Learning Presence: Additional Research on a New Conceptual Element within the Community of Inquiry (CoI) Framework

Peter Shea (University at Albany - SUNY), Suzanne Hayes (Empire State College - SUNY), Sedef Uzuner (University at Albany - SUNY), Jason Vickers (University at Albany - SUNY), Temi Bidjerano (Furman University), A,exandra Pickett, (SUNY Learning Network), Mary Gozza-Cohen (Marist College), Jane Wilde (University at Albany - SUNY), Shoubang Jian (University at Albany - SUNY),

Abstract: This paper presents an empirical study grounded in the Community of Inquiry framework (Garrison, Anderson, Archer, 2000) and employs quantitative content analysis of student discourse and other artifacts of learning in online courses in an effort to enhance and improve the framework and offer practical implications for online education. As a theoretical framework the purpose of the widely referenced CoI model is to describe, explain, and predict learning in online environments. The current study grows out of an ongoing research agenda to understand student and faculty experiences in emerging technology mediated education systems and to make recommendations for theory and practice. The major question addressed here is whether the CoI model adequately explains effective learner behavior in fully online courses and to articulate a new conceptual element – *learning presence.* Results indicate that learning presence is evident in more complex learning activities that promote collaboration and is correlated with course grades.

Online learning in US higher education has exploded in recent years. Studies by the US Department of Education (Parsad & Lewis, 2008) indicate that online students generated more than 12 million course enrollment in 2007-2008 with nearly thirty percent of American college students enrolled in at least one online course (Allen & Seaman, 2010). For learners who were married with dependent children that percentage rises to one in three (Staklis, 2010). Given that today's growth in distance higher education continues to be driven largely by developments in asynchronous online learning (Allen & Seaman, 2008; Parsad & Lewis, 2008; U.S. Department of Education, National Center for Education Statistics, 2008) it is necessary that we focus our attention on these rapidly growing environments

Recent large scale meta-analytic research indicates that success rates for online students are at least equivalent (Bernard, Abrami, Lou, Borokhovski, Wade, Wozney, Wallet, et al., 2004;

Allen, Bourhis, Burrell, & Mabry, 2002; Tallent-Runnels, Thomas, Lan, Cooper, Ahern, Shaw, et. al., 2006; Zhao, Lei, Yan, Lai, & Tan, 2005) and may be better than (Means, Toyama, Murphy, Bakia& Jones, 2009) those of classroom students. Zhao and his colleagues (2005) investigated the "heterogeneity" of previous empirical results and began to identify the conditions under which distance and online education resulted in better outcomes (Zhao, Lei, Yan, Lai, & Tan, 2005). A telling condition was "publication year" with an increasing number of studies after 1998 revealing advantages for the online format. Zhao et al. concluded that this finding suggested that the two-way interaction of internet-based online applications of distance learning provided advantages that previous technological affordances had not. Zhao and his colleagues also concluded that studies in which instructor interaction with online students was medium to high resulted in better learning outcomes for online students relative to classroom learners.

Means and her colleagues (2009) similarly conducted a comprehensive meta-analysis including an exhaustive search of 1,132 studies that compared online and face-to-face conditions. The research team examined these to locate the most rigorous studies employing only experimental and quasi-experimental research designs (Means et. al, 2009). Applying these criteria the authors conducted an analysis of the 56 most rigorous studies of online education. Reviewing studies that investigated elements of online learner self-regulation (e.g., Bixler, 2008; Chang, 2007; Chung, Chung & Severance 1999; Cook, Dupras, Thompson &. Pankratz, 2005; Crippen & Earl, 2007; Nelson, 2007; Saito & Miwa, 2007; Shen, Lee & Tsai, 2007; Wang, Wang, Wang, & Huang, 2006) the authors found advantageous outcomes for scaffolding learning strategies including self-reflection, self-explanation, and self-monitoring. These positive findings for online learner self-regulation represent fertile ground for the development of a more comprehensive explanatory model for understanding the potential benefits of online instruction, a task to which we now turn.

The present study is grounded in several complementary theoretical perspectives reflective of research on the complexity of interaction in online classrooms. Rex, Steadman, & Graciano, (2006) suggest that such inquiry falls within seven traditions and this study contains elements of several of these including process-product, cognitive-constructivist, socio-cognitive, and situative perspectives. From a process-product perspective we are interested in how online discourse informs and shapes jointly created products developed by collaborative teams. This study also attempts to bridge cognitive and socio-cognitive/situative perspectives by introducing concepts of learner self regulation to the Community of Inquiry framework (Garrison et al. (2000) - see below).

The CoI framework is based on a model of critical thinking and practical inquiry. The authors posit that learning occurs through the interaction of students and their instructor and is manifest as three integrated elements that contribute to a successful online learning community: social presence (SP), teaching presence (TP), and cognitive presence (CP). The framework theorizes online knowledge building as the outcome of collaborative work among active participants in learning communities reflecting instructional orchestration appropriate to the online environments (teaching presence) and an encouraging collegial online setting (social presence). The teaching presence construct delineates task sets such as organization, design, discourse facilitation, and direct instruction (Anderson, Rourke, Garrison, & Archer, 2001) and articulates the behaviors likely to result in a productive community of inquiry (e.g. Shea, Li, Swan & Pickett, 2005). Social presence represents online discourse that promotes positive affect, interaction, and cohesion (Rourke, Anderson, Garrison, & Archer, 1999) that support a functional collaborative environment. The model also includes cognitive presence, a multivariate measure of critical and creative thinking that results from the cyclical process of practical inquiry within such a community of learners. The specific form of interaction within the cognitive presence

construct thus reflects a pragmatic view of learning (Dewey, 1933; Lipmann, 2003, Pierce, 1955)

Given that learner self regulation is a well researched construct compatible with multiple theories of learning (see e.g. Zimmerman, 2001; 2008) its introduction has the potential to enhance the CoI framework, which foregrounds the social construction of knowledge with less focus on the self and co-regulatory strategies that successful individual learners may employ. We propose that the introduction of learner self regulation can better enhance the scope of the CoI framework.

Recent work on the CoI model (Shea, Hayes & Vickers, 2010) suggested that previous research methods may have resulted in a systematic underrepresentation of the instructional effort involved in online education. Using quantitative content analysis these authors examined course documents within and external to threaded discussion areas and concluded that the majority of teaching presence in two undergraduate online business courses occurred outside of threaded discussion (emails, assessments, private folders, etc), areas that are generally not included in past investigations of the teaching presence construct (e.g,. Akyol & Garrison, 2008; Akyol & Garrison, 2011, Anderson, Rourke, Garrison & Archer, 2001; Bliss & Lawrence, 2009; Coll, Engel & Bustos, 2009; Pawan, Paulus, Yalcin& Chang, 2003,). This ongoing project to document all instances of teaching, social, and cognitive presence in complete online courses also resulted in identification of learner discourse that did not fit within the model, i.e. could not be reliably coded as indicators of teaching, social, or cognitive presence (Shea, 2010; Shea, Hayes & Vickers, 2010). These exceptions represent interesting data for refining and enhancing the model as they suggest that learners are attempting to accomplish goals that are not accounted for within the CoI framework. This research concluded that the learners under investigation engaged in discourse on course logistics including collaborative attempts to understand instructions provided to them by the course professor. Learner discussions also

included strategic efforts to divide up tasks, manage time, and set goals in order to successfully complete group projects. As such they appeared to be indicators of online learner self and co-regulation, which can be viewed as the degree to which students in collaborative online educational environments are meta-cognitively, motivationally, and behaviorally active participants in the learning process (Zimmerman, 1986).

Self Regulated Learning- Learning Presence

Research on self-regulated learning indicates that,“ it is viewed as especially important during personally directed forms of learning, such as discovery learning, self-selected reading, or seeking information from electronic sources, (but is) also deemed important in social forms of learning.” (Zimmerman, 2008). Given the electronic, social, and “self-directed” nature of online learning, it seems imperative that we examine learner self- and co-regulation in online environments especially as they relate to desired outcomes such as higher levels of critical and creative thinking as described in the CoI framework. Accomplishing this goal requires that we examine a wide variety of issues including meta-cognitive, motivational, and behavioral traits and activities that are under the control of successful online learners and which past research indicates may be fostered in online environments (Means, et. al, 2009). We suggest that this constellation of behaviors and traits may be seen as elements of a larger construct “learning presence” (Shea, 2010). We suggest that the name “learning presence” integrates with the other forms of presence in the CoI framework and reflects the proactive stance adopted by students who marshal thoughts, emotions, motivations, behaviors and strategies in the service of successful online learning.Learning presence thus indicates the exercise of agency and control rather than compliance and passivity and more fully articulates popular beliefs about the importance of self direction in online environments.

This articulation of online learning presence is in no way meant to undermine or replace the shared instructional roles of teachers and learners described in the teaching presence construct of the CoI framework. Our goal is to examine the distinct roles that successful online learners may adopt, roles that do not apply to instructors per se. While we recognize that recent researchers (e.g. Aykyol & Garrison, 2011) have expressed concern that a construct that separates the role of teacher and learner may undermine the collaborative focus of the CoI model, we believe that the opposite may also be a danger. We suggest that while considerable overlap exists between the roles of online instructors and learners their duties, expectations, motivations, and mechanisms for success are not identical. Further articulating the strategies and activities of successful online learners will, we hope, enhance rather than diminish the explanatory power of the CoI model.

Method

In previous research (Shea, Hayes & Vickers, 2010) student discourse that occurred in certain collaborative activities could not be reliably coded as teaching, social, or cognitive presence. Given that these activities are core to learner-centered approaches to online education we felt it essential to integrate them into the CoI framework. This required that we look for additional theoretical grounding to attempt to understand and categorize the discourse. We used concepts from a variety of sources (Azevedo, Cromley, & Seibert, 2004; Azevedo, Guthrie, & Seibert, 2004; Curtis & Lawson, 2001; Zimmerman, 1989, 2008) that examined self regulated learning and collaboration to accomplish this goal. Using conceptual element from these sources we then searched for patterns of self and co-regulation within areas of the course where previous attempts to code student discourse using standard CoI indicators proved unreliable. This discourse included student small-group debate preparation areas, “ask a

question” areas as well as within two of the full-class discussions in two courses. As a result of this exploratory analysis, we developed a coding scheme that represents what we call learning presence (see Appendix A).

Once the coding scheme was established, two researchers analyzed all of the communicative processes in the two courses, including all six discussions, a separate debate discussion and four debate preparation areas, as well as “ask a question” areas for both course sections. The goal of this analysis was to determine if the theory derived codes indicating self and co-regulatory behaviors would be evident in online learner discourse.The researchers met to compare results of coding and established an inter-rater reliability metric using Cohen’s *kappa* and Holsti’s coefficient of reliability. Cohen’s *kappa* measures “the *achieved* beyond-chance agreement as a proportion of the *possible* beyond-chance agreement” (Sim & Wright, 2005, p.258). A limitation with Cohen’s *kappa* is that symmetrical imbalance in the marginal distribution of agreements can result in a significantly lower *kappa* (Feinstein &Cicchetti, 1990). In order to compensate for this, we employed Holsti’s coefficient of reliability (Holsti’s CR), which reports the simple agreement of raters. Lombard, Snyder-Duch, and Bracken (2002) suggest utilizing multiple reliability indices in order to when interpreting interrater reliability, and past CoI research have utilized this approach (see Garrison, Anderson, & Archer, 2001; Rourke, Anderson, Garrison,& Archer, 1999; Shea, Hayes, & Vickers, 2010; Shea, Hayes, Vickers, Gozza-Cohen, et. al., 2010). Initial and negotiated interrater agreement was establish for each coding session. The benefits of this approach are that coders can locate transcription errors as well as refine the coding scheme.

When the patterns had been identified, we collated the data by categories. From these data we made charts indicating the number of occurrences for our major categories: forethought/planning, monitoring, and strategy use.

In addition to identifying instances of learning presence we also used data generated in previous phases of the research to attempt to understand the relationship between learning presence and the other elements within the CoI model as well as learning outcomes. To accomplish this we examined correlations between teaching presence, social presence, cognitive presence, learning presence and course grades.

Results

Table 1 (see Appendix B) reflects the initial and negotiated inter-rater reliability for both Instructor A and Instructor B. Initial *kappa* for Instructor A was 0.2479 – 0.6398, and initial CR was 0.6000 – 1.0000. Initial *kappa* for Instructor B ranged from 0.0538 – 0.8340 , and initial CR ranged 0.9025 – 1.0000. Discussion IRR can be seen in Table 2 (see Appendix B). Initial *kappa* for Instructor A was 0.2168 – 0.6479, and initial CR was 0.8366 – 0.9574. Initial *kappa* for Instructor B ranged from 0.3086-0.7460, and initial CR ranged 0.8867-0.9759. Variation in *kappas* may have been a result of symmetric imbalance of *no codes* for LP indicators. As reflected by Holsti's CR, however, inter-rater agreement is well above the recommended 0.70 IRR for exploratory research of this nature (see Lombard et al., 2002).

Learning Presence appears to have different components (forethought/planning, monitoring, and strategy use) that are contextually dependent. For example, all three are evident in debate preparation areas, but only strategy use appears in actual discussions. It appears that self and co-regulation is triggered by the kinds of activities that learners are asked to complete. Figure 1 provides a visual representation of the levels of learning presence that are evident in two illustrative learning activities.

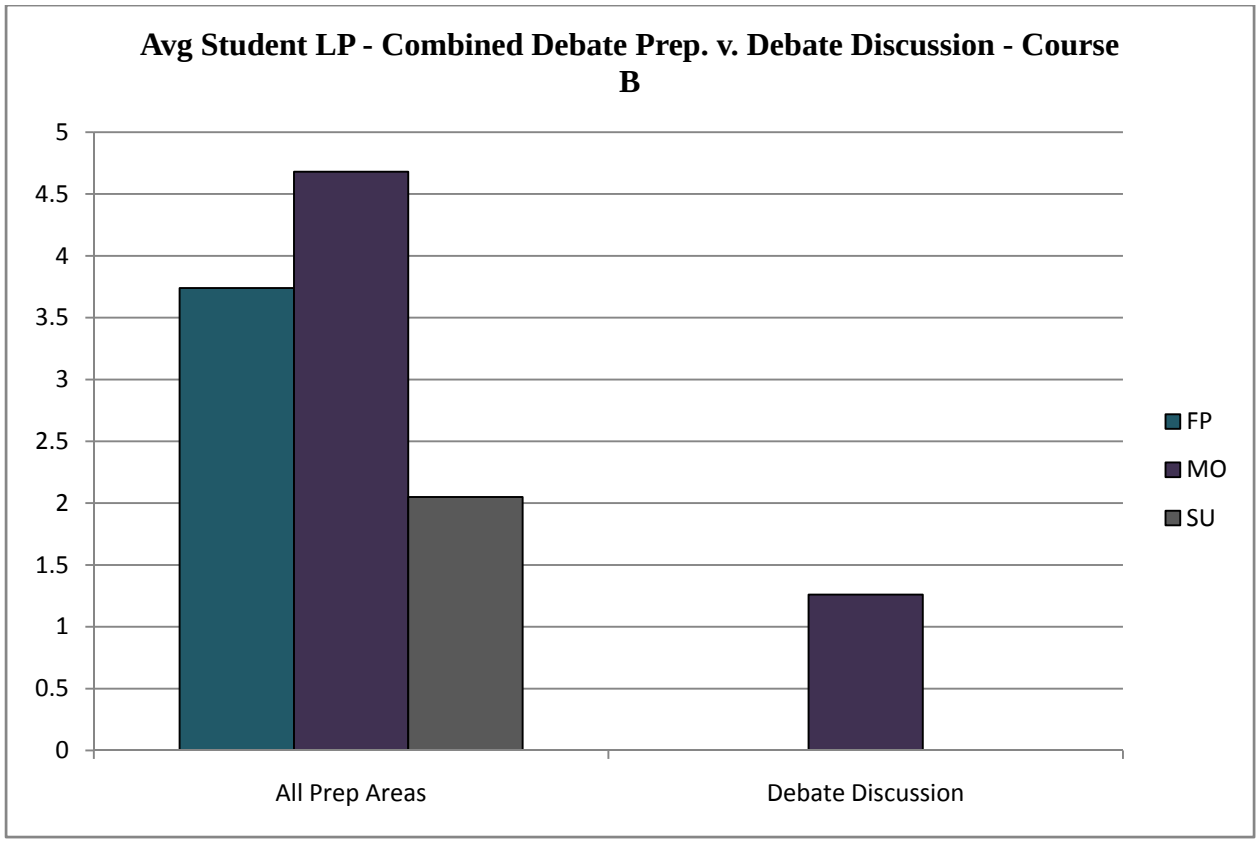

Figure1: Forethought (FP), Monitoring (MO) and Strategy Use (SU) in different online activities

As can be seen there is forethought/planning, monitoring and strategy use in the areas where students were divided into small groups and were instructed to prepare for a class debate by authoring a position paper. This contrasts with the full class debate discussion in which only monitoring behavior was demonstrated.

Figures 2 and 3 also indicate that learning presence varies by the type of activity students are asked to complete. Figure 2 shows that while there is a relative paucity of learner self and co-regulation in traditional activities such as standard threaded discussions, learning presence is more frequent in online preparatory areas where students must collaborate actively to be successful. Cognitive presence levels also increase in such activities. Figure 3 documents that when the activity turns back to the standard threaded discussion format, we see a relative

decline in indicators of learner self and co-regulation as well as a decline in cognitive presence, though a slight increase in social presence.

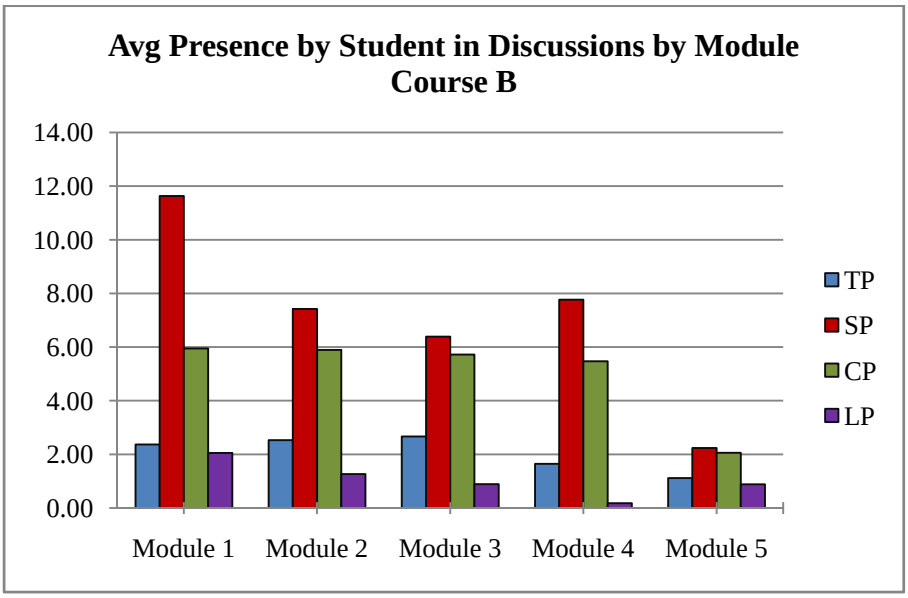

Figure 2: Instances of TP: Teaching Presence, SP: Social Presence, CP: Cognitive Presence, and LP: Learning Presence in course B

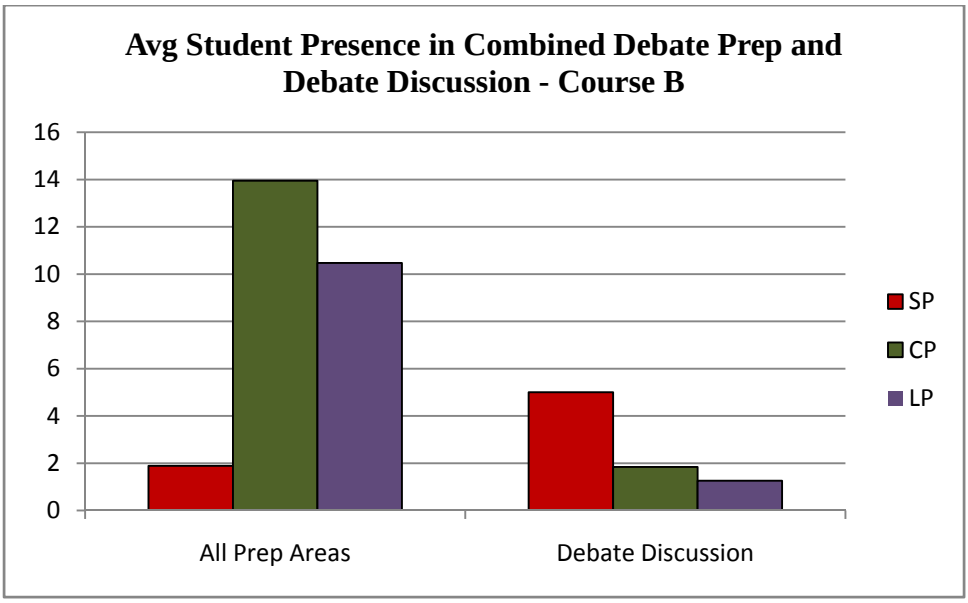

Figure 3: Forms of presence in debate preparation areas and debate discussion in course B

As can be seen in figures 4 and 5 there is a correlation between learning presence and social presence. A metric of presence density was calculated by dividing instances of the various forms of presence by the total numbers of posts in specific learning activities. Figure 4 indicates that learning presence density per small group is correlated with social presence density within the collaborative activities. Figure 5 shows a similar pattern when the message rather than the group is used as the unit of analysis. The average frequency of learning presence per message is correlated with the average frequency of social presence per message in collaborative activities.

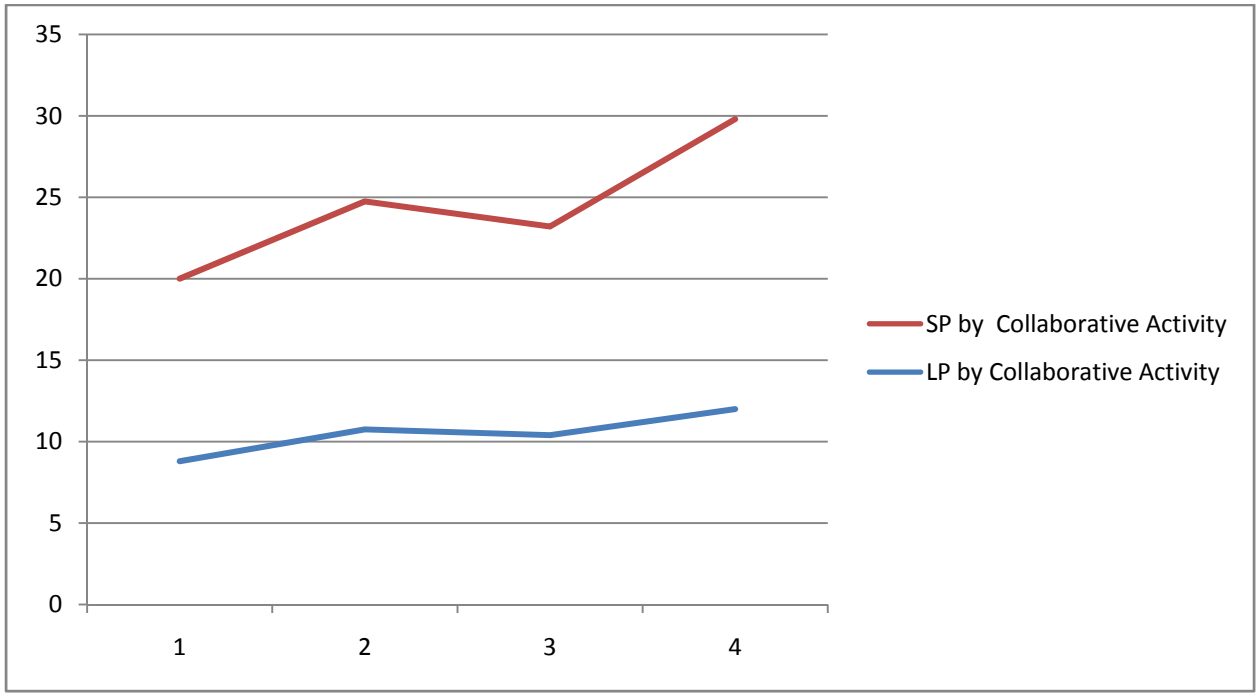

Figure 4: Learning Presence density per small collaborative group

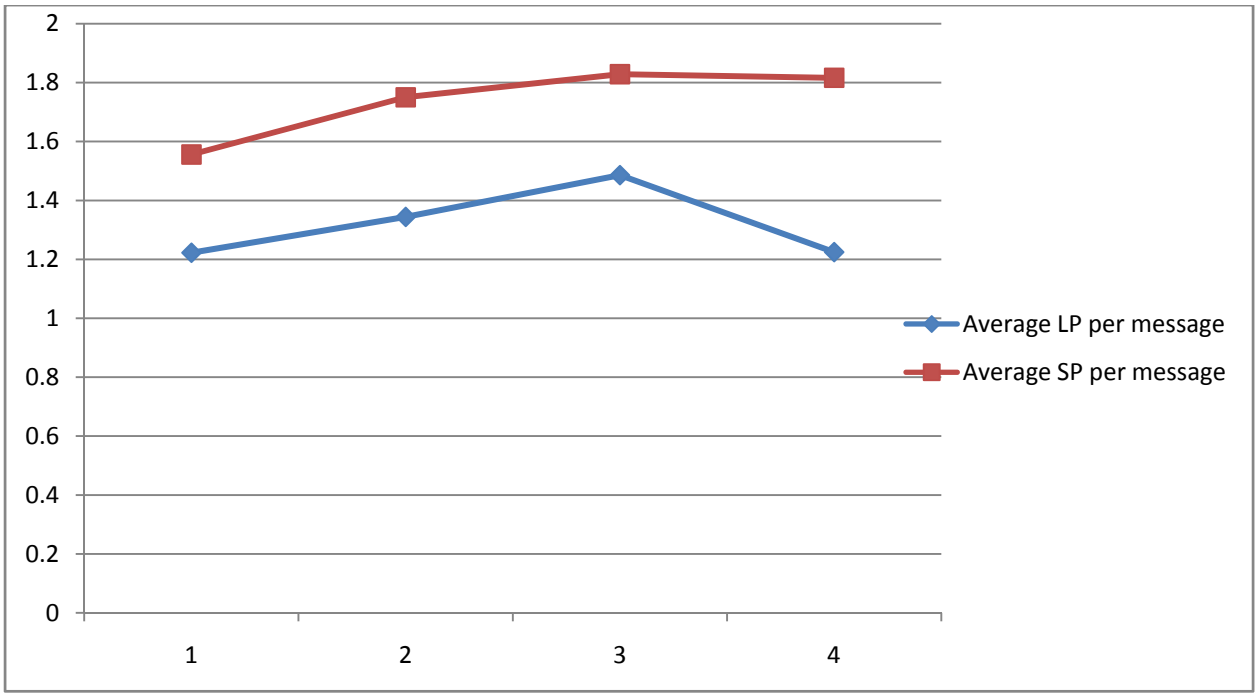

Figure 5: Average frequency of Learning Presence and Social Presence per message in collaborative online activity

Analysis of Learning Presence and Course Grades

The strength of the linear relationships among grades, learning presence, teaching presence, social presence, and cognitive presences was examined by the means of Pearson r and partial correlations.

Grades for the course were based on a variety of learning activities including module discussions; debate group participation, written assignments, a research paper, and case study analyses.

Table 1 displays the bi-variate zero-order correlations among the study variables, presented below the diagonal line. As it can be seen, the four constructs (LP, TP, SP, and CP) are moderately to strongly correlated. The largest correlations are between Cognitive Presence and Teaching Presence ($r = .86$, $p<.001$) and Cognitive Presence and Social Presence ($r = .87$,

p <.001). Learning presence, on the other hand, shows the strongest correlation with final course grades (r = .62, p<.001).

Table 1. *Zero-order and Partial Correlations Among the Study Variables*

Variables	Course Grades	Learning Presence	Teaching Presence	Social Presence	Cognitive Presence
Course Grades	--	.49**	.246	-.138	-.037
Learning Presence	.621**	--			
Teaching Presence	.476**	.528**	--		
Social Presence	.469**	.762**	.771**	--	
Cognitive Presence	.488**	.697**	.863**	.870**	--

Note. ** The correlation is significant at the .01 level (2-tailed); The partial correlations are highlighted on line one.

To estimate the relative contribution of each of the four constructs from the CoI model in predicting course grades, we computed the partial correlations between final course grades and each construct, controlling for the rest of the constructs. The results are presented on the first line of Table 1. Learning presence and final course grades remained moderately related (r = .49, p<.001), after the variance attributed to social presence, teaching presence and cognitive presence was accounted for. The relationship between teaching presence and final course grades remained positive as well but not statistically significant (r =.246, p>.05) after controlling for learning presence, social presence and cognitive presence. Social presence and cognitive presence were virtually unrelated to final course grades when the effect of the remaining three constructs in each analysis were partialed out.

In sum, the analyses suggest that relative to teaching presence, cognitive presence and social presence, learning presence is a better predictor of course grades, explaining 24% of the variance in the latter. Controlling for learning presence, teaching presence and social presence in fact eliminates the observed positive relationship between cognitive presence and grades. The same holds true for the relationship between social presence and grades when learning presence, cognitive presence and teaching presence are considered.

Discussion and Implications

Decades of research indicate that learner self regulation is an important predictor of learning (Zimmerman, 2008), yet self regulated learning in online environments in a topic that is not well understood. This gap is important to address given the near universal recognition that online learning requires significant self direction and regulation.

The CoI model represents a powerful framework for understanding online learning in collaborative pedagogical environments. While it represents an ideal in which teachers and learners perform the same roles (expressed as teaching presence), it ignores some of the real world dynamics that shape and constrain much of online learning in practice. Learners and instructors do not perform identical roles and thus must engage in different behaviors to succeed. For example, in this study, forethought and planning, monitoring, and strategy use exhibited by students is quite distinctive from the concepts of instructional design, facilitation of discourse, and direct instruction that characterize teaching presence. Because learners are accountable for their learning they exhibit distinctive behaviors, motivations, and strategies that are more or less adaptive and effective – we suggest that these are indicative of a distinct *learning presence* in online environments.

Specifying component of online learner self- and co-regulation is necessary. We began this task through an examination of discourse that occurred in two fully online courses. This

student-student discourse had previously been coded (unsuccessfully) using coding schemes that prior researchers have developed for the Community of Inquiry framework. We identified concepts, examples, and patterns of learning presence within hundreds of instances of online discourse. We believe that the categories and examples presented through this new coding scheme represent an initial and beneficial extension to the CoI model.

Learning presence is evident where learners are asked to actively collaborate. Far less forethought/planning, monitoring of learning and strategy use appear in whole class discussion than in collaborative activities. Asking students to collaborate more deeply, through instructional design that includes complex forms of collaboration appears to foster learning presence. Teaching presence is thus the route to better learning presence but relationship between forms of presence is probably reciprocal given the correlations identified here. We suggest here that it is the duty of the instructor to gain awareness of and make efforts to encourage learners to understand the benefits of self regulatory learning processes. Figure 6 indicates a revised CoI model that indicates what we hypothesize to be the relationships between the forms of presence based on work included here.

The lack of a correlation between course grades and measure of cognitive presence suggests that the instructor did not value this construct as highly as other grades on class activities and further suggests an ongoing divide between theory and practice. While course grades are a narrow measure of learning in collaborative environments they do remain an important indicator for students, faculty, and institutions. That learning presence is the only construct that was significantly correlated with course grades certainly suggests its importance. We analyzed instances of student discourse and found that forms of forethought and planning, monitoring, and strategy use that typify the activities of successful classroom-based self regulators also appear to support the success of online students as measured by course grades. Again we emphasize that the notion of learning presence is not meant to diminish the shared instructional

roles characteristic of progressive collaborative forms of learning, but that further specifying the roles of learners in online environments is beneficial.

Akyol & Garrison (2011) recently suggested that the CoI model can be seen to account for important dimensions that focus on learners per se, for example meta-cognition. We agree with this line of analysis but have some reservations with the conceptual framing. For example, while arguing for an examination of metacognition the authors state, “The importance of understanding metacognition in text-based online learning contexts becomes apparent when considering the increased responsibility for self-regulation (Akyol & Garrison, 2011, p. 3).” The argument we have made here and in the past (e.g. Shea, 2010) recognizes the importance of learner self regulation. Akyol and Garrison go on to cite (among others) Pintrich (Pintrich, Wolters, & Baxter, 2000) as a conceptual resource for understanding the significance of meta-cognition. We would agree that Pintrich does supply a good grounding for understanding what effective learners do when engaged in online academic study. However, Pintrich’s own lasting legacy is self regulated learning (see e.g. Schunk, 2005), and he considered meta-cognition to be one component of the larger construct of learner self regulation. This is demonstrated by the his Motivated Strategies for Learning Questionaire (MSLQ) (Pintrich, Smith,Garcia, & McKeachie, 1993), an instrument that measures self regulated learning in which Pintrich and his colleagues include metacognition as one of several dimensions of SRL. In other words, for Pintrich and other researchers, metacognition is a subset of learner self regulation and we would suggest that the SRL is the larger and more inclusive conceptual lens through which to investigate the roles of online learners as learners. Again, this is not to argue that teachers and learners in collaborative online environments do not share roles, including shared responsibilities for teaching presence. It does suggest that we need to know more about effective online learners qua learners and that the literature on learner self regulation seems the richer source to support and develop such knowledge.

Kuhn (1977) argued that determining the superiority of one theory over another was a matter of weighing competing values including accuracy, consistency, scope, and fruitfulness among others. In a related sense Greeno (2006) argued that theoretical progress can be made in a number of ways, ranging from improvements that add to the scope of phenomena that a theory explains to improvements that increase the accuracy with which the theory accounts for phenomena it already explains. In this paper, we examine the degree to which the CoI model represents an advantageous theoretical framework for understanding online learning based on some of these criteria. We suggest that the addition of learning presence to the CoI model represents progress by these standards. Again, the roles of teachers and learners may be similar in collaborative environments, but they are not identical. Further explicating the roles of online learners by drawing on theories of learner self regulation provides added scope, accuracy and we believe will make the model increasingly fruitful in describing and explain online learning.

Limitations and Future Research

This study was limited to archived courses and, as a result, we were not able to interview students to probe more deeply into the nature of their efforts at collaboration as it related to forethought/planning, monitoring and strategy use. At the same time, the development of the learning presence coding scheme was based on just two types of online learning activities, full class discussions and small group prep areas where students collaborated to write a position paper. Content analysis of other types of learning activities, such as student-authored reflective essays or learning journals may yield evidence of other behaviors that broaden our understanding of learning presence as it relates to individual/private and group/public learning. Other avenues for further exploration include understanding the specific roles and contributions

of students with high levels of learning presence to group collaborative work which is product-focused and shared knowledge construction which is process-oriented.

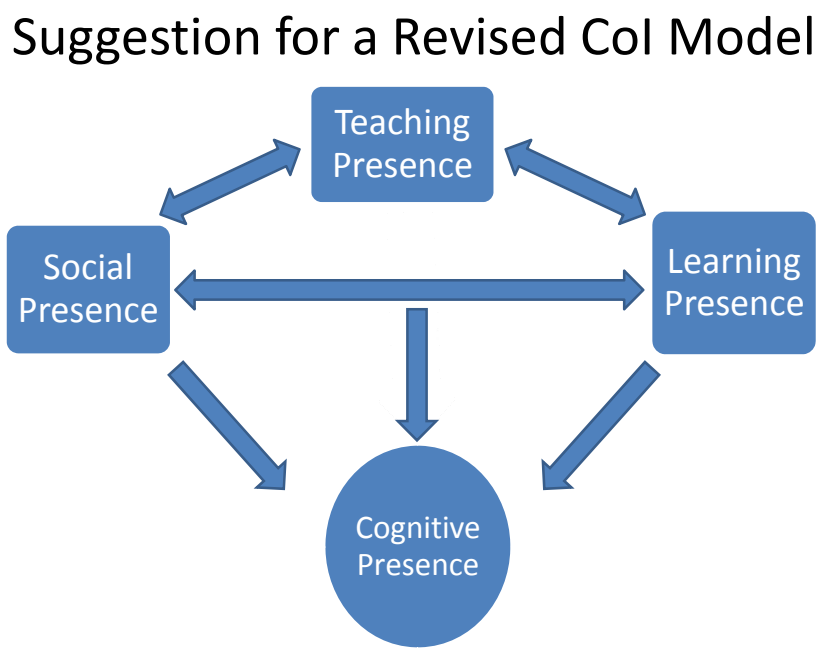

Figure 6: Revised Community of Inquiry Model including “Learning Presence”

Appendix A

Forethought and Planning

Original Codes & Source	Description	Example
FP1 - Goal setting (Zimmerman, 1989)	Online learner discourse establishing desired tangible and intangible outcomes	“At the end of next week, as a team, we have to submit a summary of our discussion points.”
FP2- Planning (Zimmerman, 1989)	Online learners considering approaches, procedures, or tasks to be used to attain goals.	“Why don't we list (all of us) what we perceive to be the cons of outsourcing.”
FP3 - Coordinating & assigning tasks to self and others (Emergent)	Online learners distributing, sequencing tasks and sub-tasks to others/self for future completion	“Are you picking this [task] up next?”

Monitoring

Original Codes & Source	Description	Example

M1- Checking for understanding (Emergent)	Online learners seeking verification of understanding of tasks, events or concepts from other online learners.	“Are we sure that everything has been cited correctly?”
M2 - Identifying problems or issues (Emergent)	Online learners drawing attention of other online learners to difficulties that may interfere with completion of tasks or other outcomes	“I am unable to open the quiz. Does anyone else have this problem?”
M3 - Noting completion of tasks (Azevedo. Et al., 2004)	Comments between online learners that indicate that certain tasks or activities have been finished to support attaining a goal.	“I did some research and then typed up the employer section.”
M4 - Evaluating the quality of an end product, its content or its constituent parts(Azevedo. Et al., 2004)	Statements between online learners that judge the accuracy, comprehensiveness, relevance or other aspects of an end product or its components	“I fully agree with this concept. This is definitely an area we should build upon. “
M5 - Appraising level of interest and engagement (Azevedo et al., 2004)	Comments between online learners about self or others' engagement, interest, commitment or participation	“I like being on the "con" end of this discussion. I am not a supporter of outsourcing.”

M6 - Noting one's own or group's learning behavior (Emergent)	Statements about individual or group's strengths/weaknesses (metacognitive knowledge) or changes in thinking between online learners.	“I am more of a hands-on learner.”

Strategy Use

Codes & Source	Description	Example
S1 - Seeking, offering, providing help or information (Curtis & Lawson, 2001)	Online learners requesting, offering, or providing assistance or information related to learning materials, activities, tasks or goals.	“If you need any assistance, please let me know what I can do to help you out.”

S2 - Seeking, offering, providing clarification (Emergent)	Seeking, offering, providing clarification between online learners	“Just as a point of clarification, are you seeking a critique of the specific information contained in the readings or are you concerned with our opinions about how the material is presented?”
S3 - Advocating effort (Curtis & Lawson, 2001)	Encouraging or urging other online learners to contribute to the online group	“Has everyone contributed their pieces?”

Appendix B

Inter-rater Reliability

Table 1. Course Debates Inter-rater Reliability

	Instructor A				Instructor B			
	kappa		CR		*kappa*		CR	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post
Con 1	0.3251	0.6436	0.9823	0.9938	0.3538	0.9025	0.6346	0.9649
Con 2	0.6398	0.8229	0.9552	0.9785	0.4654	0.9407	0.7368	0.9781
Pro 1	0.2479	1.0000	0.6000	1.0000	0.8140	1.0000	0.9307	1.0000
Pro 2	0.6172	1.0000	1.0000	0.8302	0.5462	1.0000	0.7816	1.0000
Discussion	0.5988	1.0000	0.8366	1.0000	0.4470	0.7500	0.9332	0.9833

Table 2. Course Discussions Inter-rater Reliability

	Instructor A				Instructor B			
	Kappa		CR		Kappa		CR	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post
M1	0.6479	0.9283	0.9574	0.9894	0.7460	1.0000	0.9203	1.0000
M2	0.2796	1.0000	0.8366	1.0000	0.3086	0.9025	0.8867	0.9649
M3	0.2255	1.0000	0.9468	1.0000	0.5405	0.9309	0.8923	0.9848
M4	0.2168	0.7927	0.9175	0.9801	0.4908	1.0000	0.9759	1.0000
M5	0.5359	1.0000	0.9286	1.0000	0.3767	1.0000	0.7270	1.0000

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