PERCEPTIONS AND EXPRESSIONS OF SOCIAL PRESENCE DURING

CONVERSATIONS ON TWITTER

A Thesis

by

KELLY MARIE PRITCHETT

Submitted to the Office of Graduate Studies of
Texas A&M University
in partial fulfillment of the requirements for the degree of

MASTER OF SCIENCE

December 2011

Major Subject: Agricultural Leadership, Education, and Communications

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ABSTRACT

Perceptions and Expressions of Social Presence During Conversations on Twitter.

(December 2011)

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Co-Chairs of Advisory Committee: Dr.Traci L. Naile
                                     Dr.Theresa Pesl Murphrey

Computer-mediated environments such as social media create new social climates that impact communication interactions in un-mediated environments. This study examined social variables during conversations on Twitter through a qualitative document analysis that coded messages into affective, interactive or cohesive categories. Perceived social presence, participant satisfaction, and relationships between social presence and satisfaction among Twitter users during streaming conversations were examined through an online questionnaire that was created using qualtrics.com and made available to respondents over a one-week period.

The researcher concluded that most social variables in the Twitter conversations of this study fall into the interactive social presence category. In addition, each category of responses functions in a different way to foster social presence. Two groups of survey respondents agreed with 10 out of 21 and 13 out of 21 statements about social presence and 10 out of 13 and 12 out of 13 statements about satisfaction. Findings indicated that positive and negative relationships exist between social presence and satisfaction.

Both conversations in this study appeared to be successful. Therefore, agricultural communicators should feel comfortable using CMC more frequently to circulate agricultural information among populations across the globe. It was recommended that further research be conducted to examine social presence among new topics, populations, and other forms of CMC.

DEDICATION

This study is dedicated to the generation of communicators still learning how to use text- and Web-based technologies, the current generations who have embraced these technologies as they were introduced, and the future generations who will thrive on computer-mediated communication even more than those before them.

ACKNOWLEDGEMENTS

NOMENCLATURE

CMC   Computer-Mediated Communication

F2F   Face-to-Face

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CHAPTER I

INTRODUCTION

Background and Setting

For most Americans, some form of CMC supports their everyday activities (Taylor, Jowi, Schreier, & Bertelsen, 2011). Spitzberg (2006) defined CMC as "any human symbolic text-based interaction conducted or facilitated through digitally-based technologies" (p. 630). CMC offers new forms of communication, such as posts and comments that can be archived, found in searches, and distributed to the masses (Chan, 2008). These activities have created a unique social environment that challenges traditional communication behaviors (Bartter et al., 2009). Until somewhat recently, CMC held a very matter-of-fact or un-relational connotation. More recently, many people use CMC as a means to initiate and develop relationships (Spitzberg, 2006). As innovations become more convenient and affordable, the importance of CMC is likely to increase (Spitzberg, 2006). Already, almost 78% of the population in North America is using the Internet (Internet World Stats, 2011) with 175 million registered users on Twitter.com (Twitter, 2010).

The Internet has grown from an objective research tool of the information age to a powerful catalyst for societal change where people engage in networking through chatting, messaging, and blogging (Bartter et al., 2009).

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This thesis follows the style of *Journal of Applied Communications.*

These types of social media have become a primary stage for sharing information, meeting new people, and learning (Bartter et al., 2009). Popular examples of social media include Facebook, YouTube, Flickr, blogs, del.icio.us, and Twitter (Bartter et al., 2009; Kaplan & Haenlein, 2010).

Twitter is described as a "real-time information network" that allows users to publish 140-character messages called tweets (Twitter, 2011, An information network, para. 1). Tweets are known as a form of micro-blogging (Janzen & Zheng, 2009; Zhao & Rosson, 2009). Depending on a user's preference, tweets can be accessed publicly or they can be private, meaning that tweets are viewable only to users who subscribe to another user's Twitter feed (Honeycutt & Herring, 2009; Twitter, 2011). Twitter also allows users to categorize tweets with a hash tag, which marks topics with a "#" symbol to link tweets about the same topic (Twitter, 2011). The use of hash tags makes it easy for users to engage with others who have similar interests (Miller, 2010). Twitter platforms such as TweetChat automatically add a designated hash tag to outgoing tweets and enable users to view only the tweets about one topic in a streaming format (Ferguson & Pettit, 2009).

TweetChat is one of the many third-party applications that have greatly contributed to the successful development of Twitter (Griffith, 2010). Applications such as TwitPic, Screenr, TinyChat, and StrawPoll allow users to share photos, participate in video conferences or chat rooms, and take polls (Rethlefson, 2009). Tools such as Twitteriffic, Twitteroo, and several mobile technologies increase the number of ways for

users to post tweets through text messages, instant messages, and desktop applications (Honeycutt & Herring, 2009).

In 2009, third-party applications for CMC inspired a group of farmers to develop #AgChat (#AgChat Foundation, 2011). #AgChat is a weekly moderated conversation on Twitter for "people in the business of raising food, feed, fuel, and fiber" (#AgChat Foundation, 2011, Why Agvocacy, para.1) with a mission to "empower farmers and ranchers to connect communities through social media platforms" (#AgChat Foundation, 2011, Mission, para. 1). Similarly, #GardenChat is an online conversation where people interested in gardening come together and share stories about their personal growing experiences.

Statement of the Problem

With the growing popularity of virtual technologies and their resulting social communities such as #AgChat and #GardenChat, communication has shifted from predominantly face-to-face communication to greater use of "online computer-mediated communication (CMC)" (Zhao & Rosson, 2009, p. 243). Aspects of CMC alter face-to-face communication, including fewer social cues and a sense of depersonalization (Spears & Lea, 1994). Research on CMC has found that perceptions of social presence can significantly influence the way people communicate and relate to overall satisfaction with a communication experience (Lowenthal, 2002).

A review of previous research in agricultural communications revealed minimal research that specifically examined social cues and levels of perceived social presence in computer-mediated communications, such as Twitter. Social presence theory has been

used in the past to describe differences in face-to-face communication and CMC, but further research was needed to expose how these differences relate to levels of perceived social presence and communication interactions on a Twitter-based platform related to agriculture. Specifically, a need existed to know the "skills and competencies necessary to improve the communications and knowledge management effectiveness" of people in agriculture beyond traditional communications (National Research Agenda, 2007, p.11). Research about social presence aids the understanding of "how the social practice and process of learning takes place online" (Lowenthal, 2010, p. 5). Therefore, as organizations such as the #AgChat Foundation make efforts to teach the public about agriculture, this study provided insights into "attributes needed to establish connection with others" (Biocca, Harms, & Burgoon, 2003, p. 8) and ways to optimize satisfaction in online learning (Lowenthal, 2010).

Purpose

The purpose of this study was to describe social variables, perceived social presence, and participant satisfaction among #AgChat and #GardenChat users during conversations in a computer-mediated environment.

Objectives

The objectives that guided this study included:

1. describe social presence dimensions that are present during #AgChat and #GardenChat conversations through a qualitative document analysis;

2. describe #AgChat and #GardenChat users' perceptions of social presence during a Twitter conversation through a participant survey;

3. describe #AgChat and #GardenChat users' satisfaction with a Twitter conversation through a participant survey; and

4. describe relationships between perceptions of social presence and satisfaction during #AgChat and #GardenChat conversations.

Expected Outcomes

Based on objectives two, three, and four, the researcher expected to find:

1. that #AgChat and #GardenChat users' perceptions of social presence during a Twitter conversation will indicate some level of social presence felt in a Twitter conversation and that Twitter conversations are a convenient form of communication that allows participants to feel comfortable sharing information and to build relationships with other users.

2. that #AgChat and #GardenChat users' satisfaction levels with a Twitter conversation will indicate that users find these conversations to be a useful learning experience and that they are overall satisfied with the Twitter experience.

3. that there will be a positive relationship between #AgChat and #GardenChat users' perceived social presence and satisfaction.

Scope of the Study

This study examined seven weeks of #AgChat and #GardenChat Twitter conversation transcripts and surveyed the participants who contributed to the fourth week of these conversations. Each #AgChat conversation occurred once a week for two

hours, while each #GardenChat conversation occurred once a week for one hour. The survey was made available for one week after each conversation.

Significance of the Study

According to Kaplan and Haenlein (2010), business administrators have been investigating CMC to discover how social networks can be leveraged to benefit their businesses. However, researchers have found that a lack of nonverbal and paraverbal cues such as tone, pitch, and inflection in CMC can result in unorganized conversations, misperceptions, and confusion (Rhoades, 2001; Taylor et al., 2011). Other researchers have found that lack of social cues in CMC resulted in a depersonalized or anonymous experience (Taylor, 2011). This study reported useful insights for those professionals seeking to find out more about social networks as a business tool, as well as for those who question the effects of little to no social cues in CMC.

Understanding the similarities and differences in perceived social presence and satisfaction of users in F2F communication and CMC supported the *National Research Agenda for Agricultural Education and Communication* (n.d). Specifically, this study addressed priority area number three with initiatives to examine how information and media delivery affect thinking processes, problem solving, and decision-making related to agriculture (Osborne, n.d.). This study also supported research initiatives to "understand how the public interprets, creates meaning, and values information" about important agricultural issues, evaluate new technologies for application in "agricultural knowledge management" and engage "the public in agriculture-related decision making" (National Research Agenda, 2007, p. 4).

Assumptions

This study was based on several assumptions. The researcher assumed that:

1. The streaming Twitter conversation was the only way participants were communicating with other participants during the Twitter conversation

2. All tweets among participants during the archived conversations were tagged with the appropriate "#GardenChat" or "#AgChat" hash tag.

3. All participants were behaving no differently in the week that the survey was conducted than they would in a week without the survey.

4. All participants virtually represented themselves honestly and accurately during the conversations.

5. All participants answered the survey questionnaire honestly and to the best of their ability.

Limitations

This study was subject to the following limitations:

1. Results of this study may not be generalized to people outside of the group of #GardenChat and #AgChat participants who agreed to participate in the survey and who were a part of the analyzed Twitter transcripts.

2. Social cues are highly subjective and difficult to collect (Biocca & Harms, 2002).

3. Observed social behaviors may have been influenced by variables extraneous to the study.

4. It is possible that participants associate with each other outside the topic of agriculture.

5. The topic discussed in each conversation could influence participants in aspects of interaction based on levels of interest.

Definition of Terms

For this study, the following operational definitions were used:

- Social presence is the level of salience (i.e. sense of awareness of another person with which to interact) between two people using a communication medium (Short, Williams, & Christie, 1976). Social presence is a function of communication mediums and social variables.

- Social variables are nonverbal cues expressed during the Twitter conversation that include but are not limited to emoticons, punctuation, and text symbols (Taylor et al., 2011).

- Participant satisfaction and user satisfaction are used interchangeably and defined as the degree to which participants preferred the Twitter conversation more or less than a face-to-face conversation as indicated by the collaborative learning, social presence, and satisfaction questionnaire (see Appendix B).

- Twitter conversations are moderated, computer-dependent conversations that take place among participants in separate geographic locations who cannot see, hear, or otherwise communicate with each other without the

use of Twitter or a third-party Twitter application to send and receive messages.

Chapter Summary

CMC has become an important part of everyday activities for the majority of Americans. With the growing popularity of the Internet, forms of traditional, face-to-face communication are being challenged by websites with social platforms for sharing photos and videos, teleconferencing, microblogging, and other virtual activities. For example, one social platform called Twitter is a microblogging tool that allows users to send and receive short text messages of 140 characters called tweets. Tweets can be marked with a hash tag to identify topics and allow users to find other tweets about different topics of interest. #AgChat and #GardenChat are two examples of social communities that use hash tags. #AgChat and #GardenChat are weekly moderated conversations on Twitter for farmers, ranchers, and other people interested in agriculture and gardening. #AgChat and #GardenChat conversations can be viewed by searching for the #AgChat and #GardenChat hash tags in one of the many third-party applications that enhance the Twitter experience.

As CMC continues to encourage more social communities like #AgChat, many communication behaviors will evolve and adapt to the unique social environment created by CMC. Research about CMC has shown that many differences between CMC and face-to-face communication relate to social presence. Studies on social presence help explain the process of communicating and learning online. However, a gap exists in research on social presence that overlooks perceived levels of social presence and

satisfaction on Twitter and how these levels affect agricultural communications. More research was needed to understand how agricultural workforces can use appropriate techniques to establish a connection with public audiences in the virtual realm. As organizations like the #AgChat Foundation utilize online tools to teach the public about agriculture, and as agriculturalists set out to improve agricultural communications, studies such as these can help identify appropriate CMC skills and fill the research gap on social presence. The purpose of this study was to examine social variables, perceived social presence, and participant satisfaction among #AgChat and #GardenChat users during conversations in a computer-mediated environment. To fulfill this purpose, the study had four primary objectives: 1) describe social presence dimensions that are present during #AgChat and #GardenChat conversations through a qualitative document analysis; 2) describe #AgChat and #GardenChat users' perceptions of social presence during a Twitter conversation through a participant survey; 3) describe #AgChat and #GardenChat users' satisfaction with a Twitter conversation through a participant survey; and 4) describe relationships between perceptions of social presence and satisfaction during #AgChat and #GardenChat conversations.

This study contributed to the *National Research Agenda for Agricultural Education and Communication* with initiatives that examined how information and media delivery affect thinking processes, problem solving, and decision-making related to agriculture (Osborne, n.d.). The results of this study can also assist business professionals in evaluating social networks as business tools, as well as provide insight on the lack of nonverbal cues and its effects of on computer-mediated communication.

CHAPTER II

LITERATURE REVIEW

In recent years, Internet media and social networking have become the main sources of news and information for many people (Prasarnphanich & Wagner, 2011). Already, almost 78% of the population in North America is using the Internet (Internet World Stats, 2011), with 50 percent of young adults using a social networking site (Lewandowski, Rosenberg, Parks, & Siegel, 2011). Twitter.com alone has approximately 175 million registered users (Twitter, 2010). Moreover, the Internet has grown from an objective research tool of the information age to a powerful catalyst for societal change where people engage in networking through chatting, messaging, and blogging (Bartter et al., 2009). These types of social activities have allowed the individuals to collaborate and form communities in which the contributions of each participant support the group as a single entity. These groups often seek new information, expertise, and informal interactions with others through computer-mediated communication (Prasarnphanich & Wagner, 2011).

Computer-mediated Communication

Computer-mediated communication (CMC) is "synchronous or asynchronous electronic mail and computer conferencing" by which communicators send and receive text-based messages via computers (Walther, 1992, p. 52). Synchronous communication allows users to communicate in real-time, while asynchronous communication allows users to send and receive messages at their convenience (Tu, 2002).

Structural differences exist between computer-mediated and face-to-face communication that could change the way people communicate with each other (Ho & McLeod, 2010). A differentiating characteristic of CMC is that it eliminates the transmission of nonverbal social cues that express feelings and relational information that often are found in F2F communication (Taylor et al., 2011; Tu, 2002; Walther, 1996). For example, nonverbal cues found in face-to-face communication such as eye contact, voice inflections, wardrobe, and facial expressions influence how much and how a person maintains attention, provides feedback, and develops an attitude during communication (Kupritz & Cowell, 2011). A lack of these social cues may result in altered communication behaviors (Shapiro & Allen, 2001), misinformation, and frustration during communication (Tu, 2002). Other disadvantages of CMC include changes in voice and physical appearance. Challenges associated with CMC also include time zone differences, cultural diversity, and misunderstanding from lack of explanation which can contribute to loss of productivity and lowered morale among individuals within a working relationship (Worth, 2007).

Advantages of CMC include: location independence, meaning individuals can be in separate areas when communicating, time flexibility, which allows for intellectual message development, and more direct messages with less ambiguity (Althaus, 1997; Harasim, 1990). Some individuals use CMC to manage their self-images (Becker & Stamp, 2005; Ellison et al., 2006; O'Sullivan, 2000) by planning and editing messages for optimal delivery (Taylor et al., 2011). In contrast to F2F communication where messages are sent "temporally adjacent to initiating messages," CMC, such as public

chat rooms or microblogs on Twitter, deliver messages "in the order they are received by the system," without indicating their respective topics (Honeycutt & Herring, 2009, p. 2).

<div align="center">Twitter and Micro-blogging</div>

Twitter is a "device-agnostic real-time message-routing platform" that allows people to publish microblogs in no more than 140 characters (Mestein, Chowdhury, Hochmuth, Lorica, & Magoulas, 2008, p. 3). Microblogs are brief messages that are usually sent to a network of contacts (Janzen & Zheng, 2009). As the most popular microblogging tool, Twitter has been leveraged in political campaigns, news groups, and business development (Zhao & Rosson, 2009). Most people who use Twitter fall into the categories of being an "information source," "friends," or "information seeker" and have intentions in the categories of "daily chatter," "conversations," "sharing information, and reporting news" (Java, Finin, Song, & Tseng, 2007, p. 2). People who find using Twitter irrelevant to their intentions are less likely to maximize their participation or find the experience valuable. Thus, in an environment such as Twitter where the participation of some influences additional participation from others, it is important to investigate users' intentions and keep Twitter content relevant to those intentions (Dunlap & Lowenthal, 2009).

The benefits of Twitter encourage Web 2.0 users to keep using it, despite its' drawbacks (Dunlap & Lowenthal, 2009). Some Twitter users hesitate to post updates about work due to their concerns about safety of information among an integrated following of colleagues and friends (Zhao & Rosson, 2009). Dunlap and Lowenthal

(2009) found that Twitter can become addicting, foster bad grammar and accumulate cell phone data charges. However, Twitter offers benefits such as the ability to address time-sensitive matters, foster concise writing for the public, network with professionals, practice informal learning, and maintain on-going relationships (Dunlap & Lowenthal, 2009). The broadcasting nature of Twitter and its voluntary readership allow users to post updates conveniently with less apprehension than in other tools (Zhao & Rosson, 2009). It is recognized that Twitter is used in many synchronous and asynchronous ways, but for this study it was a synchronous "tool that enables just-in-time communication with the … community" (Dunlap & Lowenthal, 2009, p.4).

Hashtags and Third Party Applications

Hashtags are used to categorize topics in a tweet so that a particular tweet is more easily found in a search. By clicking on any hashtagged word, a user can see all other tweets marked with that hashtag (Twitter, 2011). All tweets that include the same hashtag form a streaming conversation to eliminate Twitter content that is irrelevant to a user's desired conversation (Twubs, 2011).

Streaming conversations marked with a hashtag can be followed using a number of third-party applications, also known as application programming interfaces (APIs), that provide the main features of Twitter but reorganize information to create varying user experiences. These third-party applications include Twubs, TweetChat, Tweetdeck, and Brizzly (Jones & Potts, 2010). It is recognized that participants in this study may have reported different perceptions of social presence and satisfaction depending on what API participants used to participate in #AgChat and #GardenChat discussions.

#AgChat and #GardenChat

Streaming conversations onTwitter inspired many virtual communities where knowledge is shared, such as #AgChat and #GardenChat (Prasarnphanich & Wagner, 2011). These communities convene online using hashtags to locate other people tweeting about similar topics. (Twubs, 2011). In the case of #AgChat, all participants follow and contribute to a stream of tweets marked with the #AgChat hashtag (#AgChat Foundation, 2011). All participants of #GardenChat follow and contribute to a stream of tweets marked with the #GardenChat hashtag (GardenChat, 2011).

#AgChat was established in 2009 and takes place on Tuesday evenings from 8p.m. to 10p.m. (Eastern) in a streaming format on Twitter. The first 15 minutes of the conversation is reserved for personal introductions, including participants' names, interests in agriculture, and brief job descriptions. The following 1 hour and 40 minutes involve a series of questions previously submitted by the #AgChat community. These questions relate to many agriculture-related issues such as soil and water practices, agricultural literacy among the public, animal welfare, and communications (#AgChat Foundation, 2011). The moderator of #AgChat, which varies from week to week, sends out these questions and allows users to discuss each one until the following question is announced. From this Twitter-based community, the #AgChat Foundation was formed to build social media skills among farmers and to engage with groups outside of Twitter through the use of CMC (#AgChat Foundation, 2011). The final five minutes of the conversation are reserved for personal pushes where participants announce their own interests or make requests for others to visit their blog or website.

Conversations for #GardenChat take place on Monday evenings from 9p.m. to 10p.m. (Eastern) in a streaming format on Twitter. Prior to the weekly conversation, the #GardenChat community submits questions based on a given topic as designated by the upcoming week's host, which varies week by week. During the conversation, submitted questions are answered by the host and discussed by participants (#GardenChat, 2011).

Theoretical Framework

Social Presence

With the increasing use of computer-mediated communication and resulting communities such as #AgChat and #GardenChat, social presence has taken on greater importance (Dunlap & Lowenthal, 2009). Social presence has been used to explain the differences between CMC and face-to-face communication (Short et al, 1976). Social presence will be the focus of this study.

Founded on the psychological concepts of un-mediated environments, social presence was first defined by Short et al. (1976) as some level of salience (i.e. state of being there) between two people using a communication medium. According to Short et al. (1976), social presence is an important part of the process through which people develop knowledge and opinions about other people's characteristics and beliefs. Social presence often is described using the concepts of intimacy and immediacy, or the function of physical distance, eye contact, smiling, and "the perceptual availability of persons to one another," respectively (Argyle & Dean, 1965; Mehrabian & Diamond, 1971, p. 282).

The concept of social presence has been defined by researchers in several different ways. Since the original theory was developed, social presence also has been defined as the level of awareness of another during communication and the resulting value of that awareness (Walther, 1992) and "the degree of feeling, perception and reaction of being connected to another intellectual entity on CMC" (Tu, 2002, p. 2). Biocca, Harms, and Burgoon (2003) described social presence as a "sense of being with another" who is symbolized in the form of "text, images, video, 3D avatars … computers and robots" (p. 1). Shen and Khalifa (2007) endorsed a concept of social presence that described a user's experience in three dimensions: awareness, affective social presence, and cognitive social presence.

Research applications of social presence usually reside in computer-mediated environments. Over time, however, the way that social presence has been applied to computer-mediated communication has shifted. Social presence was first thought to be a varying characteristic of mediums and was studied to explain the effects of mediums on how people communicate (Richardson & Swan, 2003; Short et al., 1976). These effects related to things such as "attitudes towards mediated others, features of the interface, persuasion, illusions of reality, learning and memory, and mental health" (Biocca et al., 2003, p. 2). However, some researchers have found that it is possible for a group of individuals using the same communication medium to have varying levels of perceived social presence (Johansen, Vallee, & Spangler, 1988; Lombard & Ditton, 1997). Gunawardena and Zittle (1997) questioned whether characteristics of media determined differences in communication and suggested that social presence can be fostered among

users by adding emoticons to text-based conversations to make up for lack of nonverbal cues. Likewise, other studies suggested that social presence varies not on the medium of communication, but on user perceptions and their adaptations to missing elements such as intentional misspellings and spatial arrangement of letters that indicate the social context of communication (Rafaeli, 1988; Walther, 1992).

Social context is interpreted by communicators through static and dynamic cues (Sproull & Keisler, 1986). Static cues are objects such as a large desk or personal belongings, while dynamic cues include nonverbal behavior such as nodding the head or frowning (Sproull & Keisler, 1986). A lack of these social cues during communication via computers can cause deindividuation, or a state in which users feel a loss of individuality (Spears & Lee, 1992; Taylor, 2011).

Specific social cues and their effects have been studied by many researchers. Missing social cues in CMC can be replaced with response time; humorous or personalized message content; or paralanguage and emoticons, such as happy and sad faces (Picciano, 2002; Richardson & Swan, 2003; Rourke, Anderson, Garrison, & Archer, 2001; Taylor et al., 2011). In a study by Tu (2002), the most commonly used emoticon was ":-)," while paralanguage was commonly expressed through punctuation, abbreviations, font styles, and unique phrases. Participants indicated that emoticons and paralanguage made the conversation more comfortable (Tu, 2002). Kalman and Dafaeli (2010) also found that time-related, nonverbal, chronemic cues such as "pauses, time of day, and silence" (p. 55) affect online communication by meeting users' expectations

about response time and encouraging or discouraging the amount of friendly content expressed in a message.

Daft and Lengel (1984) concluded that mediums without nonverbal cues result in concise, matter-of-fact communication that eliminates unnecessary interactions. For this reason, they emphasized that vague or expressive information should be transmitted through more personal mediums (Daft & Lengel, 1984). Similarly, other research indicated that as communication moves along the continuum from face-to-face to computer-mediated interactions, it will increasingly be experienced as less personal and sentimental and more matter-of-fact (Walther, 1996). Moreover, studies on social presence suggested that researchers have not come to a consensus about whether social presence is a function of communication mediums, techniques used by communicators, or a combination of mediums and techniques (Richardson & Swan, 2003).

Social Presence and Online Learning

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

(1997) found it important for instructors to develop skills to create social presence when providing feedback to individuals.

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

Social presence also allows online users to identify with others in a group and contributes to useful knowledge contribution (Shen, Yu, & Khalifa, 2010). By making introductions during the first few online learning sessions, teachers can foster social presence to build trust and participation among the group (Johansen, Vallee, & Spangler, 1988). Gunawardena (1995) found that students feel more social presence when instructors interact with "introductions and salutations." Tu (2002) found that participants feel more social presence when teachers support a positive attitude about keyboarding skills and give special attention to students who need to further develop their skills. Thus, it is important for online teachers and moderators to practice techniques in support of social presence (Tu, 2002).

Measuring Social Presence

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

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

challenges of accurately transcribing "real-time, face-to-face interactions" (p. 6). To overcome challenges such as these, some researchers turned to conferencing software that "automatically and faithfully records all online interactions in a machine-readable format" (Rourke et al., 2001, p.6).

In 2002, Tu created the Social Presence and Privacy Questionnaire (SPPQ) to measure students' perceptions of social context, online communication, interactivity, and privacy. Tu collected data through interviews, direct observation, document analysis, and a survey. Finally, parts of the satisfaction scale by Gunawardena and Zittle (1997), SPPQ by Tu (2002), and previous research by Driver (2002) and Kitchen and McDougall (1998) were merged to form the Collaborative Learning, Social Presence, and Satisfaction (CLSS) questionnaire (So & Brush, 2008, Lowenthal, 2010). The CLSS questionnaire captures general demographic information, satisfaction, and social presence (So & Brush, 2008). Despite proposed alternative social presence scales (Kreijns, 2010) and arguments for multidimensional approaches (Russo & Benson, 2005), most researchers are comfortable with or adapt to the instruments developed by Gunawardena and Zittle (1997), Rourke et al. (2001), or Tu (2002) (Lowenthal, 2010).

<div align="center">Chapter Summary</div>

Internet media and social networking have become the main sources of news and information for many people (Prasarnphanich & Wagner, 2011). Many social networking sites have allowed individuals to collaborate and form virtual communities. These communities often seek new information, expertise, and informal interactions

with others through computer-mediated communication (Prasarnphanich & Wagner, 2011).

Computer-mediated communication (CMC) is "synchronous or asynchronous electronic mail and computer conferencing" by which communicators send and receive text-based messages via computers (Walther, 1992, p. 52). Structural differences between computer-mediated and face-to-face communication can change the way people communicate with each other (Ho & McLeod, 2010). Nonverbal cues in face-to-face communication may help a person engage in communication (Kupritz & Cowell, 2011), while lack of these nonverbal cues can make a person feel lost and anonymous in cyberspace (Tu, 2002).

One popular form of CMC is microblogging via the website Twitter.com (Zhao & Rosson, 2009). Twitter is a "device-agnostic real-time message-routing platform" that allows people to publish microblogs in no more than 140 characters (Mestein, Chowdhury, Hochmuth, Lorica, & Magoulas, 2008, p. 3). Microblogging on Twitter has inspired many virtual communities where knowledge is shared, such as #AgChat and #GardenChat (Prasarnphanich & Wagner, 2011). #AgChat and #GardenChat are weekly moderated conversations on Twitter that take place on Monday and Tuesday evenings for one hour and two hours, respectively.

With the growing popularity of virtual communities such as #AgChat and #GardenChat, social presence has become increasingly important (Dunlap & Lowenthal, 2009). The first definition of social presence was defined as the level of salience between two people using a communication medium (Short et al., 1976). Since then,

many researchers have developed their own versions of social presence and applied them to computer-mediated communication as a function of medium characteristics, as well as a function of user adaptations to social context (Richardson & Swan, 2003; Walther, 1992). For example, to compensate for lack of social cues in computer-mediated communication, a user may insert emoticons or personalize their messages (Picciano, 2002; Richardson & Swan, 2003; Rourke et al., 2001; Taylor et al., 2011). In online learning, techniques such as these that are used to foster social presence have been shown to correlate with student satisfaction (Richardson & Swan, 2003) and students' feelings of being closer to their teachers (Gunawardena & McIsaac, 2004).

Measurement of social presence has evolved over time. Researchers have used instruments from bipolar and five-point scales (Gunawardena, 1995) and questionnaires (Gunawardena & Zittle, 1997) to self-reports, (Biocca & Harms, 2002) and qualitative analysis (Rourke et al., 2002). These measurements are taken in many forms of computer-mediated communication (CMC).

CHAPTER III

METHODOLOGY

Purpose

The purpose of this study was to describe social variables, perceived social presence, and participant satisfaction among #AgChat and #GardenChat users during conversations in a computer-mediated environment.

Objectives

The objectives that guided this study were:

1. describe social presence dimensions that are present during #AgChat and #GardenChat conversations through a qualitative document analysis;

2. describe #AgChat and #GardenChat users' perceptions of social presence during a Twitter conversation through a participant survey;

3. describe #AgChat and #GardenChat users' satisfaction with a Twitter conversation through a participant survey; and

4. describe relationships between perceptions of social presence and satisfaction during #AgChat and #GardenChat conversations.

Research Design

To meet the purpose and objectives of this stud, a mixed-methods approach that combined a qualitative content analysis of Twitter transcripts and online quantitative participant surveys was employed. The content analysis unitized individual messages into affective, interactive, and cohesive components of social presence based on the Model and Template for Assessment of Social Presence defined in Appendix A (Rourke

et al, 2001). The quantitative survey measured participants' perceptions of social presence and satisfaction during conversations on Twitter.

Population

This study examined seven weeks of #AgChat and #GardenChat Twitter conversation transcripts and surveyed the participants who contributed to the fourth week of these conversations. Each #AgChat conversation occurred once a week for two hours, while each #GardenChat conversation occurred once a week for one hour. The survey was made available for one week after each conversation. Twitter messages and participants from #GardenChat and #AgChat conversations were selected for research based on two main criteria that supported the purpose of the study: (1) these online communities use computer-mediated communication to collaborate consistently throughout the year for a guided conversation on Twitter, and (2) these online communities support agricultural communications by helping those in the business and hobby of agriculture tell agriculture's story to the public from their perspective (#AgChat Foundation, 2011; #GardenChat, 2011).

Content Analysis

Individual tweets from the Twitter conversations were unitized based on the Model and Template for Assessment of Social Presence defined in Appendix A (Rourke et al., 2001). During unitization, only the message without any indication of the sender was viewable. Each tweet was examined for affective, interactive, and cohesive components of social presence and designated as one or all three categories depending

on two researchers' interpretation of the message. Two researchers agreed on unitization of individual tweets to establish dependability.

Dependability

Archives from the fourth week of conversations were analyzed to measure social presence based on the Model and Template for Assessment of Social Presence defined in Appendix A (Rourke et al, 2001). Two researchers coded the archives based on Rourke's model and reached a consensus to establish dependability. To further establish dependability, the most recent conversations from before and after the fourth week were coded in the same manner to determine that social presence dimensions in week four were typical of other weeks (see Table 1).

<center>Survey Instrument Design</center>

The survey instrument was adapted from the four sections and 56 items in the Collaborative Learning, Social presence, and Satisfaction (CLSS) questionnaire to have 51 items, (see Appendix B) (So & Brush, 2008). Section one of the survey asked participants questions related to age, ethnicity, Twitter experience, and number of #AgChat or #GardenChat conversations in which they had participated. Section two of the survey asked participants about their satisfaction with their ability to learn and understand during the conversation, as well as their satisfaction with the diversity of topics in #AgChat and #GardenChat. The third section asked participants to indicate the amount of learning and sharing ideas that took place during #AgChat and #GardenChat. Section four of the survey asked participants to indicate where they participate in conversations, as well as their comfort level with familiar and unfamiliar conversation

topics. The four sections are further described in Appendix C as adapted from So and Brush (2008).

Validity

Validity of the survey instrument was established through previous studies using a similar instrument. Parts of the satisfaction scale by Gunawardena and Zittle (1997), SPPQ by Tu (2002), and previous research by Driver (2002) and Kitchen and McDougall (1998) were merged to form the Collaborative Learning, Social Presence, and Satisfaction (CLSS) questionnaire (So & Brush, 2008, Lowenthal, 2010). So and Brush (2008) used this instrument to investigate relationships and critical factors in a blended learning environment. Additional researchers have indicated support for the instruments developed by Gunawardena and Zittle (1997), Rourke et al. (2001), or Tu (2002) (Lowenthal, 2010).

Post Hoc Reliability

Data from Q14, Q15, and Q16, which were the only questions containing scaled data, were used to calculate a Cronbach's alpha. The Cronbach's alpha coefficient estimates the internal consistency of attitude scales. The coefficient for #AgChat was 0.85 and the coefficient for #GardenChat was 0.92. Archives from three weeks before and three weeks after the surveys were distributed and analyzed to establish that the week of the survey was typical of other weeks in terms of number of tweets and number of participants (see Table 1).

Qualitative Data Collection

Archives were collected from three, one-hour #GardenChat conversations and three, two-hour #AgChat conversations on their respective days of the week for seven weeks. Each online conversation was archived using The Archivist, an online archiving tool. *Microsoft Excel* was used by two researchers to organize the data which consisted of four columns; one column contained the tweet to be analyzed, one column to mark affective tweets, one column to mark interactive tweets, and one column to mark cohesive tweets. Both researchers examined individual tweets, for affective, interactive, or cohesive components of social presence and marked the appropriate columns next to each tweet.

Quantitative Data Collection

Quantitative data collection took place during the fourth week of August 2011 on Monday and Tuesday during the regularly scheduled #GardenChat, and #AgChat conversations, respectively. The moderators of each Twitter conversation agreed to send a Twitter message with the link to the survey at the end of the conversation. Survey responses for #GardenChat were collected from Aug. 22, 2011 to Aug. 29, 2011. Survey responses for #AgChat were collected from Aug. 23, 2011 to Aug. 30, 2011.

The moderator of #GardenChat tweeted the suvey link at 9:26 p.m., or 26 minutes after the end of the #GardenChat conversation. The Twitter message said, "If anyone is interested check out [researcher's Twitter handle] Survey at http://ow.ly/6a2yo #GardenChat."

The moderator of #AgChat tweeted the survey at 8:56 p.m., or four minutes before the end of the #AgChat conversation. The Twitter message said, "Let's help [researcher's twitter handle] with her graduate thesis by taking this survey! http://ow.ly/69wNv #AgChat."

For each conversation, the researcher retweeted the moderator's original tweet immediately after the moderator sent out the survey link. The researcher retweeted the moderator's tweet six times, eight hours apart, starting eight hours after the end of each conversation. The researcher also sent out six original Twitter messages for each conversation, eight hours apart, starting at 9:00a.m. on the morning after each conversation. Based on response rates, three days after the conversations took place, the researcher sent a series of five reminder tweets. The first two reminder tweets were sent out eight hours apart and the last three reminder tweets were sent out 24 hours apart (see Appendix E). To specifically target individuals that participated in #AgChat and #GardenChat on August 22 and August 23, the survey was made available until the day of #GardenChat and #AgChat's next scheduled conversation for a total of seven days. In addition, reminder tweets asked for individuals who had participated in the most recent conversation. The accessible population of #GardenChat and #AgChat users during the seven days that the survey was available was used to represent the target population of #GardenChat and #AgChat users who participated during that week's conversation. During the week of the survey, the #AgChat conversation contained 915 tweets from 148 users (see Table 1). Fifty-five of these users responded to the survey for a response rate of 37.16%. The #GardenChat conversation contained 1,452 tweets from 87 users

(see Table 1). Nineteen of these users responded to the survey for a response rate of

21.84%. These numbers appeared to be normal based on conversations during the weeks

before and after the week that the survey was conducted.

Table 1
Tweets and Users of #AgChat and #GardenChat Conversations

Conversation Relevant to Survey	Tweets	Users	Tweets	Users
	#AgChat		#GardenChat	
Two Weeks Before	1,039	137	1,286	98
One Week Before	980	115	998	95
Week of Survey	915	148	1,452	87
One Week After	841	132	765	59
Two Weeks After	1,130	117	1,162	70

Data Analysis

Data consisted of individual tweets from 30 minutes before and after the start and

finish of six Twitter conversations (three from #GardenChat and three from #AgChat). A

team of two researchers coded all tweets into at least one category: affective, interactive,

and cohesive. Tweets were allowed to be coded into more than one category. Affective

tweets were those that contained expressions of emotion, humor, attraction openness, or

self-disclosure such as emoticons and indicating location (Rourke et al., 2001).

Interactive tweets were those that referred to the presence of another person such as

quoting previous comments or asking general questions (Rourke et al., 2001). Cohesive

tweets were those that mentioned a specific individual either by their first name or

Twitter username, or that used group pronouns such as "we," "us," or "all" (Rourke et

al., 2001). For example, the tweet, ":-) Evening Sally! This IS REALLY me ;-) RT

@Earthnik Dare I? Oh why not. Jane Doe #agchat" would be coded under all three categories. Use of emoticons makes it affective, the use of "RT" makes it interactive, and the use of first names makes it cohesive. For the privacy of participants, the names in this tweet have been changed.

To analyze quantitative data, the *Statistical Package for Social Sciences (SPSS®)* was used. Descriptive statistics, including means, standard deviations, medians, frequencies, percentages, and correlations were calculated to interpret the data. To measure participant responses on satisfaction and social presence, a scale was used to measure the mean response where $1.00 – 1.44$ = strongly disagree, $1.45 – 2.44$ = disagree, $2.45 – 3.44$ = neutral, $3.45 – 4.44$ = agree, and $4.45 – 5.00$ = strongly agree. Correlations were used at the $p <.05$ level to analyze the relationships between social presence and satisfaction.

Survey results were examined to describe participants' demographic information, perceived levels of satisfaction, perceived levels of social presence and possible correlations among satisfaction and social presence.

<div align="center">Institutional Review Board</div>

Texas A&M University policy and federal regulations require approval of all research studies that involve human subjects before investigators can begin their research. The Texas A&M Office of University Research Services and the Institutional Review Board conduct this review to protect the rights and welfare of human subjects involved in biomedical and behavioral research. In compliance with that policy, this study received review and was granted permission to proceed. The IRB assigned the

number 2011-0554 (see Appendix D) to this study assessing the perceptions and

expressions of social presence during conversations on Twitter.

CHAPTER IV

FINDINGS AND DISCUSSION

Findings and discussion will be presented based on a qualitative document analysis of individual tweets from six Twitter conversations (three from #AgChat and three from #GardenChat) and quantitative survey responses. The purpose of this study was to describe social variables, perceived social presence, and participant satisfaction among #AgChat and #GardenChat users during conversation in a computer-mediated environment.

Profile of Respondents

Survey responses for #GardenChat participants were collected from Aug. 22, 2011, to Aug. 29, 2011. The population for #GardenChat included 87 participants with 19 responses for a response rate of 21.84 %. Survey responses for #AgChat participants were collected from Aug. 23, 2011 to Aug. 30, 2011. The population for #AgChat included 148 participants with 55 responses for a response rate of 37.16 %. Due to the virtual nature of survey distribution, nonresponse error was not able to be addressed.

Demographics and Background

Of the #AgChat survey respondents, 65 % were female and 35 % were male. Of the #GardenChat survey respondents, 72 % were female and 28 % were male. The majority of #AgChat respondents were between 26 and 45 years of age. The majority of #GardenChat respondents were between 36 and 45 years of age. Most participants responding were Caucasian. Each conversation had one Latino respondent. One

respondent of #AgChat was Asian/Pacific Islander, while one respondent of

#GardenChat was African American.

Overall, 18 states and two countrries were represented by #AgChat respondents.

Multiple respondents indicated that they were located in either California ($n = 4$),

Indiana ($n = 4$), Iowa ($n = 3$), or Wisconsin ($n = 3$). Other respondents were either the

only one or one of two people from their specified state (see Table 2).

Table 2

State/Country of #AgChat Participants

State/Country	n
Alabama	1
Arizona	1
California	4
Canada	1
Indiana	4
Iowa	3
Kansas	1
Kentucky	2
Maryland	1
Michigan	2
Minnesota	2
Nebraska	1
New York	1
Oklahoma	1
Oregon	1
Tennessee	2
Texas	1
Vermont	1
Wisconsin	3

N=33

Overall, 11 states and one country were represented by #GardenChat respondents. Respondents of #GardenChat were either the only one or one of two people from their specified state (see Table 3).

Table 3

State of #GardenChat Participants

State	*n*
California	2
Colorado	1
Hawaii	1
Illinois	1
Indiana	1
Maryland	1
North Carolina	2
New York	1
Ohio	1
Pennsylvania	2
Washington	1

Respondents' Twitter Experience

Respondents were asked to rate themselves as having no Twitter experience, a novice Twitter user, an intermediate Twitter user, or an expert Twitter user. Of the #AgChat respondents, seven rated themselves as an expert, 24 rated themselves as intermediate users, and three rated themselves as novice users. No #AgChat respondents rated themselves as having no Twitter experience. Respondents were also asked to indicate how many #AgChat discussions they had participated in on a range of zero to more than ten. The most frequent responses were more than 10 ($n = 15$), two ($n = 5$), one ($n = 4$), and four ($n = 3$). Of the #AgChat respondents, 23 reported that the environment

around them while participating in the conversation contained some background noise such as people talking or television sounds, 10 reported that it was peaceful and quiet, and one reported that it was noisy and stressful. When asked if they had ever met in person any of the other #AgChat participants before the most recent discussion, 22 #AgChat respondents reported, "Yes" and twelve reported, "No."

Of the #GardenChat respondents, when asked to rate their level of Twitter experience, six rated themselves as expert Twitter users, seven rated themselves as intermediate users, and two rated themselves as novice Twitter users. No #GardenChat respondents rated themselves as having no Twitter experience. Respondents were also asked to indicate how many #GardenChat discussions they had participated in on a range of zero to more than ten. The most frequent responses were more than 10 ($n = 9$) and six ($n = 2$). Of the #GardenChat participants, six reported that the environment around them while participating in the conversation contained some background noise such as people talking or television sounds, six reported that it was peaceful and quiet, two reported that it was noisy and stressful, and one reported that the environment was not like any of these options. When asked if they had ever met in person any of the other #GardenChat participants before the most recent discussion, six #GardenChat respondents reported, "Yes" and nine reported, "No."

Respondents' Interest in Agriculture

Many respondents reported an interest in agriculture through some form of marketing and communications. Of the #AgChat respondents, 38.2 % reported that they were involved in marketing and communications, while 32.3 % reported that they were

involved in production. Other frequent interests of #AgChat participants included farming and sales/business. Twelve of the 34 #AgChat respondents indicated more than one interest in agriculture (see Table 4). Participants were allowed to indicate more than one interest.

Table 4
#AgChat Participants' Interest in Agriculture

Interest	*n*	*%*
Marketing/Communications	13	38.2
Production	11	32.3
Farming	6	17.6
Sales/Business	4	11.7
Studied Agricultural Major	2	5.9
Processing/Distribution	2	5.9
Family in Agriculture	1	2.9
Health/Safety	1	2.9
Politics	1	2.9

Notes: *N=55; Participants were allowed to indicate more than one interest.*

Of the #GardenChat respondents, 46.7 % reported that they were involved in marketing and communications, while 46.7 % reported that they had a home garden. Other interests of #GardenChat participants included production, green living, sales/supplies, and public gardening. Eleven of the 15 #GardenChat respondents indicated more than one interest in agriculture (see Table 5). Participants were allowed to indicate more than one interest.

Table 5

#GardenChat Participants' Interest in Agriculture

Interest	*n*	*%*
Marketing/Communications	7	46.7
Home Garden	7	46.7
Production	3	0.2
Green Living/Local/Natural Foods	3	0.2
Sales/Supplies	3	0.2
Public Gardening	3	0.2

Notes: *N=19; Participants were allowed to indicate more than one interest.*

Findings Related to Social Presence Dimensions

#AgChat

The first archived conversation for #AgChat included 1,308 total tweets, the second included 915 tweets, and the third included 1,130 tweets. In each conversation, interactive tweets were the most prominent, with over 75 % of the total tweets falling into that category (see Table 6).

Table 6
Categorization of #AgChat Tweets

	Affective	Interactive	Cohesive
Week Before Survey			
Tweets/Category	432	1,017	467
Total Tweets	1,308	1,308	1,308
% of Total	33.03%	77.75%	35.70%
Week Of Survey			
Tweets/Category	307	761	329
Total Tweets	915	915	915
% of Total	33.55%	83.17%	35.96%
Week After Survey			
Tweets/Category	217	1,006	311
Total Tweets	1,130	1,130	1,130
% of Total	19.20%	89.03%	27.52%

Though the #AgChat conversations officially started at 8 p.m. and ended at 10 p.m. Eastern, the conversations were archived and analyzed from 7:30 p.m. to 10:30 p.m. to view tweets from a full range of users, including those who may engage early, late, and throughout the official conversation.

It appeared that cohesive tweets in the #AgChat transcript played a prominent role in fostering a structured conversation, especially tweets from the moderator. For example, 30 minutes before each #AgChat conversation began, the moderator of #AgChat sent a tweet announcing the start of conversation, such as: "Hope folks are grabbing a snack & getting ready for #agchat cause we're T-minus 30 minutes -- please use twubs.com." This tweet was coded as cohesive due to the use of the group pronoun, "we're," and affective due to the use of the word "Hope" (Rourke et al, 2001). While this tweet and others like it are directed to the group as a whole, it does not interact with specific individuals or refer to previous comments. Thus, it was not coded as interactive.

Later, the moderator sent another cohesive tweet announcing the format of the conversation that said, "Format for #agchat 1) Networking 8-8:15 pm ET 2) Moderated ?s 3) Executable idea 4) 9:55 Ask your own ?s, pitch your site or get ideas." Some participants retweeted this message, making the message interactive. However, the original message not only reinforced the structure of the conversation, but helped foster a cohesive environment by addressing the group with guidelines that apply to everyone in the conversation.

Other cohesive tweets emphasized the format of the conversation and highlighted the importance of time. For example, the moderator noted a one-minute tardy in officially starting the conversation by sending a message that said, "Welcome all, a minute late in officially opening doors! #agchat." Participants also were kept on schedule with warnings from the moderator such as, "Couple more minutes and then we'll be going to another female in ag question. Great job Tweeps! #agchat," or "Q3 coming on up and we'll be moving on to new topic... #agchat." All of these tweets were coded as cohesive due to the use of greetings and group pronouns. One of these tweets was coded as interactive since the phrase "Great job" complimented others.

While cohesive tweets seemed to maintain structure of the conversation, it appeared that affective tweets may have helped participants become acquainted with each other.   Participants were asked by the moderator to provide meaningful introductions that include their locations and interests in agriculture. Though the moderator sent out a cohesive tweet to request introductory information such as, "Guidelines for #agchat, 8-10pmET 1)intro w/ location & #ag interest 2)stay on topic

3)start," the responses were affective due to the disclosure of information. The moderator also sent a tweet directed to Twitter users who may have been watching the streaming conversation but not introducing themselves; "Intro time. Tell us who you are, even if you are lurking tonight. #agchat." Some participants were located in the eastern, central, and western part of the United States, in states such as New York, Oklahoma, and California. Other participants were located in Canada. Participants' relationships with agriculture ranged from those in academia, such as a judging team coach or adviser, to farmers to people with little or no agricultural background. Moreover, many tweets during the first 15 minutes of the conversation included the user's name, state, and relationship to agriculture, all of which fall under self-disclosure, and thus, affective responses.

In addition to serving as introductory messages, it appeared that affective tweets may have provided unrequested information. Rather, affective tweets often included information that was irrelevant to the main topic of conversation. During the time allowed for introductions, participants not only shared the requested information, but shared their most recent activity, what they were doing while participating in #AgChat, and even their food and beverage choices. One participant tweeted, "Will try not to get my keyboard greasy from the cheese curd goodness since I'm tweeting in from my new #Wisconsin home for #agchat tonight." Even after the time allotted for introductions, participants who joined the conversation late contributed with similar information.

It appeared that the most prominent category of tweets, interactive, occurred during the middle of the conversation when participants were asked questions and given

the opportunity to respond. After introductions, participants were asked between 12 and 14 questions that related to agriculture. Responses to these questions were, even if nothing else, coded as interactive due to the fact that they were responding to a previous comment or question. These tweets were often recognized by a letter "Q" followed by the current question number. Though participants were asked and reminded to indicate the question they were responding to by a cohesive message from the moderator, questions containing the "Q" were coded as interactive. For example, if a participant was responding to question one, they would include "Q1" in their response. Some participants responded to the questions by sending a message to the entire group. In other words, some responses were not directed at another user and did not retweet other users' messages. However, some participants seemed to engage in conversation with just one or two individuals instead of the group as a whole by using specific Twitter usernames in the beginning of their responses. This situation is illustrated by tweets such as, "@TruffleMedia very cool that you had it 'up your sleeve' #Agchat." Tweets such as these were coded as cohesive for the use of an individual users' name. Still, some participants retweeted other participants' messages either with or without an additional comment. These kind of tweets were coded as interactive due to the reference of a previous message. Many participants sent messages in reply to questions that included emoticons such as, "Q12: Every now and then step outside your comfort zone ;-) #agchat." These tweets were coded as affective for the use of a text-based expression of emotion.

Before the last five minutes of the conversation, a tweet was sent out announcing the time allotted for personal pitches. The tweet said, "You've done great and it's now PITCH time. Feel free to share your "stuff", ask a ? of your own, get feedback. #agchat." This announcement tweet was coded as interactive due to the complimentary nature. It seemed that tweets in response to this interactive message were more affective. Many participants expressed self-disclosure by sending links for personal blogs and websites, as well as tweets with personal recommendations and information.

As the #AgChat conversation came to a close, many participants expressed appreciation for an enjoyable conversation through affective and cohesive tweets. These tweets noted the end of the conversation by saying things like, "that's a wrap" and "Very well done." Some latecomers expressed disappointment for missing the conversation with affective tweets that included statements such as, "Sad I missed #AgChat ..."

Overall, the #AgChat conversations appeared to be very structured through many cohesive tweets by the moderator that gave instructions for format and introductory content, as well as indicators of time. Questions and responses in interactive tweets were easily followed with the use of "Q" followed by the question number before each question and before participants' responses. Participants generally seemed to be speaking to the #AgChat community as a whole through interactive and cohesive tweets, with exceptions of cohesive and interactive comments directed to individual users by a few individual users. If the conversation were compared to a traditional (not Web-based) conversation, it would have been comparable to a situation where a moderator stands in

front of the room and asks a group of people one question at a time while each person responds to the entire group with his or her answer.

#GardenChat

The first archived conversation for #GardenChat included 998 total tweets, the second included 1,452 tweets, and the third included 1,162 tweets. Of these, interactive tweets were the most prominent (see Table 7).

Table 7
Categorization of #GardenChat Tweets

	Affective	Interactive	Cohesive
Week Before Survey			
Tweets/Category	368	659	457
Total Tweets	998	998	998
% of Total	36.87%	66.03%	45.79%
Week Of Survey			
Tweets/Category	340	1,067	727
Total Tweets	1,452	1,452	1,452
% of Total	23.42%	73.48%	50.07%
Week After Survey			
Tweets/Category	258	844	688
Total Tweets	1,162	1,162	1,162
% of Total	22.20%	72.63%	59.21%

Though the #GardenChat conversations officially started at 9 p.m. and ended at 10 p.m. Eastern, the conversations were archived and analyzed from 8:30 p.m. to 10:30 p.m. to view tweets from a full range of users, including those who may engage early, late, and throughout the official conversation.

It appeared that tweets before the #GardenChat conversation began were interactive and may have functioned as a way to make online users aware of the

upcoming conversation. While these interactive tweets in the #GardenChat transcript did not seem to indicate a specific format, they did seem to indicate that the conversation would soon begin. Before the advertised start of #GardenChat at 9 p.m. Eastern, tweets were sent that indicated participants were preparing for the evening's conversation. These tweets included statements such as, "Getting ready for #gardenchat tonight? ..." and "T minus 25< and counting!!" These tweets seemed to encourage other potential participants and were coded as interactive and affective due to the question sent to others and the expression of emotion through punctuation.

As 9 p.m. Eastern approached, participants began to send messages with more of a social function such as greetings like, "Hello! #gardenchat." Information such as name or location was not requested of participants. However, some participants indicated their location by tweets such as "#gardenchat hello from the drought land TX." These tweets were coded as affective due to the volunteered, personal information that expresses self-disclosure. Many participants did not include this type of information in their introductions. Therefore, many tweets in the first few minutes of the conversation were interactive or cohesive.

Participants were welcomed by the moderator at the beginning of the conversations with a message that said, "Welcome to #gardenchat : 9-10 p.m. ET on Twitter ..." Some participants continued to send greeting-type messages as the conversation began. These types of messages were coded as cohesive due to the use of words that address the group as a united entity.

It appeared that participants used interactive tweets to gain information about the upcoming conversation. For example, some participants in multiple conversations sent messages that said, "@TheGardenChat Topic tonight? #gardenchat" and "Hi #gardenchat! What's the topic tonight? #gardenchat." These tweets were later addressed in the conversation through additional interactive tweets. Many participants' interactive tweets related to gardening or questions asked by the moderator, while many affective tweets related to participants' snacks, favorite dining venues, and other topics unrelated to gardening.

After participants were welcomed, the greetings became fewer and fewer. It appeared that questions in interactive tweets were sent to the group by random participants as they were developed rather than having been planned ahead of time and sent out by the moderator. Participants were not asked to indicate what question they were responding to, so responses to each question were not obviously apparent. In two of the three archived conversations, some tweets indicated that participants were watching a live streaming video of the moderator; "OMG! I'm on Ustream and I can see and hear ya'll! So much fun #gardenchat." Tweets like this one were coded as affective for the expression of emotion through punctuation and cohesive for the use of the group pronoun "ya'll." Tweets in the #GardenChat conversation seemed to imitate many small groups of people in a room rather than one large group of people having a discussion.

As 10 p.m. Eastern approached, there was no warning that the conversation was about to end. Many users noted the end of the conversation and complimented others

with affective tweets such as, "This was fun to watch. Thanks. Have to go see if my garden is OK after the hard rain. Night. #gardenchat."

Overall, tweets in #GardenChat seemed to surround several small conversations between several individuals more than one conversation among all participants. It did not appear that one category of tweets heavily influenced the conversation more than another category. No formal structure or attention to time was apparent through a concentrated collection of tweets. Participants generally seemed to be speaking to other individual users rather than the #GardenChat community as a whole.

Findings related to #AgChat and #GardenChat Users' Perceptions of Social Presence

To measure responses on social presence, a scale was used to measure the mean response where 1.00 – 1.44 = strongly disagree, 1.45 – 2.44 = disagree, 2.45 – 3.44 = neutral, 3.45 – 4.44 = agree, and 4.45 – 5.00 = strongly agree. #AgChat participants agreed with 10 out of 21 statements about social presence. Respondents were neutral about statements related to ease of expressing ideas ($M = 3.33$, $SD = 0.96$, $Mdn = 4.00$), large amounts of messages ($M = 3.24$, $SD = 1.06$, $Mdn = 4.00$), comfort in participating even when not familiar with the topics ($M = 3.24$, $SD = .71$, $Mdn = 3.00$), location when computer-mediated communication is accessed ($M = 3.12$, $SD = 1.05$, $Mdn = 3.00$) , being uncomfortable even when the topic is unfamiliar ($M = 2.88$, $SD = 1.02$, $Mdn = 3.00$), and technology ($M = 2.55$, $SD = 0.71$, $Mdn = 2.00$). Respondents disagreed that computer-mediated communication messages are impersonal ($M = 2.36$, $SD = 0.74$, $Mdn = 2.00$), that it is unlikely someone might obtain information about them from computer-mediated messages ($M = 2.30$, $SD = 1.01$, $Mdn = 2.00$), that they are uncomfortable

communicating with a person unfamiliar to them (*M* = 2.12, *SD* = 0.86, *Mdn* = 2.00),

that unlikely someone else might re-send their messages(*M* = 1.94, *SD* = 0.70, *Mdn* =

2.00), and that computer-mediated communication is private/confidential (*M* = 1.88, *SD*

= 0.82, *Mdn* = 2.00) (see Table 8).

Table 8
#AgChat Participants' Perceptions of Social Presence

Social Presence	Mdn	M	SD
Computer-mediated communication messages are social forms of communication	4.00	4.27	.45
Computer-mediated communication allows relationships to be established based upon sharing and exchanging information.	4.00	4.24	.56
I am comfortable communicating with a person who is familiar to me.	4.00	4.24	.502
I am comfortable participating in computer-mediated communication, if I am familiar with the topic being discussed.	4.00	4.15	.71
Using computer-mediated communication is a pleasant way to communicate with others.	4.00	3.94	.75
Computer-mediated communication messages convey feeling and emotion.	4.00	3.85	.62
Computer-mediated communication allows me to build more caring social relationships with others.	4.00	3.82	.77
Computer-mediated communication permits the building of trust relationships.	4.00	3.79	.60
The language people use to express themselves in computer-mediated communication is meaningful.	4.00	3.73	.57
The language used by others to express themselves in computer-mediated communication is easily understood.	4.00	3.52	.67
It is easy to express what I want to communicate through computer-mediated communication.	4.00	3.33	.96
The large amounts of computer-mediated communication messages, including numbers of messages and length of messages, do not inhibit my ability to communicate.	4.00	3.24	1.06
I am comfortable participating, even though I am not familiar with the topics.	3.00	3.24	.71
Where I access computer-mediated communication (home, office, computer labs, public areas, etc.) does not affect my ability or desire to participate.	3.00	3.12	1.05
I am uncomfortable participating in computer-mediated communication, if I am not familiar with the topic being discussed.	3.00	2.88	1.02
Computer-mediated communication is technically reliable, or free of system or software errors that might compromise the reliability of online messages reaching only the target destination.	2.00	2.55	.71
Computer-mediated communication messages are impersonal.	2.00	2.36	.74
It is unlikely that someone might obtain personal information about me from computer-mediated communication messages.	2.00	2.30	1.01

Table 8 continued

Social Presence	Mdn	M	SD
I am uncomfortable communicating with a person who is not familiar to me.	2.00	2.12	.86
It is unlikely that someone else might re-send my messages.	2.00	1.94	.70
Computer-mediated communication is private/confidential.	2.00	1.88	.82

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

#GardenChat respondents strongly agreed that computer-mediated communication allows relationships to be established based upon sharing and exchanging information (*M* = 4.47. *SD* = 0.74, *Mdn* = 5.00). Respondents agreed with 13 out of 21statements about social presence. Respondents were neutral on items related to technology (*M* = 3.33. *SD* = 0.90, *Mdn* = 3.00), comfort level even if they are not familiar with the topic being discussed (*M* = 2.73. *SD* = 1.45, *Mdn* = 2.00), and the likeliness that someone might obtain information about them from computer-mediated communication (*M* = 2.53, *SD* = 0.99, *Mdn* = 2.00). Respondents disagreed that computer-mediated communication is private/confidential (*M* = 1.93, *SD* = 0.88, *Mdn* = 2.00), that computer-mediated communication messages are impersonal (*M* = 2.13, *SD* = 0.64, *Mdn* = 2.00)., and that they were uncomfortable communicating with a person unfamiliar to them (*M* = 1.93, *SD* = 1.10, *Mdn* = 2.00). (see Table 9).

Findings related to #AgChat and #GardenChat Users' Satisfaction

To measure participant responses on satisfaction, a scale was used to measure the mean response where 1.00 – 1.44 = strongly disagree, 1.45 – 2.44 = disagree, 2.45 – 3.44 = neutral, 3.45 – 4.44 = agree, and 4.45 – 5.00 = strongly agree. #AgChat respondents agreed with 10 out of 13 statements about satisfaction. Respondents agreed most with

the statement that as a result of their participation in #AgChat, they made acquaintances electronically in other parts of the country and/or world. Respondents were neutral about statements related to diversity of topics prompting them to participate in the discussion (*M* = 3.29, *SD* = 1.12, *Mdn* = 3.00), their level of learning being at the highest quality during the conversation (*M* = 3.21, *SD* = 0.81, *Mdn* = 3.00), and the amount of effort put forth to participate in the conversation (*M* = 2.85, *SD* = 1.13, *Mdn* = 3.00) (see Table 10).

Table 9
#GardenChat Participants' Perceptions of Social Presence

Social Presence	Mdn	M	SD
Computer-mediated communication allows relationships to be established based upon sharing and exchanging information.	5.00	4.47	.74
I am comfortable communicating with a person who is familiar to me.	5.00	4.40	.74
Computer-mediated communication messages are social forms of communication	4.00	4.33	.72
Using computer-mediated communication is a pleasant way to communicate with others.	4.00	4.27	.80
I am comfortable participating, even though I am not familiar with the topics.	4.00	4.20	.78
Computer-mediated communication messages convey feeling and emotion.	4.00	4.20	.56
Computer-mediated communication allows me to build more caring social relationships with others.	4.00	4.13	.91
It is easy to express what I want to communicate through computer-mediated communication.	4.00	4.07	.80
The language used by others to express themselves in computer-mediated communication is easily understood.	4.00	4.00	.85
The language people use to express themselves in computer-mediated communication is meaningful.	4.00	4.00	.54
I am comfortable participating in computer-mediated communication, if I am familiar with the topic being discussed.	4.00	3.87	1.13
Computer-mediated communication permits the building of trust relationships.	4.00	3.87	.92
The large amounts of computer-mediated communication messages, including numbers of messages and length of messages, do not inhibit my ability to communicate.	4.00	3.80	.94
Where I access computer-mediated communication (home, office, computer labs, public areas, etc.) does not affect my ability or desire to participate.	4.00	3.60	1.06
Computer-mediated communication is technically reliable, or free of system or software errors that might compromise the reliability of online messages reaching only the target destination.	3.00	3.33	.90
I am uncomfortable participating in computer-mediated communication, if I am not familiar with the topic being discussed.	2.00	2.73	1.45
It is unlikely that someone might obtain personal information about me from computer-mediated communication messages.	2.00	2.53	.99
Computer-mediated communication messages are impersonal.	2.00	2.13	.64

Table 9 continued

Social Presence	Mdn	M	SD
It is unlikely that someone else might re-send my messages.	2.00	2.07	.84
I am uncomfortable communicating with a person who is not familiar to me.	2.00	1.93	1.10
Computer-mediated communication is private/confidential.	2.00	1.93	.88

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

Table 10

#AgChat Participants' Satisfaction

Statement	Mdn	M	SD
As a result of my participation in #AgChat, I made acquaintances electronically in other parts of the country and/or world.	5.00	4.35	.95
As a result of my experience with #AgChat, I would like to participate in another discussion in the future.	4.00	4.18	.97
Overall, I am satisfied with the moderator's guidance during this discussion	4.00	4.18	.83
The discussion assisted me in understanding other points of view.	4.00	4.06	.60
Able to learn through the medium of computer-mediated communication	4.00	4.03	.79
This discussion was a useful learning experience.	4.00	4.03	.76
I was stimulated to do additional readings or research about topics discussed during #AgChat	4.00	4.00	.78
Overall, I am satisfied with what I learned in this discussion	4.00	4.00	.65
Overall, I am satisfied with the #AgChat discussion	4.00	3.97	1.03
Able to learn from the #AgChat discussion	4.00	3.97	.87
The diversity of topics in this discussion prompted me to participate in the discussion.	3.00	3.29	1.12
My level of learning that took place in this discussion was of the highest quality	3.00	3.21	.81
I put in a great deal of effort to learn computer-mediated communication skills (e.g. how to use Twitter) to participate in this discussion	3.00	2.85	1.13

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

#GardenChat respondents agreed with 12 out of 13 statements about satisfaction. Respondents agreed most with the statement that as a result of their experience, they would like to participate in another discussion in the future ($M = 4.40$, $SD = 0.83$, $Mdn = 5.00$). Respondents agreed least with the statement that their level of learning that took place in the discussion was of the highest quality ($M = 3.93$, $SD = 1.03$, $Mdn = 4.00$). Respondents were neutral about the statement related to the amount of effort put forth to participate in the conversation ($M = 2.93$, $SD = 1.22$, $Mdn = 3.00$) (See Table 11).

Table 11
#GardenChat Participants' Satisfaction

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

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

Findings related to Relationships Between Social Presence and Satisfaction

Pearson's product-moment correlation coefficients were calculated to find statistical relationships between social presence and satisfaction at the $p < .05$ level. For #AgChat respondents, the social presence item stating that computer-mediated communication messages convey feeling and emotion showed a low to medium, positive correlation with six other statements about satisfaction. The strongest of these correlations related to the level of learning that took place ($r = .52$), ability to learn through the medium of computer-mediated communication ($r = .50$), and the discussion as a useful experience ($r = .48$). Responses showed a low, negative correlation between

the social presence statement that computer-mediated communication messages are impersonal and five statements about satisfaction. The strongest of these correlations related to wanting to participate in another discussion in the future ($r = -.46$), overall satisfaction with the #AgChat discussion ($r = -.45$), and the discussion as a useful learning experience ($r = -.44$). A low to medium, positive correlation also exists between the social presence statement that computer-mediated communication is a pleasant way to communicate with others and six statements about satisfaction. The strongest of these correlations related to overall satisfaction ($r = .53$), ability to learn through computer-mediated communication ($r = .51$), and level of learning ($r = .50$). A low to medium, positive correlation also exists between the social presence statement that the language used by others to express themselves in computer-mediated communication is easily understood and six statements about satisfaction. The strongest of these correlations related to overall satisfaction with the #AgChat discussion ($r = .59$),overall satisfaction with the moderator's guidance during the discussion ($r = .59$), and the discussion assisting in understanding other points of view ($r = .54$) (see Table 12).

Table 12
Correlations of Social Presence and Satisfaction for AgChat Participants

Social Presence	Satisfaction	r
Computer-mediated communication messages convey feeling and emotion.	My level of learning that took place in this discussion was of the highest quality	*.52**
	I was able to learn through the medium of computer-mediated communication	*.50**
	This discussion was a useful learning experience.	*.48**
	I was able to learn from the #AgChat discussion	*.41**
	As a result of my experience with #AgChat, I would like to participate again	*.40**

Table 12 continued

Social Presence	Satisfaction	*r*
Computer-mediated communication is private/confidential.	The discussion assisted me in understanding other points of view.	*-.42**
	I put in a great deal of effort to learn computer-mediated communication skills (e.g. how to use Twitter) to participate in this discussion	*-.35**
Computer-mediated communication messages are impersonal.	As a result of my experience with #AgChat, I would like to participate in another discussion in the future.	*-.46**
	Overall, I am satisfied with the #AgChat discussion	*-.45**
	This discussion was a useful learning experience.	*-.44**
	Overall, I am satisfied with the moderator's guidance during this discussion	*-.39**
	The diversity of topics in this discussion prompted me to participate in the discussion.	*-.34**
Using computer-mediated communication is a pleasant way to communicate with others.	Overall, I am satisfied with the #AgChat discussion	*.53**
	I was able to learn through the medium of computer-mediated communication	*.51**
	My level of learning that took place in this discussion was of the highest quality	*.50**
	I was able to learn from the #AgChat discussion	*.43**
	This discussion was a useful learning experience.	*.38**
	Overall, I am satisfied with what I learned in this discussion	*.40**
It is easy to express what I want to communicate through computer-mediated communication.	The discussion assisted me in understanding other points of view.	*.34**
The language used by others to express themselves in computer-mediated communication is easily understood.	Overall, I am satisfied with the #AgChat discussion	*.59**
	Overall, I am satisfied with the moderator's guidance during this discussion	*.59**
	The discussion assisted me in understanding other points of view.	*.54**
	Overall, I am satisfied with what I learned in this discussion	*.40**
	This discussion was a useful learning experience.	*.38**
	I was able to learn from the #AgChat discussion	*.38**

Table 12 continued

Social Presence	Satisfaction	r
Computer-mediated communication is technically reliable, or free of system or software errors that might compromise the reliability of online messages reaching only the target destination.	I was stimulated to do additional readings or research about topics discussed during #AgChat	-.49*
Computer-mediated communication allows me to build more caring social relationships with others.	As a result of my participation in #AgChat, I made acquaintances electronically in other parts of the country and/or world.	.54*
	The diversity of topics in this discussion prompted me to participate in the discussion.	.40*
Where I access computer-mediated communication (home, office, computer labs, public areas, etc.) does not affect my ability or desire to participate.	The discussion assisted me in understanding other points of view.	.43*
	As a result of my participation in #AgChat, I made acquaintances electronically in other parts of the country and/or world.	.39*
Computer-mediated communication permits the building of trust relationships.	The discussion assisted me in understanding other points of view.	.46*
	This discussion was a useful learning experience.	.36*
	As a result of my participation in #AgChat, I made acquaintances electronically in other parts of the country and/or world.	.36*
	The diversity of topics in this discussion prompted me to participate in the discussion.	.35*
The large amounts of computer-mediated communication messages, including numbers of messages and length of messages, do not inhibit my ability to communicate.	The discussion assisted me in understanding other points of view.	.46*
	Overall, I am satisfied with the #AgChat discussion	.46*
	Overall, I am satisfied with the moderator's guidance during this discussion	.37*
	This discussion was a useful learning experience.	.36*
I am comfortable participating in computer-mediated communication, if I am familiar with the topic being discussed.	As a result of my experience with #AgChat, I would like to participate in another discussion in the future.	.52*
	This discussion was a useful learning experience.	.49*
	I was able to learn through the medium of computer-mediated communication	.45*

Table 12 continued

Social Presence	Satisfaction	r
	My level of learning that took place in this discussion was of the highest quality	.43*
	Overall, I am satisfied with the #AgChat discussion	.43*
	I was able to learn from the #AgChat discussion	.41*
	The discussion assisted me in understanding other points of view.	.41*
I am uncomfortable participating in computer-mediated communication, if I am not familiar with the topic being discussed.	Overall, I am satisfied with the #AgChat discussion	-.42*
	Overall, I am satisfied with the moderator's guidance during this discussion	-.42*
	My level of learning that took place in this discussion was of the highest quality	-.39*
	As a result of my experience with #AgChat, I would like to participate in another discussion in the future.	-.37*
	This discussion was a useful learning experience.	-.34*
I am uncomfortable communicating with a person who is not familiar to me.	Overall, I am satisfied with the moderator's guidance during this discussion	-.66*
	Overall, I am satisfied with the #AgChat discussion	-.46*
	The diversity of topics in this discussion prompted me to participate in the discussion.	-.37*
	My level of learning that took place in this discussion was of the highest quality	-.37*
	Overall, I am satisfied with what I learned in this discussion	-.35*

Note. *Significant at *p<.05*

For #GardenChat participants, a high to medium, positive correlation exists between the social presence statement that computer-mediated communication messages are social forms of communication and 12 other statements about satisfaction. The strongest of these 12 correlations related to level of learning that took place being at the highest quality (*r* = .80), the discussion as a useful experience (*r* = .80), overall satisfaction with what was learned (*r* = .79), and the discussion assisting in

understanding other points of view ($r = .76$). A medium to high, positive correlation

exists between the social presence statement that computer-mediated communication

permits the building of trust relationships and eight statements about satisfaction. The

strongest of these eight correlations relate to level of learning being at the highest quality

($r = .75$) and the diversity of topics prompting respondents to participate ($r = .70$). A

medium, negative correlation exists between the statement that it is unlikely for someone

else to re-send messages and nine statements about satisfaction. The strongest of these

correlations relate to overall satisfaction with the moderator's guidance ($r = -.73$) and

overall satisfaction with what was learned during the discussion ($r = -.72$) (see Table

13).

Table 13
Correlations of Social Presence and Satisfaction for GardenChat Participants

Social Presence	Satisfaction	r
Computer-mediated communication messages are social forms of communication	My level of learning that took place in this discussion was of the highest quality	.80*
	This discussion was a useful learning experience.	.80*
	Overall, I am satisfied with what I learned in this discussion	.79*
	The discussion assisted me in understanding other points of view.	.76*
	As a result of my participation in #GardenChat, I made acquaintances electronically in other parts of the country and/or world.	.74*
	As a result of my experience with #GardenChat, I would like to participate in another discussion in the future.	.72*
	I was stimulated to do additional readings or research about topics discussed during #GardenChat	.70*

Table 13 continued

Social Presence	Satisfaction	r
	The diversity of topics in this discussion prompted me to participate in the discussion.	.70*
	Overall, I am satisfied with the #GardenChat discussion	.70*
	Overall, I am satisfied with the moderator's guidance during this discussion	.69*
	I was able to learn through the medium of computer-mediated communication	.69*
	I was able to learn from the #GardenChat discussion	.64*
Computer-mediated communication messages convey feeling and emotion.	My level of learning that took place in this discussion was of the highest quality	.52*
	Overall, I am satisfied with the moderator's guidance during this discussion	.51*
Using computer-mediated communication is a pleasant way to communicate with others.	My level of learning that took place in this discussion was of the highest quality	.63*
The language people use to express themselves in computer-mediated communication is meaningful.	Overall, I am satisfied with the moderator's guidance during this discussion	.54*
	My level of learning that took place in this discussion was of the highest quality	.52*
It is easy to express what I want to communicate through computer-mediated communication.	The discussion assisted me in understanding other points of view.	.55*
	My level of learning that took place in this discussion was of the highest quality	.53*
The language used by others to express themselves in computer-mediated communication is easily understood.	My level of learning that took place in this discussion was of the highest quality	.57*
	This discussion was a useful learning experience.	.56*
	I was able to learn through the medium of computer-mediated communication	.53*
	Overall, I am satisfied with the #GardenChat discussion	.53*
	I was able to learn from the #GardenChat discussion	.52*
I am comfortable participating, even though I am not familiar with the topics.	My level of learning that took place in this discussion was of the highest quality	.55*
Computer-mediated communication allows relationships to be established based upon sharing and exchanging information.	This discussion was a useful learning experience.	.61*
	The discussion assisted me in understanding other points of view.	.57*
	I was able to learn from the #GardenChat discussion	.56*

Table 13 continued

Social Presence	Satisfaction	r
	I was able to learn through the medium of computer-mediated communication	*.51**
	My level of learning that took place in this discussion was of the highest quality	*.51**
Computer-mediated communication allows me to build more caring social relationships with others.	I was able to learn through the medium of computer-mediated communication	*.61**
	I was able to learn from the #GardenChat discussion	*.59**
	The discussion assisted me in understanding other points of view.	*.56**
	This discussion was a useful learning experience.	*.55**
	My level of learning that took place in this discussion was of the highest quality	*.54**
Where I access computer-mediated communication (home, office, computer labs, public areas, etc.) does not affect my ability or desire to participate.	This discussion was a useful learning experience.	*.53**
	I put in a great deal of effort to learn computer-mediated communication skills (e.g. how to use Twitter) to participate in this discussion	*-.52**
Computer-mediated communication permits the building of trust relationships.	My level of learning that took place in this discussion was of the highest quality	*.75**
	The diversity of topics in this discussion prompted me to participate in the discussion.	*.70**
	The discussion assisted me in understanding other points of view.	*.65**
	I was able to learn through the medium of computer-mediated communication	*.61**
	I was able to learn from the #GardenChat discussion	*.61**
	This discussion was a useful learning experience.	*.58**
	Overall, I am satisfied with the moderator's guidance during this discussion	*.55**
	Overall, I am satisfied with the #GardenChat discussion	*.54**
It is unlikely that someone else might re-send my messages.	Overall, I am satisfied with the moderator's guidance during this discussion	*-.73**
	Overall, I am satisfied with what I learned in this discussion	*-.72**
	As a result of my participation in #GardenChat, I made acquaintances electronically in other parts of the country and/or world.	*-.66**
	The discussion assisted me in understanding other points of view.	*-.65**

Table 13 continued

Social Presence	Satisfaction	r
	As a result of my experience with #GardenChat, I would like to participate in another discussion in the future.	-.63*
	Overall, I am satisfied with the #GardenChat discussion	-.63*
	I was stimulated to do additional readings or research about topics discussed during #GardenChat	-.57*
	This discussion was a useful learning experience.	-.57*
	My level of learning that took place in this discussion was of the highest quality	-.54*

Note. *Significant at *p<.05;*

CHAPTER V

SUMMARY, CONCLUSIONS, RECOMMENDATIONS, AND IMPLICATIONS

This chapter provides a summary of the study that examined social variables, perceived social presence, participant satisfaction, and relationships between social presence and satisfaction during streaming conversations on Twitter. Content in this chapter will be reported based on findings of a qualitative document analysis that coded messages into affective, interactive or cohesive categories. In addition, this chapter will be based on responses from a survey created using qualtrics.com and made available to respondents over a one-week period.

Summary

Summary of Findings Related to Social Presence Dimensions

The category that contained the most tweets for #AgChat and #GardenChat conversations was interactive, followed by cohesive and then affective. Cohesive tweets within #AgChat seemed to foster a structured and time-sensitive format. The moderator sent tweets that informed participants of the start and finish of the conversation, as well as transitional tweets in between. Affective tweets seemed to be centered around a request from the moderator for informative introductions. As a result, many users revealed their names, locations, and relationships to agriculture. Many questions and their responses were coded as interactive and were easily sighted by the use of "Q" followed by the question number with each question and response. Overall, participants of #AgChat seemed to be engaging more in one main conversation with the group in an organized fashion rather than to selected individuals with the group.

Cohesive and interactive tweets within #GardenChat appeared to support informal communication and encourage potential participants to contribute to the evening's conversation. Interactive tweets seemed to seek information such as the topic of the upcoming conversation. Affective tweets within #GardenChat seemed tocontain more expression of emotion than expression of self-disclosure. It is possible that this is the case since participants were not asked to offer specific personal information. It did not appear that one category of tweets heavily influenced the conversation more than another category. No formal structure or attention to time was apparent through a concentrated collection of tweets. Overall, participants of #GardenChat seemed to be engaging more in many smaller conversations with selected individuals rather than with the group as a whole.

Summary of Findings related to #AgChat and #GardenChat Users' Perceptions of
Social Presence

#AgChat participants agreed with 10 out of 21 statements about social presence. Respondents were neutral about statements related to ease of expressing ideas ($M = 3.33$, $SD = 0.96$, $Mdn = 4.00$), large amounts of messages ($M = 3.24$, $SD = 1.06$, $Mdn = 4.00$), comfort in participating even when not familiar with the topics ($M = 3.24$, $SD = .71$, $Mdn = 3.00$), location when computer-mediated communication is accessed ($M = 3.12$, $SD = 1.05$, $Mdn = 3.00$) , being uncomfortable even when the topic is unfamiliar ($M = 2.88$, $SD = 1.02$, $Mdn = 3.00$), and technology ($M = 2.55$, $SD = 0.71$, $Mdn = 2.00$). Respondents disagreed with statements about social presence such as computer-mediated communication messages are impersonal ($M = 2.36$, $SD = 0.74$, $Mdn = 2.00$) and that it

is unlikely someone might obtain information about them from computer-mediated

messages ($M = 2.30$, $SD = 1.01$, $Mdn = 2.00$).

#GardenChat respondents strongly agreed that computer-mediated

communication allows relationships to be established based upon sharing and

exchanging information ($M = 4.47$. $SD = 0.74$, $Mdn = 5.00$). Respondents agreed with 13

out of 21statements about social presence. Respondents were neutral on items related to

technology ($M = 3.33$. $SD = 0.90$, $Mdn = 3.00$), comfort level even if they are not

familiar with the topic being discussed ($M = 2.73$. $SD = 1.45$, $Mdn = 2.00$), and the

likeliness that someone might obtain information about them from computer-mediated

communication $M = 2.53$, $SD = 0.99$, $Mdn = 2.00$). Respondents disagreed that

computer-mediated communication is private/confidential ($M = 1.93$, $SD = 0.88$, $Mdn = $

2.00), that computer-mediated communication messages are impersonal ($M = 2.13$, $SD = $

0.64, $Mdn = 2.00$)., and that they were uncomfortable communicating with a person

unfamiliar to them ($M = 1.93$, $SD = 1.10$, $Mdn = 2.00$).

Summary of Findings related to #AgChat and #GardenChat Users' Satisfaction

#AgChat respondents agreed with 10 out of 13 statements about satisfaction.

Respondents agreed most with the statement that as a result of their participation in

#AgChat, they made acquaintances electronically in other parts of the country and/or

world. Respondents were neutral about statements related to diversity of topics

prompting them to participate in the discussion ($M = 3.29$, $SD = 1.12$, $Mdn = 3.00$), their

level of learning being at the highest quality during the conversation ($M = 3.21$, $SD = $

0.81, *Mdn* = 3.00), and the amount of effort put forth to participate in the conversation (*M* = 2.85, *SD* = 1.13, *Mdn* = 3.00).

#GardenChat respondents agreed with 12 out of 13 statements about satisfaction. Respondents agreed most with the statement that as a result of their experience, they would like to participate in another discussion in the future (*M* = 4.40, *SD* = 0.83, *Mdn* = 5.00). Respondents agreed least with the statement that their level of learning that took place in the discussion was of the highest quality (*M* = 3.93, *SD* = 1.03, *Mdn* = 4.00). Respondents were neutral about the statement related to the amount of effort put forth to participate in the conversation (*M* = 2.93, *SD* = 1.22, *Mdn* = 3.00).

Summary of Findings related to Relationships Between Social Presence and Satisfaction

For #AgChat respondents, the social presence item stating that computer-mediated communication messages convey feeling and emotion showed a low to medium, positive correlation with six other statements about satisfaction. The strongest of these correlations related to the level of learning that took place (*r* = .52). Responses showed a low, negative correlation between the social presence statement that computer-mediated communication messages are impersonal and five statements about satisfaction. The strongest of these correlations related to wanting to participate in another discussion in the future (*r* = -.46). A low to medium, positive correlation also exists between the social presence statement that computer-mediated communication is a pleasant way to communicate with others and six statements about satisfaction. The strongest of these correlations related to overall satisfaction (*r* = .53). A low to medium, positive correlation also exists between the social presence statement that the language

used by others to express themselves in computer-mediated communication is easily

understood and six statements about satisfaction. The strongest of these correlations

related to overall satisfaction with the #AgChat discussion ($r = .59$).

For #GardenChat participants, a high to medium, positive correlation existed

between the social presence statement that computer-mediated communication messages

are social forms of communication and 12 other statements about satisfaction. The

strongest of these 12 correlations related to level of learning that took place being at the

highest quality ($r = .80$). A medium to high, positive correlation exists between the

social presence statement that computer-mediated communication permits the building

of trust relationships and eight statements about satisfaction. The strongest of these eight

correlations related to level of learning being at the highest quality ($r = .75$). A medium,

negative correlation exists between the statement that it is unlikely for someone else to

re-send messages and nine statements about satisfaction. The strongest of these

correlations relate to overall satisfaction with the moderator's guidance ($r = -.73$).

<div align="center">Conclusions</div>

Conclusions Related to Social Presence Dimensions

For this study, the definition of social presence was operationalized as the level

of salience between two people using a communication medium (Short et al,1976).

Social presence was viewed as a function of communication mediums and social

variables found within #AgChat and #GardenChat messages. Based on the findings that

most tweets in both conversation s were interactive, it seemed that social presence on

Twitter is often created through interactive responses such as asking other people

questions and referring to previous comments. This conclusion aligned with previous research that says reaching out to others contributes to social presence, helps users to identify with others in a group, and contributes to useful knowledge contribution (Shen, Yu, & Khalifa, 2010).

Further, Twitter messages indicated that it might be possible for interactive responses, as well as cohesive and affective responses, to function differently. For example, many interactive responses in the #AgChat conversation took place in a structured format during the time when the moderator asked questions and gave participants the opportunity to respond. Interactive responses in the #GardenChat conversation took place in a less structured environment where participants were engaging in with others through a combination of affective and interactive responses. Further, cohesive tweets in #AgChat helped maintain conversation structure by announcing important times and format for the upcoming conversation, while cohesive tweets in #GardenChat announced the upcoming conversation, encouraged others to participate, and acknowledged participants' contributions as a whole. Affective tweets in #AgChat contained more personal information such as location and occupation, while affective tweets in #GardenChat focused on expression of emotions. These conclusions aligned with previous research that found Twitter hosts a variety of users with different goals and interests (Java et al., 2007) and that social presence can be separated into different dimensions (Rourke et al., 2001).

Though cohesive and affective responses were not as frequent as interactive responses, participants still used them to create social presence. Cohesive tweets

involved salutations; vocatives (addressing someone specifically by name); and group pronouns. These type of tweets created a sense of unity and closeness among multiple people, as well as the sense of establishing closer relationships. Affective responses involved more personal content attributed to feelings of connection. The use of fewer affective responses in #AgChat and #GardenChat conversations align with previous research that demonstrated it is harder to express affective interactions in text-based environments (Rourke et al., 2001). The use of emoticons and expressions of emotions also aligns with research that says lack of body language and facial expressions can be compensated for with text-based responses (Kalman and Dafaeli, 2010).

Overall, it appeared that social dimensions in #AgChat and #GardenChat conversations involve mostly messages that acknowledge and express appreciation for participants in the group. Participants do not appear to be heavily concerned with developing and maintaining close relationships with other participants. Rather, most social dimensions supported a general relationship founded on commonalities of agriculture and gardening. Outside of these general topics in these one or two hour conversations, it did not seem that participants cared to associate closely with other participants. This conclusion supports previous research that Twitter users fall into different categories depending on their intentions, and that if Twitter is irrelevant to their intentions, they are less likely to use it (Java et al., 2007; Dunlap & Lowenthal, 2009).

Though #AgChat and #GardenChat conversations were not studied to be compared, it is important to note that #AgChat conversations did not have the same moderator every week, but appeared to be more structured and contained more formal

questions than #GardenChat. It seemed that the more formal structure of #AgChat

conversations related to the moderator's behavior, specifically through indicators of

time, transition, and requests for participants to include specific information in

messages. Thus, it can be suspected that the moderator of #AgChat and #GardenChat

conversations greatly influence the social dynamics of participants. This conclusion

aligned with previous research that says is important for online moderators to practice

techniques in support of social presence (Tu, 2002).

Conclusions Related to Perceptions of Social Presence

Participants of both conversations appear to sense a social presence and that they

are communicating and interacting with other people. Participants of GardenChat

strongly agreed and participants of #AgChat agreed that computer-mediated

communication allows relationships to be established based upon sharing and

exchanging information. Participants of both conversations agreed that computer-

mediated communication allows them to build more caring social relationships with

others. Therefore, participants do not appear to feel a sense of deindividuation as

described by Taylor (2011).

Based on the findings that participants of both conversations disagreed with the

statement that it is unlikely someone else might re-send their messages and that

participants disagreed with the statement that they were uncomfortable communicating

with a person unfamiliar to them, it appeared that participants have a sense that other

participants are in close virtual proximity. This conclusion aligns with previous research

that says perceptions of social presence can influence psychological distance or felt

immediacy during online communication (Gunawardena & McIsaac, 2004). This conclusion also aligns with research in distance education identifying a trend that defines distance in terms of psychological aspects rather than physical proximity (Garrison, 2000; So, H., 2008).

Based on findings that participants of both conversations agreed that computer-mediated communication conveys feeling and emotion, it appears that whether it is through affective, interactive, or cohesive responses, or some other method, it is possible to express feeling and emotion in CMC. This conclusion contradicts previous research by Walther (1996) that says CMC will become increasingly be experienced as less emotional and more matter-of-fact.

Conclusions Related to Satisfaction

Based on findings in this study that participants of #AgChat and #GardenChat agreed with most statements about satisfaction, such as they would like to participate in another conversation in the future, they were stimulated to do additional readings, they were able to learn, and that they were overall satisfied with the #AgChat and #GardenChat discussions , it appeared that participants maintained attention and developed an attitude about their communication experience. Kupritz and Cowell (2011) report that how a person maintains attention and develops an attitude about communication is influenced by nonverbal cues found in face-to-face communication, such as eye contact, voice inflections, wardrobe, and facial expressions. Therefore, based on findings in this study and the study by Kupritz and Cowell (2011), perhaps there are components within #AgChat and #GardenChat conversations that compensate for the

nonverbal cues found in face-to-face communication that influence how much and how a person maintains attention and develops an attitude about communication. This conclusion aligns with previous studies that report social presence can be fostered through text-based variables, such as emoticons, to compensate for lack of nonverbal or face-to-face cues (Gunawardena and Zittle,1997). This conclusion also supports previous studies that report missing social cues in CMC can be compensated for with response time; humorous or personalized message content; or paralanguage and emoticons, such as happy and sad faces (Picciano, 2002; Richardson & Swan, 2003; Rourke, Anderson, Garrison, & Archer, 2001; Taylor et al., 2011).

Conclusions related to Relationships Between Perceptions of Social Presence and Satisfaction

Based on findings that participants of #AgChat and #GardenChat are more satisfied when their discussions convey feeling and emotion, it appeared that it is important for users to craft their messages with sentiment and express their feelings as best as possible through text. These expressions could include special punctuation, the use of capital letters, emoticons, and descriptive language. This conclusions aligns with previous studies reporting that missing social cues in CMC can be replaced with response time; humorous or personalized message content; or paralanguage and emoticons, such as happy and sad faces (Picciano, 2002; Richardson & Swan, 2003; Rourke, Anderson, Garrison, & Archer, 2001; Taylor et al., 2011). This conclusion also aligns with a study by Tu (2002) reporting that the most commonly used emoticon was ":-)," while paralanguage was commonly expressed through punctuation, abbreviations,

font styles, and unique phrases. Similarly, participants in Tu's study indicated that emoticons and paralanguage made the conversation more comfortable (Tu, 2002).

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

<div align="center">Recommendations</div>

Recommendations for Practice

Findings and conclusions in this study suggest that social presence, satisfaction and the relationships among them influence satisfaction in computer-mediated communication, specifically in Twitter conversations. It is recommended that when interacting or teaching in a computer-mediated environment such as Twitter, agricultural communicators use responses that support components of social presence. Studies have shown correlations between social presence and student satisfaction (Gunawardena, 1995; Gunawardena & Zittle, 1997; Richardson & Swan, 2003), social presence and learning communities (Rourke et al., 2001; Rovai, 2002), and social presence and perceived learning (Richardson & Swan, 2003).

Messages that support social presence should include affective responses to express feeling and emotion through special punctuation and/or emoticons. Emoticons and paralanguage expressed through abbreviations, font styles, and unique phrases make participants in a CMC environment feel more comfortable (Tu, 2002). Interactive responses in the form of quoting others or referring to previous comments should also be used in computer-mediated environments to reinforce the presence of another person. Cohesive responses that use individuals' names or screen names, group pronouns such as "we," or greetings should also be used in a CMC environment. Cohesive responses, such as introductions, during the first few online learning sessions can foster social presence to build trust and participation among the group (Johansen, Vallee, & Spangler, 1988).

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

Recommendations for Research

Many studies on social presence have been conducted to explain the differences between CMC and face-to-face communication (Short et al., 1976). More research should be conducted to directly compare social presence dimensions in a CMC and face-

to-face environment. For example, it would be helpful for a researcher to compare the social presence dimensions that exist among a sample group engaging in conversation in a F2F environment with the social presence dimensions that exist among the same sample group engaging in conversation in a CMC environment. Further, since one conversation in this study appeared to be more structured while the other appeared to be less structured and participants in both seemed to be satisfied, future research should compare and contrast structured and unstructured conversations. Studies as described above will allow communicators to closely define the similarities and differences between F2F and CMC, and better understand how structure levels in Twitter conversations relate to satisfaction levels of participants.

To build on this study, further research should be conducted to investigate the best methods of supporting components of social presence. For example, while findings in this study indicate that feeling and emotion support more satisfying conversations, more research should be conducted to determine how feeling and emotion are best conveyed. Since both conversations on Twitter appeared to be successful (as indicated by some level of satisfaction and cohesive responses among participants), a study that examines the social presence practices that make Twitter conversations a successful tool will aid communicators in defining best practices for Twitter.

Future research should also be conducted to improve methods of measuring social presence, especially since some aspects of social presence have been deemed highly subjective and are thought to be measured best by self-report tools (Biocca & Harms, 2002). It is possible that digital scales allowing users to indicate their level of

agreement on a continuum rather than one a one through five Likert scale may yield more accurate responses. Since many tweets in this study were sent by or related to the moderator of each conversation, the field of agricultural communications will benefit from a study that examines the role of moderators in Twitter conversations.

Finally, further research should examine social presence dimensions among varying populations and sample groups that convene about topics outside of agriculture or subtopics of agriculture such as sustainability, production, organics, and more. Members of these groups should include individuals outside of #AgChat, #GardenChat, and Twitter to investigate social presence dimensions within other forms of computer-mediated communication. These groups should also involve groups that are gender exclusive to examine gender roles in creating social presence dimensions.

<div align="center">Implications</div>

Studies on social presence and CMC have been conducted to investigate the possible benefits that CMC can provide for businesses (Kaplan & Haenlein, 2010). However, some researchers have found that a lack of nonverbal and paraverbal cues such as tone, pitch, and inflection in CMC can result in unorganized conversations, misperceptions, and confusion (Rhoades, 2001; Taylor et al., 2011). Other researchers have found that lack of social cues in CMC result in a depersonalized or anonymous experience (Taylor, 2011). However, both conversations in this study, whether structured or unstructured, portrayed elements of social presence and appeared to be successful (as indicated by some level of satisfaction among participants and findings related to objective one). Therefore, agricultural communicators should be confident that

with certain social presence dimensions, Twitter conversations can be a successful way to communicate agricultural stories to others.

Now that this study has provided more insight on the social presence dimensions that exist during Twitter conversations, perhaps businesses can better understand how to connect with existing and potential customers on Twitter, thus leading to the benefit of new or increased sales. For example, based on the finding that over 50 % of respondents in this study were female, it is implied that females may be more interested in and likely to recognize and support social presence dimensions. Therefore, businesses may search for female consumers on Twitter and connect with them through the use of appropriate social presence dimensions. In addition, understanding the affective, interactive, and cohesive functions of social presence dimensions will allow agricultural communicators to better connect with and educate the general public about agricultural practices.

Insight on participants' perceptions of social presence and how they relate to perceptions of satisfaction will allow businesses, agricultural communicators, and other social media users to implement Twitter strategies that are more satisfying. For example, suppose a Twitter user or organization on Twitter has the goal of educating their audience. Since participants in this study indicated that the more they felt CMC conveyed feeling and emotion, the more they felt their learning experience was of the highest quality, the Twitter user or organization on Twitter would most likely achieve their goal of education by using affective responses, which express feeling and emotion (as shown in findings for objective one).Thus, this study provided useful insights for

those professionals seeking to understand social networks as a business tool and how these social networks can be adapted to make up for lack of F2F social cues.

In addition, understanding the similarities and differences in perceived social presence and satisfaction of users in F2F communication and CMC will support the *National Research Agenda for Agricultural Education and Communication* (Osborne,n.d). Specifically, this study provided insight that addresses priority area number three with initiatives to examine how information and media delivery affect thinking processes, problem solving, and decision-making related to agriculture (Osborne, n.d.). This study also supported research initiatives to "understand how the public interprets, creates meaning, and values information" about important agricultural issues, evaluate new technologies for application in "agricultural knowledge management" and engage "the public in agriculture-related decision making" (National Research Agenda, 2007, p. 4).

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

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APPENDIX A

MODEL AND TEMPLATE FOR ASSESSMENT OF SOCIAL PRESENCE

Category	Indicators	Definitions	Example
Affective	Expression of emotions	Conventional expressions of emotion, or unconventional expressions of emotion, includes repetitious punctuation, conspicuous capitalization, emoticons.	"I just can't stand it when … !!!!"
	Use of humor	Teasing, cajoling, irony, understatements, sarcasm.	The banana crop in Edmonton is looking good this year
	Self-disclosure	Presents details of life outside of topic, or expresses vulnerability	"Where I work, this is what we do …" "I just don't understand this question"
Interactive	Continuing a thread	Using reply feature of software, rather than starting a new thread.	Software dependent, e.g., "Subject: Re" or "Branch from"
	Quoting from others' messages	Using software features to quote others entire message or cutting and pasting selections of others' messages.	Software dependent, e.g., "Martha writes." Or text prefaced by less-than symbol <.
	Referring explicitly to others' messages	Direct references to comments of others' posts.	"In your message, you talked about Moore's distinction between …"
	Asking questions	Students ask questions of other students or the moderator.	"Anyone else had experience with WEBCT?"
	Complimenting, expressing appreciation	Complimenting others or contents of others' messages.	"I really like your interpretation of the reading"
	Expressing agreement	Expressing agreement with others or content of others' messages.	"I was thinking the same thing. You really hit the nail on the head."
Cohesive	Vocatives	Addressing or referring to participants by name.	"I think John made a good point." "John, what do you think?"
	Addresses or refers to the group using inclusive pronouns	Addresses the group as *we, us, our, group*	"Our textbook refers to …" "I think we veered off track …"
	Phatics, salutations	Communication that serves a purely social function; greetings, closures.	"Hi all" "That's it for now" "We're having the most beautiful weather here"

Source: Rourke et al., (2001)

APPENDIX B

THE COLLABORATIVE LEARNING, SOCIAL PRESENCE, AND SATISFACTION

QUESTIONNAIRE

Default Question Block

Dear #AgChat participant:

As someone who is passionate about agriculture, you can provide insights that will help those in the business of raising food, feed, fuel, and fiber to better connect with fellow stakeholders and bridge the gap between producers and non-producers. Your satisfaction with and perceptions of social presence in #AgChat conversations are essential in developing skills and resources among advocates of agriculture. The knowledge you can provide is vital to the dissemination of accurate agricultural information in the virtual world of Twitter, as well as other social networks on the Internet.

The primary purpose of this study, "Perceptions and expressions of social presence during conversations on Twitter," is to examine similarities and differences in social variables, perceived social presence, and overall satisfaction among participants in two different streaming conversations on Twitter; #AgChat and #GardenChat. The moderators of these conversations and Texas A&M University have assisted in the preparations for this study. A report about the results will be shared with the moderators so that your views may be incorporated into future resources.

This survey will take approximately 15 minutes to complete. Please respond to the questions based on your knowledge and perceptions. You will be able to access the survey one time from your computer. If you are not able to access the online survey or prefer a printed version of the survey, please email Kelly Pritchett at kelly@neo.tamu.edu or call her at 817-247-7850.

By clicking the "Next" button below, you are giving your consent to participate in this study.

Your responses are completely voluntary and will be treated confidentially. Responses to this survey will be stored in an online, password-protected account until the survey is closed and then will be stored on a password-protected spreadsheet on the researcher's computer.

You may choose to withdraw from the survey at any time without penalty. The risks associated with this project are not greater than those ordinarily encountered in daily life.

Thank you for taking your valuable time to complete this survey. If you have any questions, please call Kelly Pritchett at 817-247-7850 or Dr. Traci Naile at 405-744-8135. This research study has been reviewed by the Human Subjects' Protection Program at Texas A&M University. For research-related problems or questions regarding your rights as a research participant, you can contact these offices at 979-458-4067 or irb@tamu.edu.

Sincerely,

Kelly Pritchett
Graduate Student
Department of Agricultural Leadership, Education and Communications
Texas A&M University

Section 1: Demographics

The following questions are related to your background and your experience with #AgChat. Please read and answer the questions carefully.

What is your gender?

- ○ Male
- ○ Female

What is your age?

○ Under 18
○ 18 - 25
○ 26 - 35
○ 36 - 45
○ Above 45

What is your predominant ethnic background?

○ Caucasian
○ African-American
○ Latino
○ Asian/Pacific Islander
○ Other

Please estimate your level of Twitter expertise.

○ No experience
○ Novice
○ Intermediate
○ Expert

Briefly describe your interest in agriculture (i.e., consumer, producer, professional speaker, marketing/communications, etc).

[   ]

In how many #AgChat discussions have you participated?

○ 0
○ 1
○ 2
○ 3
○ 4
○ 5
○ 6
○ 7
○ 8
○ 9
○ 10
○ More than 10

Please list the state in which you were located during your most recent participation in #AgChat. If you participated from outside the United States, please list the country in which you were located.

Please indicate the general environment around you during the #AgChat conversation.

○ Peaceful and quiet

○ Some background noise, such as people talking or television noise

○ Business office with people coming and going

○ Noisy and stressful

○ Other

Have you ever met in person any of the other #AgChat participants before the most recent discussion in which you participated? If yes, please list how many other participants you have met.

○ Yes

○ No

Section 2: Satisfaction

The following questions are related to your attitude toward computer-mediated communication (CMC), specifically the online Twitter conversation (#AgChat) in which you recently participated. Please consider your use of CMC related to the conversation only. You will be presented with statements about CMC and will be asked to select the appropriate response for each statement. Please read each statement carefully.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
I was able to learn through the medium of computer-mediated communication.	○	○	○	○	○
I was able to learn from the #AgChat discussion.	○	○	○	○	○
I was stimulated to do additional readings or research about topics discussed during #AgChat.	○	○	○	○	○
The discussion assisted me in understanding other points of view.	○	○	○	○	○
As a result of my experience with #AgChat, I would like to participate in another discussion in the future.	○	○	○	○	○
This discussion was a useful learning experience.	○	○	○	○	○

As a result of my participation in #AgChat, I made acquaintances electronically in other parts of the country and/or world.	○	○	○	○	○
The diversity of topics in this discussion prompted me to participate in the discussion.	○	○	○	○	○
I put in a great deal of effort to learn computer-mediated communication skills (e.g., how to use Twitter) to participate in this discussion.	○	○	○	○	○
My level of learning that took place in this discussion was of the highest quality.	○	○	○	○	○
Overall, I am satisfied with the #AgChat discussion.	○	○	○	○	○
Overall, I am satisfied with the moderator's guidance during this discussion.	○	○	○	○	○
Overall, I am satisfied with what I learned during this discussion.	○	○	○	○	○

Section 3: Collaborative Learning

The following questions are related to your attitude toward collaborative learning through computer-mediated communication (CMC), specifically the online Twitter conversation (#AgChat) in which you recently participated. Please consider your use of CMC related to the conversation only. You will be presented with statements about CMC and will be asked to select the appropriate response for each statement. Please read each statement carefully.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Collaborative learning in a computer-mediated communication environment is better than in a face-to-face learning environment.	○	○	○	○	○
I felt like part of a learning community during #AgChat.	○	○	○	○	○
I actively exchanged my ideas with group members.	○	○	○	○	○
I was able to develop new skills and knowledge from other members in my group.	○	○	○	○	○
I was able to develop problem-solving skills through peer collaboration.	○	○	○	○	○
Collaborative learning in the group was effective.	○	○	○	○	○
Collaborative learning in the group was time consuming.	○	○	○	○	○
Overall, I am satisfied with my collaborative learning	○	○	○	○	○

experience in #AgChat.

Section 4: Social Presence

The following questions are related to your attitude toward computer-mediated communication (CMC), specifically the online Twitter conversation (#AgChat) in which you recently participated. Please consider your use of CMC related to the conversation only. You will be presented with statements about CMC and will be asked to select the appropriate response for each statement. Please read each statement carefully.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Computer-mediated communication messages are social forms of communication.	○	○	○	○	○
Computer-mediated communication messages convey feeling and emotion.	○	○	○	○	○
Computer-mediated communication is private/confidential.	○	○	○	○	○
Computer-mediated communication messages are impersonal.	○	○	○	○	○
Using computer-mediated communication is a pleasant way to communicate with others.	○	○	○	○	○
The language people use to express themselves in computer-mediated communication is meaningful.	○	○	○	○	○
It is easy to express what I want to communicate through computer-mediated communication.	○	○	○	○	○
The language used by others to express themselves in computer-mediated communication is easily understood.	○	○	○	○	○
I am comfortable participating, even though I am not familiar with the topics.	○	○	○	○	○
Computer-mediated communication is technically reliable, or free of system or software errors that might compromise the reliability of online messages reaching only the target destination.	○	○	○	○	○
Computer-mediated communication allows relationships to be established based upon sharing and exchanging information.	○	○	○	○	○
Computer-mediated					

communication allows me to build more caring social relationships with others.	◉	◉	◉	◉	◉
It is unlikely that someone might obtain personal information about me from computer-mediated communication messages.	◉	◉	◉	◉	◉
Where I access computer-mediated communication (home, office, computer labs, public areas, etc.) does not affect my ability or desire to participate.	◉	◉	◉	◉	◉
Computer-mediated communication permits the building of trust relationships.	◉	◉	◉	◉	◉
The large amounts of computer-mediated communication messages, including numbers of messages and length of messages, do not inhibit my ability to communicate.	◉	◉	◉	◉	◉
It is unlikely that someone else might re-send my messages.	◉	◉	◉	◉	◉
I am comfortable participating in computer-mediated communication, if I am familiar with the topic being discussed.	◉	◉	◉	◉	◉
I am uncomfortable participating in computer-mediated communication, if I am not familiar with the topic being discussed.	◉	◉	◉	◉	◉
I am comfortable communicating with a person who is familiar to me.	◉	◉	◉	◉	◉
I am uncomfortable communicating with a person who is not familiar to me.	◉	◉	◉	◉	◉

APPENDIX C

SURVEY ADAPTATIONS

Section 1 (General):	Nine questions were included to gather demographic information and level of Twitter expertise. Two of these questions were added to determine the state and local environment in which each participant was located during the Twitter conversation. One question asks participants to indicate if they had ever met any of the other individuals in a face-to-face setting or on a Twitter platform before the Twitter conversation. Types of questions include those that ask participants to indicate age, gender, Twitter expertise, and how they are related to agriculture.
Section 2 (Satisfaction):	Thirteen components of the questionnaire were based on the satisfaction scale by Gunawardena and Zittle (1997). Three of these items were added to measure users' overall satisfaction with the Twitter conversation, moderator, and learning material. Types of questions include those that ask participants to indicate their satisfaction with their ability to learn, their ability to understand the conversations, and the diversity of topics in each conversation.
Section 3 (Collaborative Learning):	Eight items were included to measure users' preferences on addressing the group versus individuals during conversation, preferences to online discussion versus face-to-face discussion, amounts of collaboration, and overall satisfaction with collaborative discussion. These items were adapted from previous research (e.g., Driver, 2002; Kitchen & McDougall, 1998) on online collaborative learning among students and teachers in distance education. Types of questions include those that ask participants to share their opinions on computer-mediated communication versus face-to-face communication, amount of learning, and sharing ideas in each conversation.

Section 4 (Social Presence Scale):	Twenty-one questions were adapted from the Computer-Mediated Communication (CMC) Questionnaire developed by Tu (2002) to measure variables among users on four dimensions of social presence: (a) social context, (b) online communication, (c) interactivity, and (d) privacy. Types of questions include those that ask participants to indicate where they participate in the weekly conversations, their comfort level with sharing information, and their comfort level with familiar and unfamiliar conversation topics.

Source: So & Brush, 2008

APPENDIX D

INSTITUTIONAL REVIEW BOARD

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TEXAS A&M UNIVERSITY
DIVISION OF RESEARCH AND GRADUATE STUDIES - OFFICE OF RESEARCH COMPLIANCE

1186 TAMU, General Services Complex
College Station, TX 77843-1186
750 Agronomy Road, #3500

979.458.1467
FAX 979.862.3176
http://researchcompliance.tamu.edu

Human Subjects Protection Program

Institutional Review Board

APPROVAL DATE:

03-Aug-2011

MEMORANDUM

TO:	PRITCHETT, KELLY
	77843-2166
FROM:	Office of Research Compliance
	Institutional Review Board
SUBJECT:	Initial Review

Protocol Number:	2011-0554
Title:	Perceptions and expressions of social presence during conversations on Twitter
Review Category:	Exempt from IRB Review

It has been determined that the referenced protocol application meets the criteria for exemption and no further review is required. However, any amendment or modification to the protocol must be reported to the IRB and reviewed before being implemented to ensure the protocol still meets the criteria for exemption.

This determination was based on the following Code of Federal Regulations:
(http://www.hhs.gov/ohrp/humansubjects/guidance/45cfr46.htm)

45 CFR 46.101(b)(2) Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures, or observation of public behavior, unless: (a) information obtained is recorded in such a manner that human subjects can be identified, directly or through identifiers linked to the subjects; and (b) any disclosure of the human subjects' responses outside the research could reasonably place the subjects at risk of criminal or civil liability or be damaging to the subjects' financial standing, employability, or reputation.

Provisions:

Comments:

This electronic document provides notification of the review results by the Institutional Review Board.

APPENDIX E

REMINDER TWEETS

Retweeted Messages			Original Messages		
Date	Time	Message	Date	Time	Message
#GardentChat					
8/22/11	9:30 a.m.	Thank you for your help! =) RT @BG_Garden: IF anyone is interested check out Survey at http://ow.ly/6a2yo #gardenchat	8/23/2011	23-Aug-11	Thanks to all #gardenchat folks who've already taken my thesis survey! Haven't taken it yet? You can do it here! ~> http://ow.ly/68Ry5
08/23/11	5:00a.m.	Would love your feedback! =) RT @BG_Garden: IF anyone is interested check out Survey at http://ow.ly/6a2yo #gardenchat	23-Aug-11	5:00p.m.	Would love feedback from #gardenchat folks on your experience with online convos. Thesis project in the works! =) Thx! ~> http://ow.ly/6a34K
08/23/11	1:00p.m.	Excited to see results! RT @BG_Garden: IF anyone is interested check out Survey at http://ow.ly/6a2yo #gardenchat	24-Aug-11	1:00a.m.	Participated in the 8/22 #gardenchat? Your insight is valuable and would be greatly appreciated on thesis work! Thx! ~> http://ow.ly/6a7u7
08/23/11	9:00p.m.	Appreciate everyone's input! RT @BG_Garden: IF anyone is interested check out Survey at http://ow.ly/6a2yo #gardenchat	24-Aug-11	9:00a.m.	Will leave you alone soon, #gardenchat peeps. Just don't want you 2 miss an opp 2 help in thesis on Twitter convos! ~> http://ow.ly/6a7yp
08/24/11	5:00a.m.	Almost there! RT @BG_Garden: IF anyone is interested check out Survey at http://ow.ly/6a2yo #gardenchat	24-Aug-11	5:00p.m.	Opportunity to take survey for thesis on social presence in Twitter convos. Appreciate the help! #gardenchat ~> http://ow.ly/6a7B2

			26-Aug-11	2.00 p.m.	Excited to hear feedback from my new #gardenchat buddies! Please share your valuable thoughts for thesis survey! ~> http://ow.ly/6dX50
			27-Aug-11	2.00 a.m.	Thesis survey open for just a few more days! Please share your valuable thoughts on Twitter convos! #gardenchat ~> http://ow.ly/6dYXf
			27-Aug-11	2.00 p.m.	Thx to all my garden buds who've taken the survey on Twitter convos! Still want to take it? Please do! ~> #gardenchat ~> http://ow.ly/6dZ05
			28-Aug-11	2.00 p.m.	Need a lazy Sunday activity? Help a desperate grad student w/thesis survey on Twitter convos! =) Thx all! #gardenchat ~> http://ow.ly/6dZ8v
			29-Aug-11	2.00p.m.	Thx to all #gardenchat buds who took thesis survey on Twitter convos! Still want to take it? Please do! Closes 2nite! ~> http://ow.ly/6dZdz

Retweeted Messages			Original Messages		
Date	Time	Message	Date	Time	Message
#AgChat					
8/23/2011	8:56p.m.	Thanks for your help! Wahoo! RT @agchat: Let's help @KMPritchett with her graduate thesis by taking this survey! http://ow.ly/69wNv #agchat	8/24/2011	9:00a.m.	Thanks to all #agchat folks who've already taken my thesis survey! Still want to take it? You can do it here! ~> http://ow.ly/6b5Sr
8/24/2011	5:00a.m.	Would love your feedback! RT @agchat: Let's help @KMPritchett with her graduate thesis by taking this survey! http://ow.ly/69wNv #agchat	8/24/2011	5:00p.m.	Would love feedback from #agchat folks on your experience with online convos. Thesis project in the works! =) Thx! ~> http://ow.ly/6b5Vj
8/24/2011	1:00p.m.	Excited to see results! RT @agchat: Let's help @KMPritchett with her graduate thesis by taking this survey! http://ow.ly/69wNv #agchat	8/25/2011	1:00a.m.	Participated in the 8/23 #agchat ? Your insight is valuable and would be greatly appreciated on thesis work! Thx! ~> http://ow.ly/6b5X2

8/24/2011	9:00p.m.	Appreciate everyone's input! RT @agchat: Let's help @KMPritchett with her graduate thesis by taking this survey! http://ow.ly/69wNv #agchat	8/25/2011	9:00a.m.	Promise I'll leave you alone soon, #agchat! But don't miss your opp 2 share insight on Twitter convos for thesis work! ~> http://ow.ly/6b60F
8/25/2011	5:00a.m.	Almost there! RT @agchat: Let's help @KMPritchett with her graduate thesis by taking this survey! http://ow.ly/69wNv #agchat	8/25/2011	5:00p.m.	Opportunity to take survey for thesis on social presence in Twitter convos! Appreciate your help, #agchat buds! http://ow.ly/6b64R
8/25/2011	1:00p.m.	Thx 4 ur help! Thesis almost done! RT @agchat: Let's help @KMPritchett w/graduate thesis by taking this survey! http://ow.ly/69wNv #agchat	8/26/2011	1:00a.m.	Didn't get a chance to take the survey on Twitter convos? Please feel free to take it now! ~> http://ow.ly/6b6aH Thesis in works! #agchat
			8/26/2011	2.00 p.m.	Looking forward to hearing your input on Twitter convos! Please share your valuable thoughts for thesis survey!~> http://ow.ly/6dWTF #agchat
			8/27/2011	2.00 a.m.	Thesis survey open for just a few more days! Please share

					your valuable thoughts on Twitter convos! ~> http://ow.ly/6dY0q #agchat
			8/27/2011	2:00 p.m.	Thx to all my aggie buds who've taken the survey on Twitter convos! Still want to take it? Please do! ~> http://ow.ly/6dY7u #agchat
			8/28/2011	2.00 p.m.	A good Sunday afternoon activity? Helping a desperate grad student w/thesis survey on Twitter convos! Thx all! ~> http://ow.ly/6dYvE #agchat
			8/29/2011	2.00 p.m.	Survey up for one more day! Thx to everyone who's taken it! If you haven't yet, feel free here! ~> http://ow.ly/6dYez #agchat
			8/30/2011	2.00 p.m.	Thx to all #agchat buds who took survey on Twitter convos! Still want 2 take it? Please do! Closes 2nite! ~> http://ow.ly/6dYLI #agchat

VITA

Name:	Kelly Marie Pritchett
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