(37) = 4.74$, $p < .001$, $d = .77$, were statistically significant. Effect sizes were found to be medium for appearance, smell, and texture and large for flavor (Cohen, 1988).

Table 9

Perceptions of Qualities of CP and AP Chocolate among Students who Prefer AP Chocolate

	CP Chocolate		AP Chocolate				
	M	*SD*	*M*	*SD*	*t*	*p*	*d*
Appearance	4.26	0.86	4.71	0.52	3.33	.002	.54
Smell	4.18	0.83	4.61	0.64	2.66	.012	.43
Texture	4.18	0.83	4.63	0.68	2.90	.006	.47
Flavor	3.89	0.86	4.71	0.65	4.74	.000	.77

Students who preferred AP beef (*f* = 33) reported higher mean scores on all four of the AP beef's qualities (see Table 10). Differences in mean scores were statistically significant for the beef's appearance $t(32) = 2.20$, $p = .035$, $d = .38$, smell $t(32) = 3.11$, $p = .004$, $d = .54$, texture $t(32) = .65$, $p < .001$, $d = .81$, and flavor $t(32) = 6.20$, $p < .001$, $d = 1.08$. Effect sizes were found to be small to medium for appearance, medium for smell, and large for texture and flavor.

Table 10

Perceptions of Qualities of CP and AP Beef among Students who Prefer AP Beef

	CP Beef		AP Beef				
	M	*SD*	*M*	*SD*	*t*	*p*	*d*
Appearance	2.97	1.13	3.55	1.06	2.20	.035	.38
Smell	3.00	1.00	3.70	0.98	3.11	.004	.54
Texture	2.73	1.04	3.85	0.91	4.65	.000	.81
Flavor	2.82	0.95	4.09	1.04	6.20	.000	1.08

Students who preferred AP chicken (f = 45) reported higher mean scores on all four of the AP chicken's qualities (see Table 11). Mean scores for AP chicken were significantly higher than mean scores for CP chicken with regard to appearance $t(44)$ = 5.55, p < .001, d = .83, smell $t(44)$ = 3.73, p = .001, d = .56, texture $t(44)$ = 5.56, p < .001, d = .83, and flavor $t(44)$ = 5.73, p < .001, d = .85. Effect sizes were found to be large for all qualities with the exception of smell, which was found to have a medium effect size (Cohen, 1988).

Table 11

Perceptions of Qualities of CP and AP Chicken among Students who Prefer AP Chicken

	CP Chicken		AP Chicken				
	M	*SD*	*M*	*SD*	*t*	*p*	*d*
Appearance	3.69	.095	4.53	0.73	5.55	.000	.83
Smell	3.71	0.99	4.40	0.94	3.73	.001	.56
Texture	3.38	1.05	4.44	0.87	5.56	.000	.83
Flavor	3.49	1.20	4.60	0.78	5.73	.000	.85

Students who preferred the AP apple (f = 63) reported a higher mean score for it on all four of the apples' aspects (see Table 12). Mean scores for the AP apple were significantly higher than mean scores for the CP apple with regard to appearance $t(62)$ = 6.43, p < .001, d = .80, smell $t(62)$ = 5.72, p < .001, d = .72, texture $t(62)$ = 7.18, p < .001, d = .90, and flavor $t(62)$ = 6.05, p < .001, d = .76. Effect sizes were found to be medium to large for smell and flavor and large for appearance and texture.

Table 12

Perceptions of Qualities of CP and AP Apples among Students who Prefer AP Apples

	CP Apples		AP Apples				
	M	*SD*	*M*	*SD*	*t*	*p*	*d*
Appearance	3.25	1.23	4.35	0.79	6.43	.000	.80
Smell	3.52	1.08	4.40	0.71	5.72	.000	.72
Texture	3.43	1.08	4.49	0.62	7.18	.000	.90
Flavor	3.65	1.14	4.60	0.64	6.05	.000	.76

Conclusions

With regard to Objective 1, results showed more students preferred AP chicken, chocolate, and apples, while more students preferred the CP milk. Students did not indicate an overall preference between CP and AP beef. These findings are reported by previous positions reporting the millennial generation values AP products (Hughner, et al, 2007).

Objective 2 results demonstrated how students perceived CP and AP foods based on sensory aspects. Students reported consistent perceptions regarding the favorability of each sensory aspect of chicken and apples; the AP versions of the products yielded higher mean scores on every sensory aspect. These findings support those found by Reganold, et al. (2001), who reported panelists described organic apples as sweeter and less tart. However, students' perceptions of the sensory qualities of chocolate, milk, and chicken were not consistent for each product; they reported more favorable perceptions of the appearance and smell of CP milk, but they perceived a more favorable texture and flavor from the AP milk. Students' perceptions of CP chocolate were more favorable with regard to appearance and texture, but less favorable than the AP chocolate with regard to smell and flavor. CP beef yielded greater mean perception scores regarding appearance, smell, and flavor, but the texture of AP beef was perceived as more favorable. These findings are confirmed by the inconsistency found in previous research regarding sensory aspects of CP and AP foods (Bourn & Prescott, 2002) and suggest while sensory-based intrinsic cues may influence a consumer's intentions regarding future purchases (Grunert, et al., 1996), they may create mixed feelings about a product. The conflicting perceptions regarding the sensory aspects of a product imply when making purchasing decisions, consumers may value specific sensory attributes over others, which contributes to the various subjective experiences in which consumers engage with their foods (Hughner, et al., 2007).

Results of Objective 3 indicated students who preferred CP milk displayed significantly higher scores on the CP milk's appearance when compared to their scores on the AP milk's appearance. However, results from Objective 4 indicated students who preferred AP milk reported significantly higher scores on the AP milk's smell, texture, and flavor.

Differences in the perceptions of sensory aspects between those who prefer different products is expected according to the Total Food Quality Model (Grunert, et al., 1996). Further, the notion numerous sensory aspects of a product can yield different results with regard to favorability, i.e., smell of a product may be perceived as favorable but appearance or flavor may be perceived as unfavorable,

is also well researched (Haglund, et al., 1999; Reganold, et al., 2001; Zhao, et al., 2007). However, the notion consumers' priorities among the various sensory aspects, partnered with their perceptions of those aspects, influences decisions to purchase was not found in previous literature. Results showing those preferring CP milk and those preferring AP milk perceived significant differences in sensory aspects of the milk samples imply that while their perceptions of the sensory aspects of the two products differ, those who in turn impacted their preferences may differ, as well.

Students who preferred CP chocolate scored it as significantly more favorable than the AP chocolate in flavor. However, those who preferred AP chocolate reported significantly higher scores on its appearance, smell, texture, and flavor when compared to scores on CP chocolate. As was observed with student preferences regarding milk, the sensory aspects valued by those who preferred CP and AP chocolate differed. Findings suggest while flavor was a factor in determining a preference for CP chocolate, all four aspects were valued by those who preferred AP chocolate. Similar conclusions can be drawn with regard to CP and AP beef. Students who preferred CP beef displayed significantly higher scores on its appearance and flavor while those who preferred AP beef displayed significantly higher scores on all four aspects.

While no statistically significant differences were found among the perceptions of CP and AP chicken among students who preferred CP chicken, these students indicted the AP chicken had a more favorable appearance. This conflicts findings reported in previous studies that consumers were persuaded not to buy organic versions of food based on appearance (Hack, 1993; Jolly & Norris, 1991; Roddy, et al., 1994). Results suggest students preferring AP chicken value the sensory aspects of smell, texture, and flavor of the chicken products differently than those who preferred the CP chicken, as those students reported significantly higher scores on those aspects of the AP chicken, in addition to appearance.

While no significant differences were found between scores of sensory aspects among students who preferred CP apples, these students reported more favorable perceptions of the CP apple's texture and flavor, but less favorable perceptions of the CP apple's appearance and smell when compared to the AP apple. These findings are in conflict with those of Hack (1993), Jolly and Norris (1991), and Roddy, et al. (1994), who each reported the appearance of organic foods was negatively perceived. Those who preferred the AP apple reported significantly higher scores on all four of the AP apple's sensory aspects. These results imply students who prefer CP apples may do so based on the sensory qualities of texture and flavor, but if their value of appearance and smell aspects increase, they may alter their preference to favor the AP apple.

Findings led the researchers to partially retain Null Hypothesis 1; significant differences were found in perceptions of CP and AP milk, chocolate, and beef sensory aspects, but were not found in perceptions of chicken and apple sensory aspects among students who prefer CP products. Researchers rejected Null Hypothesis 2; significant differences were found in perceptions of CP and AP milk, chocolate, beef, chicken, and apply sensory aspects among students who prefer AP products.

Recommendations

The results and conclusions of this study yield recommendations for both future research and those marketing CP and AP products. This study was conducted at one institution and should be replicated with other members of the millennial generation, both within and outside of the postsecondary educational environment. A main limitation of the study is the lack of a blind sensory panel, which

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was not feasible within the event in where the panel took place; participants were aware of the production method of each food as they were assessing sensory aspects, which could have impacted their perceptions and, therefore, presented a threat to the internal validity of the study. The researchers recommend future research be conducted using a blind sensory panel to enhance validity. Further research also should be conducted using qualitative and quantitative methods to more fully understand how individuals value different sensory aspects and how those values influence consumer decisions. Finally, the Total Food Quality Model incorporates sensory aspects as one form of intrinsic cue combined with extrinsic cues and the food preparation and eating experiences. Researchers should design studies to evaluate more holistically the influence of combinations of these factors to determine how marketing can most effectively influence consumer purchasing decisions.

Those marketing CP and AP products should focus on the millennial generation as an audience from which increased concern in food production practices will be seen. Agricultural communicators should focus on enhancing consumer awareness of the sensory aspects valued by those who prefer that product. For example, when marketing AP chicken, communicators should highlight the appearance of the product to attract consumers typically purchasing CP chicken, as this group reported higher scores regarding AP chicken over their preferred CP chicken. An alternative approach when marketing AP products is to focus on valued extrinsic aspects, such as environmental improvement, in communications designed to attract consumers to purchase products in spite of their perceptions of sensory aspects, which may be valued less than extrinsic aspects (Jolly, et al., 1989).

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Exploring Agriculturalists' Use of Social Media for Agricultural Marketing

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Abstract

The Internet has had a significant impact in how agriculturists get their information and how they communicate with consumers. The use of user-generated media, especially social media, now provides agriculturalists free and practically instantaneous channels through which to engage with their audience members. The purpose of this study was to explore agriculturalists' use of social media for agri-marketing. This study used a qualitative research approach consisting of in-depth interviews with four agriculturalists who met certain criteria: an individual (1) working in agriculture, (2) using several social media platforms, and (3) using social media to market his/her own agricultural operation. Analysis of the interview transcripts identified seven emergent themes to address the three research objectives. Findings indicated participants became active using social media to combat dominant negative messages about production agriculture. Participants also discussed how they manage their social media presence and balance responsibilities. Overall, they were positive about the use of social media for their own operations and for the broader agricultural community. Additional analysis indicated some gender differences in regard to social media use. Recommendations for both practitioners and researchers are provided to further explore social media use in agriculture.

Key Words

Agriculture, social media, advocacy, agricultural marketing, qualitative

Introduction/Need for the Study

Until the mid-19th century, most agricultural information was communicated from farmer to farmer by word of mouth (Paskoff, 1990). At the end of the last century, agriculturalists' top three sources of information were radio, mail, and face-to-face communication (American Farm Bureau Federation, 2013). Although these forms of communication are still important, the Internet has had a greater influence on U.S. agriculture than any other communication channel during the past century; its two main impacts being how agriculturalists get their information and the ability of agriculturalists to communicate with the consumer (American Business Media Agri Council, 2010).

Internet adoption and the introduction of social media have changed how many individuals seek and receive information. Henroid, Ellis, and Huss (2003) noted the Internet has made the process of information retrieval easier and is often seen as a reliable source of information because of the readiness of the information. The rapid rate of Internet adoption of the 1990s (Rogers, 2003) is similar to the rapid rate of adoption of social media today (Hoffman, 2009). Kabani (2010) referred to social media tools as online systems of websites whose main objectives include interacting, socializing, building, and maintaining relationships. Some forms of social media tools include Facebook, Twitter, LinkedIn, YouTube, and blogs (Kabani, 2013).

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From 2005 to 2009, participation in social networking has more than quadrupled (Jones & Fox, 2009). A Pew Research Center (2012) study found 67% of all Internet users in the United States use at least one social media site; 83% of people between the ages of 18 and 29 use social media sites. Women are more likely to use social media than men, and Internet users are more likely to use social media if they reside in an urban area as opposed to rural (Pew Research Center, 2012). The American Farm Bureau Federation (2013) reported that out of 92% of farmers and ranchers ages 18-29 surveyed who use computers, 82% regularly use some form of social media.

As Americans continue to move away from rural areas, their understanding of agriculture will continue to decrease (Elliot, 1999). The evolving landscape of agriculture has brought about a shift in consumer demands and a disconnect between agricultural producers and consumers that continues to grow (Perkins, 2010). Consumers now put more emphasis on wanting food that is convenient, ethically raised, and healthy; they want to know where their food is coming from, how it was raised, and how it got to their plate (U.S. Department of Agriculture, 2013). To meet these demands, food producers and consumers have had to forge new relationships, and social media platforms have provided a way to do so. For U.S. agriculture to continue to be successful in the global agricultural market, it is necessary for U.S. agriculturalists to understand who and where their consumers are and how to please them (Allen, 1993). It is also important for U.S. agriculturalists to be familiar with the methods through which consumers gain information and make decisions regarding agriculture (Elliot & Frick, 1995). Agriculturists — producers, communicators, or employees — are successfully participating in two-way communication with consumers via social media. Exploring how these communication efforts began and are sustained will provide more insight to inform additional communication efforts through social media.

Literature Review

Social media created an environment for individuals to interact with each other in a two-way communication pattern, allowing for the creation and maintenance of relationships (Rajagopalan & Subramani, 2003). This form of communication can benefit the information sender because it can affect how individuals react to messages. In an era of increased demand for transparency and authenticity, social media is rapidly creating a new standard for communication (Kaizen Digital Marketing, 2011). "The immediacy and accessibility of social media makes it an ideal medium for transparency, whether intended or not" (Prescient Digital Media, 2013, para. 1).

Increased participation and interaction of users is taking place on the Internet as users create, communicate, and express themselves through the development of content. User-generated content is "content that comes from regular people who voluntarily contribute data, information, or media that then appears before others in a useful or entertaining way, usually for the web" (Krumm, Davies, & Narayanaswami, 2008, p. 10). With the recent growth of social media, people all over the world are connecting through common interests more quickly, more inexpensively, and with less reservation (Anderson-Wilk, 2009). This trend allows users to keep in contact with others they might not normally be able to because of time and distance issues. Social media allows for users to be more involved in an activity than has previously been possible through one-way communication channels (Anderson-Wilk, 2009).

As audiences become more dependent on the Internet for information, it is becoming more important for businesses to have a strong online presence (Rigby, 2008). One way this presence can be strengthened is through the use of social media platforms. Social media tools represent a revolutionary new trend for any business (Kaplan & Haenlein, 2010) and are now an important and integral

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part of modern day business operations (Kabani, 2013). Marketing has changed drastically with the introduction of social media (Smith & Zook, 2011). The American Marketing Association (2014) defined marketing as the "activity, set of institutions, and processes for creating, communicating, delivering, and exchanging offerings that have value for customers, clients, partners, and society at large" (para. 2). This definition extends to marketing within the agricultural industry that "includes a wide spectrum of decisions and activities that center on effectively reaching your customers, prospects, and public, and providing them with information about your products or services that satisfy their needs and wants" (Barnard, Akridge, Dooley, & Foltz, 2012, p. 123).

The tools of social media allow the consumer to become the center of an organization and give marketers innovative ways to engage with them. This new opportunity also allows marketers to create stronger brands through social media and ultimately build a better business because brands help create a relationship between businesses and their audiences (Smith & Zook, 2011). Agri-businesses have incorporated social media as a tool that is transforming communication throughout the industry (Baumgarten, 2012).

Within agriculture, organizations such as the AgChat Foundation and American Farm Bureau Federation have encouraged the use of social media use. The AgChat Foundation serves as an educational resource to help farmers and ranchers learn the skills necessary to participate in communication via social media channels (AgChat Foundation, 2014). The American Farm Bureau Federation has encouraged social media use, claiming that through the use of social media, farmers and ranchers can shape the future of their business (American Farm Bureau Federation, 2011). Katims (2010) reported a growing number of U.S. farmers use social media as a way to promote the agricultural industry by directly reaching the consumer. Farmers use social media on a personal level to tell their stories, give updates, promote their products and answer consumer questions (Baumgarten, 2012). Farmers believe social media is an effective rebuttal to the mixed-marketing messages targeted against production agriculture (Katims, 2010).

Interactivity is the main way the Internet facilitates consumers' active participation in online communities (Yoon, Choi, & Sohn, 2008). However, these interactions may be experienced differently by males and females because gender differences impact personal identity (Manago, Graham, Greenfield, & Salimkhan, 2008). Manago et al. (2008) stated women tend to be more concerned with connective communication strategies, whereas men tend to use more power-oriented communication strategies. Women provide more information in general while men and women are both more likely to provide information to women than men. Muscanell and Guadagno (2012) found women used social networking sites to maintain existing relationships while men were more likely to use the sites to network and establish new relationships. While researchers have noted gender differences for general Internet use, this individual difference variable is also related to how social networking sites are used (Muscanell & Guadagno, 2012).

Theoretical Framwork

The theoretical framework for this study drew upon the uses and gratifications theory and the diffusion of innovations theory. The uses and gratifications theory seeks to understand why people use certain media channels to satisfy personal needs (Katz & Blumler, 1974). This theory suggests media consumers are not passively participating but actively partaking in media selection. This theory has been used to study various types of mass media forms including television, radio, print media, music, news, and movies (Rubin, 2009). Beyond these traditional forms of media, uses and gratifications theory has been applied in studies of online communication technologies. Ruggiero (2000) foresaw

the Internet "will lead to profound changes in media users' personal and social habits and roles" (p. 28). The characteristics of the Internet and user-generated media make uses and gratifications an ideal theory through which to examine how emerging technologies are selected and utilized. Rubin (2009) stated this theory "will continue to be an invaluable approach as we seek to understand the evolving, interactive digital environment" (p. 155).

One particular area uses and gratifications theory is currently being applied is the study of user-generated media (UGM), which are the new media that contain content created by individuals outside of their professional responsibilities and made widely available online (Shao, 2009). These media include social networking platforms, podcasting, and digital video. Individuals receive various gratifications from using UGM, specifically to meet entertainment, information, and mood management needs; to interact with content and other individuals; and to create their own content to achieve self-expression and self-actualization (Shao, 2009). Nardi, Schiano, Gumbrecht, and Swartz (2004) used in-depth interviews to identify five main gratifications met by user-generated content: recording one's life, giving options, articulating sincerely felt emotions, expressing thoughts through writing, and establishing and sustaining relationships.

The diffusion of innovations theory looks at how, why, and at what rate innovations spread through social systems (Rogers, 2003). Rogers (2003) defined diffusion as "the process by which an innovation is communicated through certain channels over time among the members of a social system" (p. 5). This theory seeks to explain how ideas and technologies, such as social media, spread through social systems. Although social media is a new division of media, several studies have been conducted to explore how this innovation has diffused. Avery et al. (2010) examined the use of social media among public relations practitioners within the medical industry in communities of various sizes and found the most common barriers for adoption were lack of trialability and observability. Waters (2010) explored the use of social media among nonprofit organizations. He found while some nonprofits embrace social media technologies, most are waiting to see how other nonprofit organizations use the tools before they adopt. Doerfert, Graber, Meyers, and Irlbeck (2012) researched Texas agricultural producers' use of traditional and social media and found the producers to be in the beginning stages of adoption, according to Rogers' (2003) model.

Purpose and Objectives

The second priority of The National Research Agenda (NRA): Agricultural Education and Communication 2011-2015 (Doerfert, 2011) is concerned with new technologies, practices, and product adoption decisions consumers undergo. One of the objectives within this priority area is to "determine the types of knowledge, skills, environment, and support systems that facilitate decision-making and adoption processes by individuals and groups" (p. 8). The purpose of this study was to explore agriculturalists' use of social media for agri-marketing. The following research objectives were used to guide the study:

1. Explore participants' motivations for becoming involved with social media.
2. Describe participants' administration of their social media presence.
3. Explain participants' opinions about social media use for their personal agri-marketing efforts.
4. Identify participants' appraisal of future social media use in agri-marketing efforts.

Methods

A qualitative research design was used to accomplish the research objectives because qualitative

research has the ability to explore individuals' lives, experiences, actions, and feelings as well as social movements and social phenomena (Strauss & Corbin, 1990). The particular qualitative design utilized was a phenomenological study, which is designed to describe "the meaning of the lived experience for several individuals about a concept or the phenomenon" (Creswell, 1998, p. 51). The phenomenon under study was agriculturalists' use of social media for agri-marketing purposes.

To gain insightful information about the phenomenon, participants were purposively selected to have the following characteristics: an individual (1) working in agriculture, (2) using several social media platforms, and (3) using social media to market his/her own agricultural operation. Any individuals who work in public relations or manage social media accounts for an organization were excluded, even if it was an agricultural organization. These participants were identified from a review of the AgChat Foundation website to identify individuals actively involved in agriculture and social media. Once 10 potential participants were identified, they were contacted to seek participation in the study; four agreed. These 10 participants represented various agricultural commodities and met all the outlined characteristics to be included in the study. Multiple attempts were made to contact all potential participants, but they either did not reply or said they could not complete the interviews due to time constraints. Morse (2000) noted the ideal number of participants in a qualitative study depends on a few factors such as quality of the data and the amount of information each participant provides. Fewer participants are needed in cases where more rich information is obtained from each participant (Morse, 2000). After only four interviews, themes and statements were becoming repetitive, and the researchers knew they were getting the rich description of the phenomenon they were seeking.

After receiving the university's Human Research Protection Program approval, the lead researcher conducted semi-structured interviews via telephone in February 2013. Semi-structured interviews are beneficial when the researcher knows enough about the phenomenon to develop questions in advancem but not enough to be able to anticipate the participants' answers (Morse & Richards, 2002). The interview questions addressed the individuals' motivations to start using social media; utilization of social media; opinions, attitudes and beliefs of social media use; and assessment of his or her social media use. The four participants represented the dairy industry (three dairy cattle operations and one dairy goat operation). With the consent of all participants, interviews were audio recorded and detailed notes were taken to ensure accuracy in transcription.

To ensure anonymity, each participant was assigned a pseudonym prior to the researchers analyzing data and writing the findings. After transcribing the interviews verbatim, the lead researcher used NVivo 9.0 data management software to help analyze, store, and organize the data. The researcher read the transcripts and coded information into common themes. The interviews were analyzed using the constant comparative method (Glaser & Strauss, 1967). Each of the four interviews was first read then the information was coded to identify emergent, dominant themes. Initial themes were identified from the first transcription; from there, remaining information was placed into the previously determined themes that emerged or additional themes were created as needed. As themes began to emerge from the data, they were compared to other themes to help find relationships in the data collected. The guidelines established by Lincoln and Guba (1985) were used to maintain trustworthiness: credibility, transferability, dependability, and confirmability. Specific strategies to address trustworthiness were conducting one-on-one interviews, maintaining an audit trail, and transcribing interviews verbatim. The lead author also completed a subjectivity statement to bracket any possible biases that could interfere with data collection or analysis.

Findings

All participants were involved in social media to promote his or her agri-business. Table 1 provides the respondents' pseudonyms, geographic location, age, operation type, and the year the participant began using social media.

Table 1

Demographic Characteristics of Selected Agriculturalists Using Social Media for Agri-Marketing (N = 4)

Pseudonym	Geographic Location	Age	Operation Type	Social Media Start Date
April	Midwest	42	Dairy Cattle	2010
Miranda	Northwest	58	Dairy Goats	2009
Jackson	Southeast	33	Dairy Cattle	2007
Owen	Southeast	37	Dairy Cattle	2010

RO1: Explore participants' motivations for becoming involved with social media.

Data analysis identified one dominant theme for this objective: desire to speak on behalf of agriculture. All four participants said they were encouraged to join social media for the use of agri-marketing because of personal experiences with negative information being shared about agriculture. The participants said negative messages about agriculture outweighed messages supporting agriculture and social media provided a way to share their opinions. April said: "It was getting overwhelming how much negative information there was about agriculture. I wanted a forum where I could share accurate information."

Two of the participants described their social media use as being just one more way to defend agriculture. Owen said, "If I'm just one more person sharing information, positive information, about agriculture, hopefully that will help others find positive information." Participants were asked if they tried to target their messages to a certain audience. One of the participants said he did not spend too much time trying to target an audience.

> JACKSON: My thought has always been if what I put out there is good enough, people will read it and they'll keep reading it. If my message is any good, it's eventually going to reach people. It may be slow, but ultimately, I try to be genuine.

Owen said he tried to start small with his social media use and never thought about targeting an audience. He said: "All I wanted was to be another grain of sand saying the same thing as everyone else. That way I could make that voice for agriculture a little louder."

Miranda and April are more specific when they target their messages. April said: "I'm a mom of two kids, so when I talk, I try to target it to moms." Miranda said she tried to target the people in the community who are going to be buying her products.

> MIRANDA: I try to target to local eaters. Not even of just my cheese, I promote all local foods – everybody's cheese, everybody's local meat, local produce. I promote all of it because we live in a region where we can get almost all of our diet almost all year around. I try to let the community know that.

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RO2: Describe participants' administration of their social media presence.

Data analysis identified two themes for this objective: 1) managing their social media presence and 2) balancing responsibilities.

Managing their social media presence.

Participants used a variety of strategies to manage their social media presence, including linking different platforms, determining content to post, and responding to negative feedback. In regard to linking social media channels, the participants had differing strategies. April and Owen use heavy cross promoting. April said, "I try to do as much cross promotion as possible." Owen said he tries to make the most of his social media channels, and said, "I even promote my blogs on my personal Facebook and Twitter pages." Miranda supports using cross promotion, but she uses it less. She said, "Sometimes I get annoyed with those auto feeds." Jackson uses no cross promoting, saying he tries to reach his audience in separate ways. He said, "I try to tailor my message to get my point across, depending on the platform."

Participants had similar approaches to identify the subject matter of their posts. Subject content was usually generated from happenings on the farm, current agricultural issues, general agricultural information, or audience inquiries. Owen said most of his posts come from what is currently happening on the farm. He explained, "Sometimes I'll blog about what we are doing on the farm, and try to make it relatable to other people." Miranda said she will sometimes write posts related to current "hot topic" agricultural issues. She said: "When the Farm Bill was being discussed, I tried to piggy back on that issue. That way if people Google it, maybe they'll pull up my blog and see what I have to say about it." Jackson said sometimes he will use his phone to post something to just promote agriculture in general. He said, "Sometimes I'll just say something encouraging everyone to drink milk." April said one of her forms of content generation comes from audience inquiries. She explained: "When they ask, I answer. I don't go into any kind of detail, but I always answer their questions."

Two participants said they had experience with negative messages, while the other two said they had not had to handle negative messages. Owen said: "I've had some positive comments, and I've had some in the middle of the road, but I've never had any blatantly negative comments." Contrasting Owen's experiences, Miranda said the negative messages she had received is the reason she had made a technology upgrade. She said: "It's what prompted me to get an iPhone. People were saying things, and I wanted to be able to see what they were saying immediately."

Balancing responsibilities.

All the participants agreed that even though they have other duties, they have been able to manage their social media presence effectively. Jackson said he does not let his social media distract from his work on the dairy. He said: "If I've got a few minutes where I can do something on social media, I'll do it, but I'm not going to create work for someone else because I'm on social media." Miranda said technology is what helps make social media so easy. She shared: "When we're at the farmer's market, I'll post a picture and invite people to come see us. It's really easy that way and it's in real time." Although April said she agrees social media use is not hard to balance with her other responsibilities, she does think it is something you have to prioritize. She explained: "I think you have to commit to some kind of schedule. I just feel like you have to be disciplined and persistent with whatever you decide to do."

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RO3: Explain participants' opinions about social media use for their personal agri-marketing efforts.

Data analysis identified two themes for this objective: 1) a presence on social media benefits agriculture and 2) social media can (sometimes) be overwhelming.

A presence on social media benefits agriculture.

When discussing the impact of social media on agriculture, the participants all talked about social media allowing for more transparency between the producer and the consumer. Owen said farmers who post information explaining what they are doing has helped improve communication between these groups. He said, "It has made it more open and more accessible." Miranda said she has learned consumers want to know more about their food.

> MIRANDA: People are hungry for that kind of information; they want to see the person behind the scene. I think people are just hungry for something real that they can put their fingers on. I think we're so disconnected, and social media gives us a forum to fix that.

Jackson said the transparency social media has allowed not only helps the consumers who want to know more about their food, but also it helps him. He said, "I have a better insight into what consumers want and what they expect out of us, and I guess, more self-assessment."

Participants mentioned the importance of participating in the promotion of agriculture via social media. April said, "It's really important for us to show that what we do is important and we're proud of it." Miranda said, "We need everyone to understand that there's a real science to all of this, and we're not just doing it on a whim." Participants also described the impact social media has had on their personal businesses. April said: "I think it has had tremendous value because in our community, people know who we are, in our community and also in the agricultural community. I think it helps everybody work together."

Social media can (sometimes) be overwhelming.

Participants' had some differing opinions as to whether or not social media is overwhelming. Jackson and Miranda said they did not feel overwhelmed by social media. Miranda said, "If I get close to feeling overwhelmed, I won't do it that day. It's as simple as that."

Two of the participants said they can sometimes feel overwhelmed by social media. Owen said, "Sometimes you get sucked into it and sometimes it's hard to turn it off." April said she often feels overwhelmed by certain social media tools.

> APRIL: I feel like on Facebook or different blogs you can scan every once in a while and get a good picture of what's out there. With Twitter I feel like it's so fast moving, in order to really get a benefit out of it, you have to constantly be watching it.

RO4: Identify participants' appraisal of future social media use in agri-marketing efforts

Data analysis identified two themes for this objective: 1) satisfied with social media use and 2) future social media use in agriculture will be important.

Satisfied with social media use.

All the participants said they were satisfied with their social media use and would not have

changed anything about their adoption of this technology. April said: "I think you learn and grow. You improve, and there's always something to improve on."

One indication of this satisfaction was their desire to continue using social media in the future. Most participants said although they do not have plans for expansion right now, the unknown factor of future technology could change their opinion. "You never know what is around the corner," Miranda said. April also said, "There's always new technology or an update to enhance your social media use." Jackson said the growth of technology has surprised him and will probably continue to do so.

> JACKSON: I would never have imagined technology would have jumped at the rate it has. It's easy to say we'll be doing this or that in five or 10 years with the technology we have, but in reality, I probably can't even imagine how much growth there is going to be in two or three years.

Future social media use in agriculture will be important.

The idea of social media being a permanent element in agriculture was heard from all the participants. Participants also realized the growing trend of social media was not just with their use of social media for their agricultural operation, but throughout all of agriculture. Jackson said: "There's no stopping it. It's going to continue to grow." Although all the participants said they think the use of social media in agriculture will increase and become more important, April said she thinks it is going to be imperative to integrate social media into agricultural operations.

> APRIL: To me, if you're in agriculture today, that's got to be someone's responsibility at your farm or in your family. You've got to be out there doing it. So whether it's your children, grandchildren, nieces or nephews, you've got to figure out how you can incorporate it into what you do.

Participants also shared their advice for others in agriculture who are considering using social media for their business or to promote agriculture in general. The most common piece of advice was to be authentic. Jackson said: "Be genuine, let a little bit of your personality show through. Be honest about what you do." Another piece of advice was to start small. Owen said: "Don't make it another job for yourself, an unpaid job. Have fun with it. Telling your story should be a wonderful experience."

Conclusions

As the gap between consumers and agricultural producers increases, the idea of building trust and understanding between these two parties is crucial (Perkins, 2010). Participants in this study recognized a disconnect between agriculturalists and consumers and they desired to refute negative information or correct misinformation about agriculture. It is interesting the participants felt the need to use social media not because they initially wanted to tell their agriculture stories but to address the negative information. According to Shao (2009), the participants' desire to provide content was to achieve the self-expression and self-actualization gratifications. The information participants were encountering online about agriculture was mainly negative or incorrect. Because of this, participants were motivated to inform others about their own agri-business and agriculture in general through social media.

The desire to use social media to communicate agricultural information implies participants recognized the relative advantage (Rogers, 2003) of social media. Before social media, the opportunities for individuals to share their own perspectives to a mass audience were quite limited and

typically only possible if the individual was able to get the message through traditional media outlets such as television, radio, magazine, or newspaper, either through paid advertising or earned publicity. The advent of social media brought about a revolution in how information is created and shared. The increased participation and interaction between users on the Internet is allowing users to create, communicate, and express themselves (Krumm et al., 2008). This technology was an effective way for participants to share information to audiences that might not be accessible any other way.

Participants realized the management of social media is multi-faceted. They recognized their social media presence is most successful when multiple tools are used to promote each other. The idea of participants using many different social media platforms demonstrates Rogers' (2003) concept of technology clusters, which are defined as "one or more distinguishable elements of technology that are perceived as being closely interrelated" (p. 14). The participants' use of several social media tools illustrates they view social media use collectively and not isolated to individual platforms. They did not discuss how they use Twitter for one purpose and Facebook for another; they used their entire social media presence to communicate about their agri-business and agriculture in general. This can help in reaching multiple audiences wherein a portion of the audience may prefer Twitter over Facebook and vice versa as people use varying media channels to satisfy different needs (Katz & Blumler, 1974).

The participants in this study were very positive overall about their use of social media to communicate about agriculture. The discussion of their opinions about social media identified a number of reasons they use social media, which directly relate to the gratifications sought and obtained through social media. Nardi et al.'s (2004) study of uses and gratifications of social media suggested five main gratifications are met by user-generated content: "documenting one's life, providing opinion, expressing deeply felt emotions, articulating ideas through writing, and forming and maintaining community" (p. 43). Participants recognized the content they create and share impacts the agricultural industry because they try to provide accurate information to audience members who are not aware of current agricultural practices. This desire to make a difference has a connection with the other needs met by social media. They mentioned the things happening on their farms help generate content, which is an example of documenting one's life. All the participants said the primary motivation for beginning their social media presence was to provide audiences with accurate information about agriculture. This demonstrates their need to provide opinion, express deeply felt emotions, and document one's ideas through writing.

After reviewing the initial coding results, additional analytic coding was performed and the researchers found some differences in the responses between the male and female participants for each of the main categories within the emergent themes. Table 2 displays the results of this coding process organized by emergent themes and gender. A difference was noted in how males and females targeted their audience. The male participants did not consider targeting their messages and made them more general to appeal to a broad audience. The female participants said they targeted their messages (e.g., to moms, people in the community). Manago et al. (2008) said women typically use more connective communication strategies, which may explain why they were trying to target audience members to develop a more meaningful connection. When handling negative messages, the males said they did not receive negative messages, while the females said they did receive negative messages.

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Table 2

Analytic Coding of Categories and/or Emergent Themes for Differences in Gender

Theme	Male	Female
Targeting an audience	General	Targeted
Using cross promotion	No Difference	No Difference
Determining subject matter	No Difference	No Difference
Handling negative messages	Didn't Receive	Received (Sensitive)
Balancing responsibilities	Less Intentional	Intentional
Social media presence benefits agriculture	Transparency	Advocacy
Social media can (sometimes) be overwhelming	No Difference	No Difference
Satisfied with social media use	Status Quo	Open to growth
Future social media use in agriculture	No Difference	No Difference

In their descriptions of how they balanced social media responsibilities with other personal responsibilities, the males were less intentional while females were more intentional. When males had time to post on their social media channels they would, while the females made it a point to have a schedule and stick to it. When discussing their social media presence benefiting agriculture, males said their presence helps encourage transparency, while females said their presence helps support advocacy. The final difference in responses was seen in participants' satisfaction with their current social media use. Although both males and females were satisfied with their social media use, males said they were happy with the way they operated their social media presence and did not see things changing much in the future. However, the females were very open to growth and changing how they used social media in the future, if necessary.

Recommendations

The participants in this study support what has been said previously by others (American Farm Bureau Federation, 2012; Baumgarten, 2012; Katims, 2010) – social media use in agriculture is important and will continue to expand in the future. Based on the responses of this study's participants, agriculturalists should use social media to promote their agri-business and agriculture in general. With 67% of the online U.S. population using social media (Pew Research Center, 2013), it is a very powerful resource for agriculturalists. The information agriculturists provide can include agri-marketing efforts as well as information to refute negative or incorrect information about agriculture currently available online.

When providing social media content, it is important to be consistent, reliable, and accurate. The content developed and shared should have purpose behind it. Content can be generated from a variety of sources, whether it is providing details of one's daily life, offering personal perspective on a current agricultural issue, or responding to readers' questions and concerns. Practitioners must decide the types of information their audience members want or need and strive to provide it in a way they would understand and even be willing to share.

The use of social media does require practice and learning from experience. Change agents, such as individuals working for the AgChat Foundation or the American Farm Bureau Federation, should seek ways to demonstrate social media to various agriculturists to help them better understand how and when to utilize the various social media tools. It would be beneficial to provide workshops or

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online trainings to help farmers and ranchers learn how to evaluate their own social media presence.

Although this study does provide a better understanding of the social media phenomenon from those who use this technology to communicate about agriculture, the results are limited due to the small number of participants. It would be useful to conduct additional interviews with more participants who represent other agricultural commodities and geographical regions. Another approach to collect farmers' and ranchers' opinions of using social media would be to conduct research, such as a focus group or intercept survey, in conjunction with a AgChat Foundation or American Farm Bureau Federation convention. This convenience sample would yield additional data to supplement the current study and further elicit the benefits and challenges of using social media to communicate about agriculture. As Rogers (2003) encouraged, it is beneficial to research technology not as individual entities but as clusters. Research to further explore social media as a technology cluster in agricultural communications would be insightful. The results of the additional analytic coding regarding the differences and similarities in gender and encourage subsequent research to further explore how males and females may vary in their user-generated content within agricultural communications.

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An Examination of the International Federation of Agricultural Journalists' Involvement in Agriculture Knowledge Mobilization

William Nelson, David L. Doerfert, Courtney Meyers, Matt Baker, Cindy Akers, Masaru Yamada, Teruaki Nanseki and Owen Roberts

Abstract

It is estimated the global population will reach 9 billion by the year 2050. This growth in population presents a very imposing problem for agriculture. A potential solution to increasing agricultural production is the mobilization of information through agricultural innovation systems. What has not been studied is the role the International Federation of Agricultural Journalists (IFAJ) has in this system. This study sought to describe the IFAJ and its membership's knowledge mobilization role within Agricultural Knowledge and Innovation System (AKIS), describe the issues facing the membership related to agricultural innovation systems, and record the practices members feel are best to identify stories of interest, create media pieces, and disseminate those media pieces.

The results of the study indicate the majority of respondents work as journalists/reporters and a large portion of organizations employ fewer than five people. In respect to the AKIS model, the largest portion of respondents saw themselves as facilitators of knowledge movement. Despite some similarities, differences were revealed between the employment category types found within the IFAJ membership in their perceived objectivity when it comes to their role within AKIS. Talking to stakeholders was the most popular method of identifying stories of interest, involving the farm perspective was most popular strategy for the creation of interesting media pieces, and the use of digital and traditional media was the most popular method to disseminate their work. As IFAJ continues its dedication to providing helpful information to the world's farmers, the organization should realize its membership is not unified in its approach.

Key Words

Agricultural knowledge mobilization, best practices, source trust, knowledge, knowledge transfer

Introduction/Need for the Study

The dissemination of information from a source to a receiver is as old as time itself. The idea something, some piece of information, is perceived of such value that it may be wanted, even needed, by someone else to the point we are motivated to share it is intrinsic to us all. When the receiver shares in that value for the information, an exchange happens in which both the sender and receiver have gained from the experience.

At this base level, stripped bare of extrinsic motivations, distractions, technologies, and other factors that make this simple human interaction more complicated, mutual understandings are reached, learning occurs, and individual growth and change are realized. Replicate this process and expand it to include others and the potential for individual and societal growth through innovation and the solving of problems that emerge through life in dynamic, ever-changing systems becomes a reality.

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Educators, journalists, and other individuals and organizations focused on the sharing of information can be found throughout the history. Expanding on the single source/receiver process, these individuals and their organizational structures often will gather information from a variety of sources on a single topic and assemble it in both a form and process that creates efficiencies as it distributes the information to a receiver that typically exceeds the number of one. As context can influence the effectiveness of information sharing, it is not uncommon to find individuals and organizations that limit their information sharing activities to a single context. Such is the case in agriculture and the International Federation of Agricultural Journalists (IFAJ).

With a history dating back to 1933 with the formation of the International Federation of the Agricultural Press in Belgium, the IFAJ is a non-political, professional association for agricultural journalists in 32 countries. IFAJ supports and encourages the practice of agricultural journalism in countries embracing freedom of the press and gives agricultural journalists and communicators a platform for professional development and international networking. IFAJ sees its role of providing helpful information to the world's farmers as well as reporting new trends to consumers as being critical to the future of the planet.

At this time in human history, the global population is predicted to grow to 9 billion people by 2050. This is creating fears of food insecurity, especially in less developed regions (United Nations, 2004). In addition, the United Nations Food and Agriculture Organization (2000) projected by 2025, the need for food in developing countries could possibly double. Ash, Jasny, Malakoff, and Sugden (2010) stated, "Feeding the nine billion people expected to inhabit our planet by 2050 will be an unprecedented challenge" (p. 797).

Core to addressing this global challenge is the ability to share information effectively — such as emerging research, new innovations, best practices, and lessons learned — with individuals and organizations that create the solutions to this challenge. To that end, it is critical to understand agricultural communicators' perceptions and behaviors within their role in the exchange of knowledge to their audience beyond the local, regional, or national levels.

Conceptual and Theoretical Framework

To address the global challenge of food security, agricultural production will need to become more efficient in every region of the world. As a part of reaching that food secure outcome, agricultural knowledge systems also will need to operate as efficiently as possible. McKibbon et al., (2010) found more than 100 terms have been used to describe knowledge transfer or an aspect of the process. Because research is spread across multiple disciplines, barriers to compiling a comprehensive analysis of the body of knowledge are difficult (Levin, 2008; McKibbon et al., 2010). For this study, the review of literature and related theory was confined to the concept of knowledge mobilization.

Levin (2008) defined knowledge mobilization as the connections between researcher and decision maker. Previous knowledge mobilization research has primarily had a healthcare focus (Sudsawad, 2007). However, an apparent lack of research exists pertaining to the role agricultural journalists and communicators play in mobilizing knowledge, though some research has been conducted examining journalists in respect to sharing scientific knowledge (Waddell et al., 2005). Manning (2013) stated there are two ways of gaining knowledge: The first way is by knowledge transfer (KT), and the second is knowledge exchange (KE).

Knowledge Transfer

Knowledge transfer (KT) illustrates the unidirectional flow of knowledge. Knowledge transfer has

been likened to the Shannon-Weaver Model of communication (Wolfe, 2006). Within the agriculture industry, KT can be seen in Leeuwis and Van Den Ban's (2004) linear model of innovation (see Figure 1). However, according to Leeuwis and Van Den Ban (2004), researchers were getting ideas from farmers, a process that is not captured in this model or in the definition of knowledge transfer.
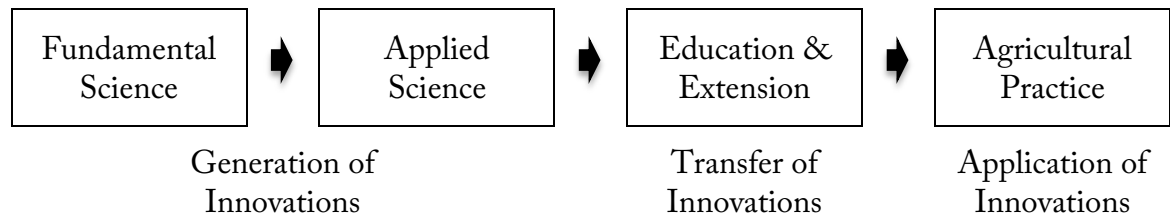

Figure 1: Fundamental Science → Applied Science → Education & Extension → Agricultural Practice

Generation of Innovations — Transfer of Innovations — Application of Innovations

Figure 1: Leeuwis & Van Den Ban's (2004) Linear Model of Innovation

Knowledge Exchange

Knowledge exchange represents the multidirectional flow of knowledge and includes other factors that influence the process such as trust. Feedback is another aspect included in the definition and models of knowledge exchange. Renn and Levine (1991) established the importance of identifying source trust in relation to communication effectiveness. Levin, Cross, Abrams, and Lesser (2002) examined trust with respect to the movement of knowledge. The researchers proposed strong ties, meaning strong relationships and high levels of trust, would positively impact knowledge transfer outcomes. The researchers also found people get knowledge from sources they have strong ties to adding that users get this knowledge from those ties because they are viewed as trusted and competent.

Knowledge Movement Frameworks

Numerous frameworks exist illustrating the idealized process of knowledge movement with two being chosen for this study. The first is the Understanding-User-Context Framework (Jacobson, Butterill, & Goering, 2003). This framework is used to evaluate knowledge translation. Jacobson et al. (2003) evaluated the process by focusing on five areas they identified as important to knowledge translation: "the user group," "the issue," "the research," "the researcher-user relationship," and "the dissemination strategies." The user group is evaluated by a researcher's understanding of an end-user. Gaps in the user group were identified by the perceived level of understanding agricultural communicators have of their audiences. This information will shed light on communicators' perceived understanding of audiences as well as perceived relevance of the research being conducted in the communicators' respective countries.

The research area, according to Jacobson et al. (2003), is evaluated on the quantity and quality of the research available to users. Quality is evaluated in two methods: quality of research and research relevance. According to Sudswad (2007), knowing how users interpret research quality and quantity provides researchers insights into the relevance, congruence, and compatibility of available research. The researcher-user relationship is assessed in terms of perceived trust and interaction between researcher and research user. The last area this framework evaluates is the dissemination strategy. In this area, deficiencies are appraised in terms of channel of communication and knowledge of appropriate channels (Jacobson et al., 2003).

The Agricultural Knowledge and Innovation System (AKIS) illustrates the flows of knowledge

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within the global agricultural industry, drawing connections between various groups with arrows showing two-way information flow. Roling (1992) integrated the system perspective of this model, the idea that consequences of actions are not linear, by means of his "formative experiences" working in various countries in agricultural extension capacities.
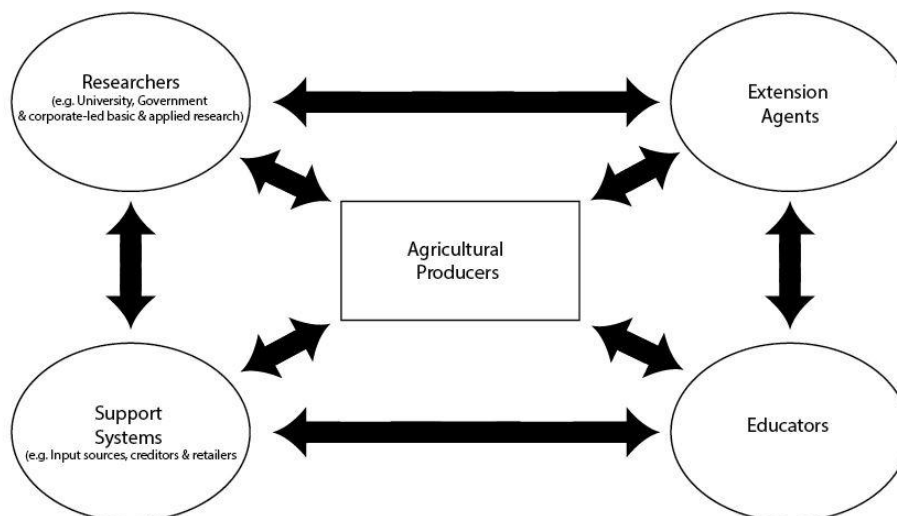
Figure 2: The Pakistan version of the AKIS model (Rivera, Qamar, & Mwandemere, 2005)

The AKIS model emerged from an earlier model depicting system members connected by two-way flows of communication (Röling, 1988). From this original model an "idealized" model emerged, the "Pakistan Model" (see Figure 2), which includes one aspect previously omitted — support systems (Rivera, Qamar, & Mwandemere, 2005).

Purpose and Objectives
The purpose of this study was to determine international agricultural communicators' perceptions and behaviors within their role in the exchange of knowledge to their audience. To accomplish this purpose, a set of four objectives was established. Those objectives were to:

1. Describe respondents in terms of their IFAJ guild of origin, employment position, and size of employing organization.
2. Describe potential differences between employment type categories and respondent's perceived personal bias and the type and number of communication channels used to complete their knowledge mobilization activities.
3. Describe potential differences between employment type categories and respondent's thoughts of the AKIS model and their perceived role/position within AKIS model.
4. Describe potential differences between employment type categories and their practices used to identify, create, and disseminate stories.

Methods and Procedures
This study's design was descriptive in nature and used a researcher-developed instrument created using Qualtrics™, an online survey deployment tool. The accessible population for this study consisted of members of the IFAJ who receive email communication from their respective national guild. IFAJ

membership is, according to Queck (2009), limited to journalists or communicators who reside in a country with a freedom of press and submit their membership dues to the organization.

Recruitment during both the pilot test and formal data collection processes was completed in a purposive manner due to the limitations of the IFAJ organization. Owing to privacy issues in certain member guilds and countries, IFAJ is unable to maintain an exhaustive list of its membership's email addresses. As a result, researchers were unable accurately define the population (i.e. membership), use probabilistic sampling procedures, or directly correspond with the potential participants in this study.

The instrument used to collect data consisted of questions from the review of literature as well as questions offered by a panel of agricultural communications experts from Canada, Japan, and the United States. Questions presented to respondents eliciting perceptions were Likert-type using a four-point scale (1 = *Strongly Disagree*, 2 = *Disagree*, 3 = *Agree*, and 4 = *Strongly Agree*). Two sets of semantic differential word pair scales were used to elicit respondents' personal beliefs of their understanding of the AKIS model as well as respondents' perception of their own bias. Initial word sets for the understanding semantic differential scale came from Osgood (1964).

Respondents were asked where they feel they operate within the AKIS model. If a respondent felt he or she was an arrow or arrows, a follow-up question was presented to determine which arrow. Arrows were assigned letters alphabetically progressing in a counterclockwise fashion moving from the outer arrows inward. Story identification, creation, and dissemination best practice questions were presented in an open-ended format.

Prior to full deployment of the instrument, a pilot test was conducted with the five members of the IFAJ Presidium. The IFAJ defines the presidium as the president, vice president, treasurer, secretary general, and past president. The pilot test began on May 6, 2013, two days after an informative article was posted on the IFAJ's website. Feedback was collected from the pilot test respondents and minor changes were made to the instrument. A post-hoc reliability was calculated for the AKIS understanding and perceived bias semantic differential scales with respective Cronbach's alpha score of .95 and .81 resulting.

On May 13, 2013, Dr. Owen Roberts, IFAJ's vice president, issued a tweet from his personal account directing his Twitter followers who were IFAJ members to be aware of the upcoming study and encouraging them to participate. Due to privacy issues within IFAJ, additional recruitment efforts were performed in the following method. The researchers sent an email requesting participation and outlining participants' rights to Roberts. He then forwarded the email to the IFAJ's secretary, who sent the email to IFAJ guilds worldwide to request they share the email with their country's membership.

The initial recruitment email was sent on June 4, 2013. In accordance with the recommendations provided by Dillman (2007) regarding response rate, a reminder email was sent on June 17, 2013, and a final reminder email was sent on June 24, 2013. Potential participants were made aware of their rights at the beginning of the questionnaire and also could cease participation by exiting their web browser at anytime during the questionnaire. Participants were not rewarded in any way for their participation.

Data collection ended July 17, 2013, when the data were downloaded from Qualtrics™ and imported into SPSS for data analysis. A total of 167 responses were collected. Of the 167 collected, 102 were determined to be complete, resulting in a completion rate of 62%. Statistical analyses consisted of means, medians, modes, standard deviations, ranges, and measure of relationship. For the open-ended section of the questionnaire, data were analyzed by open coding — the process by which qualitative data is labeled and separated into categories (Pandit, 1996).

As part of the data analysis process, respondents were grouped into one of three employment types: journalistic, corporate or governmental. The journalistic employment type consisted of journalists/reporters, publishers, and editors. The corporate employment type consisted of those whose response indicated they were industry communications professionals. The governmental employment type consisted of those whose responses indicated they were government communications professionals. Only two "other" responses were deemed as inappropriate for any one of the three employment types and were excluded in the data analysis process beyond the initial descriptive statistics used to portray all respondents.

Findings

The first objective was to describe respondents in terms of their IFAJ guild of origin, employment position, and size of employing organization. Of the 102 respondents completing this question, 19 of the 32 IFAJ guilds (59.4%) were represented, with the largest portion of respondents from the United States (f = 36; 35.3%), followed by Canada (f = 22; 21.6%) and South Africa (f = 16; 15.7%). When asked about their current employment position, the majority of the responding IFAJ members indicated they were journalists (reporter, editor, or publisher; f = 74, 72.5%) followed by corporate (f = 20, 19.6%), and government employees (f = 6, 5.8%). As for size of the respondent's employing organization, the most frequently indicated organization size was of less than five employees (f = 32; 31.1%) regardless of the employment categories (journalistic, corporate, governmental), with more than 62% of the total respondents being found in organizations with 20 or less employees.

Objective two sought to describe potential differences between employment type categories and respondent's perceived personal bias and the type and number of communication channels used to complete their knowledge mobilization activities. To determine personal bias in communication efforts, respondents were provided a semantic differential scale with four bipolar evaluative adjective word pairs (e.g. *persuasive – objective*) with a 12-point scale between the words. Respondents indicated their personal belief by selecting the position between the word pairs that best reflected their evaluation of their personal belief. The number relates to their position on that scale with a higher number reflecting the least biased adjective. The results of each pair indicate journalistic members consistently perceived themselves as being the least biased while corporate members consistently perceived themselves to be more biased in their behaviors than other IFAJ employment types (see Table 1).

Table 1

Bias Semantic Differential Word Pair Results Broken Down by Respondent's Type of Employment (f = 95)

	Overall		Journalistic (f = 69)		Corporate (f = 18)		Governmental (f = 6)	
	μ	SD	μ	SD	μ	SD	μ	SD
Persuasive: Objective	8.3	2.9	9.1	2.4	5.9	2.7	8.0	3.3
Offering a Point of View: Unbiased	6.7	3.3	7.1	3.3	5.3	3.2	6.0	3.2
Advocating: Journalistic	8.2	3.2	9.0	2.8	6.1	3.2	7.2	4.0
Biased: Balanced	8.6	2.7	9.1	2.6	6.8	2.4	8.0	2.8

NOTE: Sixteen of the study participants did not complete this section of the study.

When this data is displayed as a line chart for the four word pairs, the consistency of the responses by employment type becomes clear. Figure 3 indicates all employment categories tend to offer their point of view when communicating, with no employment category having achieved a mean score of 12. The blue line (second from right with the letter "A") represents the mean scores for all respondents. The orange line (far right with the letter "J") represents the scores from journalistic (J) employment category; the pink line (far left with the letter "C") represents the corporate (C) respondent category; and the green line (second from left with the letter "A") represents the government (G) respondent category. As the lines illustrate, differences appear to be present between the employment categories.

KEY

Pink line *(far left) with the letter "C" is mean scores for Corporate respondents*

Green line *(second from left) with the letter "G" is mean scores for Government respondents*

Blue line *(second from right) with the letter "A" represents mean score for all respondents*

Orange line *(far right) with the letter "J" is mean scores for Journalistic respondents*
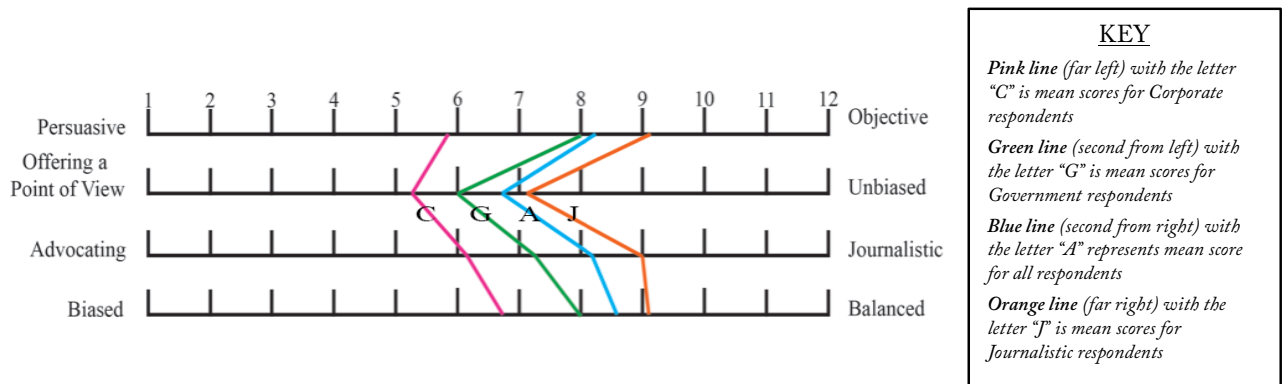
Figure 3: IFAJ Member Perceived Level of Personal Bias by Employment Type

Table 2 shows the frequency and percentage of communication channels respondents use to disseminate information to their audience. Magazines represented the largest percentage of channels used (*f* = 71, 69.6%). However, the next two most popular channels are electronic in nature — email (*f* = 67, 65.7%) and social media (*f* = 66, 64.7%) — with email being the most popular channel for corporate communicators (*f* = 18, 90%). Podcasts were the least used communication channel (*f* = 15, 14.7%). The governmental communicators did not use blogs *(f* = 0, 0.0%).

Table 2

Type of Communication Channels Respondents use to Disseminate Information to Their Audience (f = 102)

Channel Type	Overall		Journalistic (*f* = 74)		Corporate (*f* = 20)		Governmental (*f* = 6)	
	f	%	*f*	%	*f*	%	*f*	%
Magazines	71	69.6	51	68.9	15	75.0	4	66.7
Email	67	65.7	44	59.5	18	90.0	3	50.0
Social Media	66	64.7	47	63.5	15	75.0	3	50.0
Newsletters	51	50.0	30	40.5	15	75.0	5	83.3
Internet Video	49	48.0	35	47.3	10	50.0	3	50.0
Blogs	40	39.2	31	41.9	8	40.0	0	00.0
Newspaper	39	38.2	30	40.5	10	50.0	4	67.0
Radio	30	29.4	13	17.6	12	60.0	5	83.3
Television	18	17.6	12	16.2	5	25.0	1	16.7
Podcasts	15	14.7	12	16.2	2	10.0	1	16.7

NOTE: Respondents could indicate use of more than one channel

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Table 3 shows the number of channels respondents commonly use to disseminate information to their audiences. The results indicate the respondents and their organizations commonly use multiple channels to disseminate information to their audiences with 92.8% (*f* = 92) using at least two channels. While the average number of channels used to disseminate information was 4.48, more than half of the respondents (52.8%) use five or more channels to disseminate information with corporate communicators being the most likely group to use five or more channels (80.0%). The data collected revealed IFAJ members use as many as 10 different channels to disseminate information to stakeholders.

Table 3

Number of Communication Channels Respondents Use to Disseminate Information to Their Audience (f = 106)

Number of Channels	Overall		Journalistic (*f* = 72)		Corporate (*f* = 20)		Governmental (*f* = 6)	
	f	%	f	%	f	%	f	%
One	14	13.2	10	13.9	1	5.0	1	16.7
Two	13	12.3	13	18.1	0	0.0	0	0.0
Three	10	9.4	9	12.5	1	5.0	0	0.0
Four	13	12.3	8	11.1	2	10.0	2	33.3
Five	21	19.8	11	15.3	7	35.0	1	16.7
Six	11	10.4	6	8.1	5	25.0	0	0.0
Seven	14	13.2	9	12.5	1	5.0	1	16.7
Eight	7	6.6	4	5.6	2	10.0	1	16.7
Nine	2	1.9	2	2.8	0	0.0	0	0.0
Ten	1	0.9	0	0.0	1	5.0	0	0.0

NOTE: The average number of channels used was 4.5. Employment types may not total 106 due to nonresponses and "other" responses.

Objective three sought to describe potential differences between employment type categories and respondents' thoughts of the AKIS model and their perceived role/position within the AKIS model. Respondents were provided a semantic differential scale with seven bipolar evaluative adjective word pairs with a 12-point scale between the words. Respondents indicated their thoughts about the AKIS model by indicating the position between the word pairs that best reflects their thoughts of the model. The number relates to their position on that scale with a higher number reflecting the positive adjective as it relates to the AKIS model. The word pairs then were summated to create an overall understanding score. The results of each pair indicate journalistic members do not see a positive value in the AKIS model while IFAJ corporate members were more likely to see value in the model (see Table 4).

Table 4

Semantic Differential Word Pair Results Indicating Respondents' Thoughts of AKIS Model Broken Down by Respondent's Type of Employment (f = 87)

	Overall		Journalistic (f = 62)		Corporate (f = 17)		Governmental (f = 6)	
	μ	SD	μ	SD	μ	SD	μ	SD
Terrible: Outstanding	7.6	2.6	7.3	2.6	8.2	2.7	9.2	1.9
Unhelpful: Helpful	7.4	3.0	7.2	3.0	7.6	2.5	8.7	3.8
Inadequate: Adequate	7.9	2.9	7.6	3.1	8.4	2.3	9.7	2.0
Worthless: Valuable	7.5	2.6	7.1	2.7	7.9	2.1	9.5	2.3
Random: Logical	8.0	3.0	7.8	3.1	8.1	2.9	8.8	2.6
Ineffective: Influential	6.3	2.7	6.0	2.7	6.8	2.4	8.2	2.6
Irrelevant: Relevant	7.0	2.9	6.8	3.0	6.8	2.3	8.7	2.6

When this data is displayed as a line chart for the seven word pairs, the consistency of the responses by employment type becomes clear (see Figure 4). The orange line (far left with the letter "J") represents the scores from journalistic employment category; the pink line (second from the right with the letter "C") represents the corporate respondent category; and the green line (far right with the letter "G") represents the government respondent category. Similar to the perceived bias response in Figure 3, differences appear to be present between the employment categories.
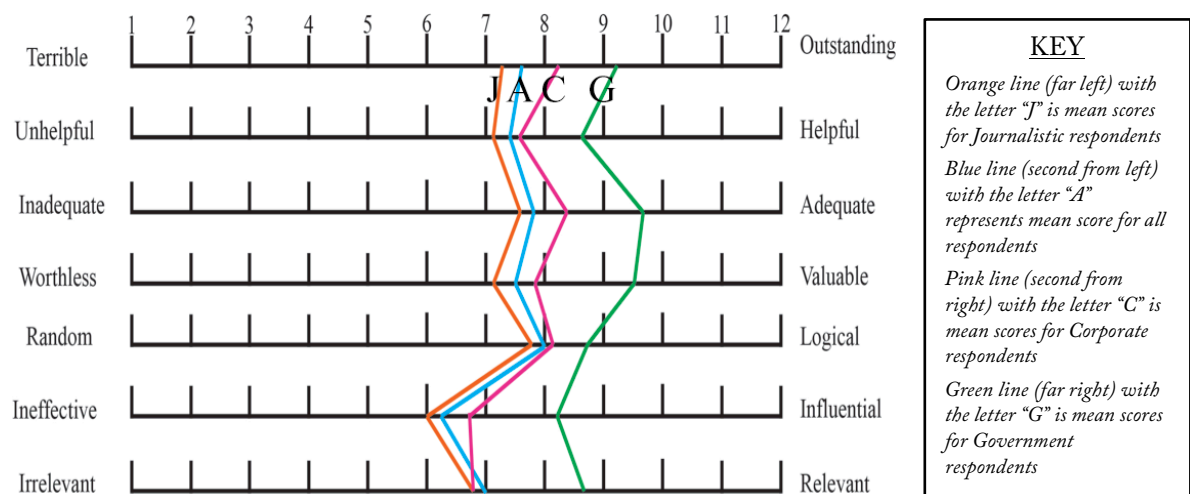
Figure 4: IFAJ Member Understanding of the AKIS Model by Employment Type

Respondents were presented with a depiction of the model and were asked to identify themselves as working as a researcher, an extension agent, a support system, an educator, or as an arrow or arrows within the AKIS model (see Figure 2). Respondents most frequently saw their role as an arrow in the AKIS model (f = 47, 46.5%) indicating their role as facilitators of information flow between the five [entities] presented in the model (agricultural producers, researchers, extension agents, educators, or

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support systems) followed by being in the role of educator (f = 30; 29.7%). Questioning those who saw themselves as facilitators (an arrow) revealed that the respondents commonly perceived their role in the AKIS model as the conduit between a potential information source (researcher, extension agent, educator, or support system) and the agricultural producer, with the most frequent connection being the conduit between researchers and the agricultural producer (f = 36; 76.6%).

Objective four sought to describe the potential differences between employment categories and their knowledge mobilization practices. Table 3 contains a list of best practices IFAJ members provided in terms of identifying stories of interest. Overall, responses referencing "talking to stakeholders" were the most popular method, a practice also the most popular with journalistic (f = 17, 40.5%) and corporate professionals (f = 6, 40.0%). Governmental professionals prefer to use current relationships to identify stories (f = 2, 50.0%).

Table 5 also illustrates the means by which IFAJ members create stories of interest for their audiences. "Involving the farm perspective" was overall (f = 16, 34.0%), and among the three employment categories, the most popular response, though results showed greater diversity among journalistic professionals with a greater variety of practices being used to create stories.

When asked about the best practice respondents used to disseminate their information to their primary audience, the use of multiple channels was again confirmed as the most popular (59%) method of dissemination overall and among the three employment categories (see Table 3). Traditional media was defined as print and/or radio, and digital media was defined as web-based media (e.g. social media). It should be noted this information was solicited near the end of the questionnaire and response rates diminished considerably, likely attributable to fatigue bias.

Conclusions, Recommendations and Implications

With the imposing challenge of feeding the world's growing population, the mission of the IFAJ to provide information that supports the success of the world's farmers serves as a critical component for achieving that outcome. Helping to illustrate the efforts of knowledge mobilization in agriculture is the Agricultural Knowledge and Innovation System (AKIS).

Table 5

Respondents Reported Best Practice for Identifying, Creating, and Disseminating Stories to Their Stakeholders by Employment Category

	Overall		Journalistic		Corporate		Gov't	
	f	%	f	%	f	%	f	%
Identifying stories (*f* = 61)								
Talking to stakeholders	23	37.7	17	40.5	6	40.0	0	0.0
Maintaining relationships	13	21.3	6	14.3	5	33.3	2	50.0
Surveillance of social media	11	18.0	8	19.1	2	13.3	1	25.0
Attending relevant meetings	11	18.0	8	19.1	2	13.3	1	25.0
Cooperating with other organizations	3	4.91	3	7.1	0	0.0	0	0.0
Creating stories (*f* = 46)								
Involve the farm perspective	16	34.0	9	27.3	5	50.0	2	66.7
Involve researchers or research findings	13	27.7	9	27.3	3	30.0	1	33.3
Show the relevance to the reader	6	12.8	4	12.1	1	10.0	0	0.0
Commitment and time	6	12.8	5	15.2	1	10.0	0	0.0
Brevity	2	4.3	2	6.1	0	0.0	0	0.0
Attend meetings	2	4.3	2	6.1	0	0.0	0	0.0
Show the practice/product	2	4.3	2	6.1	0	0.0	0	0.0
Disseminating Stories (*N* = 41)								
Use both digital and traditional media	24	58.5	16	59.3	6	50.0	2	100.0
Traditional media only	13	31.7	9	33.3	4	33.3	0	0.0
Digital media only	4	9.8	2	7.4	2	16.7	0	0.0

However, within the IFAJ membership, this study found diversity in the focus and methods used for knowledge mobilization by the members based on their employment category. Differences were found in members' perceived level of bias as they conducted their information dissemination activities for their type of employing organization with journalistic IFAJ members perceiving themselves as the least biased while corporate IFAJ members perceiving themselves as more biased than the other employment categories.

For all employment categories, the use of multiple channels to disseminate the information is commonplace with both print and digital channels being used and the number of channels often exceeded five.

What was commonplace among the IFAJ members was their appreciation of the AKIS model. While more highly valued by the governmental membership types, all members considered the AKIS model as valuable and they saw themselves as facilitators of the flow of information between the five groups in the AKIS model, with the most frequent connection being the conduit between researchers and the agricultural producer.

Despite the use of multiple print and digital channels and differing perceptions of objectivity, IFAJ members still see their roles as connecting the source and the receiver in the genesis of the writing process when they are identifying and creating a story.

As a professional organization, IFAJ needs to recognize the diversity that exists in its members as each works individually and collectively in harmony with IFAJ's mission and focus. Armed with

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such information, IFAJ can more effectively support its members through information and professional development experiences that will serve them as they serve farmers and, ultimately the growing world population.

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Texas and Southwestern Cattle Raisers Association Members' Preferred Sources of Animal Health Information

Patrick R. Allen, Traci L. Naile, Tom A. Vestal and Monty Dozier

Abstract

The nation's agriculture and food infrastructure is vulnerable to significant social disruption and economic loss from hazards. Biological hazards, such as animal disease epidemics, have resulted in millions of dollars of economic loss and the death of millions of livestock in the past, and it will happen again unless infrastructure stakeholders adopt proper preventative measures. From farm to plate, defense starts on the farm with producers. With the multitude of potential hazards, many factors influence livestock producers' protective action decision process. A major factor in the decision to take a protective action is from where or from whom the threat information originates. By identifying preferred sources, perceived credible sources, and preferred formats of animal health information by producers, risk communicators can more effectively develop critical animal health warnings and messages to promote rapid detection of hazards. This study targeted 7,661 members of the Texas and Southwestern Cattle Raisers Association. An online questionnaire developed from previous research with similar populations allowed TSCRA members to respond to questions related to the objectives of this study. A representative sample of TSCRA members from Texas, Oklahoma, and New Mexico responded and identified high levels of perceived trust and reliability in local veterinarians as a source of information along with livestock associations and county extension offices. TSCRA members also indicated they have multiple preferred formats for receiving animal health information. By using this information when communicating possible hazards, protective action from such threats will become more probable in this population.

Key Words

Agrosecurity, vulnerability, animal health, protective active decision model, information sources, disaster management, risk communication

Introduction/Need for the Study

The nation's agriculture and food infrastructure is vulnerable to biological hazards that could result in significant economic and social disruptions (Breitmeyer, Whiteford, & Shere, 2004; Horn & Breeze, 2006; Spellman, 2008). Biological hazards, such as animal disease epidemics, have resulted in millions of dollars of economic loss and the death of millions of livestock in the past (Knowles, 2005; Thompson et al., 2002). Protection of the agriculture and food infrastructure is the responsibility of all stakeholders in the food supply chain. Though the chain is composed of many stakeholders, livestock producers emerge as the first line of defense against animal health hazards, such as disease epidemics that threaten food supply security and animal production (Ceddia, Heikkila, & Peltola, 2008; Dement, 2008). With varying attitudes and perceptions toward the amount of acceptable risk among livestock operations, the value placed on risk communication messages varies by individual livestock

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owner (Ceddia et al., 2008; Lindell & Perry, 2004). By identifying preferred sources, perceived credibility in these sources, and preferred formats of animal health information, risk communicators can help reduce agricultural vulnerability by more effectively reaching livestock producers with critical hazard information.

Literature Review

Agricultural vulnerability encompasses many hazards, including biological, affecting the agriculture and food infrastructure that, according to Lindell, Prater, Perry, & Nicholson (2006), is very complex due to the multitude of species involved in the agricultural sector. Spellman (2008) defines the agriculture and food infrastructure as "the physical production and distribution systems critical to supporting national security and economic well-being, including all activities essential to food, feed, and fiber production, including all techniques for raising and processing livestock" (p. 8).

In the United States, the agriculture and food infrastructure has such great importance globally that in 2003 it was listed as a critical infrastructure to be protected under Homeland Security Presidential Directive 7 (Horn & Breeze, 2006; Ceddia, Heikkila, & Peltola, 2008). The Marsh Report first defined infrastructures in 1997 as a "network of independent, mostly privately owned, manmade systems that function collaboratively and synergistically to produce and distribute a continuous flow of essential goods and services" (Lewis, 2006). In the U.S. agriculture and food infrastructure, an animal disease outbreak in the beef industry would cost an estimated $750,000 to $1 million per minute (Knowles, 2005). This potential impact was observed in the 2001 foot-and-mouth disease outbreak in the United Kingdom that led to the depopulation of more than 11 million cattle, 42 million sheep, and 6.5 million pigs (Thompson et al., 2002).

Beyond local economic impacts, biological events cause consumer distrust and trade restrictions for the infected country in an industry that exports $140 billion in goods and provides 860,000 jobs annually, as evidenced by restrictions on the United States during the 2002-2003 exotic Newcastle outbreak in California (Breitmeyer et al., 2004; Horn & Breeze, 2006; USDA-APHIS, 2007). Distrust by consumers in the agriculture and food infrastructure after a disease outbreak is very well documented, even after the outbreak has been controlled (Breitmeyer et al., 2004; Lindell & Perry, 2004; USDA-APHIS, 2007).

Producers are vital in reducing agricultural vulnerability and preventing the associated social and economic impacts (Dement, 2008). It is imperative producers adopt hazard adjustments through biosecurity measures and surveillance of herds to reduce the chance of a disease outbreak (Dement, 2008). The decision to adopt any protective action, such as monitoring a herd in conjunction with biosecurity practices, involves several stages, including an information-seeking stage (Lindell & Perry, 2004). Individuals often seek and use hazard information from perceived reliable and trustworthy sources (Lindell & Perry, 2004). A protective action decision is the decision to take pre-hazard impact actions based on cues, warnings, and receiver characteristics (Lindell & Perry, 2004).

The perception of credibility in an information source can increase compliance with protective action recommendations and is a critical part of risk communication (Lindell & Perry, 2004; Kasperson & Stallen, 1991). In risk communication, the ultimate goal is to influence a protective action in the message receiver (Lindell & Perry, 2004). Information from a credible source is more likely to reach this goal through accurately conveying the real threat of the hazard and gaining notice by the receiver (Lindell & Perry, 2004).

Credibility is built over time through reliable and trustworthy communication from the organization (Kasperson & Stallen, 1991). Kasperson and Stallen (1991) suggest trust in communication

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refers to the "expectancy that a message received is true and reliable and that the communicator demonstrates competence and honesty by conveying accurate, objective, and complete information" (p. 179). Kasperson and Stallen (1991) further break trust into five substructs: perceived competence, objectivity, fairness, consistency, and faith. Trust does not require equality from all substructs to exist due to a higher weight placed on any one over another by the receiver; however, trust exists through all five components (Kasperson & Stallen, 1991).

Trustworthy sources of information are used by stakeholders to overcome a deficiency in knowledge and are important in developing disaster resiliency (Hardenbrook, 2005; Williams & Noyes, 2007). Risk information, regardless of the hazard, is internalized by the receiver, and the process to determine a need for protective action is initialized (Eiser, Miles, & Frewer, 2002; Lindell & Perry, 2004). The level of trust and distrust in the source of the risk information influences the decision to continue the protective action process if the source is trusted or to disregard the information as unreliable from an untrusted source (Eiser et al., 2002).

In a consumer study by Rosati and Saba (2004), the government and food industry was perceived as responsible for food safety assurance. However, the same study also found government organizations perceived as least honest sources of food hazard information, while private consumer and environmental organizations were most trusted. Dunaway and Shaw (2010) found the public to place higher expectations on private organizations and local authorities for providing security and safety to their communities than on federal organizations. Further, trust in industry has eroded with government over the past 40 years (Peters, Covello, & McCallum, 1997). However, this same study cites citizen groups are trusted over other sources (Peters et al., 1997).

A source credibility problem in information sources poses a problem in effective risk management and decision-making (Peters et al., 1997). The U.S. government, through presidential directives, has been charged to protect the nation's critical infrastructures (HSPD-7, 2003; HSPD-9, 2004). Producers receive information from various organizations in an effort to prevent or rapidly control a biological hazard before it becomes on outbreak (Spellman, 2008). In an effort to influence a protective action, communicating risk to specific populations, such as producers, depends on trust and credibility in the source of information (Eiser et al., 2002; Lindell & Perry, 2004; Peters et al., 1997).

Theoretical Framwork

Lindell and Perry's (2004) protective action decision model (PADM) provided a foundation for this study. The PADM (see Figure 1) characterizes the way people typically make decisions to protect against environmental and biological hazards (Lindell & Perry, 2004). Lindell and Perry (2004) designed the model to account for various cues and warnings an individual may receive pre-hazard impact. They also factored the influence of risk communication on an individual in making protective action decisions (Lindell & Perry, 2004).
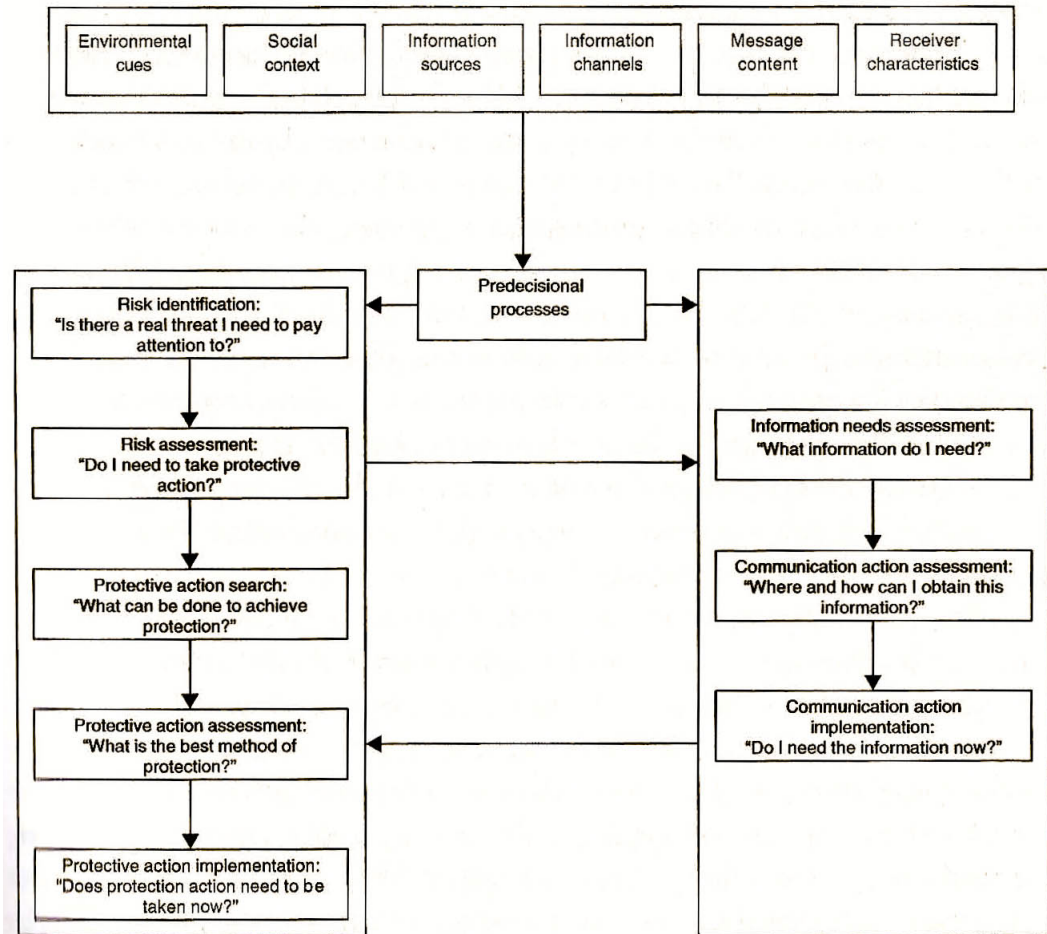
Figure 1: Protective Action Decision Model (Lindell & Perry, 2004)

The PADM requires a definitive answer for each stage and accounts for information-seeking behaviors in the search for answers. Ultimately, individuals will reach a determination as to how and when to implement protective actions after completing the stages in the model (Lindell & Perry, 2004). This study focused primarily on risk communication of animal health information opposed to the actual protective actions; therefore, only the predecisional processes and information-seeking stages of the model are used.

Predecisional processes

The PADM suggests various cues or warnings initiated through risk communication prompt three predecisional processes required to bring the hazard to the awareness of an individual: exposure to cues, attention to cues, and interpretation of cues (Lindell & Perry, 2004). For this study, cues may be characterized by a producer's or neighboring producer's animals becoming sick and dying (Lindell & Perry, 2004).

Warnings of biological threats to animals in a certain area by local, state, or federal animal health professionals serve as an example of risk communication messages. Lindell & Perry (2004) found both cues and warnings are somewhat frivolous unless individuals are exposed to, understand, and take action based on the information. Once the three predecisional processes are completed, individuals will continue to the decision stages, as noted on the left side of Figure 1 (Lindell & Perry, 2004). The decision stages encompass the actions an individual will take to make the decision to protect themselves or not (Lindell and Perry, 2004). These are supplemented by the information-seeking

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activities an individual takes in order to complete each decisional stage (Lindell and Perry, 2004).

Information needs assessment

This activity is initiated by insufficient information to proceed further through the PADM core stages (Lindell & Perry, 2004). Frequency and previous exposure to the hazard affect an individual's knowledge of appropriate protective actions (Lindell & Perry, 2004). Subsequently, the next stage is where to get the information, once it is determined that more information is needed (Lindell & Perry, 2004).

Communication action assessment

The range in sources of information used is vast and varies among groups of individuals and hazards (Lindell & Perry, 2004). Individuals likely will seek information from a source they believe is credible. This may not be a government official or local authority; however, it may be a peer or local opinion leader (Lindell & Perry, 2004; Peters et al., 1997).

Communication action implementation

The final step can have one of three outcomes (Lindell & Perry, 2004). The information either is considered reliable and is used, is determined unreliable and not used, or is no longer desired and sought through another source or channel (Lindell & Perry, 2004).

Purpose and Objectives

The purpose of this study was to examine the effectiveness of risk communicators in reaching livestock operations with critical animal health hazard information and warnings. The information presented in this paper is part of a larger study that examined Texas and Southwestern Cattle Raisers Association members' perceptions related to their herds' vulnerability to disease, their preparedness to respond to animal disease outbreaks, and their preferred sources of information about animal health. Four objectives related to TSCRA members' preferences for receiving animal health information were identified:

1. Identify members' preferred sources of animal health information.
2. Identify sources of animal health information perceived by members to be reliable.
3. Identify sources of animal health information perceived by members to be trustworthy.
4. Identify members' preferred formats for receiving animal health information.

Methods

Population

The population for this study was members of the Texas and Southwestern Cattle Raisers Association who were accessible via the TSCRA email list. Founded in 1877, the TSCRA has a 138-year history with livestock producers in Texas and surrounding states and is the largest livestock association in Texas (TSCRA, 2011). With more than 15,000 member families representing more than 4 million head of cattle, TSCRA's mission is to protect "the stewards of land and livestock in the Southwest" (TSCRA, 2011).

TSCRA members include of a wide variety of livestock owners with varying degrees of ownership as implied by its membership application (TSCRA, 2011). The researchers verified livestock ownership through demographic questions regarding number of livestock owned or managed. According to TSCRA, approximately 7,661 members were contacted through the ConstantContact®

system during this study. Using this number, at a confidence level of 95% and a margin of error of 5%, the representative target sample size was determined to be 367 responses (Krejcie & Morgan, 1970). Only TSCRA members who used the ConstantContact® system were contacted for this study, which according to TSCRA's magazine The Cattleman January 2012 issue, is nearly half of its 2011 total membership of 15,500 (Haynie, 2012).

Instrumentation

An online questionnaire was developed based on instrumentation used in previous studies of Oklahoma beef producers (Ashlock, 2006) and Kansas beef feedlot managers (Riley, 2007). Additional questions were generated based on pertinent literature and expert opinions. The instrument was divided into five sections based on the research objectives of the larger study: perceptions of vulnerability, perceptions of preparedness, perceptions of barriers to making hazard adjustments, sources of information, and demographics.

Validity & Reliability

Validity of the instrument was established through panels of experts in two previous studies using the same instrument (Ashlock, 2006; Riley, 2007). An additional panel of experts reviewed the instrument and established face and content validity for this study. In this study, a post-hoc reliability analysis was performed for the two scales used in the instrument. The correlation coefficients calculated using Cronbach's alpha were .879 and .783.

Data Collection

The TSCRA ConstantContact® email system was used to distribute the survey request to members. Researchers submitted a draft notice and reminder email to the point of contact at TSCRA headquarters. This person formatted the message into the ConstantContact® program and sent it to members at the direction of the researchers. SurveyMonkey.com®, an online survey tool, was used to collect responses from the target population during a two-week period.

The first notice was sent to 7,661 members on April 19, 2011. TSCRA recorded 279 bounce backs from this initial email and 14 spam notices. After the initial notice, the survey was allowed to run for one week before a reminder email was sent via ConstantContact® on April 26, 2011. This email was sent to 7,643 recipients; however, 262 messages bounced back and 5 spam reports were recorded. The discrepancy in mailing list quantities from the first and second notice is explained through the deletion of members from TSCRA's ConstantContact® system not related to this study. The survey was closed May 3, 2011, after a representative sample was attained (n = 570). Due to the loyalty to agreements between TSCRA and TSCRA members, only two ConstantContact® emails were allowed to be distributed.

The Statistical Package for Social Sciences (SPSS®) was used to analyze the data of this study. For analysis of the objectives, descriptive statistics were used, including means, standard deviations, modes, medians, frequencies, and ranges. The scaled items used to gather participant responses were interpreted as 1.00 – 1.44 = disagree, 1.45 – 2.44 = somewhat disagree, 2.45 – 3.44 = neutral, 3.45 – 4.44 = somewhat agree, and 4.45 – 5.00 = agree.

Discussion

For objective 1, respondents were asked to rate their level of agreement for information sources (see Table 1) sought regarding animal health issues.

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Table 1

Information Sources Sought by TSCRA Members (f = 570)

Information Sources	Level of Agreement %						
	D	SDA	N	SA	A	*M*	*SD*
Local or consulting veterinarian	1.9	2.1	8.6	27.6	59.5	4.41	.881
Livestock associations	2.1	2.0	7.6	33.0	55.3	4.37	.873
Internet	4.5	3.0	10.2	40.0	42.3	4.13	1.02
Magazine	3.9	3.5	12.5	46.8	33.3	4.02	.976
Other livestock producers	2.7	4.3	13.8	47.7	31.4	4.01	.933
County extension office	8.8	7.5	20.8	31.8	31.2	3.69	1.23
State land-grant institution	15.5	6.3	24.4	25.0	28.8	3.45	1.37
USDA	13.5	8.6	26.8	29.5	21.5	3.37	1.28
Local agricultural retailers/service providers	14.2	7.3	24.1	39.6	14.8	3.34	1.23
Television news	25	10.7	20.6	28	15.7	2.99	1.42
Radio news	25.1	12	26.3	22.6	14	2.88	1.38
Weekly newspaper	34.4	7.6	16.9	27.4	13.7	2.78	1.49
Daily newspaper	40.2	9.2	18.6	21.6	10.4	2.53	1.45
High school agriculture science teacher	46.3	14.9	25.9	9.1	3.8	2.09	1.19

Note. Scale interpreted as 1.00 − 1.44 = disagree (D), 1.45 − 2.44 = somewhat disagree (SDA), 2.45 − 3.44 = neutral (N), 3.45 − 4.44 = somewhat agree (SA), and 4.45 − 5.00 = agree (A).

Respondents were given the option to provide sources of information they use other than those provided in the questionnaire in the "other (please describe)" text box. Sixteen responses were recorded and are as follows: APHIS-CDC, consult with Noble Foundation, emails from Texas Animal Health Commission (listed by three other respondents), emails from state veterinarian, fellow veterinarians, professional meeting/literature/veterinary journals, my farm manager, Texas professional school resources, i.e. Texas A&M University, trade magazines and newspapers, TSCRA, meeting at local auction barns, and Livestock Weekly.

For the information sources provided, the highest level of agreement was reported for the local or consulting veterinarians (*M* = 4.41, *SD* = .881, *Mdn* = 5.00) as a sought-after source of information by TSCRA respondents. Respondents somewhat agreed state land grant institution (university) (*M* = 3.45, *SD* = 1.37, *Mdn* = 4.00), magazines (*M* = 4.02, *SD* = .976, *Mdn* = 4.00), county extension office (*M* = 3.69, *SD* = 1.23, *Mdn* = 4.00), other livestock producers (*M* = 4.01, *SD* = .933, *Mdn* = 4.00),

Internet (*M* = 4.13, *SD* = 1.02, *Mdn* = 4.00), and livestock associations (*M* = 4.37, *SD* = .873, *Mdn* = 5.00) are sought-after sources of information.

Respondents were neutral on the daily newspaper (*M* = 2.53, *SD* = 1.45, *Mdn* = 3.00), weekly newspaper (*M* = 2.78, *SD* = 1.49, *Mdn* = 3.00), television news (*M* = 2.99, *SD* = 1.42, *Mdn* = 3.00), radio news (*M* = 2.88, *SD* = 1.38, *Mdn* = 3.00), USDA (*M* = 3.37, *SD* = 1.28, *Mdn* = 4.00), and local agricultural retailers/service providers (other than veterinarian or extension office) (*M* = 3.34, *SD* = 1.23, *Mdn* = 4.00) as information sources. Respondents somewhat disagreed high school agricultural science teachers (*M* = 2.09, *SD* = 1.19, *Mdn* = 2.00) were sought as animal health information sources. For the information sources provided to respondents in the questionnaire, no average respondent reported disagreement with any sources.

To identify reliable sources (objective 2) of information, respondents were given the same sources in the questionnaire and allowed the opportunity to mark their level of agreement regarding reliability of those sources (see Table 2).

Table 2

TSCRA Members' Perceived Reliable Information Sources (f = 570)

Information Sources	Level of Agreement %						
	DA	SDA	N	SA	A	*M*	*SD*
Local or consulting veterinarian	.4	1.4	4.7	22.7	70.8	4.62	.678
Livestock associations	.8	1.4	7.1	37.5	53.2	4.41	.751
County extension office	4.9	3.8	14.0	33.0	44.3	4.08	1.08
Other livestock producers	2.0	3.1	21.7	51.2	22.0	3.88	.853
State land-grant institution	7.9	3.6	21.6	27.4	39.5	3.87	1.20
Internet	3.8	5.4	23.5	48.6	18.7	3.73	.953
Magazine	5.5	6.7	20.6	45.9	21.2	3.70	1.05
USDA	8.4	4.6	25.6	32.9	28.5	3.69	1.18
Local agricultural retailers/ service providers	7.4	4.4	27.5	44.4	16.3	3.58	1.05
High school agricultural science teacher	19.6	13.0	43.0	17.2	7.2	2.79	1.16
Radio news	22.1	16.3	32.1	24.1	5.4	2.74	1.20
Weekly newspaper	26.0	16.1	24.3	27.8	5.8	2.71	1.28
Television news	26.7	16.8	28.3	23.8	4.4	2.62	1.23
Daily newspaper	32.2	19.3	28.4	16.9	3.2	2.40	1.19

Note. Scale interpreted as 1.00 − 1.44 = disagree (D), 1.45 − 2.44 = somewhat disagree (SDA), 2.45 − 3.44 = neutral (N), 3.45 − 4.44 = somewhat agree (SA), and 4.45 − 5.00 = agree (A).

Respondents were given the opportunity to provide any reliable sources not listed in the "other (please describe)" text box.

Four responses were recorded and are as follows: APHIS – CDC, Noble Foundation is very good on research and programs offered, and the Texas Animal Health Commission. For the listed sources of information, the average TSCRA respondent agreed his or her local or consulting veterinarian (M = 4.62, SD = .678, Mdn = 5.00) is a reliable source of animal health information. For the magazines (M = 3.70, SD = 1.05, Mdn = 4.00), the Internet (M = 3.73, SD = .953, Mdn = 4.00), local agricultural retailers/service providers (other than veterinarian or extension office) (M = 3.58, SD = 1.05, Mdn = 4.00), other livestock producers (M = 3.88, SD = .853, Mdn = 4.00), the county extension office (M = 4.08, SD = 1.08, Mdn = 4.00), livestock associations (M = 4.41, SD = .751, Mdn = 5.00) the state land-grant institution (University) (M = 3.87, SD = 1.20, Mdn = 4.00), and the USDA (M = 3.69, SD = 1.18, Mdn = 4.00), respondents somewhat agreed these are sources are reliable.

While respondents disagreed with none of the provided sources, the average respondent felt neutral about radio news (M = 2.74, SD = 1.2, Mdn = 3.00), television news (M = 2.62, SD = 1.23, Mdn = 3.00), high school agricultural science teachers (M = 2.79, SD = 1.16, Mdn = 3.00), and weekly newspaper (M = 2.71, SD = 1.28, Mdn = 3.00) as reliable sources of information. Respondents somewhat disagreed the daily newspaper (M = 2.4, SD = 1.19, Mdn = 2.00) is a reliable source of animal health information.

To identify perceived trustworthy sources (objective 3) of animal health information used by TSCRA members, a five-point Likert scale was used to identify respondents' level of agreement with each source listed as trustworthy (see Table 3).

Table 3

Perceived Trustworthy Sources of Information by TSCRA Members (f = 570)

Information Sources	Level of Agreement %						
	D	SDA	N	SA	A	*M*	*SD*
Local or consulting veterinarian	.4	.4	4.5	22.3	72.3	4.65	.626
Livestock associations	1.1	.4	8.0	34.7	55.9	4.44	.747
County extension office	4.4	1.7	13.8	33.1	47.1	4.17	1.02
State land-grant institution	6.5	3.4	19.3	25.4	45.5	400	1.17
Other livestock producers	1.6	2.3	19.1	52.3	24.7	3.96	.823
USDA	6.6	4.5	23.2	31.4	32.3	3.74	1.20
Internet	3.8	6.7	27.2	45.8	16.5	3.65	.96
Local agricultural retailers/service providers	7.9	3.3	25.6	45.1	18.1	3.62	1.07
Magazine	8.3	7.2	21.9	46.4	16.1	3.55	1.10
High school agriculture science teacher	16.8	9.5	43.7	20.8	9.2	2.96	1.16
Radio news	20.1	16.1	35.4	23.0	5.4	2.78	1.17
Weekly newspaper	24.1	15.9	28.2	27.0	4.8	2.73	1.23
Television news	26.7	16.5	29.9	22.5	4.4	2.61	1.22
Daily newspaper	29.9	17.9	28.9	20.8	2.5	2.48	1.19

Note. Scale interpreted as 1.00 – 1.44 = disagree (D), 1.45 – 2.44 = somewhat disagree (SDA), 2.45 – 3.44 = neutral (N), 3.45 – 4.44 = somewhat agree (SA), and 4.45 – 5.00 = agree (A).

Following the listed sources, respondents were given the opportunity to identify trustworthy sources not listed. Four responses were recorded and are as follows: APHIS – CDC, the Cattleman Magazine, and the Texas Animal Health Commission was identified twice.

For the sources listed, TSCRA respondents agree the local or consulting veterinarian (M = 4.65, SD = .626, Mdn = 5.00) is a trustworthy source of animal health information. Respondents somewhat agreed magazines (M = 3.55, SD = 1.10, Mdn = 4.00), the Internet (M = 3.65, SD = .96, Mdn = 4.00), local agricultural retailers/service providers (other than veterinarian or extension office) (M = 3.62, SD = 1.07, Mdn = 4.00), the county extension agent (M = 4.17, SD = 1.02, Mdn = 4.00), livestock associations (M = 4.44, SD = .747, Mdn = 5.00), state land-grant institutions (universities) (M = 4.00, SD = 1.17, Mdn = 4.00), the USDA (M = 3.74, SD = 1.20, Mdn = 4.00), and other livestock producers (M = 3.96, SD = .823, Mdn = 4.00) are trustworthy. However, respondents were neutral on the daily newspaper (M = 2.48, SD = 1.19, Mdn = 3.00), weekly newspaper (M = 2.73, SD = 1.23, Mdn = 3.00), radio news (M = 2.78, SD = 1.17, Mdn = 3.00), television news (M = 2.61, SD = 1.22, Mdn = 3.00), and high school agricultural science teachers (M = 2.96, SD = 1.16, Mdn = 3.00) as trustworthy sources. Respondents neither disagreed nor somewhat disagreed with any sources of animal health information as being trustworthy.

Objective 4 aimed to identify the preferred format in which TSCRA members receive animal health information. A list of formats was provided for respondents to mark their level of agreement regarding their preferences. A five-point Likert scale was used with disagree denoting the lowest level of agreement and agree marking the highest agreement level (see Table 4).

Following the listed formats provided on the questionnaire, a free response text box marked "other (please describe)" was offered for respondents to identify formats that were not listed. Ten responses with multiple formats per response were recorded. Respondents identified educational presentations, seminars, trade shows, magazines, email, standard mail, Internet subscriptions to various daily livestock reports, my vet and livestock association magazines, peer reviewed research and statistically significant clinical trials, professional journals, Texas Animal Health Commission emails, TSCRA, USDA newsletters, and vet visits supplemented by follow-up on websites in the free response text box in this subsection.

For the formats listed in the questionnaire, the average TSCRA respondent indicated no high level of agreement for preferred formats to receive animal health information. Respondents indicated a somewhat agreement level for magazine articles (M = 3.70, SD = 1.12, Mdn = 4.00), newsletters (M = 4.04, SD = .984, Mdn = 4.00), websites (M = 3.75, SD = 1.11, Mdn = 4.00), standard mail (M = 3.8, SD = 1.1, Mdn = 4.00), county extension publications (M = 4.04, SD = 1.03, Mdn = 4.00), county extension meetings (M = 3.97, SD = 1.15, Mdn = 4.00), and livestock association meetings (M = 4.25, SD = 1.1, Mdn = 4.00). Respondents were neutral on radio news (M = 2.42, SD = 1.32, Mdn = 3.00), e-mail lists (M = 3.03, SD = 1.36, Mdn = 3.00), newspaper articles (M = 2.73, SD = 1.35, Mdn = 3.00), and e-mails (other than lists) (M = 3.08, SD = 1.33, Mdn = 3.00) as preferred formats to receive information.

From the listed formats, respondents disagreed on none of the preferred formats listed; however, they indicated a somewhat disagreement level for television news (M = 2.36 SD = 1.32, Mdn = 2.00), Facebook (M = 1.84, SD = 1.07, Mdn = 1.00), Twitter (M = 1.74, SD = .994, Mdn = 1.00), blogs (M = 1.85, SD = 1.05, Mdn = 1.00), YouTube (M = 1.86, SD = 1.06, Mdn = 1.00), and RSS feeds (M = 2.19, SD = 1.15, Mdn = 2.00) as a preferred format.

Livestock producers have many options when it comes to gaining information regarding the health their livestock. Synthesizing this information and determining value can be a cumbersome

Table 4

Formats Preferred by TSCRA Members (f = 570)

Formats	Level of Agreement %						
	D	SD	N	SA	A	*M*	*SD*
Livestock association meetings	2.1	2.3	12.3	35.6	47.7	4.25	.906
County extension publications	4.5	2.5	16.5	37.0	39.5	4.04	1.03
Newsletter	4.8	1.7	13.0	46.4	34.2	4.04	.984
County extension meetings	6.6	3.4	17.8	30.7	41.5	3.97	1.15
Mail	6.6	3.1	24.1	36.8	29.5	3.80	1.1
Websites I find	8	3.8	18.1	45.6	24.5	3.75	1.11
Magazine articles	8.7	3.5	18.9	47.1	21.8	3.70	1.12
E-mail, other than lists	20.8	6.9	30.3	27.5	14.6	3.08	1.33
E-mail lists	23.8	6.0	27.9	28.5	13.8	3.03	1.36
Newspaper articles	29.4	10.7	25.6	25.6	8.6	2.73	1.35
Radio news	38.4	10.8	27.2	17.3	6.3	2.42	1.32
Television news	41.1	10.1	25.6	18.0	5.2	2.36	1.32
RSS feeds	42.7	7.9	39.1	7.9	2.4	2.19	1.15
You Tube	55.7	9.6	29.4	3.6	1.7	1.86	1.06
Blogs	55.2	10.6	29.1	3.8	1.3	1.85	1.05
Facebook	56.5	10.2	27.5	3.8	1.9	1.84	1.07
Twitter	60	9.8	27.6	1.1	1.5	1.74	.994

Note. Scale interpreted as 1.00 – 1.44 = disagree (D), 1.45 – 2.44 = somewhat disagree (SD), 2.45 – 3.44 = neutral (N), 3.45 – 4.44 = somewhat agree (SA), and 4.45 – 5.00 = agree (A).

task for any individual. Identifying cues and warnings regarding animal health hazards, determining actual threat, and taking action can be even more arduous, but it is essential in the process of preparing for hazards (Lindell and Perry, 2004).

To begin the protective action process, an individual must become aware of the hazard in some way — usually through cues and warnings (Lindell & Perry, 2004). Objective 1 of this study sought to determine preferred sources of animal health information by TSCRA members. In the case of TSCRA members, local or consulting veterinarians are identified as the preferred source of animal health information. This finding was not a surprise to the researchers as it was consistent with the findings of previous studies by Ashlock (2006) and Riley (2007) where producers in Oklahoma and Kansas indicated veterinarians as the preferred source of information related to animal health issues.

Not only were veterinarians the preferred source of animal health information for TSCRA, but

they also were perceived as the most trustworthy and reliable when ranked by means. This was again consistent with Ashlock (2006) and Riley (2007) finding veterinarians a highly reliable and trustworthy source by Oklahoma and Kansas producers. Lindell and Perry (2004) identify perceived credibility as an important factor in making a protective action decision; and Kasperson and Stallen (1991) speak to its importance in efficient risk communication. By identifying TSCRA members' trustworthiness and reliability in an information source through objective 2 of this study, targeted animal health hazard information has a better chance to reach its intended audience if distributed through these sources.

Through this study and the two previous studies in Oklahoma by Ashlock (2006) and in Kansas by Riley (2007), it becomes clear veterinarians are the best source to use when attempting to reach the participants of these studies. The protection of the agriculture and food infrastructure and reduction of agricultural vulnerability is achieved through the adoption of protective actions by its stakeholders. However, as Lindell and Perry (2004) have identified, protective action decision making is not such a simple process and involves using available information.

Producers, as a vital stakeholder in the agriculture and food infrastructure, have a responsibility to protect their livestock from various hazards. However, they cannot do this without progressing through the PADM. Risk communicators have a responsibility to help with this decision process by more effectively reaching these populations. In the case of TSCRA members, this can be accomplished through the dissemination of information to local veterinarians, county extension offices, and livestock associations as these sources of information were preferred and ranked highest by means as perceived trustworthy and reliable sources.

The final objective of this study sought to identify the format in which TSCRA members prefer to receive animal health information. The data shows TSCRA members have no one preferred format to receive animal health information. This is likely explained by the large amount of information available to seeking individuals. Related to biological hazards alone, researchers found the large amount of related literature often overwhelms and confuses individuals (Moore, Merryman, Hartman, & Klingborg, 2008). In the PADM, individuals must sift through the vast amount of information to arrive at a conclusion for each of the decision stages. However, during the pre-decisional process, exposure to the hazard information may come in many formats.

Even though TSCRA members could not identify one preferred format, they indicated they prefer magazine articles, newsletters, websites, standard mail, county extension publications, county extension meetings, and livestock association meetings to receive animal health information. Dissemination of animal health information should be in these formats as opposed to television news, Facebook, Twitter, blogs, YouTube, and RSS feeds, which TSCRA members somewhat disagreed with as prefer formats.

Livestock producers vary in size of operation from non-commercial backyard animals to large commercial operations. This was consistent with the findings of TSCRA members in this study. With such a diverse audience, reaching this population efficiently and effectively increases the chances of controlling any animal-health-related hazards before they become widespread. By using preferred and perceived credible information sources as well as preferred information formats, risk communicators can quickly reach this population in all phases of disaster management.

Recommendations for Future Research

Future research should focus on information and groups not addressed in this study, including differences in educational programs for noncommercial and commercial producers as well as preferences

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of producers who are not associated with livestock associations. Noncommercial and commercial producers have similar goals for protection of animals' health, but differences in the need for and preferences related to delivering educational programs should be explored further. In addition, this study should be replicated with at least two additional groups: producers who are not associated with livestock associations and noncommercial producers who are not associated with livestock associations. Collecting data from either of these groups may be difficult without an established frame of producers. However, eliminating the potential bias of membership in livestock associations is important to developing a deeper understanding of how to design biological hazard preparedness educational programs for the broad range of producers in the cattle industry.

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