

## Community of Inquiry Framework: Establishing Community in an Online Course

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### Abstract

Using the Community of Inquiry (CoI) framework, the author conducted a mixed method research study to examine the existence of the three CoI elements in a graduate-level educational technology online course. The author also looked at student perceptions and preference for community in online learning. High mean scores on the CoI showed that all three elements of CoI were more than adequately addressed in the course, particularly teaching presence. Lowest scores indicated that some students were uncomfortable expressing themselves in an online environment and felt a lack of freedom to disagree with class members. Demographic data showed that students preferred a sense of community but were not so fond of collaborative assignments that are essential for building the community they desire. Since collaborative assignments demand a greater degree of communication and ability to bring problems to an adequate resolution, it is plausible that inhibitions in expressing oneself may become more pronounced when more collaboration is required.

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Social media such as social networking sites, video and audio sharing websites, wikis, and blogs offers online spaces where people interact, publish, collaborate, share, and communicate with others in virtual communities. Community members typically share common interests based on lifestyles, religion, politics, work, and hobbies. The explosive growth in online communities is evidenced by the fact that in a single month (September, 2012) more than an estimated 750 million people used Facebook, 250 million used Twitter, and 110 million used LinkedIn (eBizMBA, 2012). A sense of community is what attracts people to form groups and persist in these kinds of environments. Therefore, it is possible that when incorporated into a distance learning environment, a sense of community might improve student retention and engagement in learning.

However, there are significant differences between social and educational communities that might affect the potential of community for education purposes. Unlike popular social web sites, educational communities are focused on learning in a social environment, not merely in socializing. In social communities, members tend to create their own network and they do this around common interests. In contrast, course structure, leadership, and learner connectedness must be designed into a course for a sense of community to develop in learning communities. Furthermore, in social networking, the motivation is high because people have a personal desire to participate. In online learning communities, students may choose to enroll in a course but they may not necessarily want to take a required course in a program or they also may or may not be fond of the idea of socializing in a classroom environment. Moreover, unless the course content is of high interest to students, they may not have the incentive to socialize as a community in the

course. Finally, personality traits give people different preferences for socializing such as with extroverts and introverts so it is uncertain whether students truly desire community in online courses. Even with these wide variations in community and individual preferences, some researchers have found that a sense of community does tend to enhance learning (Garrison, Anderson, & Archer, 2000; Palloff & Pratt, 2007; Rovai, 2002). Garrison, Anderson, and Archer (2000) however, take educational community to another level as they emphasize that it is not simply a social community that enhances learning, but rather, a community that is built around inquiry that will sufficiently challenge and intellectually engage students. Since retention and engagement are sometimes problems inherent in online learning, it warrants further investigation to understand if a sense of community will increase learning potential and whether students prefer this feature during educational pursuits. This is especially important as newer technologies provide excellent tools that make community-building an easy task.

Online technologies, when appropriately utilized, can encourage community among distant learners and challenge learners beyond what might be possible in courses without technology. Content management systems and Web 2.0 web sites such as wikis can be used to seamlessly design a course environment that easily integrates online resources such as slide shows, videos, podcasts, and documents. Blogs, discussion forums, and virtual classrooms can be used to provide collaborative and interactive opportunities for students and synchronous and asynchronous communication among students and between students and the instructor. All these technologies allow students to explore, create, and share their new knowledge and these are the types of activities that encourage deeper engagement with learning (Jacobs, 2003).

This paper will describe an exploratory research study examining the community of inquiry that was purposefully designed in an online graduate-level distance education course in the program of Educational Technology at a large Midwest university. Courses in applied disciplines like this inherently require a greater degree of technical proficiency due to the use of more advanced technologies. This study is important because of the impact these technologies might have on the development of community in online learning.

## Literature

In contrast to popular social networking communities, a learning community is comprised of individuals who collaboratively engage in critical discourse and reflection in which they construct meaning and mutual understanding (Garrison, 2007). Palloff and Pratt (2007) believe that the single most important element of successful distance learning is “the formation of a learning community through which knowledge is imparted and meaning is co-created” (p. 4). A community such as this develops through “the interactions among students themselves, the interactions between faculty and students, and the collaboration in learning that results from these interactions” (p. 4). When these interactions exist, a learning community is built upon shared intellectual pursuits, not simply on social interactions. Garrison and Arbaugh (2007) contend that community is essential for the occurrence of higher order learning and that this kind of pursuit can be experienced most effectively within a community of inquiry where teachers and learners are engaged as real people who are thinking critically about intellectual issues. Early investigations of asynchronous, text-based computer conferencing in higher education led Garrison and Arbaugh (2000) to propose the Community of Inquiry (CoI) framework. When used as a guide for online discussions, Garrison and Arbaugh found the CoI had considerable potential for creating a community of inquiry among learners. As online learning became more

prevalent, the initial framework has been used extensively over a decade to design the online learning process and guide research and the practice of online learning (Garrison, Arbaugh, & Archer, 2010).

Akyol and Garrison (2011a) used CoI strategies to design and organize a graduate course to investigate the development of cognitive presence in online and blended collaborative communities of inquiry. Students were assigned peer reviews, online discussions, and a redesign project of a blended learning course. Social presence was created through students' home pages and collaborative activities. Cognitive presence was created as the instructor modeled and facilitated discussions. Research findings indicated a strong relationship between collaborative constructivism and higher-order learning outcomes. Akyol and Garrison (2011b) developed another graduate course by applying CoI strategies to assess metacognition in an online community of inquiry. The aim of this research was to develop and validate a metacognitive construct that reflects the learning process in an online community of inquiry. Researchers found that the cognitive model of the CoI was a reliable way to identify and assess indicators of metacognition in an online learning environment. In another study, Akyol, Vaughan, and Garrison (2011) used the CoI framework as the basis for design and development of an online course. They found that the course design adequately reflected the teaching, social, and cognitive presences. Akyol et al. (2011) also found that effective instructional design and organization of the course and teacher-led facilitation of discourse were more influential for creating community of inquiry than course duration. Students did tend to need more time to think critically but group cohesion could be experienced even in short-term courses. In an earlier study, Vaughan (2010) reported the successful outcomes of a major institutional initiative to redesign undergraduate courses for blended learning using the CoI framework. Students were surveyed about their experience and faculty members interviewed. When asked to identify what they had learned from the initiative, faculty members stressed that they would take a more intentional role in designing, organizing, facilitation, and directing the inquiry process in their online community of learners. They also wanted to make significant improvements regarding the degree of active and collaborative strategies incorporated into courses.

As evidenced by the research investigating the usefulness of CoI, this framework offers a way to conceptualize what it means to experience deep and meaningful learning, particularly in an online learning environment. The framework also operationalizes what it means to build a community of inquiry and provides explicit strategies to use in the design, development, and assessment of online courses by ensuring the presence of three interdependent elements - social, cognitive and teaching presences (Garrison & Arbaugh, 2007). These three overlapping elements provide the structure to support higher levels of inquiry and meaningful collaboration (Garrison, Cleveland-Innes, & Fung, 2010).

*Social presence* can be described as “the ability of learners to project themselves socially and emotionally, thereby being perceived as ‘real people’ in mediated communication” (Garrison & Arbaugh, 2007, p. 159). The concept has been defined as the ability of participants to connect and identify themselves within the community, communicate in a trusting environment, and develop relationships through expressing their individual personalities. Social presence includes affective expression, open communication, and group cohesion, which become increasingly important as more collaborative assignments are required of online students. Research shows that social presence tends to correlate with successful learning outcomes and learner satisfaction in online learning (Arbaugh & Benbunan-Fich, 2006; Hwang & Arbaugh, 2006), and leads to increased interaction (Beuchot & Bullen, 2005) and engagement (Brown, 2001). Other research

suggests that social presence alone will not ensure critical discourse in online learning but it is highly unlikely that such discourse will develop without a foundation of social presence. As such, social presence should be considered a mediating variable between teaching and cognitive presence (Garrison, Anderson, & Archer, 2010). According to Garrison, Anderson, and Archer (2000), “The primary importance of this element is its function as a support for cognitive presence, indirectly facilitating the process of critical thinking carried on by the community of learners” (p. 89).

*Cognitive presence* is described as the extent to which learners construct meaning through sustained reflection and discourse (Garrison & Arbaugh, 2007). Research has shown a relationship between sense of community and cognitive learning in online educational environments (Rovai, 2002). Using a practical inquiry model, Garrison and Arbaugh explained the four phases of developing cognitive presence: (1) identification of problem or issue that warrants further inquiry (Triggering Event), (2) exploration of a problem or issue through critical reflection and discourse, (3) learner construction of meaning from ideas developed through exploration (Integration), and (4) resolution where learners apply their new knowledge in other settings or contexts. To ensure that students progress through these phases, the instructor must include activities or questions that require critical thinking, provide independent learning opportunities, and offer a forum where students can demonstrate or exhibit applications of their new knowledge. Instructors must also provide scaffolds to ensure that students progress to higher levels of cognition during these activities. Research shows that the quality of cognitive presence is influenced by the question or activity asked of students, many of whom tend not to move on to synthesis or resolution phases otherwise (Arnold & Ducate, 2006; Murphy, 2004). There is plenty of evidence to suggest that the role of the instructor is a major factor in helping students reach the highest levels of inquiry (Garrison & Arbaugh, 2007).

Of particular relevance for this study, researchers have found discipline-specific differences, particularly in cognitive presence, when using the instrument to measure perceptions of the three presences (Arbaugh, Bangert, & Cleveland-Innes, 2010). A study was conducted with over 1500 students in seven disciplines at two U.S. institutions. In the hard, pure disciplines such as math, science, and social studies where teachers are more instructive, more attention is placed on knowledge acquisition, linear thinking, factual knowledge, and assessment through examinations. In soft, applied disciplines such as health and technical courses, knowledge building will be more of a constructive process and focus placed on the development of practical skills. In such courses, transferrable skills are emphasized as well as reflective practice, exploration, and authentic learning tasks. Since the final stage of cognitive presence is problem resolution and application of newly gained knowledge, soft disciplines might tend to show higher scores in cognitive presence than pure disciplines since students in these areas would be more apt to interact and collaborate with other learners.

*Teaching presence*, which establishes the course framework that makes it possible for all members to realize the intended learning outcomes, has been found to be a significant determinant of student satisfaction, perceived learning, and sense of community (Garrison & Arbaugh, 2007). Course design, structure, and leadership tend to affect the extent that learners engage in deep learning of course content (Garrison & Cleveland-Innes, 2005). The three dimensions of teaching presence are (1) the design and organization of the course structure, process, interaction, and evaluation of student learning (curriculum and methods); (2) the means by which students are engaged in their interactions and discourse (facilitating discourse); and (3) the provision of intellectual and scholarly leadership by sharing knowledge, promoting

reflection, and offering immediate feedback (direct instruction). For teaching presence to be effective, teachers must give explicit directions for completing assignments and conducting discourse. Instructors can facilitate dialogue or activities with minimal or direct involvement. Direct involvement may promote metacognitive awareness that helps students recognize their shifts in thinking while completing course activities or discussions. In either case, a strong and active presence by instructors is related to students' sense of community and learning (Shea, Li, & Pickett, 2006).

Garrison and Arbaugh (2007) aptly explain the relationship between the three CoI elements, "Social presence lays the groundwork for higher level discourse; and the structure, organization, and leadership associated with teaching presence creates the environment where cognitive presence can be developed" (p. 163). Using the CoI as a framework for course design, the author conducted a study to examine the following questions:

1. When used as a basis for course design, is CoI a viable means of establishing community in an online educational technology course where technical skill plays an important role?
2. Were the three elements of CoI adequately addressed in this online course?
3. Do students prefer a sense of community in online learning?
4. Based on results, what improvements could be made in the course?

### Method

A mixed method research design was used to examine student perceptions regarding the preference for a sense of community in an online learning course and the existence of the three elements of CoI. The 34-item Community of Inquiry Framework Survey (Arbaugh et al., 2008), which was used to collect data, has been found useful for studying online learning, particularly the complex and dynamic relationships between the teaching, social, and cognitive presences. The instrument is separated into statements within three subscales including teaching presence (Statements 1-13), social presence (Statements 14-22), and cognitive presence (Statements 23-34) that exist in an online course. Example statements include, "The instructor clearly communicated important course topics" (teaching presence), "I felt comfortable participating in the course discussions" (social presence), and "Problems posed increased my interest in course issues" (cognitive presence). See Table 2 under Results and Discussion for a list of all CoI statements. According to research conducted by Garrison et al., (2010), "The three presences are interconnected and influence each other in the hypothesized manner" (p. 35). Teaching presence affects social and cognitive presence and social presence significantly predicts perceptions of cognitive presence. As a result, social presence is a mediating variable between teaching and cognitive presence and teaching presence plays a central role in creating and sustaining social and cognitive presence in online learning environments. Ordinal responses were scored using a five point Likert scale (1=Strongly Disagree) to (5=Strongly Agree). When administered to 287 students at four institutions, the CoI Cronbach's Alpha yielded internal consistencies of 0.94 for Teaching Presence, 0.91 for Social Presence, and 0.95 for Cognitive Presence (Arbaugh et al, 2008). Arbaugh et al. (2008) determined that the CoI instrument is a valid, reliable, and efficient measure of social and cognitive presences. Furthermore, factor analysis supported the construct of teaching presence but suggested that one factor related to course design and organization and another factor related to instructor behavior during the course. The instrument has been used in

many areas of online learning including education, business, information systems, and foreign languages (Garrison & Arbaugh, 2007).

A demographic questionnaire (see Table 1) was also used to obtain student preferences for community and collaboration and quality of course assignments. Both online surveys were collected at the end of the semester. Qualitative data from blogs were used to supplement data. The study was conducted during a single semester at a large Midwestern university with 15 graduate-level students, 8 masters and 7 doctoral students (4 males and 11 females). The course was offered as an elective in the Educational Technology program.

### **Course Description**

The study was conducted in a 16-week graduate-level course entitled, “Using the Internet in the Classroom.” Graded assignments required students to create an introductory personal wiki page, write a position paper about how four emerging technologies are changing the classroom; post seven blog reflections related to weekly readings; post responses to class members on weekly blog reflections; collaborate on a group presentation; attend required planning meetings; carry on conversations via email, wiki commenting features, and Skype; complete an independent web-based project; and submit a research paper related to using the Internet in the classroom as a final exam. A free online wiki application was used as a course content management system. No textbook was required as all course content including texts, journal articles, and videos were made accessible on the course website.

Social presence was encouraged initially by requiring students to create a personal wiki page to introduce themselves and exchange comments or questions based on these introductions using the commenting features of the course wiki. Active interaction was encouraged through group presentations and weekly blog postings and required responses to class members. The group presentation, in which groups of four to five students investigated online mapping applications, required collaborative research and online communication. Students investigated ways that online mapping applications might be useful for learning and final products were shared with the class on a wiki page. Students were asked to use email, Trello, or Skype for group planning, whichever tool they found most effective. Peer group evaluations were submitted using a Google Doc spreadsheet. Students also turned in peer evaluations as a way for the instructor to fairly evaluate each group member for their contribution to the project.

Cognitive presence was promoted through challenging assignments that required critical thinking or application of concepts learned in the course (e.g., discussion questions, collaborative group presentations, blog postings). Course activities were carefully chosen to intellectually engage learners in the course content. As previously described, the group presentation provided instructions on the introductory investigation of different online mapping or mashups applications. Students researched their topic and choose specific online mapping programs they believed to be most beneficial for learning. On a wiki page, the group described three applications, the personal benefits of using each program, and how the programs could be used in different content areas. Weekly blog postings related to critical thinking questions about weekly readings. At the end of the gaming and simulations week, students were asked, “What do you think about gaming in the classroom?” What benefits and challenges might exist when trying to use these for teaching and learning?” Students were assigned different partners each week to respond to class members’ blog posts. The independent project allowed students an opportunity to design a product related to course content and relevant to their own context (e.g., classroom or

industry). Approximately a dozen ideas were provided for these projects, with students choosing one to complete in a three-week period. Students could also suggest ideas of their own. Some ideas included:

- Design a professional development workshop and accompanying website around some of the technologies you investigated in this course.
- Create a series of podcasts or video podcasts for training relevant and useful in your particular situation.
- Conduct a brief research project in which you test the use of a particular application on someone. Report your results on a wiki page.
- Write a proposal and create a PowerPoint presentation on major topics studied in this course that you could present at a conference in your particular area.
- Write a 2000-3000 word article for publication in a major professional journal synthesizing some of the ideas you studied in this course.

Teaching presence was established first by structuring the course into easily-accessible weekly learning units that were linked on a sidebar by week number and topic title. Other links included a course library, technical help, weekly notes, grading, and communication tools. The instructor posted some personal information and a photo on a wiki page. Students were asked to create their own wiki pages and through the comments feature on a wiki, the instructor and class members carried on a dialog about personal lives and interests. Introductory activities were intended to build familiarity among students themselves and with the instructor. Explicit instructions were given for each week's investigations and course assignments and rubrics were provided for blog postings and other assignments. The instructor participated by making occasional responses on weekly blog postings. Feedback on all course-related questions or problems was given usually within a few hours via email or Skype. Weekly notes were sent by email and posted on the course wiki to summarize the week's work and provide important upcoming information.

## Results and Discussion

Results from the demographic questionnaire are provided in Table 1.

Table 1  
*Demographic Questionnaire*

Questions	Scale or Response Categories	Results
How many online courses have you taken besides this one?	1, 2, 3, 4, more than 4	$M = 2.71$
How would you rate your technology proficiency at the beginning of this class?	Not very proficient = 1 Expert = 5	$M = 3.11$
How would you rate your technology proficiency at the end of this class?	Not very proficient = 1 Expert = 5	$M = 4.23$

Which assignment was the MOST cognitively challenging for you? (Select no more than 2 answers)	Personal wiki page, Position paper, Readings and blog response, Group presentation, Independent project, Research paper	Independent project = 9 Research paper = 6 Group Project = 2 Position Paper = 2
Which assignment was the LEAST cognitively challenging for you? (Select no more than 2 answers)	Same as above	Personal Wiki Page = 8 Readings & Blog Responses = 3
Which week's readings and assignments were MOST engaging for you? (Please select no more than 2 answers)	Overview of Technologies; Blogging & Twittering; Cloud Computing, Tags, & Social Bookmarking; Open Content and Ethics; Gaming/Simulations; Social Media; Mapping & Mashups; Theory; Research; Independent Project; Research Paper	Games/Simulations = 6 Mapping & Mashups = 4 Social Media = 4 Independent Project = 4
Which week's readings and assignments were LEAST engaging for you? (Please select no more than 2 answers)	Same as above	Open Content/Ethics = 2 Cloud Computing = 2 Overview of Technologies = 2
Which do you prefer most, a course that provides a sense of community or one in which you can remain more anonymous?	Community = 1 Anonymous = 5	$M = 1.85$
Which do you prefer most, a course that requires collaborative/ interactive assignments or one with mainly independent assignments?	Collaborative = 1 Independent = 5	$M = 3.69$

Most of the students had taken at least one or two other online courses prior to the present one. Students believed themselves to be fairly proficient users of technology ( $M = 3.11$ ) and on average, their capabilities increased by the end of the semester ( $M = 4.23$ ). Since the course required students to learn new content as well as technical skills in using various applications (e.g., wikis, blogs, social bookmarking, games/simulations, online mapping, etc.), technical proficiency was an important consideration in this study since it could easily add to students' distress already experienced as a natural part of the learning process. While adding technology skills to course requirements may have increased anxiety, particularly in students with less technology ability, growth in this area tend to show that students became more comfortable and felt more capable of handling this additional mental load.



Students felt most cognitively challenged during the independent project ( $n = 9$ ) and research paper ( $n = 6$ ) and least challenged by the personal wiki page ( $n = 8$ ). This finding supports the assumptions that critical inquiry emerges through practice and reflection and the products of inquiry are the resolutions of course-related problems (Garrison et al., 2000). Simply posting one's personal information on the Internet may increase social presence but it is not necessarily a challenging experience. In contrast, completing an independent project relevant to one's context requiring students to solve problems or applications of knowledge can be quite challenging.

Additionally, for three students blog responses were not so engaging and this could be due to several reasons. First, weekly prompts might have been improved somewhat by requiring a higher level of critical analysis of weekly investigations. Second, it was evident that some students were not seriously engaged in the content while making blog responses to other students and as a result, these students did not benefit fully by gaining other perspectives or in participating in meaningful critical discourse. Last, some students simply do not enjoy the process of reflecting and writing about what they have learned. These students might tend to prefer course assignments where they can create a product rather than write to share their new knowledge.

Games and simulations was the most engaging content for students. Only three topics were selected as least engaging and by only two students each, an indication that overall course content was engaging for most students. Least engaging topics for those students included open content, cloud computing, and initial overview of technology. Most students preferred a sense of community ( $M = 1.85$ , Community = 1). However, a majority of students preferred independent assignments over collaborative ones ( $M = 3.69$ , Independent = 5). CoI results concur with this finding that communication, a skill needed more so during collaborative assignments, was the most important challenge for some students.

Table 2 lists the mean scores of the three elements of CoI.

Table 2  
*Community of Inquiry Mean Scores*

<b>Teaching Presence</b>	<b><i>M</i></b>	<b><i>(SD)</i></b>
1. The instructor clearly communicated important course topics.	4.77	(0.44)
2. The instructor clearly communicated important course goals.	4.85	(0.37)
3. The instructor provided clear instructions on how to participate in course learning activities.	4.92	(0.28)
4. The instructor clearly communicated important due dates/time frames for learning activities.	5.00	(0.00)
5. The instructor was helpful in identifying areas of agreement and disagreement on course topics that helped me to learn.	4.69	(0.48)
6. The instructor was helpful in guiding the class towards understanding course topics in a way that helped me clarify my thinking.	4.85	(0.37)
7. The instructor helped to keep course participants engaged and participating in productive dialogue.	4.77	(0.44)
8. The instructor helped keep the course participants on task in a way that helped me to learn.	4.77	(0.44)
9. The instructor encouraged course participants to explore new concepts in this course.	4.85	(0.38)

10. Instructor actions reinforced the development of a sense of community among course participants.	4.85	(0.56)
11. The instructor helped to focus discussion on relevant issues in a way that helped me to learn.	4.92	(0.28)
12. The instructor provided feedback that helped me understand my strengths and weaknesses relative to the course's goals and objectives.	4.92	(0.28)
13. The instructor provided feedback in a timely fashion.	4.92	(0.28)
<b>Mean of Teaching Presence</b>	<b>4.85</b>	<b>(0.14)</b>
<b>Social Presence</b>		
14. Getting to know other course participants gave me a sense of belonging in the course.	4.46	(0.78)
15. I was able to form distinct impressions of some course participants.	4.23	(1.01)
16. Online or web-based communication is an excellent medium for social interaction.	4.23	(0.73)
17. I felt comfortable conversing through the online medium.	4.77	(0.44)
18. I felt comfortable participating in the course discussions.	4.77	(0.44)
19. I felt comfortable interacting with other course participants.	4.54	(0.52)
20. I felt comfortable disagreeing with other course participants while still maintaining a sense of trust.	3.92	(0.95)
21. I felt that my point of view was acknowledged by other course participants.	4.38	(0.77)
22. Online discussions help me to develop a sense of collaboration.	4.54	(0.66)
<b>Mean of Social Presence</b>	<b>4.43</b>	<b>(0.21)</b>
<b>Cognitive Presence</b>		
23. Problems posed increased my interest in course issues.	4.54	(0.66)
24. Course activities piqued my curiosity.	4.92	(0.28)
25. I felt motivated to explore content related questions.	4.85	(0.38)
26. I utilized a variety of information sources to explore problems posed in this course.	4.92	(0.28)
27. Brainstorming and finding relevant information helped me resolve content related questions.	4.85	(0.38)
28. Online discussions were valuable in helping me appreciate different perspectives.	4.46	(0.52)
29. Combining new information helped me answer questions raised in course activities.	4.69	(0.48)
30. Learning activities helped me construct explanations/solutions.	4.77	(0.44)
31. Reflection on course content and discussions helped me understand fundamental concepts in this class.	4.85	(0.37)
32. I can describe ways to test and apply the knowledge created in this course.	4.85	(0.38)
33. I have developed solutions to course problems that can be applied in practice.	4.77	(0.44)
34. I can apply the knowledge created in this course to my work or other non-class related activities.	4.92	(0.28)
<b>Mean of Cognitive Presence</b>	<b>4.78</b>	<b>(0.11)</b>

Only negligible differences existed between the mean scores of the three CoI elements with teaching presence ( $M = 4.85$ ,  $SD = 0.14$ ), social presence at ( $M = 4.43$ ,  $SD = 0.21$ ), and cognitive presence ( $M = 4.78$ ,  $SD = 0.11$ ) well above an average score of 2.5. These scores indicate that each CoI element was more than adequately addressed in the course, particularly in teaching presence where the lowest item scored a mean of 4.69.

Ranges of scores can offer specifics about social and cognitive presences that were successfully addressed and those areas that need more attention in future course design. Social presence scores ranged from the lowest mean of 3.92 (20. I felt comfortable disagreeing with other course participants while still maintaining a sense of trust) to the highest mean of 4.77 (17. I felt comfortable conversing through the online medium) and (18. I felt comfortable participating in the course discussions). Cognitive presence scores ranged from the lowest mean of 4.46 (28. Online discussions were valuable in helping me appreciate different perspectives) to the highest mean of 4.92 (26. I utilized a variety of information sources to explore problems posed in this course) and (34. I can apply the knowledge created in this course to my work or other non-class related activities). These scores indicate that most students were comfortable conversing and participating in an online environment but did not feel comfortable when disagreements arose with class members. Discomfort at expressing disagreement may be due to several reasons. Different personalities are more anxious about disagreeing with others and have more concern with how other class members might respond to open mindedness when expressed in discussions. This seems to be plausible based on the lowest score in cognitive presence (28. Online discussions were valuable in helping me appreciate different perspectives). It may also be the case that the instructor did not incorporate sufficient guidelines for carrying on open expression. Whatever the cause, to ease the discomfort in this area, the instructor might consider incorporating more strategies to facilitate the openness of ideas and providing more explicit guidelines on handling disagreements during online discussions. Based on high scores in cognitive presence, students felt challenged to explore problems and apply their newly-learned knowledge in other contexts. This supports demographic data indicating that the independent project and research paper were most engaging for students.

Standard deviations were highest for the two CoI items with the lowest mean scores, both of which were in the social presence category: 15. I was able to form distinct impressions of some course participants ( $M = 4.23$ ,  $SD = 1.01$ ), and 20. I felt comfortable disagreeing with other course participants while still maintaining a sense of trust ( $M = 3.92$ ,  $SD = .095$ ). These wide variations might support the previous assumption that a few individuals, not the class as a whole, were uncomfortable expressing themselves or disagreeing in an online environment.

Overall, qualitative data support findings that the three elements of CoI were sufficiently addressed as evidenced in discussion and blog comments listed below.

“Honesty is a strong point of this course and particularly of the instructor’s style of teaching. The goal of creating an online course is to create a sense of openness, where a grade is not affected by stating opinion.” (Teaching presence)

“I’ve felt empowered in this class, especially with the website assignment. Essentially we were the teacher or ultimate authority within our own site and academic discipline.” (Cognitive presence)

“I enjoyed the challenge especially when creating the collaborative mapping project. It allowed me to investigate a topic and immediately apply what I found by presenting the information on a website. I appreciated the fact that you let us explore and find the information on our own and present it the way the group decided. You did not teach us. We taught ourselves! And you learn a lot more when you have to teach others about a topic.” (Cognitive presence)

“The instructor follows up with probing questions, asking for clarification and specificity to prove that the student knows and is trying to master the objectives at hand. Students are expected to respond to one another’s thoughts, posts, assignments, as well. This pedagogical practice builds an online learning community.” (Teaching presence)

“The course was well organized and easy to follow. Due dates were always posted and questions about completing assignments were minimal. You were always available for questions and sent feedback on assignments very quickly. Much appreciated!” (Teaching presence)

“As I navigated the course site, I instantly experienced the powerful impact of community, creativity, and reflection. Community was established through introductions and pictures of the students and their families. The class shared their desires, dreams, and inhibitions. In my opinion, a bond was formed and I knew that I was in for an exhilarating and remarkable journey! Creativity was initiated with excellent design and planning by the instructor. The teaching presence provided solid direction, but also allowed the students the flexibility to become explorers in the quest for new knowledge.” (Social presence)

“I liked putting up my personal wiki page and reading the pages of other students. When we commented back and forth, it made me feel like I got to know them. Responding to others on weekly blog assignments also helped me get to know others a bit better. It felt very close to a real classroom, especially since we met on Skype and heard the voices of classmates.” (Social presence)

## Conclusions

This research study lends further support for the use of the CoI framework and its three essential elements (i.e., teaching, social, and cognitive) as a guide for designing an online course, particularly a course in a soft, applied discipline such as educational technology where learning the use of technology is as important as gaining conceptual knowledge. As indicated by high mean scores of all three presences within the course, the framework also was a viable means of establishing community in an online educational technology course. The strength of CoI is that it offers specific areas and actions that might tend to make a course more engaging (e.g., organization of course, facilitation, affective expression, group cohesion, exploration, resolution, etc). Additionally, the individual items within each CoI category inform an instructor about the strengths and weaknesses of online instruction that can be used in improving a course.

Results from CoI indicate that the instructor more than adequately achieved the three dimensions of teaching presence by incorporating clear course structure, strategies to build community, timely communication and feedback, explicit guidance on discourse and assignment completion, thought-provoking assignments, and provision of intellectual and scholarly leadership. However, incorporating different strategies for developing social presence,

particularly in the areas of affective expression and group cohesion, may be advantageous specifically for learners who are reluctant or fearful about communicating their thoughts and ideas directly with class members during discussions. Also, since collaboration and communication were integral components of many assignments in this course, it may have been expedient to give specific guidelines or strategies to deal with difficulties as they arose. With new modes of communication and collaboration and the capability to learn anytime and anywhere, students must assume much of the responsibility for making personal meaning and becoming familiar with members of the learning community and this requires a role adjustment in both learners and instructors (Garrison et al., 2004).

As indicated by the demographic questionnaire, while most of the students tended to prefer a sense of community in online learning, they were not so fond of collaborative assignments that are essential in building the community they desire. This is understandable since collaborative assignments require more interaction, communication, and the ability to bring problems to an adequate resolution, such as when writing an article or creating a web page to share research findings. This finding supports other research showing that many students do not tend to move on to synthesis or resolution phases of inquiry without some degree of scaffolding (Arnold & Ducate, 2006). Collaboration and communication skills are necessities in a 21<sup>st</sup> century global workplace and online courses are the perfect context to offer students opportunities to put these skills into practice. Consequently, it might be beneficial for instructors to consider ways to integrate these skills in online learning and evaluate performance of the skills. For example, the author used rubrics to grade blog postings and responses and peer evaluations on group member collaboration. Finally, CoI scores and student comments show that the integration of exploration, application, and reflection in course activities sufficiently challenged students intellectually. The independent project allowed students to make the course content relevant to their own situation, which proved to be most engaging. Overall, the CoI offered a helpful guide in organizing the course, selecting content and teaching strategies, creating a sense of community among class members, and incorporating learning activities that would challenge and engage students.

It should be noted that a small sample size and lack of control group are weaknesses of the study and therefore, limit conclusions that can be drawn. Additionally, while course structure and content might be replicable in another study, teaching methods, student characteristics, and learning environments are variables that differ depending on the situation. Therefore, caution should be used when generalizing the results of this study. Due to the nature of the study, it does not tell us if the course would have been just as engaging if a strong social presence did not exist. Further research might examine whether social presence is indeed, necessary in situations where teaching presence (i.e., course design and structure, facilitation, and direct instruction) is more than adequately addressed and students are cognitively challenged by the course material alone. It may be the case that particular students are just as engaged in learning even without critical discourse, reflection, collaboration, and interaction with other students. Research might also examine whether students perceive the presence of a teacher as positive or negative, depending on the existence of the two other presences.

More research is also needed to examine the effect of technical skill proficiency on students' ability to focus on the course content, to collaborate and communicate, and develop a sense of community in online learning environments, particularly when a wide variety of newer tools is used in this effort such as in educational technology courses. It is the nature of all online courses to utilize technologies since these are the means for offering this mode of learning, but

the development of community in these and other courses that use an array of technologies may be hindered or enhanced due to the learning curve students experience when using new tools. This supports the assertion by Arbaugh et al. (2010) that community building tends to be discipline-specific with technical courses resulting in higher cognitive scores. It results from the simple fact that it is a greater challenge to learn course content while simultaneously learning the skills of using some technology. No matter what tools are employed, we are reminded that successful development of community will depend largely on how an instructor designs the course and incorporates all three presences using proven strategies (Garrison & Arbaugh, 2007; Palloff & Pratt, 2007). But this means strategies that include newer technologies might prove to be more challenging than anticipated warranting some form of scaffolding for students with fewer technical skills to enter the learning community with some degree of comfort.

Furthermore, in most of CoI studies of the past decade, researchers have limited their investigations to the use of text-based asynchronous online discussion forums for building communities of inquiry when today more advanced technologies are available for creating these communities. For example, in this study personal wiki pages, Skype meetings, blog responses, and collaborative project work with online presentations were used to ensure that students experienced social presence and were cognitively challenged through the incorporation of a variety of tools and authentic learning tasks. More so than text-based discussion forums, newer forms of web-based technologies provide innovative opportunities for teaching and learning, offer closer approximations or simulations of face-to-face learning, and provide exciting platforms for building community. Subsequently, research needs to look beyond the use of discussion forums and begin exploring the impact of other tools that can be just as effective, if not more so, in developing communities of inquiry in online learning.

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