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

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Keywords

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

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Introduction

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

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

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

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

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

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

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

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

Literature Review/Theoretical Framework

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

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

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

Measuring Social Presence

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

Some aspects of social presence have been deemed highly subjective and are thought to be mea- sured 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, af- fective, 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., p. 6).

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

Purpose and Objectives

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

Methods

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

Survey Instrument Design

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

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

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

Quantitative Data Collection

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

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

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

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

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

Findings

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

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

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

Perceptions of Social Presence

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

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

Table 1

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

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

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

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

Satisfaction with Conversation

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

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

Relationships among Social Presence and Satisfaction

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

Table 2

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

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

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

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

Table 3

#AgChat Participants' Satisfaction (n = 55)

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

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

Table 4

#GardenChat Participants' Satisfaction (n = 19)

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

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

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

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

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

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

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

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

Relationships among Social Presence and Satisfaction

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

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

Recommendations

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

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

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

Implications

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

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

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

References

American Farm Bureau Federation. (2011, March 3). *87 percent of young farmers, ranchers express more optimism*. Retrieved from http://www.fb.org

Bartter, A., Fellow, A., Fernandez, N.P., Hidalgo, R., Martin, L., Underdue, S.,Vu, M., & Won, M. (2009). New digital media. Retrieved 2010 from http://vpadmin.fullerton.edu/AssociateVP/OrgDev/UnivLeadAcademy/LeadDevProg/ProjectReports/New_Digital_Media.pdf

Biocca, F., & Harms, C. (2002). Defining and measuring social presence: Contribution to the networked minds theory and measure. Retrieved 2010 from http://citeseerx.ist.psu.edu/viewdoc/summary?doi=10.1.1.84.8350

Brenner, J. & Smith, A. (2013, August 5). *72% of online adults are social networking site users*. Retrieved from http://www.pewinternet.org/~/media//Files/Reports/2013/PIP_Social_networking_sites_update.pdf

Driver, M. (2002). Exploring student perceptions of group interaction and class satisfaction in the web-enhanced classroom. *The Internet and Higher Education, 5*(1), 35-45. doi: 10.1016/S1096-7516(01)00076-8

Doerfert, D. L. (Ed.). (2011). *National research agenda America Association for Agricultural Eductaion' research priority areas for 2011-2015* Lubbock TX Texas Tec University Department of Agricultural Education and Communications

Garrison, R. (2000). Theoretical challenges for distance education in the 21st century: A shift from structural to transactional issues. *International Review of Research in Open and Distance Learning, 1*(1), 1–17.

Gunawardena, C. N. (1995). Social presence theory and implications for interaction and collaborative learning in computer conferences. *International Journal of Educational Telecommunications, 1*(2), 147-166. Charlottesville, VA: AACE.

Gunawardena, C. N., & McIsaac, M. S. (2004). Distance education. In *D. Jonassen (Ed.), Handbook of research for educational communications and technology*, 2, (pp. 355-395). Bloomington, IN: Association for Educational Communications &Technology.

Gunawardena, C. N., & Zittle, F. J. (1997). Social presence as a predictor of satisfaction within a computer-mediated conferencing environment. *American Journal of Distance Education*, *11*(3), 8-26.

Hampton, K. N., Sessions, L. F., Her, E. J., & Rainie, L. (2009, November). *Social isolation and new technology: How the internet and mobile phones impact Americans' social networks*. Retrieved from http://www.pewinternet.org/~/media//Files/Reports/2009/PIP_Tech_and_Social_Isolation.pdf

Hara, N., Bonk, C., & Angeli, C. (2000). Content analysis of online discussion in an applied educational psychology. *Instructional Science*, *28*(2), 115–152.

Harasim, L. M. (1993). Networlds: Networks as social space. In L. M. Harasim (Ed.), Global networks: *Computers and international communication* (pp. 15–34). Cambridge, MA: MIT Press.

Internet World Stats. (2011). *Internet usage and population in North America.* Retrieved from http://www.internetworldstats.com/stats14.htm

Johansen, R., Vallee, J., & Spangler, K. (1988). Teleconferencing: electronic group communication. In R. S. Cathcart & L. A. Samovar (Eds.), *Small group communication*: A reader (5th ed., pp. 140-154). Menlo Park, CA: Institute for the Future.

Kitchen, D., & McDougall, D. (1998). Collaborative learning on the internet. *Journal of Educational Technology Systems, 27*(3), 245-258.

Kreijns, K., Kirschner, P., Jochems, W., & van Buuren, H. (2010). Measuring perceived social presence in distributed learning groups. *Education and Information Technologies, 1*. doi:10.1007/s10639-010-9135-7 ER

Kupritz, V.W., & Cowell, E. (2011). The impact of the physical environment on supervisory communication skills transfer. *Journal of Business Communication, 48*(1), 148-185. doi: 10.1177/0021943610385656

Lewandowski, J., Rosenberg, B.D., Parks, J.M., & Siegel, J.T. (2011). The effect of informal social support: Face-to-face versus computer-mediated communication. *Computers in Human Behavior*, *27*(5), 1806-1814. doi:10.1016/j.chb.2011.03.008

Lowenthal, P. R. (2009). Social Presence. In P. Rogers, G. Berg, J. Boettcher, C. Howard, L. Justice, and K. Schenk (eds.), *Encyclopedia of Distance and Online Learning*, 2nd Edition, (pp. 1900-1906). IGI Global, Hershey, PA.

Picciano, A. (2002). Beyond student perceptions: Issues of interaction, presence, and performance in an online course. *JALN, 6*(1), 21-40.

Prasarnphanich, P., & Wagner, C. (2011). Explaining the sustainability of digital ecosystems based on the Wiki model through critical-mass theory. *Industrial Electronics, 58*(6) 2065-2072. doi: 10.1109/TIE.2009.2027248

Richardson, J., & Swan, K. (2003). Examining social presence in online courses in relation to students' perceived learning and satisfaction. *JALN, 7*(1), 68-88.

Rourke, L., Anderson, T., Garrison, R. D., & Archer, W. (2001).Assessing social presence in asynchronous text-based computer conferencing. *Journal of Distance Education, 14*(2), 50-71. Retrieved from http://www.mendeley.com/research/assessing-social-presence-in-asynchronous-textbased-computer-conferencing-1/

Rovai, A. (2002). Sense of community, perceived cognitive learning, and persistence in asynchronous learning networks. *Internet and Higher Education, 5*, 319-332.

Russo, T., & Benson, S. (2005). Learning with invisible others: Perceptions of online presence and their relationship to cognitive and affective learning, educational technology & society. *Educational Technology and Society, 8*(1), 54-62.

Spears, R., & Lea, M. (1994). Panacea or panopticaon? The hidden power in computer-mediated communication. *Communication Research, 21*, 427–459.

Spitzberg, B. H. (2006). Preliminary development of a model and measure of computer-mediated communication (CMS) competence. *Journal of Computer–Mediated Communication*, *11*(2). Retrieved from http://jcmc.indiana.edu

Short, J., Williams, E., et al. (1976). The social psychology of telecommunications, London: John Wiley & Sons.

So, H., & Brush, T. (2008). Student perceptions of collaborative learning, social presence and satisfaction in a blended learning environment: Relationships and critical factors. *Computers and Education. 51,* 318-366.

So, H. J., & Kim, B. (2005). Instructional methods for computer supported collaborative learning (CSCL): A review of case studies. Paper presented at the 10th CSCL Conference, Taipei, Taiwan.

Taylor, M., Jowi, D., Schreier, H., & Bertelsen, D. (2011). Students' perceptions of E-mail interaction during student-professor advising sessions: the pursuit of interpersonal goals. *Journal of Computer–Mediated Communication, 16*(2), 307-330. doi:10.1111/j.1083-6101.2011.01541.x

Tu, C. (2002). The impacts of text-based CMC on online social presence . *Journal of Interactive Online Learning, 1*(2). 1-24.

Twitter. (2011). About. An information network, what are hashtags?. Retrieved April 2011 from http://www.twitter.com

Vrasidas, C., & McIsaac, M. S. (1999). Factors influencing interaction in an online course. *The American Journal of Distance Education, 13*(3), 22-36.

Walther, J. (1992). Interpersonal effects in computer-mediated interaction; a relational perspective. *Communication Research 19*(1): 52-90.

Zhao, D., & Rosson, M. B. (2009). How and why people Twitter: The role that micro-blogging plays in informal communication at work. *Proceedings of the ACM 2009 International Conference on Supporting Group Work (GROUP '09).* ACM, New York, NY, USA,. 243-252. doi:10.1145/1531674.1531

Research

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