Association for Information Systems
AIS Electronic Library (AISeL)

PACIS 2011 Proceedings

Pacific Asia Conference on Information Systems (PACIS)

9 July 2011

The Influence Of Social Presence On Virtual Community Participation: The Relational View Based On Community-Trust Theory

Kai Wang
National University of Kaohsiung, kwang@nuk.edu.tw

Chi-Feng Tai
National Chiayi University, jeffreycftai@mail.ncyu.edu.tw

THE INFLUENCE OF SOCIAL PRESENCE ON VIRTUAL COMMUNITY PARTICIPATION: THE RELATIONAL VIEW BASED ON COMMITMENT-TRUST THEORY

(Research-in-Progress)

Kai Wang, Department of Information Management, National University of Kaohsiung, Kaohsiung, Taiwan, R.O.C., kwang@nuk.edu.tw

Chi-Feng Tai, Department of Management Information Systems, National Chiayi University, Chiayi, Taiwan, R.O.C., jeffreycftai@mail.ncyu.edu.tw

Abstract

Virtual communities constitute an online environment that offers not only a new form of communication through which community members share information and interact with each other, but also an arena in which members develop social relationships. Prior research on the conceptualization of social presence, the degree to which a person is perceived as real in a mediated communication, results in two lines of perspectives. The media richness view conceives social presence as a media attribute while the relational view considers social presence as a quality of relational systems, emphasizing the relational aspects of communication. Drawing upon the relational view of social presence, this research incorporates the commitment-trust theory to investigate the influence of social presence on virtual community members' continual participation. Moreover, this research considers sense of virtual community (SOVC) as the mediator between social presence and virtual community participation. The contributions of this research are three-fold. First, this research contributes to social presence literature by focusing on the social relational aspects of communication that are dependent on the participants rather than on the medium. Second, this research examines the role and importance of social presence in SOVC and virtual community participation. Lastly, it helps clarify how social presence contributes to continual participation in virtual communities.

Keywords: Virtual community, social presence, commitment-trust theory, sense of virtual community, continual participation.

1   INTRODUCTION

The advance of Internet technologies has contributed to the development and proliferation of virtual communities in which Internet users participate to develop personal relationships or to further seek business opportunities (Fernback and Thompson, 1995). Virtual communities also form an arena that offers a new form of communication whereby community members can share information and knowledge for mutual learning or problem solving (Lechner and Hummel, 2002).

To foster computer-mediated communication proficiency in telecommunication systems and online learning (Biocca et al., 1995; Gunawardena and Zittle, 1997; Kehrwald, 2008; Kreijns et al., 2004; Mykota and Duncan, 2007; Richardson and Swan; 2003), social presence emerges as an important determinant of community participation. Social presence is first proposed by Short et al. (1976) and refers to the extent that a medium allows users to experience others as psychologically present (Fulk et al., 1987). This conceptualization results in two lines of social presence research. The media richness view sees social presence as a media attribute that reflects the media's capacity to convey the mediated experience to be perceived as non-mediated, usually using face-to-face interaction as a benchmark (Kehrwald, 2008; Short et al., 1976). The relational view, in contrast, considers social presence as a quality of relational systems, emphasizing the relational aspects of communication.

The relational view is especially important for the study of virtual communities. Virtual communities differ from conventional communities in that the former focus on nurturing interpersonal relationships on a digital platform, that is, the Internet (Guo et al., 2010). In relationship development, trust and commitment are the most prominent factors in the formation, development, and maintenance of interpersonal relationships (Li et al., 2006). Few studies, however, have linked the commitment-trust theory (Morgan and Hunt, 1994; Rusbult, 1983) with social presence research to investigate virtual community members' participation behaviors. To address this gap, the investigation of the influence of social presence on virtual community participation, through the relational view of commitment-trust theory, is needed and would contribute to this area of study.

Moreover, to further identify the causal relationship between social presence and participation of virtual community members, this research considers sense of virtual community (SOVC) (Blanchard, 2007; Blanchard, 2008; Koh and Kim, 2003-4) as the mediator between social presence and virtual community participation. Prior research has identified sense of community (SOC) as an important feature of face-to-face communities (Chipuer and Pretty, 1999; McMillan and Chavis, 1986; Obst and White, 2004). While some researchers have considered SOVC in virtual communities (Blanchard and Markus, 2004; Koh and Kim, 2003-4; Roberts et al., 2002), few have carefully examined its role in the development and maintenance of social relationships in virtual communities.

Therefore, to understand the factors that contribute to successful virtual communities, this research intends to investigate the influence of social presence on continual participation in virtual communities by incorporating the commitment-trust theory and the SOVC construct. The aim of this research is not only to investigate the value of social presence in social relationship in virtual communities but also to examine the mediating effect of SOVC between social relationship factors and continual participation in virtual communities. That is, this research argues that social relationship with the presence of social presence enhances SOVC. With stronger and enhanced SOVC, members tend to show higher satisfaction for and deeper participation in virtual communities.

Based on the above discussion and motivation, the research question is described as "how social presence, through social relationship development of commitment and trust, enhances SOVC and further contributes to the continual participation of community members?" The contributions of this research are three-fold. First, prior research has investigated social presence in the context of computer-mediated conferencing (Gunawardena and Zittle, 1997; Gunawardena, 1995), distributed or online learning (Hughes et al., 2007; Kreijns et al., 2004; Richardson and Swan, 2003), and virtual team collaboration and productivity (Andres, 2002). In the online context, however, the issues

examined primarily center on online shopping and website design (Fortin and Dholakia, 2005; Gefen and Straub, 2004; Hassanein and Head, 2005-6; Holzwarth et al., 2006) and on trusting beliefs or behavior of community members (Hess et al., 2009; Chen et al., 2008). Yet, the investigation into the effect of social presence on continual participation of virtual community members, through social relationship development and the mediation of SOVC, is scarce. This research fills this gap by examining the role and influence of social presence in the virtual community context.

Second, this research contributes to social presence research by focusing on the relational aspects of communication that are dependent on the participants rather than on the medium. As described earlier, earlier researchers conceive social presence as a media attribute (e.g., Daft and Lengel, 1986; Short et al., 1976; Daft et al., 1987), in which media are compared with one another and determined to be more or less rich to support communicative tasks. Although some researchers investigate social presence from the perspective of relational aspects of communication (e.g., Shin, 2002), few address the issue of continual participation in virtual communities from this viewpoint. The incorporation of the commitment-trust theory contributes to the understanding of the relational aspects of social presence in virtual communities.

Lastly, the research model helps clarify how social presence contributes to continual participation of virtual community members. Moreover, SOVC have gained attention in research on virtual communities, yet most research focuses on its antecedents (e.g., Blanchard, 2008; Koh and Kim, 2003-04) or the comparison with SOC (e.g., Blanchard and Markus, 2004; Obst, Zinkiewicz, and Smith, 2002b). This research focuses on the mediating role of SOVC between social presence and the behavioral consequences, therefore further advances this line of research.

This paper is structured as follows: Section 2 discusses theoretical background of this research, covering social presence theory, commitment-trust theory, and relevant literature on SOVC. Section 3 presents the research model and Section 4 describes the research methodology. The expected contributions of this research are described in Section 5.

2 THEORETICAL BACKGROUND

2.1 Social Presence

Social presence derives from the concept of presence, which is defined as the perceptual illusion that "*a mediated experience is not mediated*" (Lombard and Ditton, 1997) or the extent to which mediated communications seem unmediated (Kumar and Benbasat, 2002; Selverian and Hwang, 2003). Social presence represents "*the degree of salience of the other person in the interaction and the consequent salience of the interpersonal relationships*" (Short et al., 1976, p. 65). Following this conceptualization, prior research regards social presence as a subjective quality of the communications media (e.g., Fortin and Dholakia, 2005; Gefen and Straub, 2003; McGrath, 1990) that reflects the media's ability to approximate the characteristics of face-to-face interactions (Hackman and Walker, 1990).

The above conceptualization of social presence represents the media richness view, which focuses on the ability of media to convey necessary information for the mediated communication to be perceived as real or unmediated. In this view, face-to-face interaction is the benchmark form of interaction that possesses the highest level of social presence. A rich medium, which is perceived to be higher in social presence, has better ability in substituting face-to-face interactions and still achieves the desired collaborative outcome (Stein and Wanstreet, 2003). The implication of this media richness view is that users are aware of the degree of social presence of each medium and tend to avoid interactions that require a higher sense of social presence in media which lack such capacity (e.g., Carlson and Davis, 1998; D'Ambra et al., 1998; Daft et al., 1987).

As technologies evolve, researchers have also noted the limitation of defining social presence as a media attribute (Johansen et al., 1988; Rafaeli, 1988; Walther, 1992) and focus on it's value in

relational systems (Shin, 2002). From the perspective of the relational view, social presence is defined as "*an individual's ability to demonstrate his/her state of being in a virtual environment and so signal his/her availability for interpersonal transactions*" (Kehrwald, 2008, p. 94). A number of studies have adopted this view and investigated the issues of the sense of one's ability to perceive others through mediated interactions (Collins and Murphy, 1997), the degree of 'tangibility and proximity' of others within a communicative context (McLeod et al., 1997), affective connection in computer-mediated communications (Swan and Shih, 2005), comparison of relational effects in computer-mediated and face-to-face communications (Walther, 1995), and ability of learners to project themselves socially and affectively into a community of inquiry (Rourke et al., 2001).

With the growing importance of the online environment, researchers have drawn on social presence theory to investigate the effects of infusing a sense of human warmth and social interaction in the Web environment (Hassanein and Head, 2005-6; Hess et al., 2009; Holzwarth et al., 2006; Li et al., 2006). Other topics investigated cover the effect of social presence on the usage of telecommuting systems (Venkatesh and Johnson, 2002), on information sharing in computer-mediated communication (Miranda and Saunders, 2003), and on customer trust and satisfaction in e-commerce (Gefen and Straub, 2004; Holzwarth et al., 2006; Kumar and Benbasat, 2002). Shen and Khalifa (2008) have also conceptualized social presence as a multidimensional construct and integrate social presence theory with motivational theory to explain virtual community participation.

2.2 Commitment-Trust Theory

Among the various forms of online participation on the Internet, virtual communities have provided social outlets for Internet users to develop new or strengthen existing interpersonal relationships. The commitment-trust theory of Morgan and Hunt (1994) focuses on the joint roles of commitment and trust in building and maintaining successful relationships. According to Morgan and Hunt (1994), relationship commitment is "*an exchange partner believing that an ongoing relationship with another is so important as to warrant maximum efforts at maintaining it*" (p. 23). Trust exists "*when one party has confidence in an exchange partner's reliability and integrity*" (p. 23). Morgan and Hunt's (1994) conceptualization of trust is similar to the definition of "*a willingness to rely on an exchange partner in whom one has confidence*" (Moorman, Deshpandé, and Zaltman, 1993, p. 82). The only difference is that Moorman et al. (1993) argue that behavioral intention of "willingness" is a critical facet of trust, while Morgan and Hunt (1994) assert that such willingness to act is implicit in their conceptualization because the confidence in another party's reliability would imply one's intention to rely on him/her.

Morgan and Hunt (1994) have developed the key mediating variable (KMV) model, which position commitment and trust as key mediators between five antecedents (relationship termination costs, relationship benefits, shared values, communication, and opportunistic behavior) and five outcomes (acquiescence, propensity to leave, cooperation, functional conflict, and decision-making uncertainty). Highly committed individuals tend to express a long-term orientation toward the relationship to be developed (Li et al., 2006). Trust has a positive impact on and is a major antecedent of relationship commitment (Morgan and Hunt, 1994; Walter et al., 2000). It exists when one believes that the other party is trustworthy and is confident about that party's future behavior (Li et al., 2006; McAllister, 1995). Commitment and trust are important in the formation, development, and maintenance of interpersonal relationships and are necessary for pro-relationship behaviors and motivations (Morgan and Hunt, 1994; Rusbult et al., 1999).

For interaction with a website, commitment to and trust in the website are especially important to understand why a user sticks to the website (Li et al., 2006). A relational view that aims to examine social and psychological factors (such as trust) in online interactions or relationship development has also emerged in e-commerce research literature (e.g., Gefen and Straub, 2003; Gefen and Straub, 2004; Hassanein and Head, 2005-6; Mukherjee and Nath, 2007). Moreover, Chen et al. (2008) and Guo, Shim, and Otondo (2010) specifically focus on trust issues in virtual communities and social networking service websites. Based on the relational view of online interactions, this research extends

from past studies by incorporating the commitment-trust theory to examine the influence of social presence on virtual community participation.

2.3 Sense of Virtual Community

As the Internet revolution leads to the proliferation of virtual communities, which provide a new form of communication whereby community members interact to share information and knowledge for mutual learning or problem solving (Lechner and Hummel, 2002), sense of virtual community (SOVC) has gained researchers' attention. SOVC derives from sense of community (SOC) (McMillan and Chavis, 1986; McMillan, 1996) and is defined as "*the individual's feelings of membership, influence, and immersion toward a virtual community*" (Koh and Kim, 2003-4, p. 77). Drawing from McMillan and Chavis' (1986) conceptualization of SOC, Koh and Kim (2003-4) define the three dimensions of SOVC, namely membership, influence, and immersion. Each of these dimensions represents the affective, cognitive, and behavioral aspects of SOVC, respectively. Blanchard (2008), however, argues that Koh and Kim's (2003-4) inclusion of the immersion dimension makes the final measure different and is not used in any other conceptualizations of SOC or SOVC. In contrast, Blanchard (2007) develops a SOVC measure that demonstrates the increased content validity and sensitivity over the traditional measure of face-to-face SOC in virtual communities. Blanchard (2008) further uses the eighteen items developed by Blanchard (2007) to test a model that includes group norms as the mediator between the antecedents (i.e., supporting and identifying each other in the virtual communities) and the members' SOVC.

Through a qualitative study, Roberts et al. (2002) find that participants who use text objects to interact in a chat room setting experience SOVC. Blanchard and Markus (2004) examine SOVC in Multiple Sports Newsgroup (MSN). Besides demonstrating that SOVC had developed in MSN, they find similarities to and differences in the dimensions of McMillan and Chavis' (1986) SOC, compared with those found in non-virtual communities. Because of the differences between electronic and face-to-face communication, three important aspects of MSN's SOC, creation of identity, identification of other members, and relationships with individual community members, do not figure in McMillan and Chavis' (1986) framework. With respect to the behavioral processes that contribute to SOVC, the exchange of support process is similar to that found in non-virtual communities, while the other two processes, creation of identity/making of identifications and the production of trust, seem to be specific to virtual communities.

SOVC has been an important topic for virtual community researchers. For example, Xu et al. (2009) investigate the antecedents of SOVC in the context of QQ group, which is a virtual community network based on QQ, the most popular instant messaging system in China. They indicate that perceived usefulness, perceived ease of use, and perceived enjoyment lead to membership and influence, and perceived enjoyment and exchanging support contribute to immersion. Perceived ease of use, however, negatively impacts immersion. Huang et al. (2009) indicate the moderating effects of SOVC on the relationship between perceived influence of electronic word of mouth (eWoM) and online members' intention to disseminate word of mouth (WoM). Moreover, Ellonen et al. (2007) explore the presence and development of feelings of membership in an active virtual community called Baby and Pregnancy community (BAP). Through a qualitative case study, they find needs, similarity with other members, and impersonal trust as three main antecedents of SOVC.

3 RESEARCH MODEL

Focusing on the relational aspect of social presence, the research model incorporates the commitment-trust theory to investigate how social presence indluences SOVC, which further leads to continual participation in virtual communities, directly and indirectly through satisfaction with the virtual community. The research model of this research is shown in Figure 1.

Trust and commitment are two important factors in the formation, development, and maintenance of interpersonal relationships (Morgan and Hunt, 1994; Rusbultet al., 1999). Therefore, following the commitment-trust theory, the research model incorporates trust and commitment as two important factors determining SOVC. The commitment-trust theory suggests that trust and commitment are key factors mediating successful relationship marketing. It is believed that when one has trust on a virtual community and is willing to commit to the relationship with that community, his or her SOVC will be stronger. The enhanced SOVC further leads to increased satisfaction toward and continual participation in the community. Empirical studies such as Li et al. (2006) have also confirmed the relational perspective in the online environment. Support for the relational view of online interaction motivates this research to investigate how social presence fosters virtual community participation through social relationship development of trust and commitment.
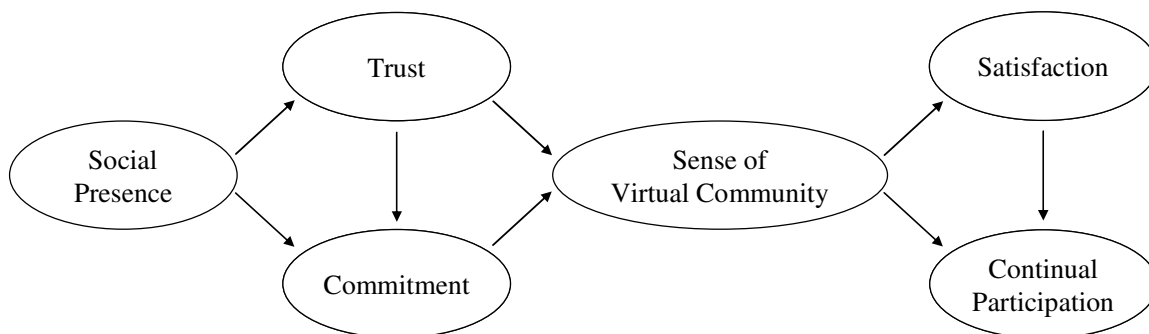

Figure 1. Research Model

Despite the wide acceptance of McMillan and Chavis' (1986) framework, prior research has shown differences in the components of SOC. For example, research has indicated that influence may not be as important in SOVC as in SOC (Blanchard and Markus, 2004; Obst, Smith, and Zinkiewicz, 2002c). Such difference may come from the specific nature of interaction in the online environment (Blanchard and Markus, 2004). For example, because of the anonymity feature in the online environment, virtual community members may be less likely to be aware of their own influence or the influence of others and tend to recognize specific individuals and develop relationships with them to feel a SOVC (Blanchard, 2008). This motivates this research to investigate the role of SOVC in virtual community participation.

4 RESEARCH METHODOLOGY

4.1 Online Survey

This research will follow a survey approach, targeting at those who have experiences in virtual community participation. The sampling frame covers Internet users who are currently users of one or more virtual communities.

This research plans to conduct online surveys for data collection. The online mode of data collection is selected because of its expediency in data collection, ease of data tabulation, and ability to reach a wide population of users (Bhattacherjee, 2002).The announcement for the online survey will be posted in the major virtual communities in Taiwan (a ranking list of these websites is available from http://blog.awoo.com.tw/2010/03/website100/). In order to increase the number of participants in this survey, those who finish filling in the questionnaire will be entitled to enter a lottery. To avoid

duplicate registration in the survey, the IP address as well as identity information of each respondent need to be recorded to filter out attempts at opportunism.

4.2   Pretest and Pilot Test

To ensure face validity and content validity of the questionnaire, the draft version will be reviewed by field experts (i.e., operators of virtual communities) and virtual community participants. The purpose of this pretest phase is to ensure the appropriateness and readability of the final questionnaire. Modifications in semantic wording or expression will proceed if suggested. Based on the comments and suggestions, the questionnaire will be improved in terms of clarity and readability and adopted for the online survey. After the questionnaire is finalized, a pilot test will be carried out. The pilot test can be used to test the quality of the instrument. The identities of the pilot test participants will also be recorded to avoid duplicate participation in the final survey.

To test the quality of the instrument, several analyses will be carried out. Confirmatory factor analysis will be performed to examine the measurement model. Internal consistency can be assured by examining the composite reliability of the constructs (Fornell and Larcker, 1981). All composite reliability values must surpass the suggested threshold value of 0.7 (Hair et al., 1998; Nunnally, 1978). Convergent validity refers to the degree to which multiple items measure one construct and can be evaluated by checking (1) whether the average variance extracted (AVE) values are larger than 0.5 (Fornell and Larcker, 1981) and (2) whether the factors loadings of the all items are significant and higher than 0.5 (Nunnally, 1978). Finally, discriminant validity tests whether the measures of constructs are different from each other. Discriminant validity can be assessed by examining whether the square root of AVE of each construct is larger than the correlation between constructs (Chin, 1998; Fornell and Larcker, 1981).

5   EXPECTED CONTRIBUTIONS

This research investigates the influence of social presence on continual participation of virtual community members. The uniqueness of this research is the incorporation of the commitment-trust theory to reflect the relational nature of social presence in determining continual participation in virtual communities. This research makes the following contributions. First, it sheds light on social presence research by focusing on the relational view and its influence on virtual community participation. The media richness view of social presence fails to recognize the relational component in virtual community participation. This research fills this vacancy by introducing the commitment-trust theory to address the issue of social relationship development in virtual communities.

Second, although prior research has attempted to investigate social presence in the online context, few specifically focus on the issue of continual participation in virtual communities. Shen and Khalifa (2008) may be an exception, but their primary concern is the multidimensional structure of social presence. As virtual communities differ from other computer-mediated communication tools in terms of the modes of social interaction, it warrants the value of this research in addressing the role and importance of social presence.

Third, as described earlier, most research on SOVC focuses on its antecedents or the comparison with SOC. This research advances the line of research on virtual community by illustrating the mediating role of SOVC between social presence and continual participation of virtual community members. This research contributes to the literature by providing an integrated view of the influences of social presence, the social relationship development, and the participants' SOVC on the success of virtual communities.

References

Andres, H.P. (2002). A comparison of face-to-face and virtual software development teams. *Team Performance Management*, 8(1/2), pp. 39-48.

Bhattacherjee, A. (2002). Individual trust in online firms: Scale development and initial test. *Journal of Management Information Systems*, 19(1), pp. 211-241.

Biocca, F., Kim, T., and Levy, M.R. (1995). The vision of virtual reality. In F. Biocca and M.R. Levy (Eds.), *Communication in the age of virtual reality*, pp. 3-14. Mahwah, NJ: Erlbaum.

Blanchard, A.L. (2007). Developing a sense of virtual community measure. *CyberPsychology and Behavior*, 10(6), pp. 827-830.

Blanchard, A.L. (2008). Testing a model of sense of virtual community. *Computers in Human Behavior*, 24, pp. 2107-2123.

Blanchard, A.L. and Markus, M.L. (2004). The experienced sense of a virtual community: Characteristics and processes. *The DATA BASE for Advances in Information Systems*, 35(1), pp. 65-79.

Carlson, P.J. and Davis, G.B. (1998). An investigation of media selection among directors and managers: From 'self' to 'other' orientation. *MIS Quarterly*, 22(3), pp. 335-352.

Chen, Y.-H., Wu, J.-J., and Chung, Y.-S. (2008). Cultural impact on trust: A comparison of virtual communities in China, Hong Kong, and Taiwan. *Journal of Global Information Technology Management*, 11(1), pp. 28-48.

Chin, W.W. (1998). The partial least squares approach for structural equation modeling. In G.A. Marcoulides (Ed.), *Modern Methods for Business Research*, pp. 295-336. Mahwah, NJ: Lawrence Erlbaum Associates.

Chipuer, H.M. and Pretty, G.H. (1999). A review of the sense of community index: Current uses, factor structure, reliability and further development. *Journal of Community Psychology*, 27, pp. 643-658.

Collins, M. and Murphy, K.L. (1997). Development of communications conventions in instructional electronic chats. *Journal of Distance Education*, 12(1/2), pp. 177-200.

D'Ambra, J., Rice, R.E., and O'Connor, M. (1998). Computer-mediated communication and media preference: An investigation of the dimensionality of perceived task equivocality and media richness. *Behaviour and Information Technology*, 17(3), pp. 164-174.

Daft, R.L. and Lengel, R.H. (1986). Organizational information requirements, media richness and structural design. *Management Science*, 32(5), pp. 554-571.

Daft, R.L., Lengel, R.H., and Trevino, L.K. (1987). Message equivocality, media selection, and manager performance: Implications for information systems. *MIS Quarterly*, 11(3), pp. 355-366.

Ellonen, H.K., Kosonen, M. and Henttonen, K. (2007). The development of a sense of virtual community. *International Journal of Web Based Communities*, 3(1), pp. 114-130.

Fernback J. and Thompson B. (1995). Virtual communities: Abort, retry, failure? <http://www.well.com/~hlr/texts/VCcivil.html> (Accessed December 1, 2010).

Fornell, C. and Larcker, D.F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research*, 18(1), pp. 39-50.

Fortin, D.R. and Dholakia, R.R. (2005). Interactivity and vividness effects on social presence and involvement with a web-based advertisement. *Journal of Business Research*, 58, pp. 387-396.

Fulk, J., Schmitz, J., and Power, G.J. (1987). A social information processing model of media use in organizations. *Communication Research*, 14 (5), pp. 520-552.

Gefen, D. and Straub, D.W. (2004). Consumer trust in B2C e-Commerce and the importance of social presence: Experiments in e-Products and e-Services. *Omega*, 32, pp. 407-424.

Gefen, D. and Straub, D. (2003). Managing user trust in B2C E-services. *E-Service Journal*, 2(2), pp. 7-24.

Gunawardena, C.N. (1995). Social presence theory and implications for interaction and collaborative learning in computer conferences. *International Journal of Educational Telecommunications*, 1(2/3), pp. 147-166.

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

Guo, C., Shin, J.P. and Otondo, R. (2010). Social network services in China: An integrated model of centrality, trust, and technology acceptance. *Journal of Global Information Technology Management*, 13(2), pp. 76-99.

Hackman, M.Z. and Walker, K.B. (1990). Instructional communication in the televised classroom: The effects of system design and teacher immediacy on student learning and satisfaction. *Communication Education*, 39(3), pp. 196-206.

Hair, J.F., Ronald, L.T., Rolph, E.A., and William, B. (1998). *Multivariate Data Analysis*. Englewood Cliffs, NJ: Prentice Hall.

Hassanein, K. and Head, M. (2005-6). The impact of infusing social presence in the web interface: An investigation across product types, *International Journal of Electronic Commerce*, 10(2), pp. 31-55.

Hess, T., Fuller, M., and Campbell, D. (2009). Designing interfaces with social presence: Using vividness and extraversion to create social recommendation agents. *Journal of the Association for Information Systems*, 10(12), pp. 889-919.

Holzwarth, M., Janiszewski, C., and Neumann, M.M. (2006). The influence of avatars on online consumer shopping behavior. *Journal of Marketing*, 70, pp. 19-36.

Huang, J.H., Hsiao, T.T., and Chuang, S.-T. (2009). The role of virtual community in disseminating electronic word of mouth. *Proceedings of the 2009 Joint Conferences on Pervasive Computing (JCPC)*, pp. 755-760.

Hughes, M. Ventura, S., and Dando M. (2007). Assessing social presence in online discussion groups: A replication study. *Innovations in Education and Teaching International*, 44(1), pp. 17-29.

Johansen, R., Vallee, J., and Spangler, K. (1988) Teleconferencing: electronic group meetings. In: R.S. Cathcart and L.A. Samover (Eds.), *Small Group Communications: A Reader*, pp. 140-154. Dubuque, IA: William C. Brown.

Kehrwald, B. (2008). Understanding social presence in text-based online learning environments. *Distance Education*, 29(1), pp. 89-106.

Koh, J. and Kim, Y.-G. (2003-4). Sense of virtual community: A conceptual framework and empirical validation. *International Journal of Electronic Commerce*, 8(2), pp. 75-93.

Kreijns, K., Kirschner, P.A., Jochems, W., and van Buuren, H. (2004). Determining sociability, social space, and social presence in (a)synchronous collaborative groups. *CyberPsychology & Behavior*, 7(2), pp. 155-172.

Kumar, N. and Benbasat, I. (2002). Para-social presence and communication capabilities of a web site. *eService Journal*, 1(3), pp. 5-24.

Lechner, U. and Hummel, J. (2002). Business models and system architectures of virtual communities: From a sociological phenomenon to peer-to-peer architectures. *International Journal of Electronic Commerce*, 6(3), pp. 41-53.

Li, D., Browne, G.J., and Wetherbe, J.C. (2006). Why do Internet users stick with a specific web site? A relationship perspective. *International Journal of Electronic Commerce*, 10(4), pp. 105-141.

Lombard, M. and Ditton, T. (1997). At the heart of it all: The concept of presence. *Journal of Computer Mediated Communication*, 3(2), <http://www.ascusc.org/jcmc/vol3/issue2/lombard.html> (Accessed November 25, 2010).

McAllister, D.J. (1995). Affect- and cognition-based trust as foundations for interpersonal cooperation in organizations. *Academy of Management Journal*, 38(1), pp. 24-59.

McGrath, J.E. (1990). Time matters in groups. In J. Galegher, R.E. Kraut, and C. Egido (Eds.), *Intellectual Teamwork: Social and Technological Foundations of Cooperative Work*, pp. 23-61. Hillsdale, NJ: Erlbaum.

McLeod, P.L., Baron, R.S., and Marti, M.W. (1997). The eyes have it: Minority influence in face-to-face and computer-mediated group discussion. *Journal of Applied Psychology*, 82(5), pp. 706-718.

McMillan, D.W. (1996). Sense of community. *Journal of Community Psychology*, 24(4), pp. 315-325.

McMillan, D.W. and Chavis, D.M. (1986). Sense of community: A definition and theory. *Journal of Community Psychology*, 14, pp. 6-23.

Miranda, S.M. and Saunders, C.S. (2003). The social construction of meaning: an alternative perspective on information sharing. *Information Systems Research*, 14(1), pp. 87-106

Moorman, C., Deshpandé, R., and Zaltman, G. (1993). Factors affecting trust in market research Relationships. *Journal of Marketing*, 57, pp. 81-101.

Morgan, R.M., and Hunt, S.D. (1994). The commitment-trust theory of relationship marketing. *Journal of Marketing*, 58(3), pp. 20-38.

Mukherjee, A. and Nath, P. (2007). Role of electronic trust in online retailing: A re-examination of the commitment-trust theory. *European Journal of Marketing*, 41(9/10), pp. 1173-1202.

Mykota, D. and Duncan, R. (2007). Learner characteristics as predictors of online social presence. *Canadian Journal of Education*, 30(1), pp. 157-170.

Nunnally, J. (1978). *Psychometric Theory*, New York: McGraw-Hill.

Obst, P., and White, K.M. (2004). Revisiting the sense of community index: A confirmatory factor analysis. *Journal of Community Psychology*, 32(6), pp. 691-705.

Obst, P., Smith, S.G., and Zinkiewicz, L. (2002c). An exploration of sense of community, Part 3: Dimensions and predictors of psychological sense of community in geographical communities. *Journal of Community Psychology*, 30(1), pp. 119-133.

Obst, P., Zinkiewicz, L., and Smith, S.G. (2002b). Sense of community in science fiction fandom, part 2: Comparing neighborhood and interest group sense of community. *Journal of Community Psychology*, 30(1), pp. 105-117.

Rafaeli, S. (1988). Interactivity: from new media to communication. In: R.P. Hawkims, J.M. Wiemann and S. Pingree (Eds.), *Advancing Communication Science: Merging Mass and Interpersonal Processes*, pp. 110-134. Beverly Hills, CA: Sage.

Richardson, J.C. and Swan, K. (2003). Examining social presence in online courses in relation to students' perceived learning and satisfaction. *Journal of Asynchronous Learning Networks*, 7(1), pp. 68-88

Roberts, L.D., Smith, L.M., and Pollock, C.M. (2002). MOOing till the cows come home: The sense of community in virtual environments. In C.C. Sonn (Ed.). *Psychological Sense of Community: Research, Applications, Implications*. New York: Kluwer Academic/Plenum.

Rourke, L., Anderson, T., Garrison, D.R., and Archer, W. (2001). Assessing social presence in asynchronous text-based computer conferencing. *Journal of Distance Education*, 14(2), pp. 50-71.

Rusbult, C.E. (1983). A longitudinal test of the investment model: The development (and deterioration) of satisfaction and commitment in heterosexual involvements. *Journal of Personality and Social Psychology*, 45(1), pp. 101-117.

Rusbult, C.E., Wieselquist, J., Foster, C.A., and Witcher, B.S. (1999). Commitment and trust in close relationships: An interdependence analysis. In J.M. Adams and W.H. Jones (Eds.), *Handbook of Interpersonal Commitment and Relationship Stability*, pp. 427-449. New York: Kluwer Academic/Plenum.

Selverian, M.M. and Hwang, H.S. (2003). In search of presence: A systematic evaluation of evolving VLEs. *Presence: Teleoperators and Virtual Environments*, 12(5), pp. 512-522.

Shen, K.N. and Khalifa, M. (2009). Exploring multidimensional conceptualization of social presence in the context of online communities. *International Journal of Human-Computer Interaction*, 24(7), pp. 722-748.

Shin, N. (2002). Beyond interaction: the relational construct of 'Transactional Presence.' *Open Learning*, 17(2), pp. 121-137.

Short, J., Williams, E., and Christie, B. (1976). *The social psychology of telecommunications*. London: Wiley.

Stein, D.S. and Wanstreet, C.E. (2003). Role of social presence, choice of online or face-to-face group format, and satisfaction with perceived knowledge gained in a distance learning environment. *Proceedings of the 2003 Midwest Research to Practice Conference in Adult, Continuing, and Community Education*, pp. 193-198.

Swan, K. and Shih, L.F. (2005). On the nature and development of social presence in online course discussions. *Journal of Asynchronous Learning Networks*, 9(3), pp. 115-136.

Venkatesh, V. and Johnson, P. (2002). Telecommuting technology implementations: A within- and between- subjects longitudinal field study. *Personnel Psychology*, 55(3), pp. 661-687.

Walter, A., Helfert, G., and Mueller, T.A. (2000). The impact of satisfaction, trust, and relationship value on commitment: Theoretical considerations and empirical results. *Proceedings of the 16th IMP-Conference*, <http://www.impgroup.org/uploads/papers/131.pdf> (Accessed November 14, 2010).

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

Walther, J.B. (1995). Relational aspects of computer-mediated communication: Experimental observations over time. *Organization Science*, 6(2), pp. 186-203.

Xu, C., Liu, Y., Zhong, C., Luo, M., and Tian, X. (2009). Antecedents of sense of virtual community: An empirical study of QQ group in Chinese college students. *Proceedings of the First International Conference on Information Science and Engineering (ICISE)*, pp. 2559-2562.