Understanding the Social Nature of an Online Community of Practice for Learning to Teach

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Abstract

This study is aimed to build new knowledge about the social nature of a community of practice. Path analysis was used to understand the relationships among key social constructs: perceived ease of use (PEU) and usefulness (PU), social ability (SA), sense of community (SOC), satisfaction with NETwork experience (S), and effectiveness of NETwork for Teaching (ET). The results show that: 1) members' S was the only direct factor impacting members' perceptions of ET; 2) SA, SOC, and PU directly impacted members' S; 3) SA and PU help explain members' SOC, while members' perception of PEU directly influences their SA and PU; 4) members' perception of PU was found to explain the relationship between social navigation and social presence with instructor.

Introduction

One effective approach to meeting the needs of long-term professional development is the establishment of professional learning communities (PLC) based upon a CoP framework (Wenger, 1998). Improved ease of access and new capabilities of network technologies offers the potential to support these communities online. Some cases of applying online systems to support the continuum of teachers' professional development have been found effective but not easy to sustain. (Job-Sluder & Barab, 2004; Gray & Tatar, 2004; Roup, Gal, Drayton, & Pfister, 1993; Steele, 2002; Desimone, Porter, Garet, Suk Yoon, & Birmnan, 2002). To better understand how teachers can be supported and sustained while participating in an online community of practice, this study investigated the social nature of the online learning community via examining the interdependent relationships among the social constructs (i.e. perceived ease of use and usefulness of online learning tools, social ability, sense of community, satisfaction with NETwork experience, and effectiveness of NETwork for teaching) of the teachers online learning community, NETwork (Nurturing Elementary Teachers' work).

Theoretical Perspectives

In the interest of the brevity needed for the proposal, more detailed literature review will be included in the final paper.

Community of Practice (CoP)

Wenger (1998) defined CoP as groups of people who join together with a common purpose and share a common practice. Members of CoP integrate practice, meaning, identity, and community as components of learning and knowing in their interaction within CoP. Lave and Wenger (1991) said "activities, tasks, functions, and understandings do not exist in isolation; they are part of broader systems of relations in which they have meaning. These systems of relations arise out of and are reproduced and developed within social communities, which are in part systems of relations among persons" (p. 53). Learning and membership in a community are intertwined as members' identities change gradually from

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peripheral participation to more core roles as they gain more knowledge of practice. The changes in members identities, indicating how they perceive who they are and how other members think about them, is a result of their participation and engagement in online learning and interaction (Wenger, 1996).

Factors Influencing Participation & Interaction

The following sections identify previous studies that help form a model of how people's sense of community (SOC), social ability (SA), and technology acceptance (TA) are primary constructs impacting social interaction and participation of CoP.

SOC. Sense of community and social ability have been identified as two critical factors influencing members' level of online participation and social interaction (Rovai, 2003; Carroll, 2001; Putnam, 2000; Lin, et al., 2006; Riedl, 2001; Picciano, 2002). McMillan and Chavis (1986) defined sense of community as "a feeling that members have of belonging, a feeling that members matter to one another and to the group, and shared faith that members' needs will be met through their commitment to be together" (p.9).

SA. Social ability has been shown to be a critical factor for effective online learning (Author, et al., 2006a; Rovai, 2001; Gunawardena & Zittle, 1997). Social ability is defined as "a person's capacity to associate with fellows and to use the members, resources and tools of the social context to achieve something of value" (Social Computing Research Group (SCRG), 2006, p.2). Social presence and social navigation are underlying factors of social ability in online learning environments (Author, et al., 2006; Authors, 2006a; Lin, et al., 2006). Social navigation is defined as "a construct representing being aware of what others are doing as a primary guide for one's own actions" (Author, et al., 2006, p.166). The relationships between social presence and navigation as two critical aspects of social ability are interdependent and contribute to effective online learning.

TA. The Technology Acceptance Model (TAM) is a frequently used framework for exploring people's technology usage behaviors (Davis, 1989). Since people's intention of using technologies influences their attitude about using the tools and their perception of how useful the tools are, two primary constructs, perceived usefulness and perceived ease of use, have been identified as determinants of people's technology acceptance (Mathieson, 1991; Davis,1989).

Previous study, which explored the relationships among PEU, PU, SA, and SOC in online courses, found that PEU directly influences SA and PU positively impacts SOC (Authors, 2008a). However, it is not clear if these relationships found in online courses exist or are present in the same way in a teacher CoP. In order to better understand how technology use influences people's social interaction in a CoP, this study will not only investigate the relationships among SOC, SA, and S and ET but also relationships among members' perception of TA, SA, and SOC.

Research Question

The purpose of this study was to understand the social nature of learning in a Community of Practice. The proposed path model (Figure 1) of how well the social constructs of the online learning community explain the effectiveness of professional development in a community was adapted from Authors (2008a). Below are the two research questions for this study.

1. How well does the proposed path model explain the relationships among the social

constructs of online learning (i.e. SOC, SA, PEU, and PU) and explain community outcomes/effects (S and ET)?

2. How do members' perceptions of sub constructs of social ability (SPi, SPp, and SN) influence or impacted by other social constructs?

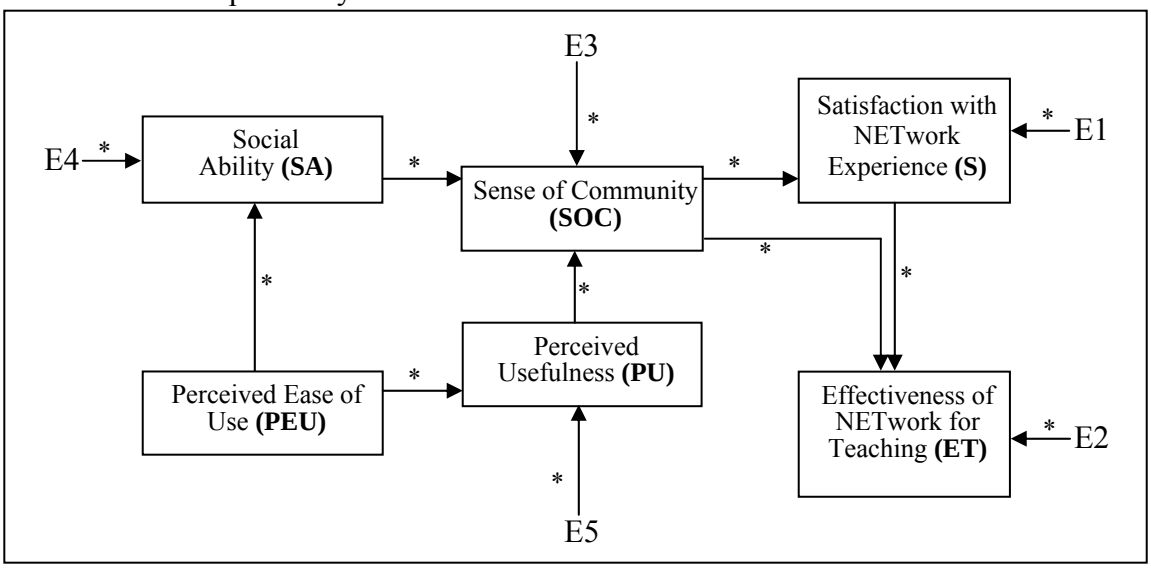

Figure 1. Proposed Path Model (⟶ represents direct relationship, "E" represents residual error)

Research Method

Research Context and Participants

An online teacher community, NETwork (Nurturing Elementary Teachers' work), has been in place using the Sakai course management system to support K-8 science teaching since August 2006. The purpose of NETwork at the University of Missouri is to overcome the current disconnection between pre-service teacher education and in-service teaching practice and to provide pre-service and in-service teachers a collaborative learning environment. There were a total of 92 members in NETwork and 66 of the 92 members who participated in the final survey.

Instruments

The items for assessing the social constructs were adapted from previous studies. Below are the social constructs included in the survey.

TA. The 10 items of these constructs were adapted from an online learning experience survey (Authors, 2006a; Authors, 2008) based upon Davis's technology acceptance instrument (Davis, 1989).

SOC. The 20 items for sense of community were adapted from Rovai's Classroom Community Scale (Rovai, 2002), which measures sense of community in an online learning environment.

SA. The 18 items of social ability were adapted and modified from a 30-item instrument of online learning experience (Authors, 2006a), including 3 constructs: social navigation (SN), social presence with instructor (SPi), and social presence with peers.

S. Nine items to measure members' satisfaction with NETwork experience were modified to meet the context of this study from a previous online learning experience study

(Author, et. al., 2006; Authors, 2006a) which developed items based upon Alavi's (1994) learning and evaluation scales.

ET. The 10 items about how members perceive the value of participating in NETwork were developed by the authors to address how members feel about their teaching knowledge, skills, and confidence after participating in NETwork.

Data Collection and Analysis

A final survey was conducted in the end of the semester. Path analysis was employed to analyze the survey data in regard to teachers' perceptions of the relationships among the social constructs of online experiences in NETwork. To further understand how sub constructs of social ability is related to other social constructs, two further examinations were conducted to investigate how members' technology acceptance influence the sub constructs of social ability and how the sub constructs of social ability impact members' sense of community and satisfaction of participating in NETwork.

Results

In the interest of the brevity needed for the proposal the analysis for the mediators of path models and the explanation of the model for the sub path models will be included in the final paper but are excluded from this proposal.

Examination of the Proposed Path Model

After discarding the five non-significant paths, a final path model with best model fit was found. According to the criteria for a good model fit suggested by Hu and Bentler (1999), the indices suggest a good model fit. Although the chi-square value for the final path model was 15.76 ($p < .05$) indicating a poor fit, the comparative fit index (CFI) was .99, the Tucker-Lewis Index (TLI) was .96, and the standardized root mean square residual (SRMR) was .05, which also indicated the data fit the model well. Because the achieved statistically significant chi-square value could be due to the small sample size of this study, an alternative index of fit was used to further examine the model fit. According to Byrne (2001), if a χ^2/df ratio less than 5, the model is considered to be indicative of a good model fie (Hayduk, 1987). The χ^2/df ratio of this model is 2.25 (15.76/ 7 = 2.25), indicating a good model fit. Table 1 presents the fit indices of goodness for this over-identified model. Additionally the final model with R^2 values is presented in Figure 2.

Table 1 *Model Fit Indices*

Model	χ^2	P	CFI	TLI	SRMR	RMSEA	RMSEA 90% C. I.
Criteria	N/A	>.05	>.95	>.95	< .10	< .06	
Results of the Final Model	15.76	.03	.98	.96	.05	.14	.04 ~ .23

Note. N=66 (Hu & Bentler, 1999)

In the final path model, the R^2s means indicate that approximately 80% of the variance of effectiveness of NETwork for teaching is explained by their overall satisfaction of learning in the NETwork community. Also, members' perception of SOC, SA, PEU contribute to explaining approximately 72% of the variance of members' overall satisfaction with NETwork experience. Also, SA and PU account for 68% of the variance in members' SOC. Last, members' PEU of learning tools directly accounted for about 75% of variance of members' SA and approximately 52% of variance of PU.

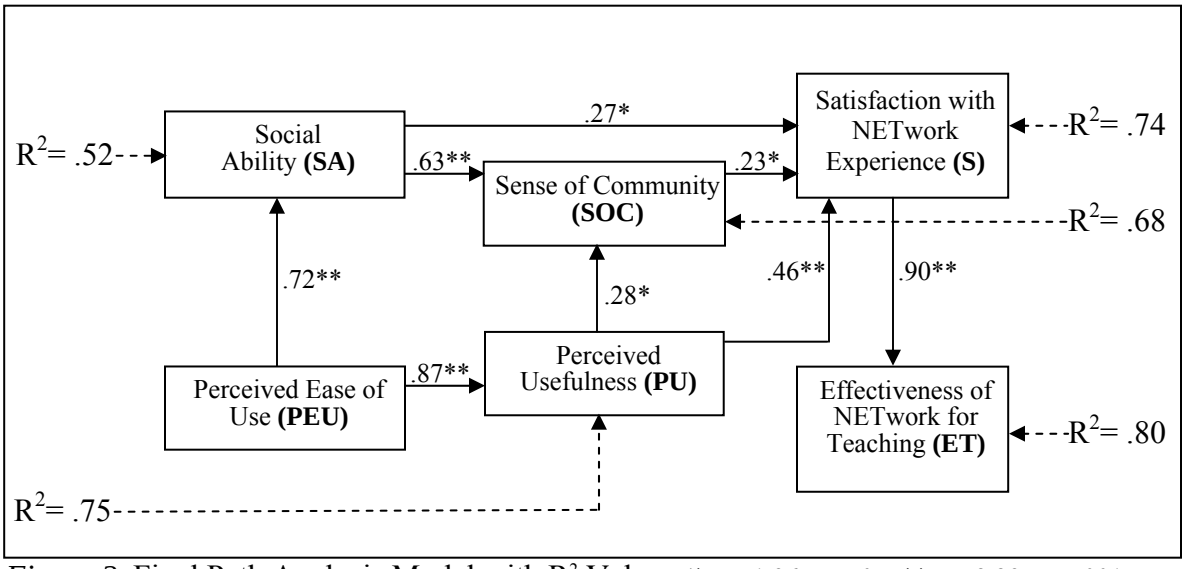

Figure 2. Final Path Analysis Model with R^2 Values (* $z > 1.96$, $p < .05$; ** $z > 3.29$, $p < .001$ statistically significant; ⟶ represents significant path, - - → represents variance explained)

Examination of SA Sub-constructs

To further examine the relationships, SA was replaced with its sub-constructs, including SN, SPi, and SPp. Relationships among SA's sub-constructs and PEU and PU were examined as the first set. Later, a second set of relationships among SA's sub-constructs, SOC, and S were investigated.

First Set Examination. A final path model presented in Figure 3 was achieved. The indices reported in Table 2 suggest a good model fit for this over-identified model.

Table 2 *Model Fit Indices (Set 1)*

Model	χ^2	P	CFI	TLI	SRMR	RMSEA	RMSEA 90% C. I.
Criteria	N/A	>.05	>.95	>.95	< .10	< .06	
Results of the Final Model	2.05	.36	1.00	1.00	.04	.02	.00 ~ .25

Note. N=66 (Hu & Bentler, 1999)

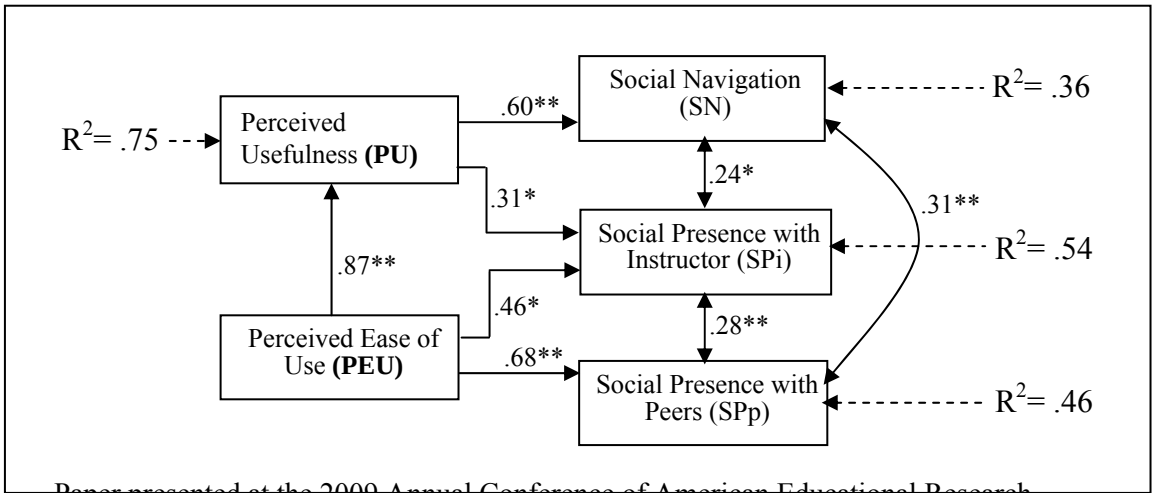

Figure 3. Final Path Analysis Model (Set 1) with R^2 Values (* $z > 1.96$, $p < .05$; ** $z > 3.29$, $p < .001$ statistically significant; ⟶ represent significant direct path, ⟷ represents significant correlation paths, - - → represents variance explained)

Second Set Examination. The indices presented in Table 3 indicate a good model fit for this model. Overall the data fits the model well. The final path model is presented the Figure 4

Table 3 *Model Fit Indices (Set 2)*

Model	χ^2	P	CFI	TLI	SRMR	RMSEA	RMSEA 90% C. I.
Criteria	N/A	>.05	>.95	>.95	< .10	< .06	
Results of the Final Model	3.57	.17	.99	.97	.02	.11	.00 ~ .29

Note. N=66 (Hu & Bentler, 1999)

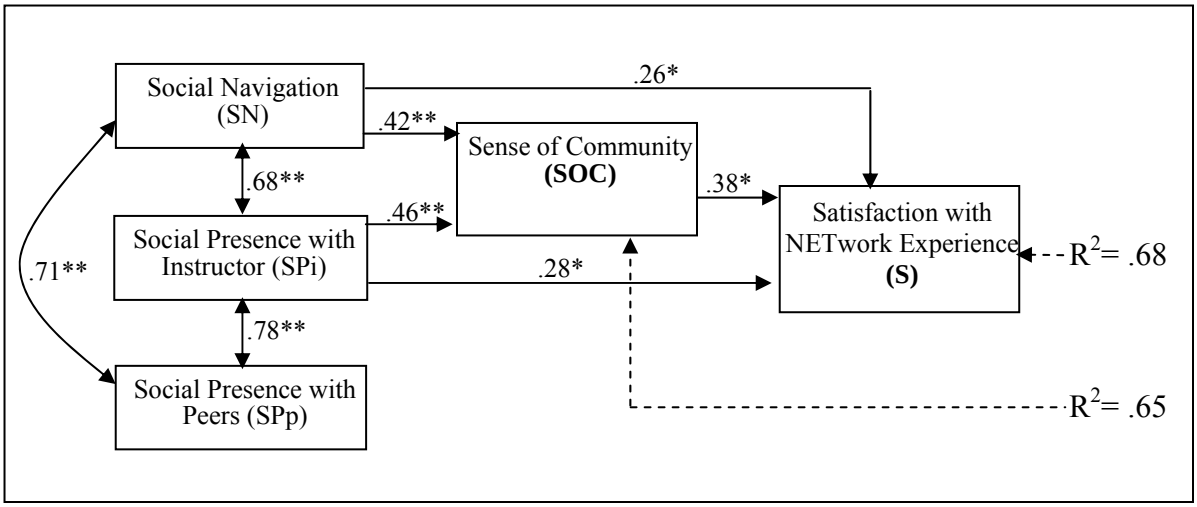

Figure 4. Final Path Analysis Model (Set 2) with R^2 Values (* z < 1.96, p < .05; ** z < 3.29, p < .001 statistically significant; ⟶ represent significant direct path, ⟷ represents significant correlation paths, - - - ▸ represents variance explained)

Discussion

Differing from prior studies (Authors, 2008a; Lin et al., 2006) that utilized statistical models to visualize the relationships among social constructs of online learning, an additional variable, members' perception of ET, was added in this study. Members' S was found to be the only direct factor impacting members' perceptions of ET, which means members felt the effectiveness of NETwork for their teaching only when they felt satisfied with learning in NETwork. Additionally, SA, SOC, and PU directly impact members' S and SA and PU account for significant variation in members' SOC, which not only confirm the relationships identified by previous studies (Authors, 2008a; Lin, et al., 2006) but also support the insight that social interaction can be supported by CMC tools if the tools are utilized effectively and members feel the usefulness of the tools for their learning (Tu & Corry, 2003; Lavooy & Newlin, 2003; Tu & McIsaac, 2002). Going beyond prior studies, this study provided new insights for understanding how different sub-constructs of social ability influence sense of community and satisfaction with NETwork experience. The detailed discussion will be included in the final paper.

Importance of the Study

This study has significant potential for theoretical and practical implications for online learning and teacher education as well as a methodological impact on social computing studies. First of all, this study explored multiple social constructs influencing online interaction at once in a path model, which contributes new knowledge for understanding the interconnected relationships among social constructs. Differing from previous studies that mostly explored unitary relationships between a particular social construct and learning achievement or satisfaction, this study examined a range of relationships in a holistic way. The results of this study provide practical implications for online instructors to better understand how to sustain social interaction in online learning.

References

Alavi, M. (1994). Computer-mediated collaborative learning: An empirical evaluation. *MIS Quarterly, 18*(2), 150-174.

Authors. (2006). Assessing social ability in online learning environments. *Journal of Interactive Learning Research, 17*(2), 163-177.

Authors. (2006a). Exploring the relationships between students' academic motivation and social ability in online learning environments. *Internet and Higher Education, 9*(4), 277-286.

Authors. (2008, April). Differences in student-instructor and Student-peers social interactions in explaining satisfaction in online learning. Paper presented at the 2008 Annual Conference of American Educational Research Association, New York, USA.

Authors. (2008a). Building a Model Explaining the Social Nature of Online Learning. *Journal of Educational Technology and Society, 11*(3), 198-215.

Byrne, B. M. (2001). *Structural equation modeling with AMOS: Basic concepts, applications, and programming.* Mahwah, NJ: Erlbaum.

Carroll, J. M. (2001). Community computing as human-computer interaction. *Behavior and Information Technology, 20*(5), 307-314.

Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly, 13*(3), 319-340.

Desimone, L., Porter, A. A., Garet, M., Suk Yoon, K., & Birman, B. (2002). Effects of professional development on teachers' instruction: Results from a three-year longitudinal study. *Educational Evaluation and Policy Analysis, 24*(2), 81-112.

Gray, J. H., & Tatar, D. (2004). Sociocultural analysis of online professional development: A case study of personal, interpersonal, community, and technical aspects. In S. A. Barab, R. Kling & J. H. Gray (Eds.), *Designing for virtual communities in the service of learning* (pp.404-436). New York, NY: Cambridge University Press.

Hayduk, L. A. (1987). *Structural equations modeling with LISREL: Essentials and advance.* Baltimore: Johns Hopkins Press.

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

Hu, L., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling: AMultidisciplinary Journal, 6*(1), 1-55.

Job-Sluder, K., & Barab, S. A. (2004). Shared "We" and shared "They" indicators of group identity in online teacher professional development. In S. A. Barab, R. Kling, & J. H. Gray (Eds.), *Designing for virtual communities in the service of learning* (pp.377-403). New York, N.Y.: Cambridge University Press.

Lave, J. and E. Wenger (1991). *"Situated learning" legitimate peripheral participation.* New York, Cambridge University Press.

Lavooy, M., & Newlin, M. (2003). Computer mediated communication: Online instruction and interactivity. *Journal of Interactive Learning Research 14*(2), 157-165.

Lin, Y., Lin, G., Liu, P., Huan, X., Shen, D., & Laffey, J. (2006, April). ***Building a social and motivational framework for understanding satisfaction in online learning.*** Paper presented at the Annual Conference of American Educational Research Association, San Francisco, USA.

Mathieson, K. (1991). Predicting user intentions: Comparing the Technology Acceptance Model with the Theory of Planned Behavior. *Information Systems Research, 2*(3), 173-191.

McMillan, D.W., & Chavis, D.M. (1986). Sense of community: A definition and theory. *Journal of Community Psychology, 14*(1), p. 6-23.

Picciano, A. (2002). Beyond student perceptions: Issues of interaction, presence, and performance in an online course. *Journal of Asynchronous Learning Networks, 6*(1), 21-40. Retrieved June 30, 2005, from http://www.aln.org/publications/jaln/v6n1/v6n1_picciano.asp

Putnam, R. (2000). ***Bowling alone.*** New York: Simon & Schuster.

Riedl, M. O. (2001, January) A Computational Model and Classification Framework for Social Navigation. *Proceeding of the ACM International Conference on Intelligent User Interfaces (137-144).*

Roup, R., Gal, S., Drayton, B., & Pfister, M. (Eds.). (1993). ***LabNet: Toward a community of practice.*** New Jersey: Lawrence Erlbaum Associates, Inc.

Rovai, A. (2002). A preliminary look at the structural differences of higher education classroom communities in traditional and ALN courses. *Journal of Asynchronous Learning NETwork, 6* (1).

Rovai, A. P. (2003). Sense of community in a higher education television-based distance education program. *Educational Technology Research and Development, 51*(2), 5-16.

Social Computing Research Group (SCRG) (2006, June). ***Social Nature of Online Learning in Sakai.*** Paper presented in ED-MEDIA Conference, Orlando, USA.

Steele, J. H. (2002). ***A descriptive case study of a virtual language learning community.*** Unpublished doctoral dissertation, University of Pennsylvania, Indiana.

Tu, C. H., & Corry, M. (2003, April). Designs, management tactics, and strategies in asynchronous learning discussions. *The Quarterly Review of Distance Education, 4*(3), 303-315.

Tu, C. H., & McIsaac, M. S. (2002). The relationship of social presence and interaction in online classes. *The American Journal of Distance Education, 16*(3), 131-150.

Rovai, A. P. (2001). Building classroom community at a distance: A case study. *Educational Technology Research and Development, 49*(4), 33-48.

Wenger, E. (1996) Communities of practice: the social fabric of the learning organization. *HealthCare Forum Journal, 39*(4), 20-26.

Wenger, E. (1998). ***Communities of practice: learning, meaning, and identity.*** New York, N.Y.: Cambridge University Press.