Karen P. Swan, Jennifer C. Richardson, Philip Ice, D. Randy Garrison, Martha Cleveland-Innes, J. Ben Arbaugh

Validating a Measurement Tool of Presence in Online Communities of Inquiry

This article examines work related to the development and validation of a measurement tool for the Community of Inquiry (CoI) framework in online settings. The framework consists of three elements: social presence, teaching presence and cognitive presence, each of which is integral to the instrument. The 34 item instrument, and thus framework, was tested after being administered at four institutions in the Summer of 2007. The article also includes a discussion of implications for the future use of the CoI survey and the CoI framework itself.

Introduction

Online learning models are increasingly present in higher education. In 2006, 3.5 million, or almost 20%, of US higher education students were taking at least one online course (Allen & Seaman, 2007). While researchers have been relatively successful in identifying the properties of successful online learning environments (Aragon, 2003; Cleveland-Innes, Garrison & Kinsel, 2007), a more in-depth analysis requires a theoretical framework that illuminates the complexities of online learning.

One model that has gained a good deal of attention is the Community of Inquiry (CoI) framework developed by Garrison, Anderson and Archer (2000). The CoI framework is a process model that provides a comprehensive theoretical model that can inform both research on online learning and the practice of online instruction. It assumes that effective online learning requires the development of a community (Rovai, 2002; Thompson & MacDonald, 2005; Shea, 2006) that supports meaningful inquiry and deep learning. Such development is not a trivial challenge in the online environment.

Figure 1: Community of Inquiry Framework
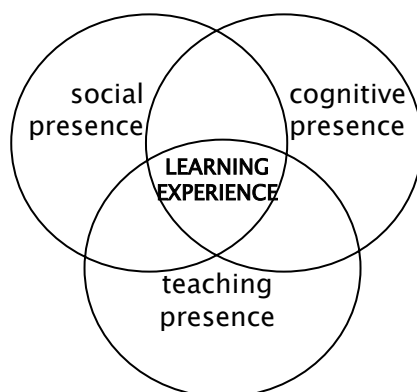
The CoI model views the online learning experience as a function of the relationship between three elements: social presence, teaching presence and cognitive presence (see Figure 1). S*ocial presence* refers to the degree to which learners feel socially and emotionally connected with others in an online environment; *teaching presence* is defined as the design, facilitation, and direction of cognitive and social processes for the realization of personally meaningful and educationally worthwhile learning outcomes; and c*ognitive presence* describes the

extent to which learners are able to construct and confirm meaning through sustained reflection and discourse. The sections which immediately follow describe each of these constructs in greater detail and summarize research findings concerning their importance in online courses.

However, two issues have challenged research utilizing the CoI framework. The first is the lack of common measures in studies investigating the individual presences, which makes generalizations across studies difficult. The second issue is that few studies explore all three presences and, more importantly, interactions among them. The later sections of this article describe efforts its authors are making to address these issues: namely, the development of a CoI survey instrument which measures all three presences using commonly agreed-upon indicators. The article concludes with a discussion of implications for the future use of the CoI survey and the CoI framework itself.

Social Presence

"Social presence", the degree to which participants in computer-mediated communication feel affectively connected one to another, is clearly the longest researched of the three presences in the Community of Inquiry (CoI) framework. Indeed, social presence research predates the creation of the CoI model by two decades. It arose from a common concern among some Communications scholars that computer-mediated communication might prevent students from developing the sense of belonging with other students, instructors, programs of study and educational institutions which social learning theories (Vygotsky, 1978) and immediacy research (Weiner & Mehrabian, 1968) suggest support learning. Research by Gunawardena (1995) and Gunawardena and Zittle (1997) moved the definition of social presence from its original focus on the capacities of the media involved to one that focused more on individual perceptions, and so the concept of "social presence" evolved to "the degree to which a person is perceived as 'real' in mediated communication" (Gunawardena and Zittle, 1997, p 8).

Social Presence and Student's Learning. A number of studies followed which examined the perception of interpersonal connections with virtual others as an important factor in the success of online learning (Swan, 2002; Tu, 2000), specifically student's perceived or actual learning. Richardson & Swan (2003) examined students' perceived social presence and its relationship to their perceived learning and satisfaction with course instructors. They found all three variables highly correlated and a regression analysis showed that 42% of the variability in perceived learning was predicted by perceived social presence. Picciano (2002) investigated perceived social presence, interactivity, and learning among students enrolled in an online course and found strong correlations among these variables. While he initially found no correlations between these variables and actual performance on tests or written assignments he discovered that by dividing students into groups perceiving low, medium and high social presence there were significant differences; students in the high social presence group scored higher than the medium, and the medium group outscored the low social presence group.

Social Presence and the CoI Framework. It is this sense of "social presence" that Garrison, Anderson and Archer (2000) incorporated into the CoI model. Their research team (Rourke, Anderson, Garrison & Archer, 2001) looked for evidence of social presence in the transcripts of online discussion. They identified three categories of social presence indicators based on research on immediacy in face-to-face interactions (Weiner & Mehrabian, 1968) - affective responses, cohesive responses, and interactive responses – and developed coding protocols using these indicators. Rourke et al. (2001) established the indicators as reliable in a pilot content analysis of two online class discussions, and documented the use of such indicators to project social presence in text-based online communication.

Social Presence and Course Design. Noting the relationship between perceived presence and success in online courses, Tu (2000) linked the development of social presence in online courses to course design. Based on elements of social learning theory, he distinguished three dimensions of course designs which influenced the development of social presence – social context, online communication, and interactivity. Tu and McIsaac (2002) found some support for these dimensions of social presence in a factor analysis of student responses to an online survey concerned with computer-mediated communication tools. They argued that these dimensions should be taken into consideration in the design of online courses.

Similarly, Swan and Shih (2005) found some support for the impact of course design on perceptions of social presence in a study they did on development of four online classes. They found that course (design) alone of seven variables (including instructor, class, age, gender, online experience, and time spent in discussion) significantly affected perceived social presence. Their findings also show an overlap in perceptions of instructor

and peer presence and indicate that the perceived presence of instructors may be a more influential factor in determining student satisfaction than the perceived presence of peers.

Teaching Presence

Garrison, et. al. (2000) contend that while interactions between participants are necessary in virtual learning environments, interactions themselves are not sufficient to ensure effective online learning. These types of interactions need to have clearly defined parameters and be focused toward a specific direction, hence the need for teaching presence. Anderson, Rourke, Garrison, and Archer (2001) originally conceptualized teaching presence as having three components: (1) instructional design and organization; (2) facilitating discourse (originally called "building understanding"); and (3) direct instruction. While recent empirical research may generate a debate regarding whether teaching presence has two (Shea, 2006; Shea, Li, & Pickett, 2006) or three (Arbaugh & Hwang, 2006) components, the general conceptualization of teaching presence has been supported by other research (Coppola, Hiltz, & Rotter, 2002; LaPointe & Gunawardena, 2004; Stein, Wanstreet, Calvin, Overtoom, & Wheaton, 2005).

Instructional (Course) Design and Organization. Anderson, et. al. (2001) describe the design and organization aspect of teaching presence as the planning and design of the structure, process, interaction and evaluation aspects of the online course. Some of the activities comprising this category of teaching presence include re-creating Power Point presentations and lecture notes onto the course site, developing audio/video mini-lectures, providing personal insights into the course material, creating a desirable mix of and a schedule for individual and group activities, and providing guidelines on how to use the medium effectively. These are particularly important activities since clear and consistent course structure supporting engaged instructors and dynamic discussions have been found to be the most consistent predictors of successful online courses (Swan, 2002; 2003). Of the three components of teaching presence, this is the one most likely to be performed exclusively by the instructor.

Facilitating Discourse. Anderson, et. al (2001) conceptualize facilitating discourse as the means by which students are engaged in interacting about and building upon the information provided in the course instructional materials. This role includes sharing meaning, identifying areas of agreement and disagreement, and seeking to reach consensus and understanding. Therefore, facilitating discourse requires the instructor to review and comment upon student comments, raise questions and make observations to move discussions in a desired direction, keeping discussion moving efficiently, draw out inactive students, and limit the activity of dominating posters when they become detrimental to the learning of the group (Anderson et al., 2001; Brower, 2003; Coppola et al., 2002).

Direct Instruction. Anderson, et. al. (2001) contextualized direct instruction as the instructor provision of intellectual and scholarly leadership in part through the sharing of their subject matter knowledge with the students. They also contend that a subject matter expert and not merely a facilitator must play this role because of the need to diagnose comments for accurate understanding, injecting sources of information, and directing discussions in useful directions, scaffolding learner knowledge to raise it to a new level.

In addition to the sharing of knowledge by a content expert, direct instruction is concerned with indicators that assess the discourse and the efficacy of the educational process. Instructor responsibilities are to facilitate reflection and discourse by presenting content, using various means of assessment and feedback. Explanatory feedback is crucial. This type of communication must be perceived to have a high level of social presence/instructor immediacy (Arbaugh, 2001; Baker, 2004; Gorham, 1988; Richardson & Swan, 2003) to be effective. Instructors must have both content and pedagogical expertise to make links among contributed ideas, diagnose misperceptions, and inject knowledge from textbooks, articles, and web-based materials. The simultaneous roles of discussion facilitator and content expert within teaching presence goes beyond early contentions which online instructors needed merely to transition from a role of knowledge disseminator to interaction facilitator. Teaching presence contends that for online learning to be effective, instructors must play both roles (Arbaugh & Hwang, 2006).

Cognitive Presence

Cognitive presence may be the least researched and understood of the three presences, yet it is cognitive presence that goes to the heart of a community of inquiry. Cognitive presence has its genesis in the work of John Dewey and scientific inquiry (1933). For Dewey, inquiry was at the core of a worthwhile educational

experience. The development of the cognitive presence construct by Garrison, et. al (2000) is grounded in the critical thinking literature and operationalized by the Practical Inquiry model (Garrison, Anderson & Archer, 2000, 2001).

   The Practical Inquiry Model. The Practical Inquiry model is defined by two axes. The vertical axis reflects the integration of thought and action. This also emphasizes the collaborative nature of cognitive presence and the need for community. The integration of discourse and reflection (i.e., public and private worlds) is a key feature of this model. Although we have identified these as two distinct processes, in practice this dimensions (i.e., discourse and reflection) are most often indistinguishable and instantaneous iterations. The horizontal axis represents the interface of the deliberation and action axis. The extremes of the horizontal axis are analysis and synthesis. These are the points of insight and understanding (Garrison, et. al, 2000).

Figure 2: Practical Inquiry Model
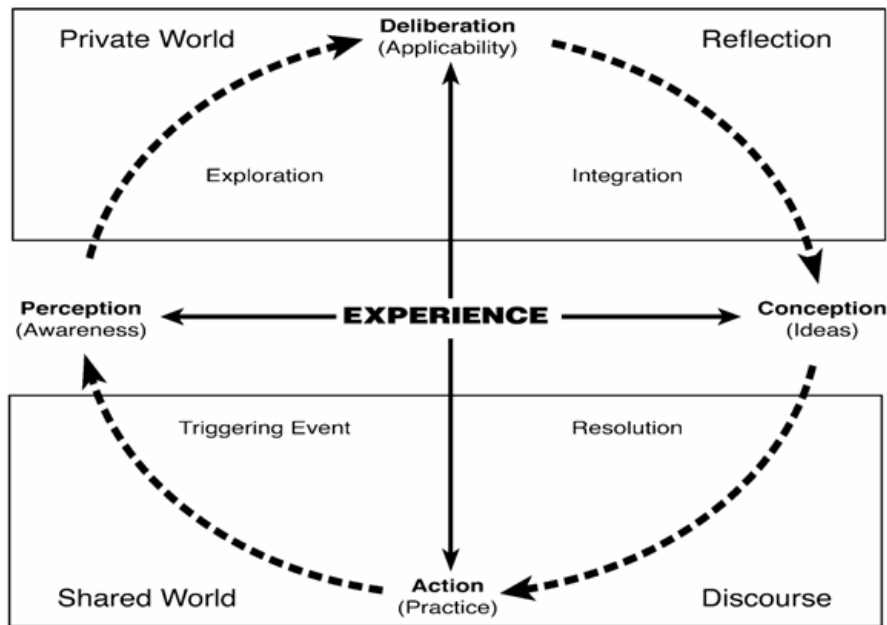
   While the axes provide the necessary theoretical frame of this model, in practical terms the focus is on the phases of the inquiry process (triggering event, exploration, integration, and resolution). It is important to keep in mind that this is a process model that has been telescoped for the sake of parsimony. As a result, in practice, there will always be a degree of fuzziness at the cusps of the phases. However, this generally is only an issue when attempting to code transcripts for research purposes.

   Phases of the Inquiry Process. The first phase is a triggering event or initiation of the inquiry through the formal presentation of a problem or a dilemma arising from a previous inquiry. Part of this process is to clearly define the problem or task. The second phase of practical inquiry is exploration. This is a crucial and time consuming process where students individually and collaboratively search for, and share, relevant material and ideas. The third phase, integration, is a reflective and convergent process where the focus is making connections and identifying potential solutions. The final phase of the inquiry process is resolution or the identification and testing of the most promising solution to the problem or dilemma (Garrison, et. al., 2001). In an educational context, this is often done vicariously. However, it is important that resolutions are defended rationally or through application.

   One of the early challenges with this model was understanding why students did not progress to the integration and resolution phases (Garrison, et. al., 2001). Most of the discussion appeared at the exploration phase. More recently, there has emerged evidence that progression through the phases has more to do with teaching presence in the form of designing tasks that require clear outcomes and then facilitating and directing

online discussion to move toward a resolution (Garrison & Arbaugh, 2007). If the goal and demand is for resolution, students will achieve this state. In addition, a recent unpublished study has found much higher frequencies of integration (Akyol & Garrison, 2008), suggesting that this may well be due to the nature of the task as well as to the maturity of the students.

Context of the Study

As previously noted, one of the challenges in utilizing the CoI framework has been the lack of common methodologies and measures. Though previous studies have addressed each of the presences and two have addressed the CoI as a whole (Garrison, Cleveland-Innes & Fung, 2004; Arbaugh, 2007), a common instrument has previously not been adopted throughout the online learning research community. In December of 2006, the authors and colleagues from two other institutions began work on creating such an instrument. Commonalities between items in previous instruments were reconciled and, where appropriate, new items created to fully capture each of the presences (Arbaugh, Cleveland-Innes, Diaz, Garrison, Ice, Richardson, Shea & Swan, 2008). The resultant, 34 item instrument was administered at four institutions in the Summer of 2007.

Participating institutions were located in the United States and Canada. Courses in which the surveys were administered were in the areas of Curriculum Theory, Distance Education, Educational Leadership, Interdisciplinary Studies, a Master's of Business Administration course on Business Literature, Teacher Education and Instructional Technology. Courses in which the survey was administered were at the Master and Doctoral levels. 287 students volunteered to complete the survey, yielding a response rate of 43%, with per course response rates ranging from 6% to 93%. Participant ages ranged from 20 to 57. Data relating to gender and ethnicity was not obtained.

Though programmatic variations were present, courses at each of the institutions were designed and delivered using the CoI as a conceptual and thematic basis. In some instances this structure was prevalent in formalized training programs, while in others awareness of the three presences informally guided best practice. From an instructional design perspective, such an approach translates into a recursive analysis of each of the three presences relative to desired course objectives to insure optimal opportunities for their inclusion in subsequent design, development and implementation; a process derivative of established goal oriented design processes (Davidson-Shivers & Rasmussen, 2006; Gagne, Wager, Golas & Keller, 2004; Morrison, Ross & Kemp, 2006).

In organizing instructional components, utilization of this process produced learning units in which overarching topics were addressed through multi-level questioning that provided for a triggering event vis-a-vis the cognitive presence framework. To supplement online components, print and physically distributable electronic media (e.g CD-ROM) were required for each course.

Using guidelines provided through effective application of the instructional design and organization component of teaching presence students were then engaged in threaded discussions. Participation in these discussions was given varying weight in determining students' final grade from course to course (with a range of 15% - 60% of the final grade accounted for by participation in threaded discussions), with a few courses in which threaded discussions were not a gradable component. In some instances, students also engaged in synchronous conferencing to supplement threaded discussions. Regardless of the weight given to participation in threaded discussions or supplemental activities, they were considered integral parts of each learning unit, subsequent artifact development and concurrent learning outcomes.

Though establishing meaningful threaded discussions has long been considered essential for cognitive scaffolding in online courses (Bender, 2003; Dixon, Kuhlhorst & Reiff, 2006; Pallof & Pratt, 1999; Salmon, 2002), application of the CoI expands the role of discussion forums to include the establishment of social presence through student-student interactions that foster open communication, subsequent group cohesion and what Green (1971) terms collaborative knowledge construction. As an example, a large majority of the discussion prompts in education courses followed a group-constructivist socio-epistemological orientation, thus producing an environment in which it was expected that responses would be open-ended in nature and allow for relatively risk-free collaborative processes to occur (Arbaugh & Benbunan-Fich, 2006; Phillips, Wells, Ice, Curtis & Kennedy, 2007). In the courses studied, this allowed students to move fluidly to the exploration, integration and resolution phases of cognitive presence. Where a group-objectivist orientation was applied to discussions, the same degree of latitude deemed acceptable for initial responses, however, more focused outcomes were expected to emerge later in the later stages of the discussion threads.

While cognitive presence is initiated in this framework via the posing of overarching questions (the triggering event) subsequent events related to the social and cognitive presences schema's are largely dependent upon adequate projection of teaching presence. Specifically, the ability to effectively facilitate discourse and provide direct instruction appears to be crucial in moving cognitive presence beyond the exploration phase (Garrison, 2007). As an example, in the exploration process it is common for students to have misconceptions or encounter areas in which they disagree with their peers. In these instances the instructor's expert input is required to help guide students toward understanding and resolve disagreements through guided exploration.

From a theoretical perspective, such actions are required to insure that the curriculum is one of richness, rigor and conversation based iteration (Doll, Fleener, Trueit & St. Julien, 2005). In the face-to-face classroom, similar processes have been highly successful through careful crafting of collaborative learning environments (Johnson & Johnson, 1998; Slavin, 1994) in which student and teacher roles are quite similar to those theorized in the CoI. However, the increased reflectivity inherent in asynchronous threaded discussions allows learners to engage the content and their peers at substantively higher cognitive level (Coppola, Hiltz & Rotter, 2004; Swan, Shea, Fredericksen, Pickett, Pelz & Maher, 2000).

Instructors for courses surveyed in this study tried to create favorable conditions for the emergence of optimal discussion based experiences in which the three presences could naturally overlap. This is consistent with the requirements underpinning an online community of inquiry. This process was not formulaic or prescriptive in nature; rather, from an instructors' perspective, it can be considered artful application of grounded theory. The presentation of data that follows provides the findings of a factor analysis in which the tripartite theoretical construct of the CoI framework was confirmed. A narrative account of the methodology employed is also provided.

Method and Results

Ordinal responses were scored using the scale (0=Strongly Disagree) to (4=Strongly Agree). Mean responses for the 34 items ranged from 2.90 to 3.63, with a standard deviation range of 0.66 to 1.04. Collectively, *Teaching Presence* items yielded a mean score of 3.34 (s.d. = 0.61). *Social Presence* items collectively yielded a mean score of 3.18 (s.d. = 0.65), and *Cognitive Presence* items yielded a mean score of 3.31 (s.d. = 0.60).

Based on the assumptions of the theoretical model and previous exploratory work, the three presences were considered to be distinct but overlapping. As such, confirmatory factor analysis, using principal component analysis with obliminal rotation was utilized. A default value $\delta=0$, was specified in SPSS 15 for Direct Obliminal rotation, to limit reasonably the level of correlation among the factors.

The sample size (n=287) for this study is reasonably adequate depending on the rule of thumb utilized. The study meets Kass & Tinley's (1979) recommendation for 5 to 10 participants per item and Comrey & Lee's (1992) sample size measure which describes 200 as Fair and 300 as Good. The Keyser-Meyer-Olkin (KMO) measure of sampling adequacy is 0.96, suggesting factor analysis should yield distinct and reliable factors given the data utilized.

Inspection of the scree plot supported the three factor construct predicted by the theoretical basis of CoI and previous exploratory research. Specifically, the marked decrease in magnitude of the factors did not support a framework consisting of more than the anticipated number of factors.

Table 1 illustrates the 34 CoI items factor loadings, with the three factors highlighted for interpretability. These results reflect the Pattern Matrix generated by the previously described principal component analysis. In support of this analysis, loadings for the Structure Matrix differed slightly, however both output matrices support the 3 factor model. Consistent with the design of the instrument, items 1-13 (Teaching Presence) loaded most heavily on Factor 1. Items 14-22 (Social Presence) loaded most heavily on Factor 2. Finally, items 23-34 (Cognitive Presence) loaded most heavily on Factor 3. Cronbach's Alpha yielded internal consistencies equal to 0.94 for Teaching Presence, 0.91 for Social Presence, and 0.95 for Cognitive Presence.

Table 1. Community of Inquiry Instrument and Factor Loadings

Pattern Matrix(a)

	Component		
	1	2	3
1. The instructor clearly communicated important course topics.	**0.826**	0.088	0.067
2. The instructor clearly communicated important course goals.	**0.877**	-0.021	0.046
3. The instructor provided clear instructions on how to participate in course learning activities.	**0.592**	0.246	-0.035
4. The instructor clearly communicated important due dates/time frames for learning activities.	**0.611**	0.078	0.040
5. The instructor was helpful in identifying areas of agreement and disagreement on course topics that helped me to learn.	**0.579**	0.162	-0.138
6. The instructor was helpful in guiding the class towards understanding course topics in a way that helped me clarify my thinking.	**0.575**	0.091	-0.281
7. The instructor helped to keep course participants engaged and participating in productive dialogue.	**0.633**	0.149	-0.160
8. The instructor helped keep the course participants on task in a way that helped me to learn.	**0.579**	0.042	-0.285
9. The instructor encouraged course participants to explore new concepts in this course.	**0.523**	0.099	-0.233
10. Instructor actions reinforced the development of a sense of community among course participants.	**0.569**	0.174	-0.176
11. The instructor helped to focus discussion on relevant issues in a way that helped me to learn.	**0.425**	0.146	-0.374
12. The instructor provided feedback that helped me understand my strengths and weaknesses relative to the course's goals and objectives.	**0.649**	-0.123	-0.201
13. The instructor provided feedback in a timely fashion.	**0.513**	-0.025	-0.103
14. Getting to know other course participants gave me a sense of belonging in the course.	0.050	**0.619**	-0.233
15. I was able to form distinct impressions of some course participants.	0.172	**0.473**	0.013
16. Online or web-based communication is an excellent medium for social interaction.	-0.181	**0.674**	-0.226
17. I felt comfortable conversing through the online medium.	-0.039	**0.814**	0.015
18. I felt comfortable participating in the course discussions.	0.109	**0.788**	0.005
19. I felt comfortable interacting with other course participants.	0.286	**0.701**	0.038
20. I felt comfortable disagreeing with other course participants while still maintaining a sense of trust.	0.103	**0.620**	-0.034
21. I felt that my point of view was acknowledged by other course participants.	0.319	**0.556**	0.025
22. Online discussions help me to develop a sense of collaboration.	0.047	**0.561**	-0.340
23. Problems posed increased my interest in course issues.	-0.099	0.172	**-0.785**
24. Course activities piqued my curiosity.	0.064	0.070	**-0.712**
25. I felt motivated to explore content related questions.	0.082	-0.031	**-0.770**
26. I utilized a variety of information sources to explore problems posed in this course.	0.078	-0.158	**-0.759**
27. Brainstorming and finding relevant information helped me resolve content related questions.	-0.106	0.130	**-0.794**
28. Online discussions were valuable in helping me appreciate different perspectives.	-0.096	0.286	**-0.699**
29. Combining new information helped me answer questions raised in course activities.	0.101	0.043	**-0.716**
30. Learning activities helped me construct explanations/solutions.	0.128	0.030	**-0.732**
31. Reflection on course content and discussions helped me understand fundamental concepts in this class.	0.008	0.237	**-0.640**
32. I can describe ways to test and apply the knowledge created in this course.	0.239	-0.097	**-0.619**
33. I have developed solutions to course problems that can be applied in practice.	0.147	0.026	**-0.653**
34. I can apply the knowledge created in this course to my work or other non-class related activities.	0.171	-0.041	**-0.687**

Rotation Method: Oblimin with Kaiser Normalization.

a. Rotation converged in 12 iterations.

Discussion

Factor analysis demonstrates the clustering of sub-elements within the model, verifying the theoretical structure proposed by Garrison, et. al (2000). The objective of this research was to explicate all three presences and to test the validity and reliability of a measurement tool for the community of inquiry framework. Creating reliable instruments is a critical step in the enhancement of research around this model; without reliability, research results using various measurement tools are not replicable, and replication is the foundation of scientific method. Reliability is estimated for this instrument through internal consistency of correlation among the variables. Cronbach's Alpha measures how well a set of variables (survey items in this case) measures a single unidimensional construct. In this data set, Cronbach's Alpha yielded numbers indicative of high inter-correlations leading to internal consistencies: 0.94 for Teaching Presence, 0.91 for Social Presence, and 0.95 for Cognitive Presence. The instrument used in this study provides a reliable measure for the existence of a community of inquiry in online learning environments.

In addition to confirming the theory presented in the CoI framework, these items provide insights into the necessary practice-based requirements of each presence. As outlined earlier, sub-concepts within each presence concretize the activity that initiate the existence of presence for instructors and students. Students experience social presence to the extent that they participate in open communication, feel a sense of group cohesion and exhibit affective expressions. Items deemed to operationalize open communication are, for example, as follows:

I felt comfortable conversing through the online medium.
I felt comfortable participating in the course discussions.
I felt comfortable interacting with other course participants.

It becomes the requirement, then, of instructional designers and online instructors to foster opportunities for students to feel comfortable conversing, participating and interacting online. Social presence acts as an intervening variable, a necessary but not sufficient condition of a satisfying and effective online experience.

This effective online experience is guided in the same way by cognitive presence. Developing ways to move students toward higher levels of cognitive processing are a latent but central objective in many higher education courses. Recent studies are contributing to our understanding of instructional design strategies to foster higher order thinking (Kanuka, Rourke & Laflamme, 2007; Schrire, 2006). Results of this study verify that cognitive presence is composed of elements across the spectrum of inquiry: triggering events, exploration, integration and resolution.

Teaching presence in the form of instructor actions plays a critical role in bringing the CoI education experience together for the students (Aragon, 2003; Garrison & Cleveland-Innes, 2005; Garrison & Arbaugh, 2007; Meyer, 2004). Validation of the items describing design and organization, direct instruction and facilitation occurred in the analysis of a three factor solution. However, other analyses suggest additional components may be at work in teaching presence. In addition, the role for students in teaching presence needs further exploration (Stein, Wanstreet, Glazer, Engle, Harris, Johnston, Simons & Trinko, 2007).

Conclusions

Results of this factor analysis provide evidence that, as currently defined and operationalized, an online community of inquiry emerges out of social, cognitive and teaching presence. Student responses to statements about his or her online experience clustered around items as defined by the theory. This effort resulted in a measurement tool of agreed upon and statistically validated items that operationalizes the concepts in the CoI model. This measurement tool may be used for continued explication of concepts in the model. It may also be used for practical purposes, to guide design elements ahead of time, or to evaluate the existence of an online community of inquiry once implemented.

Of course, meaningful research begets more questions. For example, most studies of social presence have noted the highly democratic nature of online discussion (Harasim, 1990) and accordingly conceptualized social presence as a single construct with an emphasis on perceptions of the presence of peers. As noted above, there is some indication that instructor presence may be equally important (Swan & Shih, 2005), yet occasionally overlapping with peer presence. While the social presence of instructors has been considered in explorations of "teaching presence" (Anderson, et. al., 2000; Shea, Pickett & Pelz, 2003), it has not been isolated therein. In addition, while most studies of social presence implicitly locate its development in online discussion, survey questions have not explicitly addressed it in that context. Similarly, the question of whether

social presence is really a necessary precursor of cognitive presence also needs to be examined. Most researchers in this area agree that it is, with the caveat that social presence must be directed toward learning outcomes (Garrison, 2007). This has led to a revision of the original social presence categories and indicators to reflect academic purposes (Garrison, Cleveland-Innes & Fung, 2004).

In addition to further research on social presence and other aspects of the model, expansion and application issues abound. The possibility of an expanded role for emotional presence, beyond the influence found in social presence is under review (Cleveland-Innes & Campbell, 2006). Consideration of socially rich technologies and the CoI, learner characteristics and perceptions of social presence and investigation of the CoI framework and the "Net Generation" are additional research topics currently underway (Arbaugh, Cleveland-Innes, Diaz, Garrison, Ice, Richardson, Shea & Swan, 2007).

References

I.E. Allen, J. Seaman, (2007). *Online nation: Five years of growth in online learning.* Needham, MA: Sloan Consortium.

Z. Akyol, D.R. Garrison, (2008). *The development of a community of inquiry over time: Understanding the progression and integration of social, cognitive and teaching presence.* Unpublished manuscript.

T. Anderson, L. Rourke, D.R. Garrison, W. Archer, (2001). Assessing teaching presence in a computer conferencing context. *Journal of Asynchronous Learning Networks,* 5(2). Retrieved December 10, 2004 at http://www.aln.org/publications/jaln/v5n2/v5n2_anderson.asp

S.R. Aragon (Ed.) (2003). Facilitating learning in online environments. *New Directions for Adult and Continuing Education,* No. 100.

J.B. Arbaugh, (2001). How instructor immediacy behaviors affect student satisfaction and learning in web-based courses. *Business Communication Quarterly*, 64(4): 42-54.

J.B. Arbaugh, (2007). An empirical verification of the community of inquiry framework. *Journal of Asynchronous Learning Networks, 11*(1): 73-85.

J.B. Arbaugh, R. Benbunan-Fich, (2006). An investigation of epistemological and social dimensions of teaching in online learning environments. *Academy of Management Learning & Education*, 5: 435-447.

J.B. Arbaugh, M. Cleveland-Innes, S. Diaz, D.R. Garrison, P. Ice, J.C. Richardson, P. Shea, K. Swan, (2007). *Community of Inquiry framework: Validation and instrument development.* Paper presented at the 13th annual Sloan-C International Conference on Online Learning, Orlando, FL.

J.B. Arbaugh, M. Cleveland-Innes, S. Diaz, D.R. Garrison, P. Ice, J.C. Richardson, P. Shea, K. Swan, (February, 2008). *The Community of Inquiry Framework: Validation and Instrument Development*. Athabasca, AB: Canadian Institute of Distance Education Research Session (webinar).

J.B. Arbaugh, A. Hwang, (2006). Does "teaching presence" exist in online MBA courses? *The Internet and Higher Education* 9: 9–21.

J.D. Baker, (2004). An investigation of relationships among instructor immediacy and affective and cognitive learning in the online classroom. *The Internet and Higher Education*, 7: 1-13.

T. Bender, (2003). *Discussion-based online teaching to enhance student learning: Theory, practice and assessment.* Sterling, VA: Stylus.

H.H. Brower, (2003). On emulating classroom discussion in a distance-delivered OBHR course: Creating an on-line community. *Academy of Management Learning & Education*, *2*: 22-36.

M. Cleveland-Innes, P. Campbell, (2006). Understanding emotional presence in an online community of inquiry. Paper presented at the 12th Annual SLOAN-C ALN Conference, Orlando, Florida.

M. Cleveland-Innes, R. Garrison, E. Kinsel, (2007). Role adjustment for learners in an online community of inquiry: Identifying the needs of novice online learners. *International Journal of Web-based Learning and Teaching Technologies, 2*(1), 1-16.

N.W. Coppola, S.R. Hiltz, N.G. Rotter, (2002). Becoming a virtual professor: Pedagogical roles and asynchronous learning networks. *Journal of Management Information Systems*, *18*(4): 169-189.

N.W. Coppola, S.R. Hiltz, N.G. Rotter, (2004). Building trust in virtual teams. *IEEE Transactions on Professional Communication, 47* (2): 95-104.

G.V. Davidson-Shivers, K.L. Rasmussen, (2006). *Web-based learning: Design, implementation, and evaluation.* Upper Saddle River, NJ: Pearson Prentice Hall.

J. Dewey, (1933). *How we think* (Rev ed.). Boston: D.C. Heath.

W. Doll, M.J. Fleener, D. Trueit, J. St. Julien, (Eds.). (2005). *Chaos, Complexity, Curriculum, and Culture.* New York: Peter Lang.

M. Dixcon, M. Kuhlhorst, A. Reiff, (2006). Creating effective online discussions: Optimal instructor and student roles. *Journal of Asynchronous Learning Networks 10*(4), 15-28.

D.R. Garrison, (2007). Online Community of Inquiry review: Social, cognitive and teaching presence issues. *Journal of Asynchronous Learning Networks, 11*(1), 61-72.

R.M. Gagne, W.W. Wager, K. Golas, J.M. Keller, (2004). *Principles of instructional design* (5th ed.). Belmount, California: Wadsworth/Thompson Learning.

D.R. Garrison, T. Anderson, W. Archer, (2000). Critical inquiry in a text-based environment: Computer conferencing in higher education. *The Internet and Higher Education, 2*: 87–105.

D.R. Garrison, T. Anderson, W. Archer, (2001). Critical thinking, cognitive presence and computer conferencing in distance education. *The American Journal of Distance Education, 15*(1), 7-23.

D.R. Garrison, J.B. Arbaugh, (2007). Researching the community of inquiry framework: Review, issues, and future directions. *Internet and Higher Education, 10*(3), 157-172.

D.R. Garrison, M. Cleveland-Innes, T. Fung, (2004). Student role adjustment in online communities of inquiry: Model and instrument validation. *Journal of Asynchronous Learning Networks, 8*(2): 61-74.

D. R. Garrison, M. Cleveland-Innes, (2005). Facilitating cognitive presence in online learning: interaction is not enough. *American Journal of Distance Education, 19*(3), 133-148.

J. Gorham, (1988). The relationship between verbal teacher immediacy behaviors and student learning. *Communication Education, 37*: 40-53.

T. Green, (1971). *The activities of teaching*. New York: McGraw-Hill.

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

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

L. Harasim, (1990). On-line Education: Perspectives on a New Environment. New York: Praeger.

D.W. Johnson, R.T. Johnson, (1998). Learning Together and Alone: Cooperative, Competitive, and Individualistic Learning, 5th Edition. Boston: Allyn & Bacon.

H. Kanuka, L. Rourke, E. Laflamme, (2007). The influence of instructional methods on the quality of online discussion. *British Journal of Educational Technology*, 38(2), 260 - 271.

D.K. LaPointe, C.N. Gunawardena, (2004). Developing, testing, and refining a model to understand the relationship between peer interaction and learning outcomes in computer-mediated conferencing. *Distance Education*, 25(1): 83-106.

K. Meyer, (2004). Evaluating online discussions: Four different frames of analysis. *Journal of Asynchronous Learning Networks*, 8(2), 101-114.

G.R. Morrison, S.M. Ross, J.E. Kemp, H.K. Kalman, (2006). *Designing effective instruction* (5th ed.). San Francisco: John Wiley and Sons.

R.M. Pallof, K. Pratt, (1999). *Building learning communities in cyberspace: Effective strategies for the online classroom*. San Francisco: Jossey-Bass.

P. Phillips, J. Wells, P. Ice, R. Curtis, R. Kennedy, (2007). A case study of the relationship between socio-epistemological teaching orientations and instructor perceptions of pedagogy in online environments. *Electronic Journal for the Integration of Technology in Teacher Education. 6,* 3-27.

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

J.C. Richardson, K. Swan, (2003). Examining social presence in online courses in relation to students' perceived learning and satisfaction. *Journal of Asynchronous Learning Networks, 7*(1) Retrieved June 1, 2004 from http://www.aln.org/publications/jaln/v7n1/index.asp

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

A.P. Rovai, (2002). Sense of community, perceived cognitive learning, and persistence in asynchronous learning networks. *The Internet and Higher Education*, 5(4), 319-332.

G. Salmon, (2002). *E-tivities*. New York: Falmer.

S. Schrire, (2006). Knowledge building in asynchronous discussion groups: Going beyond quantitative analysis. *Computers & Education*, 46(1), 49-70.

P.J. Shea, (2006). A study of students' sense of learning community in online learning environments. *Journal of Asynchronous Learning Networks*, 10(1). Retrieved June 15, 2006 from http://www.sloan-c.org/publications/jaln/v10n1/v10n1_4shea_member.asp

P.J. Shea, C.S. Li, A. Pickett, (2006). A study of teaching presence and student sense of learning community in fully online and web-enhanced college courses. *The Internet and Higher Education*, *9*: 175-190.

P.J. Shea, A.M. Pickett, W.E. Pelz, (2003). A follow-up investigation of "teaching presence" in the SUNY Learning Network. *Journal of Asynchronous Learning Networks, 7* (2), 61-80.

R.E. Slavin, (1994). *Cooperative Learning: Theory, Research and Practice, 2nd Edition.* Boston: Allyn & Bacon.

D.S. Stein, C.E. Wanstreet, J. Calvin, C. Overtoom, J.E. Wheaton, (2005). Bridging the transactional distance gap in online learning environments. *American Journal of Distance Education*, *19*(2): 105-118.

D.S. Stein, C.E. Wanstreet, H.R. Glazer, C.J. Engle, R.T. Harris, S.M. Johnston, M.R. Simons, L.A. Trinko, (2007). Creating shared understanding through chats in a community of inquiry. *The Internet and Higher Education,* 10, 103 - 115.

K. Swan, (2002). Building learning communities in online courses: The importance of interaction. *Education Communication and Information*, *2*(1): 23-49.

K. Swan, (2003). Learning effectiveness: What the research tells us. In J. Bourne & J. C. Moore (Eds), *Elements of Quality Online Education: Practice and Direction*: 13-45. Needham, MA: Sloan Consortium.

K. Swan, P. Shea, E. Fredericksen, A. Pickett, W. Pelz, G. Maher, (2000). Building knowledge building communities: Consistency, contact and communication in the virtual classroom. *Journal of Educational Computing Research, 23*(4): 389-413.

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

T.L. Thompson, C.J. MacDonald, (2005). Community building, emergent design and expecting the unexpected: Creating a quality eLearning experience. *The Internet and Higher Education, 8* (3), 233-249.

C.H. Tu, (2000). On-line learning migration: From social learning theory to social presence theory in CMC environment. *Journal of Network and Computer* Applications, 23(1), 27–37.

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

L.S. Vygotsky, (1978). *Mind in Society*. Cambridge, MA: Harvard University Press.

M. Weiner, A. Mehrabian, (1968). *Language within Language: Immediacy, a Channel in Verbal Communication*. New York: Appleton-Century-Crofts.

Author Information

Dr. J. B. Arbaugh is a Professor of Strategy and Project Management at the University of Wisconsin Oshkosh. He received his Ph.D. in Business Strategy from the Ohio State University. Ben is the Editor-Select for *Academy of Management Learning & Education* and a past chair of the Management Education and Development Division of the Academy of Management. Ben's online teaching research has won best article awards from the *Journal of Management Education* and the *Decision Sciences Journal of Innovative Education.* His other research interests are in graduate management education, international entrepreneurship, and the intersection between spirituality and strategic management research. Some of his recent publications include articles in *Academy of Management Learning & Education, Information & Management, Management Learning*, the *Journal of Management, Spirituality, and Religion*, the *Journal of Enterprising Culture*, and *The Internet and Higher Education.*

Dr. Martha Cleveland-Innes is a faculty member in the Center for Distance Education at Athabasca University in Alberta, Canada. She teaches Research Methods and Leadership in the graduate programs of this department. Martha has received awards for her work on the student experience in online environments and held a major

research grant through the Canadian Social Sciences and Humanities Research Council. Her work is well published in academic journals in North America and Europe. Current research interests are in the area of leadership in open and distance higher education, disciplinary differences in online higher education and emotional presence in online communities of inquiry.

Dr. D. Randy Garrison is the Director of the Teaching & Learning Centre and a Professor in the Faculty of Education at the University of Calgary. Dr. Garrison has published extensively on teaching and learning in higher, adult and distance education contexts. His most recent books are: "E-Learning in the 21st Century" (2003) and "Blended Learning in Higher Education" (2008).

Dr. Philip Ice is a clinical Assistant Professor in the College of Education at the University of North Carolina Charlotte. Phil's research is focused on two overlapping areas. The first is the Community of Inquiry Framework, with an emphasis on factors influencing the emergence of Cognitive Presence. The second area of interest is the integration of new and emerging technologies into online learning environments. With respect to this later area, Phil's research focuses on how socially rich technologies impact Teaching and Cognitive Presence.

Dr. Jennifer C. Richardson is an Assistant Professor in the College of Education at Purdue University. Jennifer's research focuses on distance education, in particular online learning environments. Specific areas of research include measuring learning in online environments and the impacts of social presence and interactions on students' perceptions and learning.

Dr. Karen P. Swan is Research Professor in the Research Center for Educational Technology at Kent State University. Dr. Swan's research has been focused mainly in the general area of media and learning on which she has published and presented nationally and internationally. Her current research focuses on online learning, ubiquitous computing and data literacy. Dr. Swan has authored several hypermedia programs and co-authored two books on media and education. She is a member of the Advisory Board for the Sloan Consortium on Asynchronous Learning Networks, the Special Issues Editor for the *Journal of Educational Computing Research,* and Editor of the *Journal of the Research Center for Educational Technology*.