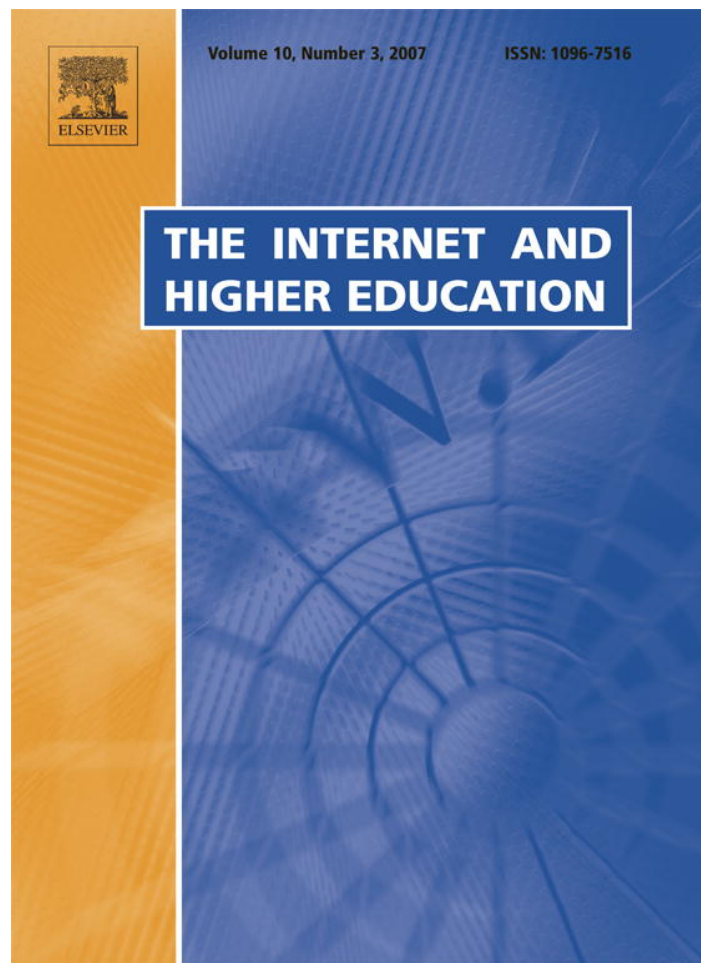


Provided for non-commercial research and education use.
Not for reproduction, distribution or commercial use.



This article was published in an Elsevier journal. The attached copy is furnished to the author for non-commercial research and education use, including for instruction at the author's institution, sharing with colleagues and providing to institution administration.

Other uses, including reproduction and distribution, or selling or licensing copies, or posting to personal, institutional or third party websites are prohibited.

In most cases authors are permitted to post their version of the article (e.g. in Word or Tex form) to their personal website or institutional repository. Authors requiring further information regarding Elsevier's archiving and manuscript policies are encouraged to visit:

<http://www.elsevier.com/copyright>



ELSEVIER

Internet and Higher Education 10 (2007) 157–172

**THE INTERNET
AND HIGHER
EDUCATION**

Researching the community of inquiry framework: Review, issues, and future directions

D. Randy Garrison^{a,*}, J.B. Arbaugh^{b,1}

^a *Teaching & Learning Centre, Biological Sciences Building, 539B, University of Calgary, Calgary, Alberta, Canada T2N 1N4*

^b *College of Business, University of Wisconsin Oshkosh, 800 Algoma Blvd., Oshkosh, WI 54901, United States*

Accepted 5 April 2007

Abstract

Since its publication in *The Internet and Higher Education*, Garrison, Anderson, and Archer's [Garrison, D. R., Anderson, T., & Archer, W. (2000). Critical inquiry in a text-based environment: Computer conferencing in higher education. *The Internet and Higher Education*, 2(2–3), 87–105.] community of inquiry (CoI) framework has generated substantial interest among online learning researchers. This literature review examines recent research pertaining to the overall framework as well as to specific studies on social, teaching, and cognitive presence. We then use the findings from this literature to identify potential future directions for research. Some of these research directions include the need for more quantitatively-oriented studies, the need for more cross-disciplinary studies, and the opportunities for identifying factors that moderate and/or extend the relationship between the framework's components and online course outcomes.

© 2007 Elsevier Inc. All rights reserved.

Keywords: Community of inquiry; Online learning research; Cognitive presence; Social presence; Teaching presence

1. Introduction

In spite of the explosion of empirical research on online learning effectiveness over the last decade (Sitzmann, Kraiger, Stewart, & Wisher, 2006; Tallent-Runnels et al., 2006), development, acceptance, and verification of theoretical frameworks unique to the online learning environment still is relatively lacking. Although there are several potential emerging models of online learning effectiveness (e.g., Alavi & Leidner, 2001; Benbunan-Fich, Hiltz, & Harasim, 2005; Brandon & Hollingshead, 1999; Leidner & Jarvenpaa, 1995; Rungtusanatham, Ellram, Siferd, & Salik, 2004), one that has attracted a lot of attention is the community of inquiry (CoI) framework developed by Garrison, Anderson, and Archer (2000). Google Scholar shows that Garrison and colleagues' initial article describing the framework has been cited in other works at least 225 times as of May 2007, making it by far *The Internet and Higher Education's* most cited article published to date. Although the framework certainly has helped to establish *IHE* as a

* Corresponding author.

E-mail addresses: garrison@ucalgary.ca (D.R. Garrison), arbaugh@uwosh.edu (J.B. Arbaugh).

¹ Tel.: +1 920 424 7189.

desirable destination for quality research on online learning environments and has become increasingly popular as a tool for conceptualizing the online learning process (Arnold & Ducate, 2006; Shea, 2007; Stodel, Thompson, & MacDonald, 2006), several issues regarding the framework must be addressed if it is to become a full-fledged theory of online learning. Therefore, we seek to identify these issues and provide suggestions to further advance the framework.

The purpose of this article is to review the research based upon the CoI framework, identify emerging issues from this research, and present an agenda for future research directions. To address these topics, the remainder of the article is organized into two primary sections. The first section provides an overview of the CoI framework and reviews the research examining social, cognitive, and teaching presence in online learning environments. From this review, we identify key issues that have emerged regarding the study of each of the three types of presence. The second section provides a future research agenda for the study of social, cognitive, and teaching presence and suggestions for comprehensively studying the framework and broadening its impact beyond the general online education research community.

2. The community of inquiry framework

Although we have been relatively successful in identifying the properties of asynchronous learning networks, a more in-depth analysis of the educational and transactional issues requires a theoretical framework that can provide order and parsimony to the complexities of online learning. A construct that has attracted considerable attention in higher education to serve this purpose is a community of learners. Higher education has consistently viewed community as essential to support collaborative learning and discourse associated with higher levels of learning. Notwithstanding the potential for disconnectedness in online learning communities, there is evidence that a sense of community can be created online (Rovai, 2002a; Thompson & MacDonald, 2005). There is also evidence that a sense of community is significantly associated with perceived learning (Rovai, 2002b; Shea, 2006; Shea, Li, & Pickett, 2006).

While considerable emphasis was placed on social presence in the early online learning research, it was Henri (1992) that turned attention to the cognitive dimension. This work was a catalyst for Garrison et al. (2000) to develop a comprehensive framework to guide the research and practice of online learning (see Fig. 1). The framework consists of three elements – social, teaching and cognitive presence – as well as categories and indicators to define each presence and to guide the coding of transcripts (see Fig. 2). The genesis of this framework can be found in the work of John Dewey and is consistent with constructivist approaches to learning in higher education. This framework has resonated with the online learning community and provided insights and methodology for studying online learning (Garrison & Archer, in press; Garrison, Cleveland-Innes, Koole, & Kappelman, 2006).

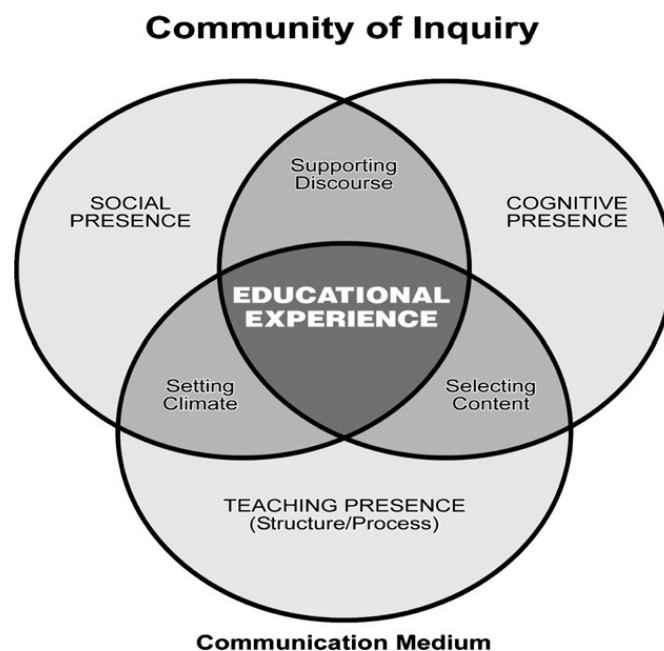


Fig. 1. Community of inquiry framework.

ELEMENTS	CATEGORIES	INDICATORS (examples only)
Social Presence	Open Communication Group Cohesion Affective Expression	Risk-free expression Encourage collaboration Emoticons
Cognitive Presence	Triggering Event Exploration Integration Resolution	Sense of puzzlement Information exchange Connecting ideas Apply new ideas
Teaching Presence	Design & Organization Facilitating Discourse Direct Instruction	Setting curriculum & methods Sharing personal meaning Focusing discussion

Fig. 2. Community of inquiry elements, categories and indicators.

The structure of the community of inquiry framework also has been confirmed through factor analyses conducted by Garrison, Cleveland-Innes, and Fung (2004), Arbaugh (2007a), and Arbaugh and Hwang (2006). Although this recent empirical research certainly supports the CoI as a parsimonious and coherent theory of online learning, this work needs to be supported by additional study. Unfortunately, to date there are very few studies that examine the three elements of the framework simultaneously, either quantitatively or qualitatively. Therefore, our literature review examines each of the elements separately. As we shall see, both the quantity of research and our understanding of each presence have progressed at different rates.

2.1. Social presence

Social presence in online learning has been described as the ability of learners to project themselves socially and emotionally, thereby being perceived as “real people” in mediated communication (Gunawardena & Zittle, 1997; Short, Williams, & Christie, 1976). Of the three elements included in the CoI framework, the role of social presence in educational settings has been studied the most extensively, in both online and face-to-face course settings (Gunawardena & Zittle, 1997; Richardson & Swan, 2003; Rourke, Anderson, Garrison, & Archer, 2001; Walther, 1992).

Recent research on the role of student group cohesiveness and interaction on team effectiveness in online graduate management education suggest a strong relationship between social presence and learning outcomes (Arbaugh, 2005b; Hwang & Arbaugh, 2006; Williams, Duray, & Reddy, 2006; Yoo, Kanawattanachai, & Citurs, 2002). This emerging research stream also suggests that activities that cultivate social presence also enhance the learner’s satisfaction with the internet as an educational delivery medium (Arbaugh & Benbunan-Fich, 2006). Collaborative activities allow learners greater opportunities for increased social presence and a greater sense of online community, which also tends to improve the socio-emotional climate in online courses (Richardson & Swan, 2003; Rovai, 2002a). These positive social climates support more rapid mastery of the “hidden curriculum” of the technological aspects of distance education (Anderson, 2002; Arbaugh, 2004), resulting in increased satisfaction with both the learning process and the medium through which it is delivered (Benbunan-Fich & Hiltz, 2003).

The original categories of social presence, as defined here, are affective expression, open communication and group cohesion (see Fig. 2). Although focusing on social presence may have been an appropriate and important place to begin the study of online learning considering its asynchronous nature, nearly all of this research has been done without considering its relationship to cognitive and teaching presence. The primary issue of concern emerges at the intersection of social and cognitive presence. Students recognize that they are not there for purely social reasons. A sense of community is based upon common purposes and inquiry. Moreover, social presence is less important if the learning activities are information acquisition and there are no collaborative assignments where students can benefit from the perspectives of others (Picciano, 2002).

To date, this research suggests that although social presence alone will not ensure the development of critical discourse in online learning, it is extremely difficult for such discourse to develop without a foundation of social

presence (Garrison & Cleveland-Innes, 2005). A recent study on the effects of interpersonal in online learning by Beuchot and Bullen (2005) suggests that increased sociability of course participants lead to increased interaction, therefore implying that social presence is necessary for the development of cognitive presence. Anagnostopoulos, Basmadjian, and McCrory's (2005) notion of intersubjective modality provides further support for this premise. According to these authors, intersubjective modality in the online environment occurs when one participant explicitly refers to another participant's statement when developing his/her own post, thereby both connecting to the other participant and laying the foundation for higher level inquiry. Other recent studies supporting the "social presence as foundation for cognitive presence" perspective include those by Molinari (2004) and Celani and Collins (2005).

The issue addressed here concerns the nature of social presence and how it needs to shift as a course of study evolves. As valuable as it is to establish affective communication and develop social bonds, for a community to sustain itself, it is essential that the group feels secure to communicate openly and coalesces around a common goal or purpose (Thompson & MacDonald, 2005). Social presence must move beyond simply establishing socio-emotional presence and personal relationships. Cohesion requires intellectual focus (i.e., open and purposeful communication) and respect. For example, Swan and Shih (2005) found that group cohesion is significantly associated with social presence and perceived learning outcomes. In addition, Dixon, Kuhlhorst, and Reiff (2006) report that group cohesion and community are related to higher-quality outcomes. It is argued here that social presence in a community of inquiry must create personal but purposeful relationships. A clear understanding of how social presence shifts or evolves in a purposeful online community is required.

In a study of the process of building online communities, Brown (2001) identified three stages of a sense of belonging to a community. In the first stage, online acquaintances were made. In the second stage, as a result of a thoughtful exchange of ideas, participants felt a part of the community (conferment). In the third stage, "after long-term and/or intense association with others involving personal communication" (p. 24), camaraderie was achieved. From the perspective of the social presence construct, these three stages seem to correspond to the three categories of social presence. It is argued that social presence evolves from open communication (interaction), to purposeful academic exchanges (discourse), and finally, to achieving a feeling of camaraderie. Students are challenged first to become acquainted with the instructor and students, next to understand the expectations, and then to feel some comfort communicating openly online. In an online community, it takes time to find a level of comfort and trust, develop personal relationships, and evolve into a state of camaraderie. Developing a sense of trust and camaraderie may not be the best or realistic first step in developing a purposeful educational CoI, as many have suggested. Brown (2001) also suggests that progression in community-building is correlated with intensity of engagement. It could be argued that the same would hold true with social presence.

Swan (2003) revealed an apparent shift of social presence over time in online course discussions. She reports that affective and interactive (i.e., open communication) categories increased while cohesive indicators decreased. The explanation was that it was "possible that the use of such reference became less necessary as a clear classroom community was formed" (p. 156). Another possible explanation is that the discussion was more exploratory than collaborative. Cohesion may well have been a secondary issue under this circumstance. That is, collaborative tasks focused on practical outcomes may well reduce the focus on the affective and emphasize cohesive comments to achieve a successful outcome. Another consideration in interpreting these findings is the gender balance of the sample. Two thirds were female. In this regard, Arbaugh (2005b) pointed to the possible differences in how male and female students communicate. This, of course, would be confounded by other issues such as community development and nature of the task. To address these issues, findings need to be interpreted in the broader context of a community of inquiry that concurrently considers social, cognitive and teaching presence issues and variables.

Contrary to the nature of the shift in social presence reported by Swan (2003), Vaughan (2004; in Vaughan & Garrison, 2006) found that over time, the frequency of affective and open communication comments decreased, but group cohesion comments increased. Based upon these findings, Vaughan (2004) suggested that affective and open communication was necessary to establish a sense of community. It was only after the social relationships were established and the group became more focused on purposeful activities that cohesive comments begin to take precedence. Not only did the focus change, but it is hypothesized that because a sense of community was established, there also was less need for social reinforcement. Social presence online becomes somewhat transparent as the focus shifts to academic purposes and activities. This supports the findings of Brown (2001).

Further study is required to understand exactly how social presence patterns develop. Can social presence detract from cognitive presence? Is the online environment focused primarily on academic goals (Garrison et al., 2004)? Do

participants in a community of inquiry naturally progress from establishing a climate of open communication, to engaging in purposeful activities (and cohesive comments), and then to naturally developing socio-emotional and personal connections? Is there a qualitative difference between online and face-to-face social presence that we need to understand? Certainly, there is evidence to suggest that the face-to-face environment can more easily provide emotional support and perhaps personal connection (Abrams, 2005).

Implications arising from these issues and related research questions have practical implications for establishing and maintaining social presence in an online community of inquiry. Certainly care must be taken to encourage social interaction and to provide structure and support early on. However, social presence should not be measured simply in terms of the quantity of interaction it engenders. The purpose of social presence in an educational context is to create the conditions for inquiry and quality interaction (reflective and threaded discussions) to achieve worthwhile educational goals collaboratively. Although socio-emotional communication may be important, it is not sufficient for educational purposes. Personal relationships and interaction must be defined in academic terms. Social presence for educational purposes cannot be separated artificially from the purposeful nature of educational communication (i.e., cognitive and teaching presence).

2.2. Cognitive presence

Garrison, Anderson, and Archer (2001) described cognitive presence as the extent to which learners are able to construct and confirm meaning through sustained reflection and discourse. Rooted in Dewey's (1933) construction of practical inquiry and the critical thinking it seeks as an outcome, cognitive presence has long been considered to be a distinguishing characteristic of higher education (Dauer, 1989; Dewey, 1959). Garrison et al. (2001) operationalized cognitive presence in terms of a practical inquiry model resulting in a four-phase process: (1) a triggering event, where some issue or problem is identified for further inquiry; (2) exploration, where students explore the issue, both individually and corporately through critical reflection and discourse; (3) integration, where learners construct meaning from the ideas developed during exploration (see Fig. 3). Garrison et al. (2001) also proposed that the integration phase typically requires enhanced teaching presence to probe and diagnose ideas so that learners will move to higher level thinking in developing their ideas; and then (4) resolution, where learners apply the newly gained knowledge to educational contexts or workplace settings. The four phases are defined in the interests of parsimony, but in practice, inquiry is not so discretely defined nor is it immutable (Garrison & Anderson, 2003).

Of the three types of presence in the CoI framework, cognitive presence likely is the most challenging to study and develop in online courses (Celani & Collins, 2005; Garrison & Cleveland-Innes, 2005; Moore & Marra, 2005).

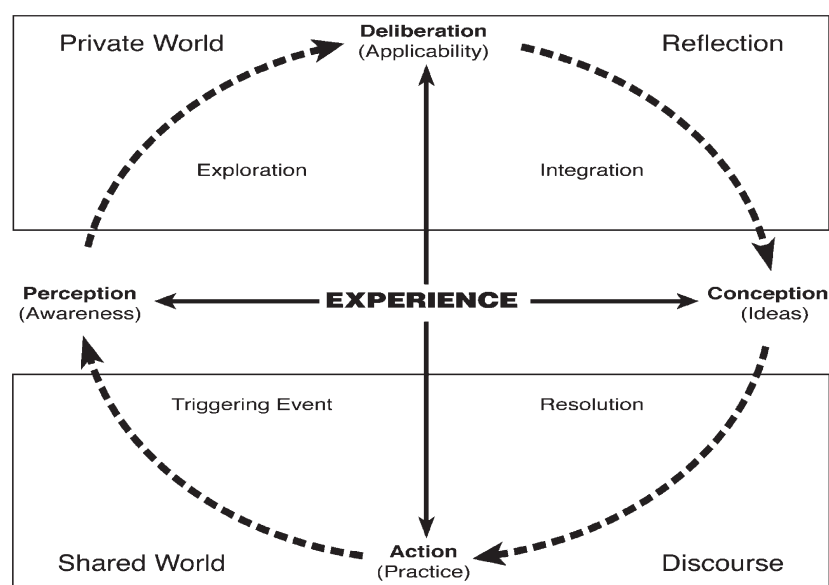


Fig. 3. Practical inquiry model.

Although participant interaction certainly is foundational for developing cognitive presence, it appears that critical thinking skills might be enhanced via a variety of online course formats (Duphorne & Gunawardena, 2005; Moore & Marra, 2005; Oriogun, Ravenscroft, & Cook, 2005; Schrire, 2004). A possible explanation for why multiple formats may be effective for enhancing cognitive presence is that group composition could be more important than discussion format. Lee and Lee (2006) recently found that student groups comprised of a variety of personalities may be more effective in developing metacognitive interaction than do groups comprised of only extroverted or introverted learners.

The primary issue regarding cognitive presence worthy of further exploration relates to the progressive development of inquiry in an online learning environment. Cognitive presence is defined in terms of a cycle of practical inquiry, where participants move deliberately from understanding the problem or issue through to exploration, integration and application. The issue revealed consistently in the research findings is that inquiry invariably has great difficulty moving beyond the information exchange or exploration phase (Celentin, 2007; Fahy, Crawford, & Ally, 2001; Garrison et al., 2001; Kanuka & Anderson, 1998; Luebeck & Bice, 2005; McKlin, Harmon, Evans, & Jones, 2002; Meyer, 2003, 2004; Murphy, 2004a; Newman, Johnson, Cochrane, & Webb, 1996; Vaughan & Garrison, 2005).

Why is it apparently so difficult to move the process of inquiry through to resolution? Is this an artifact of the inquiry model, the contrived nature of the educational context, the communication medium, or perhaps the nature of teaching presence (design, facilitation, and direction)? There is evidence that this pervasive finding may have more to do with aspects of teaching presence than to the other possible factors. Meyer (2003) observes that integration and resolution is more demanding than exploration and, as a result, requires increased time for reflection is required. More specifically, she states, “Faculty need to be more directive in their assignments ...” (Meyer, 2003, p. 8). Similarly, Celentin (2007) concluded that the reason discussions do not reach the highest levels of inquiry is “strictly related to the role of the tutor.” Others also have speculated that the role of the instructor is a major factor (Garrison et al., 2001; Luebeck & Bice, 2005).

In a subsequent study, Meyer (2004) noted, “...the question initiating each of the online discussions influenced the level of the responses from students” (p. 101). There is evidence that the questions or tasks “play an important role in the type of cognitive activity evident in the discussions” (Arnold & Ducate, 2006, p. 42). When questions specifically asked students to engage in practical applications, discussions did progress to the synthesis and resolution phase. Interestingly, it was suggested that confirmation did not come from the group; the individuals confirmed or rejected their own solutions (Arnold & Ducate, 2006). If there are no shared goals requiring a collaborative solution or artifact, the transcripts of online discourse will not reveal discourse that has moved to the resolution phase. Individual reflection may take place and, if required, solutions may be posted, but there will not be substantive discourse. Thus, in addition to teaching presence dimensions such as facilitation and direction, as noted previously, well designed tasks are important to see evidence of resolution in a community of inquiry.

The importance of designing appropriate tasks to move students through to resolution is reinforced in a study focused on online collaborative problem solving (Murphy, 2004b). Where learners specifically were tasked to formulate and resolve a problem, responses were distributed throughout five problem solving processes (understanding the problem, building knowledge, identifying solutions, evaluating solutions, acting on solutions). In fact, “participants engaged more in problem resolution than in problem formulation” (Murphy, 2004b, p. 5) — the converse of previous cognitive presence (practical inquiry) studies. This speaks strongly to the purpose and design of the learning activity. It would appear that if the activity is problem or case-based, clear expectations are given, and appropriate teaching presence is provided, participants in a community of inquiry would not have difficulty moving to resolution.

Sustained development and progression through the inquiry cycle requires well designed learning activities, facilitation, and direction. Interestingly, Vaughan (2004) found that design and facilitation comments decreased in online transcripts, while direct instruction comments increased. The interpretation is that facilitation is important but does not dominate the discourse. At the same time, the instructor must be prepared to provide crucial input to ensure that the community moves to resolution. As a subject matter expert, the teacher should interject relevant information and diagnose misconceptions if the discourse is to be productive. This delicate balancing challenge is something an experienced teacher should be aware of and prepared to address. Educational leadership defined by teaching presence is multidimensional. From an educational perspective, the distinction between facilitation and direct instruction is an important distinction.

An explanation and reason supporting why discussions may get stalled at the exploration phase is found in the group dynamics literature, which has shown that groups do not progress easily to the “performing” stage. Participants need to

connect to the group, and collaborative decision-making proceeds along four hypothesized stages — forming, norming, storming, and performing (Tuckman & Jensen, 1977). Groups need to clarify goals and clear time to come together and function in a productive manner. Groups do not naturally coalesce and move to integration and resolution phases, particularly in situations where the task and challenge is to make sense of complex and disparate information. Direction and facilitation is required to establish cohesion and ensure that messages are developmental (i.e., more than “serial monologues” or personal declarations). This perspective also suggests that the progression of social presence should be from open communication, to cohesion, and then to personal connections.

Emerging research suggests a complementary relationship between teaching presence and cognitive presence. 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. Garrison and Cleveland-Innes (2005) found that course design, structure and leadership significantly impact the extent to which learners engage course content in a deep and meaningful manner. These findings suggest that the role of instructors in cultivating cognitive presence is significant, in terms of how they structure both the course content and participant interactions.

From the participants’ perspective, it is argued here that moving the discussion developmentally would be facilitated considerably by enhancing the metacognitive awareness of the stages of inquiry and how this relates to the particular task at hand (see discussion in next section). One suggestion is for participants to be metacognitively aware of their contributions by requiring that they identify the level of the response. Pawan, Paulus, Yalcin, and Chang (2003) recommend that students self-code their postings, as modeled by their instructors. This discussion of issues related to students’ progression through the inquiry process has implications for the study of teaching presence, to which we now turn our attention.

2.3. Teaching presence

Garrison et al. (2000) contended that although both social and content-related interactions among participants are necessary in virtual learning environments, interactions by themselves are not sufficient to ensure effective online learning. These interactions need to have clearly defined parameters and be focused in a specific direction, hence the need for teaching presence. They described teaching presence as the design, facilitation, and direction of cognitive and social processes for the purpose of realizing personally meaningful and educationally worthwhile learning outcomes. Anderson, Rourke, Garrison, and Archer (2001) conceptualized teaching presence as having three components: (1) instructional design and organization; (2) facilitating discourse (originally called “building understanding”); and (3) direct instruction. The body of rapidly-growing evidence attests to the importance of teaching presence for successful online learning (Blignaut & Trollip, 2003; Dixon et al., 2006; Finegold & Cooke, 2006; Garrison & Cleveland-Innes, 2005; Kanuka, Rourke, & Laflamme, 2007; Lim & Barnes, 2002; Meyer, 2003; Murphy, 2004a; Pawan et al., 2003; Shea, Pickett, & Pelz, 2004; Swan, 2003; Swan & Shih, 2005; Varnhagen, Wilson, Krupa, Kasprzak, & Hunting, 2005; Vaughan, 2004; Wu & Hiltz, 2004; Xin & Feenberg, 2006). The consensus is that teaching presence is a significant determinant of student satisfaction, perceived learning, and sense of community. Since, of the three elements, it has been most recently conceptualized; we provide a more detailed review of teaching presence and its dimensions.

2.3.1. Instructional design and organization

Anderson et al. (2001) described 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. Instructors must be more explicit and transparent regarding these aspects of the online course because the social cues and norms of the traditional classroom are absent (Anderson, 2002; Coppola, Hiltz, & Rotter, 2002). 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 because clear and consistent course structure supporting engaged instructors and dynamic discussions has been found to be the most consistent predictor of successful online courses (Swan, 2004, 2003). Of the three components of teaching presence, this is the most likely to be performed exclusively by the instructor. These activities are, for the most part, completed prior to the beginning of the course, but adjustments can be made as the course progresses (Anderson et al., 2001). Increasingly, institutions are providing

design and organization support to instructors through the use of common instructional design formats, shared documents on student usage of technology, instructor cues across courses, and instructional design experts (Shea, Fredericksen, Picket, & Pelz, 2003).

2.3.2. *Facilitating discourse*

Related to Chickering and Gamson's (1987) ideas of contact between students and faculty and reciprocity and cooperation among students, 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 component of teaching presence is consistent with findings supporting the importance of participant interaction in online learning effectiveness (Arbaugh, 2005b; Benbunan-Fich & Arbaugh, 2006; Hiltz & Turoff, 2002; Sherry, Fulford, & Zhang, 1998; Yoo et al., 2002). This role is associated with 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 responses, raise questions and make observations to move discussions in a desired direction, keep discussion moving efficiently, draw out inactive students, and limit the activities of dominating posters when they become detrimental to the learning of the group (Anderson et al., 2001; Coppola et al., 2002; Shea et al., 2003; Xin & Feenberg, 2006). These activities are particularly important for graduate-level management education, where the emphasis is increasingly on developing team decision-making skills and creating opportunities for double-loop learning (Rungtusanatham et al., 2004).

2.3.3. *Direct instruction*

Anderson et al. (2001) conceptualized direct instruction as the instructor's provision of intellectual and scholarly leadership, in part through sharing their subject matter knowledge with the students. They also contended that a subject matter expert, not merely a facilitator, must play this role because of the need to diagnose comments for accurate understanding, inject sources of information, direct discussions in useful directions, and scaffold learner knowledge to raise it to a new level. In addition to sharing knowledge by a content expert, direct instruction is concerned with the indicators that assess the discourse and the efficacy of the educational process. Responsibilities of the instructor here 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.

Because teaching presence is the most recently conceptualized element of the CoI framework, there are questions regarding the stability of its dimensions. One question is whether it has three distinct categories — design, facilitation and direct instruction. Although the general conceptualization of teaching presence has been supported by research from other scholars (Coppola et al., 2002; LaPointe & Gunawardena, 2004; Stein, Wanstreet, Calvin, Overtoom, & Wheaton, 2005), recent empirical research may generate a debate on whether teaching presence has two (Shea, 2006) or three (Arbaugh & Hwang, 2006) components.

Before we address the validity of the construct, it is helpful to discuss the influence of teaching presence on the success of an online learning experience. Interaction and discourse play key roles in higher-order learning (Hoskins & van Hooff, 2005), but not without structure (design) and leadership (facilitation and direction). For example, without explicit guidance, students will “engage primarily in ‘serial monologues’” (Pawan et al., 2003, p. 119). Obversely, “faculty may need to be more directive in their assignments for threaded discussions, charging the participants to resolve a particular problem, and pressing the group to integrate their ideas ...” (Meyer, 2003, p. 8). With regard to direction, Finegold and Cooke (2006) state, “Direction in the form of information resources, subject knowledge and discussion initiation was thought to be helpful ...” (p. 209). Another recent study concluded “that a strong and active presence on the part of the instructor – one in which she or he actively guides and orchestrates the discourse – is related both to students' sense of connectedness [community] and learning” (Shea et al., 2006, p. 185).

Murphy (2004a) is clear “that in order for the highest-level collaborative processes to occur within an OAD [online asynchronous discussion], there must be explicit strategies or techniques aimed at promoting these processes” (p. 429). Similarly, Gilbert and Dabbagh (2005) concluded that “the number and type of facilitator postings also increased the level of interaction between students” (p. 14). They make it clear that structure and facilitation have a significant influence on discourse.

Another influence on the quality of the discourse and the depth of learning may be metacognitive awareness. Campos, Laferriere, and Lapoint (2005) state that “deep learning ... seems to occur only when metacognitive procedures are in place” (p. 75–76). That is, participants must be aware of changes in thinking. Metacognitive awareness is essential to effectively manage and monitor learning (Garrison, 2003). How does this relate to teaching presence? Teaching presence not only must increase interaction, it also must help students recognize the developmental progression of the inquiry process. As we have seen, participants do not naturally progress to resolution. Although they benefit from facilitation and direction, it is most helpful for them to have both an awareness of the inquiry cycle and reinforced insights and shifts in thinking and understanding. In an educational context, it is normally the role of the teacher to guide the learning process and provide metacognitive awareness.

That said, it is important to understand the construct of teaching presence. It is more than a theoretical issue as to whether there are two or three distinct categories. A clear understanding of the multidimensional structure of teaching presence has practical implications for a community of inquiry and supporting social and cognitive presence. A recent study questioned whether there are three categories corresponding to the hypothesized structure. Shea et al. (2006) recently completed an extensive study of teaching presence and online learning. Shea and colleagues performed a factor analysis of the survey data of over 2000 undergraduate students across multiple institutions and concluded that a two-factor solution was most interpretable. The two factors were labeled design and “directed facilitation.” Directed facilitation was the amalgamation of facilitation and direct instruction, and contributed the greatest to predicting a sense of community and learning.

Conversely, a recent study of MBA students validated the three-dimensional conceptualization of teaching presence (Arbaugh & Hwang, 2006). This survey of 191 students across multiple courses used an instrument based on the Shea et al. (2003) instrument. By using essentially the same instrument, Arbaugh and Hwang (2006) “validated the three components of teaching presence as posited in the ... Community of Inquiry model” (p. 16). Beyond the fact that the teaching presence construct was validated, the interesting question is why did this study confirm the three components of teaching presence construct and Shea and colleagues’ study find only two, when both studies used virtually the same instrument? One explanation may be the nature of the analysis. Another may be related to the fact that “all three components are distinct yet highly correlated with each other” (p. 17). That is, the design (curriculum, goals, method) may have a great influence on how the students perceive other components of teaching presence. Similarly, social and cognitive presences also will influence teaching presence and how it is perceived. As noted previously, perhaps the stronger explanation of these divergent findings is due to student differences. That is, undergraduates may not be sophisticated enough to distinguish between facilitation and direct instruction.

An important observation is that we are dealing with student perspectives. One interpretation is that students may not distinguish between facilitation and direct instruction. This would not be surprising as this may be a subtle distinction for students. Students do not come at this from an educational perspective and a full consideration of the nature of critical discourse. From a teaching perspective, this is the difference between dialogue and discourse (Rourke & Kanuka, unpublished). Facilitation supports dialogue with minimal shaping of the discussion. Discourse, on the other hand, is disciplined inquiry that requires a knowledgeable teacher who must manage the progression of the discussion in a collaborative constructive manner (i.e., direction). Direct teaching presence may also encourage and support students to gain an awareness of the inquiry process.

3. Issues and directions for future research

Based upon this literature review, we see three significant sources of issues for future research if the CoI framework is to be developed into a theory of online learning effectiveness: (1) the need for enhanced methodological and analytical rigor in future studies; (2) the need for conceptual refinement of the relationships and interactions between/among the elements, both particularly and collectively; and (3) the need for testing the framework in disciplines other than education. The following section discusses these issues in further detail.

3.1. Methodological issues

The community of inquiry framework has provided a useful tool and approach to studying online learning. The methodology to date can be described best as an exploratory qualitative approach to provide “insights for the purposes of constructing meaningful propositions to be explored in further research” (Garrison et al., 2006). This research begins

with a credible framework and, therefore, is not inductive theory building. To date, much of the research could be described best as interpretivist, in that there is an attempt to understand interactions through text analysis (Miles & Huberman, 1994). Although issues of validity are relevant to qualitative transcript analysis,

... assigning frequencies to the classifications is an aid in understanding patterns, this does not make it a quantitative, inferential statistical procedure. We are in the early stages of understanding and explaining the complexities of online conferencing and educational discourse. The goal is descriptive, not predictive (Garrison et al., 2006, p. 4).

That said, the question has been raised about moving the validity of the coding protocol to a quantitative approach. Rourke and Anderson (2004) argue for a quantitative content analysis technique and question the rigor of the research to date in this area. They frame the argument as description versus inference. Their point is that much of the online transcript analysis is descriptive, and at some point there needs to be a transition to inference and “a richer definition of test validity” (p. 6). Rourke and Anderson (2004) state that if researchers wish to proceed to the inferential, it must be done mindfully and with understanding the steps required to validate coding protocols.

For purposes of discussion, we distinguish between the broad theoretical framework and specific coding schemes, notwithstanding that they are intimately related. With regard to the validity of the theoretical framework, other constructs that are not entirely dissimilar to elements of the community of inquiry framework have been proposed (Aviv, 2000; Gunawardena, Lowe, & Anderson, 1997; Heckman & Annabi, 2005; Meyer, 2004; Murphy, 2004a,b). It would seem, however, that the community of inquiry model offers a more comprehensive perspective capable of identifying interaction effects among social, cognitive and teaching presence dynamics. There has been surprisingly little discussion about the reasonableness and usefulness of the community of inquiry framework in studying online learning.

A key question is: Do the three elements capture the core dynamics of a community of inquiry? While there is growing evidence that the CoI framework does account for much of the complexity of the teaching and learning transaction, the challenge for researchers and practitioners is to better understand the interdependence of the three elements. Each element influences the others. We need to understand the specific nature of this influence under various educational contexts that vary according to discipline, goals, student entering knowledge, and the nature of the communication (i.e., fully online or blended). We further explore this issue of interdependence in the next sections.

On the other hand, there is greater diversity of practice with regard to coding protocols (Marra, Moore, & Klimczak, 2004). The issue here is whether the elements have been well defined and if the categories are valid (representative of the element). Do the categories fully describe the elements (i.e., presences) of the community of inquiry? Should different protocols be considered for certain research questions? Shifting our focus to the indicators, certainly they must reflect the appropriate category reliably. That is, do the indicators reflect the essence of the categories? Are the indicators of sufficient detail and range to be useful in coding?

There is the question, however, of why we would want to code at the indicator level. Coding at the indicator level is difficult (Murphy & Ciszewska-Carr, 2005). Is it not a bit premature considering the early stage of this research and of testing the framework? What research questions would coding at the indicator level answer? How does being able to distinguish among the indicators add to the validity of the model? Are indicators too context specific to expect a standard set of indicators across all online educational environments?

Another coding issue is which unit of analysis (e.g., sentence, paragraph, message, or theme) should be employed. Although there has been some discussion around this issue (Fahy, 2001; Garrison et al., 2006; Rourke et al., 2001), this is an important decision from a research perspective. Certainly the research question and context will influence this decision. The importance of training for reliability is another important reliability and validity issue where more attention would be beneficial. In summary, it is clear that although we have made considerable progress, much work remains in addressing coding schemes and validating the CoI framework.

Finally, we are ready to emerge from the early exploratory and descriptive phase of researching online communities of inquiry. Because of the relative lack of quantitative research, studies that examine the relationship between any of the framework's dimensions and learning outcomes are only now beginning to emerge (Arbaugh, 2007b; Shea, 2006; Shea et al., 2006). Therefore, if the CoI framework is to gain legitimacy as a theory of online learning, we need more empirical studies to assess its explanatory power in fields beyond general online education. The time is now right to transition to a phase that utilizes both qualitative and quantitative approaches to studying online learning communities. The focus will shift to developing and employing psychometrically sound instruments capable of studying larger interdisciplinary and inter-institutional samples over time.

The foundation for this shift has been laid. Swan and Shih (2005) have developed a sound social presence survey based on the work of Gunawardena and Zittle (1997) and Richardson and Swan (2003). Arbaugh and Hwang (2006) have validated a teaching presence survey questionnaire based on the work of Shea et al. (2003). Preliminary items reflecting the cognitive presence construct have been offered by Garrison et al. (2004). Recent studies by Garrison et al. (2004) and Arbaugh (2007a) suggest that survey items developed to measure each of the elements of the framework do so in a valid and reliable manner. The theoretical framework and research to date support development of these instruments and their use to study online communities of inquiry. Although these instruments certainly would benefit from further refinement, they can be used to empirically test the relationships between the elements and examine their relationships to learning outcomes. Both qualitative and quantitative efforts will contribute to the refinement of the community of inquiry framework and the categories and indicators of its elements/constructs (Garrison et al., 2006).

Regardless of conclusions regarding the most appropriate measures of the elements, a practical matter to be addressed by future researchers is the need to determine how teaching presence can be measured more efficiently relative to the other elements. Both Shea's (2006) and Arbaugh and Hwang's (2006) studies used at least seventeen items to measure teaching presence. Although using such a large number of items to help precisely define a relatively new construct is understandable and desirable, a more efficient measure of teaching presence likely will help increase survey response rates for future studies of the CoI framework. Again, future researchers should examine the items used in these studies and by Garrison et al. (2004) to determine the optimal combination of items for construct validity, reliability, and efficiency.

3.2. Conceptual issues

Although Garrison et al. (2000) have conceptualized the nature of the relationships between the elements of the CoI framework, much of the research on the framework to date has focused on one particular presence rather than on the nature of the relationship between the types of presence, let alone on the framework comprehensively. A process for examining these relationships was proposed recently by Redmond and Lock (2006). By dividing the elements of the CoI and their interactions into seven separate sequential sections, Redmond and Lock suggest a sequential model by which the CoI framework results in knowledge in action. Their conceptualization suggests that the process of inquiry begins with the establishment of social presence, which is then used to create teaching presence followed by cognitive presence. Cognitive presence then interacts with social presence to produce knowledge in action. Future research efforts could test the accuracy of this conceptualization through longitudinal designs using course narratives and/or survey-based measures of the constructs.

3.3. Contextual issues

One implication of the relative lack of empirical research on the framework is that its generalizability to fields beyond the education discipline makes it prime for further research. The CoI framework is gaining increasing attention within general online education (Anagnostopoulos et al., 2005; Arnold & Ducate, 2006; Meyer, 2004; Shea, 2006) and recently has begun to be used to explain findings of studies of online courses in disciplines such as business (Arbaugh & Benbunan-Fich, 2006; Arbaugh & Rau, 2007), information systems (Heckman & Annabi, 2005), and foreign languages (Arnold & Ducate, 2006). However, studies that examine the framework's generalizability to online learning in other disciplines presently are limited. This suggests that future collaborations between those well versed in the CoI framework and researchers from other disciplines that have interests in online education could be fruitful.

Another potential benefit of such cross-disciplinary collaborations is the opportunity for integrating the CoI framework with theoretical perspectives for non-inquiry aspects of the online learning experience. Although the elements of the CoI framework are seen as overlapping (Garrison et al., 2000, 2003, 2004), Garrison's (2006) discussions of the interaction between the types of presence and results of the studies reviewed in this article suggest that studies that examine the extent to which the elements moderate each others' relationship to learning outcomes could be useful. In addition to examining relationships between and among the elements of the framework, researchers should consider studying other variables in concert with the CoI elements, including the course or subject matter (Arbaugh, 2005a; Drago, Peltier, & Sorensen, 2002; Wallace, 2002), the software used to deliver the course (Arbaugh, 2005b; Finlay, Desment, & Evans, 2004; Martins & Kellermanns, 2004), and characteristics of learners and/or instructors (Drago et al., 2002; Finlay et al., 2004; Hiltz & Shea, 2005; Schniederjans & Kim, 2005; Dziuban, Shea, & Arbaugh, 2005).

3.4. Practical issues

While conceptual and contextual issues have important practical implications, there is considerable room for future research from a practical pedagogical perspective. One example would be practical strategies and guidelines on how best to create social presence in an online environment. It would appear that we need to confirm the research of [Conrad \(2005\)](#) that the primary focus of students in an online environment is the academic goals and not personal relationships. That is, is open communication and group cohesion the initial challenges of creating a CoI?

From a cognitive presence perspective, an area of research worth exploring is the impact of increasing student metacognitive awareness on the quality and development of the discourse and learning outcomes. Would an understanding of the practical inquiry model help students monitor and manage their discussion contributions and expedite achieving intended learning outcomes? Future research in this area could also explore the dynamics of collaborative learning online and to understand the communication and motivational issues to motivate students and ensure productive team work. What might be the role of synchronous and even blended approaches to creating and sustaining educational communities of inquiry?

Another issue from a practical perspective that warrants further research attention is the impact of the blending of educational delivery medium and introduction of new technologies to online learning. While the conceptual grounding of the model suggests that it would be robust enough to explain effective learning outcomes in blended environments ([Graham, 2006](#); [Shea, 2007](#); [Vaughan & Garrison, 2006](#)), to date there is limited empirical research on these environments for supporting such a conclusion. Also, the increased ease with which media such as audio and video can be introduced into virtual learning environments may have significant implications for the structure, development, and interaction of the three presences ([Arbaugh, 2005b](#); [Stodel et al., 2006](#); [Wagner, 2006](#)). Future research should incorporate mechanisms for measuring the impact of these media on the community of inquiry–learning outcomes relationship.

Finally, the research does indicate that there are problems with the lack of teaching presence to focus and move the discussion forward. What may be less clear is when there is too much direct instruction. For example, if the goals are well defined and explicit, direct instruction may well be welcomed by the participants. However, in areas of less well defined learning content areas and where critical discourse is appropriate, the balance between facilitation and direct instruction is worthy of further investigation. Along this same line of reasoning, what is the impact of direct instruction in terms of modeling critical discourse and practical inquiry?

4. Conclusion

The community of inquiry framework issues discussed previously have important theoretical and practical implications. Understanding the role of social presence is essential in creating a community of inquiry and in designing, facilitating and directing higher-order learning. Creating a climate for open communication and building group cohesion are essential for productive inquiry. [Baker \(2003\)](#) found that “instructor immediacy [i.e., teaching presence] was more predictive of affective and cognitive learning” than “whether students felt close to each other” (p. 1). Some cohorts are academically focused and do not need or want to engage in a virtual social space ([McPherson & Nunes, 2004](#)). These cohorts usually have well-defined, practical outcomes that are collaboratively based. As important as social presence may be, a community of inquiry is associated with a sense of common purpose and cognitive presence.

A community of inquiry needs to have clear expectations of the nature of critical discourse and how to be a productive member of the community. Participants need to be aware of the academic objectives, the phases of inquiry, and the level of discourse. Establishing and sustaining a community of inquiry raise the importance and role of teaching presence. The distinction between facilitation and direction also must be clear from a design perspective. Teaching presence must consider the dual role of both moderating and shaping the direction of the discourse. Both are essential for a successful community of inquiry.

The purpose of this article has been to document the issues and challenges associated with the continued development of the community of inquiry framework. We have also provided direction for future research. We hope that this documentation and discussion of the issues will be of assistance to the growing number of researchers and practitioners who are finding value in the community of inquiry framework. Much work remains to validating the framework and understanding online learning, but we believe that we have reached a critical mass of research and understanding that will sustain future efforts.

Acknowledgement

We wish to acknowledge that this paper is an expanded version of a previously published article: Garrison, D. R. (2007). Online community of inquiry review: Social, cognitive and teaching presence issues. *Journal of Asynchronous Learning Networks*, 11(1), 61–72.

References

- Abrams, Z. (2005). ACMC, collaboration and the development of critical thinking in a graduate seminar in applied linguistics. *Canadian Journal of Learning Technology*, 31(2), 23–47.
- Alavi, M., & Leidner, D. E. (2001). Research commentary: Technology-mediated learning — A call for greater depth and breadth of research. *Information Systems Research*, 12(1), 1–10.
- Anagnostopoulos, D., Basmadjian, K. G., & McCrory, R. S. (2005). The decentered teacher and the construction of social space in the virtual classroom. *Teachers College Record*, 107, 1699–1729.
- Anderson, T. (2002). The hidden curriculum of distance education. *Change*, 33(6), 28–35.
- Anderson, T., Rourke, L., Garrison, D. R., & Archer, W. (2001). Assessing teaching presence in a computer conferencing context. *Journal of Asynchronous Learning Networks*, 5(2). Retrieved December 10, 2004, from http://www.aln.org/publications/jaln/v5n2/v5n2_anderson.asp
- Arbaugh, J. B. (2001). How instructor immediacy behaviors affect student satisfaction and learning in web-based courses. *Business Communication Quarterly*, 64(4), 42–54.
- Arbaugh, J. B. (2004). Learning to learn online: A study of perceptual changes between multiple online course experiences. *The Internet and Higher Education*, 7, 169–182.
- Arbaugh, J. B. (2005). How much does “subject matter” matter? A study of disciplinary effects in on-line MBA courses. *Academy of Management Learning & Education*, 4, 57–73.
- Arbaugh, J. B. (2005). Is there an optimal design for on-line MBA courses? *Academy of Management Learning & Education*, 4, 135–149.
- Arbaugh, J. B. (2007). An empirical verification of the Community of Inquiry framework. *Journal of Asynchronous Learning Networks*, 11, 73–85.
- Arbaugh, J. B. (2007). Does the community of inquiry framework predict outcomes in online MBA courses? *Paper presented at the 67th annual meetings of the Academy of Management, Philadelphia, PA.*
- Arbaugh, J. B., & Benbunan-Fich, R. (2006). An investigation of epistemological and social dimensions of teaching in online learning environments. *Academy of Management Learning & Education*, 5, 435–447.
- Arbaugh, J. B., & Hwang, A. (2006). Does “teaching presence” exist in online MBA courses? *The Internet and Higher Education*, 9(1), 9–21.
- Arbaugh, J. B., & Rau, B. L. (2007). A study of disciplinary, structural, and behavioral effects on course outcomes in online MBA courses. *Decision Sciences Journal of Innovative Education*, 5(1), 65–95.
- Arnold, N., & Ducate, L. (2006). Future foreign language teachers’ social and cognitive collaboration in an online environment. *Language Learning & Technology*, 10(1), 42–66. Retrieved January 14, 2006 from <http://llt.msu.edu/vol10num1/pdf/arnoldducate.pdf>
- Aviv, R. (2000). Educational performance of ALN via content analysis. *Journal of Asynchronous Learning Networks*, 4(2), 53–72.
- Baker, J. (2003). Instructor immediacy increases student enjoyment, perception of learning. Online Classroom, September. Retrieved January 10, 2006, from <https://www.ucalgary.ca/~commons/oc/0309OC.pdf>
- Baker, J. D. (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.
- Benbunan-Fich, R., & Arbaugh, J. B. (2006). Separating the effects of knowledge construction and group collaboration in web-based courses. *Information & Management*, 43, 778–793.
- Benbunan-Fich, R., & Hiltz, S. R. (2003). Mediators of the effectiveness of online courses. *IEEE Transactions on Professional Communication*, 46(4), 298–312.
- Benbunan-Fich, R., Hiltz, S. R., & Harasim, L. (2005). The online interaction learning model: An integrated theoretical framework for learning networks. In S. R. Hiltz & R. Goldman (Eds.), *Learning together online: Research on asynchronous learning networks* (pp. 19–37). Mahwah, NJ: Erlbaum.
- Beuchot, A., & Bullen, M. (2005). Interaction and interpersonality in online discussion forums. *Distance Education*, 26(1), 67–87.
- Blignaut, A. S., & Trollip, S. R. (2003). Measuring faculty participation in asynchronous discussion forums. *Journal of Education for Business*, 78(6), 347–353.
- Brandon, D. P., & Hollingshead, A. B. (1999). Collaborative learning and computer-supported groups. *Communication Education*, 48(2), 109–126.
- Brown, R. E. (2001). The process of community-building in distance learning classes. *Internet and Higher Education*, 5(2), 18–35.
- Campos, M. N., Laferriere, T., & Lapoint, J. M. (2005). Analysing arguments in networked conversations: The context of student teachers. *The Canadian Journal of Higher Education*, 35(4), 55–83.
- Celani, M. A. A., & Collins, H. (2005). Critical thinking in reflective sessions and in online interactions. *AILA Review*, 18, 41–57.
- Celentin, P. (2007). Online training: Analysis of interaction and knowledge building patterns among foreign language teachers. *Journal of Distance Education*, 21(3), 39–58.
- Chickering, A. W., & Gamson, Z. (1987). Seven principles for good practice in undergraduate education. *AAHE Bulletin*, 40(7), 3–7.
- Conrad, D. (2005). Building and maintaining community in cohort-based online learning. *Journal of Distance Education*, 20(1), 1–20.

- Coppola, N. W., Hiltz, S. R., & Rotter, N. G. (2002). Becoming a virtual professor: Pedagogical roles and asynchronous learning networks. *Journal of Management Information Systems*, 18(4), 169–189.
- Dauer, F. W. (1989). *Critical thinking: An introduction to reasoning*. Oxford: Oxford University Press.
- Dewey, J. (1933). *How we think*, rev. ed. Boston: D.C. Heath.
- Dewey, J. (1959). My pedagogic creed. In J. Dewey (Ed.), *Dewey on education* (pp. 19–32). New York: Teachers College, Columbia University.
- Dixon, M., Kuhlhorst, M., & Reiff, A. (2006). Creating effective online discussions: Optimal instructor and student roles. *Journal of Asynchronous Learning Networks*, 10(3), 15–28.
- Drago, W., Peltier, J., & Sorensen, D. (2002). Course content or instructor — Which is more important in online teaching? *Management Research News*, 25(6/7), 69–83.
- Duphorne, P. L., & Gunawardena, C. N. (2005). The effect of three computer conferencing designs on critical thinking skills of nursing students. *American Journal of Distance Education*, 19(1), 37–50.
- Dziuban, C., Shea, P., & Arbaugh, J. B. (2005). Faculty roles and satisfaction in ALNs. In S. R. Hiltz & R. Goldman (Eds.), *Learning together online: Research on asynchronous learning networks* (pp. 169–190). Mahwah, NJ: Erlbaum.
- Fahy, P. J. (2001). Addressing some common problems in transcript analysis. *International Review of Research in Open and Distance Learning*, 1(2). Retrieved June 20, 2005, from <http://www.irrodl.org/content/v1.2/research.html#Fahy>
- Fahy, P. J., Crawford, G., & Ally, M. (2001). Patterns of interaction in a computer conference transcript. *International Review of Research in Open and Distance Learning*, 2(1). Retrieved Sept 20, 2006, from <http://www.irrodl.org/index.php/irrodl/article/view/36/73>
- Finegold, A. R. D., & Cooke, L. (2006). Exploring the attitudes, experiences and dynamics of interaction in online groups. *Internet and Higher Education*, 9(3), 201–215.
- Finlay, W. K., Desment, C. K., & Evans, L. K. (2004). Is it the technology or is it the teacher? A comparison of online and traditional English composition classes. *Journal of Educational Computing Research*, 31, 163–180.
- Garrison, D. R. (2003). Cognitive presence for effective asynchronous online learning: The role of reflective inquiry, self-direction and metacognition. In J. Bourne & J. C. Moore (Eds.), *Elements of quality online education: Practice and direction Volume 4 in the Sloan C Series*. (pp. 29–38). Needham, MA: The Sloan Consortium.
- Garrison, D. R., & Anderson, T. (2003). *E-Learning in the 21st century: A framework for research and practice*. London: Routledge/Falmer.
- Garrison, D. R., Anderson, T., & Archer, W. (2000). Critical inquiry in a text-based environment: Computer conferencing in higher education. *The Internet and Higher Education*, 2(2-3), 87–105.
- Garrison, D. R., Anderson, T., & Archer, W. (2001). Critical thinking and computer conferencing: A model and tool to assess cognitive presence. *American Journal of Distance Education*, 15(1), 7–23.
- Garrison, D. R., & Archer, W. (in press). A community of inquiry framework for online learning. In M. Moore (Ed.), *Handbook of distance education* (Vol. 2). New York: Erlbaum.
- Garrison, D. R., & Cleveland-Innes, M. (2005). Facilitating cognitive presence in online learning: Interaction is not enough. *American Journal of Distance Education*, 19(3), 133–148.
- Garrison, D. R., Cleveland-Innes, M., & Fung, T. (2004). Student role adjustment in online communities of inquiry: Model and instrument validation. *Journal of Asynchronous Learning Networks*, 8(2), 61–74. Retrieved August 13, 2005, from http://www.sloan-c.org/publications/jaln/v8n2/pdf/v8n2_garrison.pdf
- Garrison, D. R., Cleveland-Innes, M., Koole, M., & Kappelman, J. (2006). Revisiting methodological issues in the analysis of transcripts: Negotiated coding and reliability. *The Internet and Higher Education*, 9(1), 1–8.
- Gilbert, P. K., & Dabbagh, N. (2005). How to structure online discussions for meaningful discourse: A case study. *British Journal of Educational Technology*, 36(1), 5–18.
- Gorham, J. (1988). The relationship between verbal teacher immediacy behaviors and student learning. *Communication Education*, 37, 40–53.
- Graham, C. R. (2006). Blended learning systems: Definition, current trends, and future directions. In C. J. Bonk & C. R. Graham (Eds.), *The handbook of blended learning: Global perspectives, local designs* (pp. 3–21). San Francisco, CA: Pfeiffer.
- Gunawardena, C., Lowe, C., & Anderson, T. (1997). Analysis of a global online debate and the development of an interaction analysis model for examining social construction of knowledge in computer conferencing. *Journal of Educational Computing Research*, 17(4), 379–431.
- Gunawardena, C., & Zittle, F. (1997). Social presence as a predictor of satisfaction within a computer mediated conferencing environment. *American Journal of Distance Education*, 11(3), 8–26.
- Heckman, R., & Annabi, H. (2005). A content analytic comparison of learning processes in online and face-to-face case study discussions. *Journal of Computer-Mediated Communication*, 10(2), article 7. Located January 4, 2007 at <http://jcmc.indiana.edu/vol10/issue2/heckman.html>
- Henri, F. (1992). Computer conferencing and content analysis. In A. R. Kaye (Ed.), *Collaborative learning through computer conferencing: The Najaden papers* (pp. 117–136). Berlin: Springer-Verlag.
- Hiltz, S. R., & Shea, P. (2005). The student in the online classroom. In S. R. Hiltz & R. Goldman (Eds.), *Learning together online: Research on asynchronous learning networks* (pp. 145–168). Mahwah, NJ: Erlbaum.
- Hiltz, S. R., & Turoff, M. (2002). What makes learning networks effective? *Communications of the ACM*, 45(4), 56–59.
- Hoskins, S. L., & van Hooff, J. C. (2005). Motivation and ability: Which students use online learning and what influence does it have on their achievement? *British Journal of Educational Technology*, 36(2), 177–192.
- Hwang, A., & Arbaugh, J. B. (2006). Virtual and traditional feedback-seeking behaviors: Underlying competitive attitudes and consequent grade performance. *Decision Sciences Journal of Innovative Education*, 4, 1–28.
- Kanuka, H., & Anderson, T. (1998). Online social interchange, discord, and knowledge construction. *Journal of Distance Education*, 13(1), 57–75.
- Kanuka, H., Rourke, L., & Laflamme, E. (2007). The influence of instructional methods on the quality of online discussion. *British Journal of Educational Technology*, 38(2), 260–271.

- LaPointe, D. K., & Gunawardena, C. N. (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.
- Lee, J. -M., & Lee, Y. (2006). Personality types and learners' interaction in web-based threaded discussion. *Quarterly Review of Distance Education*, 7(1), 83–94.
- Leidner, D. E., & Jarvenpaa, S. L. (1995). The use of information technology to enhance management school education: A theoretical view. *MIS Quarterly*, 19, 265–291.
- Lim, C. P., & Barnes, S. (2002). "Those who can, teach" — The pivotal role of the teacher in the information and communication technologies (ICT) learning environment. *Journal of Educational Media*, 27(1-2), 19–40.
- Luebeck, J. L., & Bice, L. R. (2005). Online discussion as a mechanism of conceptual change among mathematics and science teachers. *Journal of Distance Education*, 20(2), 21–39.
- Marra, R. M., Moore, J. L., & Klimczak, A. K. (2004). Content analysis of online discussion forums: A comparative analysis of protocols. *Educational Technology Research & Development*, 52(2), 23–40.
- Martins, L. L., & Kellermanns, F. W. (2004). A model of business school students' acceptance of a web-based course management system. *Academy of Management Learning and Education*, 3, 7–26.
- McKlin, T., Harmon, S. W., Evans, W., & Jones, M. G. (2002). Cognitive presence in web-based learning: A content analysis of students' online discussions. IT Forum Paper #60, retrieved October 11, 2005, from <http://it.coe.uga.edu/itforum/paper60/paper60.htm>
- McPherson, M., & Nunes, M. B. (2004). The failure of a virtual social space (VSS) designed to create a learning community: Lessons learned. *British Journal of Educational Technology*, 35(3), 305–321.
- Meyer, K. A. (2003). Face-to-face versus threaded discussions: The role of time and higher-order thinking. *Journal of Asynchronous Learning Networks*, 7(3), 55–65.
- Meyer, K. A. (2004). Evaluating online discussions: Four different frames of analysis. *Journal of Asynchronous Learning Networks*, 8(2), 101–114.
- Miles, M. B., & Huberman, A. M. (1994). *Qualitative data analysis: An expanded sourcebook*. Thousand Oaks, CA: Sage.
- Molinari, D. L. (2004). The role of social comments in problem-solving groups in an online class. *American Journal of Distance Education*, 18(2), 89–101.
- Moore, J. L., & Marra, R. M. (2005). A comparative analysis of online discussion participation protocols. *Journal of Research on Technology in Education*, 38, 191–212.
- Murphy, E. (2004). Recognizing and promoting collaboration in an online asynchronous discussion. *British Journal of Educational Technology*, 35(4), 421–431.
- Murphy, E. (2004). Identifying and measuring ill-structured problem formulation and resolution in online asynchronous discussions. *Canadian Journal of Learning and Technology*, 30(1), 5–20.
- Murphy, E., & Ciszewska-Carr, J. (2005). Sources of difference in reliability: Identifying sources of difference in reliability in content analysis of online asynchronous discussions. *International Review of Research in Open and Distance Learning*, 6(2). Retrieved January 17, 2006, from <http://www.irrodl.org/content/v6.2/index.html>
- Newman, D. R., Johnson, C., Cochrane, C., & Webb, B. (1996). An experiment in group learning technology: Evaluating critical thinking in face-to-face and computer-supported seminars. *Interpersonal Computing and Technology*, 4(1), 57–74. Retrieved March 30, 2005, from <http://www.helsinki.fi/science/optek/1996/n1/newman.txt>
- Oriogun, P. K., Ravenscroft, A., & Cook, J. (2005). Validating an approach to examining cognitive engagement in online groups. *American Journal of Distance Education*, 19, 197–214.
- Pawan, F., Paulus, T. M., Yalcin, S., & Chang, C. (2003). Online learning: Patterns of engagement and interaction among in-service teachers. *Language Learning & Technology*, 7(3), 119–140.
- Picciano, A. G. (2002). Beyond student perceptions: Issues of interaction, presence, and performance in an online course. *Journal of Asynchronous Learning Networks*, 6(1). Retrieved January, 6, 2006, from http://www.sloan-c.org/publications/jaln/v6n1/pdf/v6n1_picciano.pdf
- Redmond, P., & Lock, J. V. (2006). A flexible framework for online collaborative learning. *The Internet and Higher Education*, 9, 267–276.
- Richardson, J. C., & Swan, K. (2003). Examining social presence in online courses in relation to students' perceived learning and satisfaction. *Journal of Asynchronous Learning Networks*, 7(1), 68–88.
- Rourke, L., & Anderson, T. (2004). Validity in quantitative content analysis. *Educational Technology Research and Development*, 52(1), 5–18.
- Rourke, L., Anderson, T., Garrison, D. R., & Archer, W. (2001). Methodological issues in the content analysis of computer conference transcripts. *International Journal of Artificial Intelligence in Education*, 12(1), 8–22.
- Rourke, L., & Kanuka, H. (unpublished manuscript). Barriers to online critical discourse.
- Rovai, A. P. (2002). Development of an instrument to measure classroom community. *The Internet and Higher Education*, 5(3), 197–211.
- Rovai, A. P. (2002). Sense of community, perceived cognitive learning, and persistence in asynchronous learning networks. *The Internet and Higher Education*, 5(4), 319–332.
- Rungtusanatham, M., Ellram, L. M., Siferd, S. P., & Salik, S. (2004). Toward a typology of business education in the internet age. *Decision Sciences Journal of Innovative Education*, 2(2), 101–120.
- Schniederjans, M. J., & Kim, E. B. (2005). Relationship of student undergraduate achievement and personality characteristics in a total web-based environment: An empirical study. *Decision Sciences Journal of Innovative Education*, 3, 205–221.
- Schrire, S. (2004). Interaction and cognition in asynchronous computer conferencing. *Instructional Science: An International Journal of Learning and Cognition*, 32, 475–502.
- Shea, P. (2006). A study of students' sense of learning community in online environments. *Journal of Asynchronous Learning Networks*, 10(10). http://www.sloan-c.org/publications/jaln/v10n1/v10n1_4shea_member.asp
- Shea, P. (2007). Towards a conceptual framework for learning in blended environments. In A. G. Picciano & C. D. Dziuban (Eds.), *Blended learning: Research perspectives* (pp. 19–35). Nedham, MA: Sloan-C.

- Shea, P. J., Fredericksen, E. E., Pickett, A. M., & Pelz, W. E. (2003). A preliminary investigation of “teaching presence” in the SUNY learning network. In J. Bourne & J. C. Moore (Eds.), *Elements of quality online education: Practice direction, Vol. 4* (pp. 279–312). Needham, MA: Sloan Center for Online Education.
- Shea, P., Li, C. S., & Pickett, A. (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(3), 175–190.
- Shea, P. J., Pickett, A. M., & Pelz, W. E. (2004). Enhancing student satisfaction through faculty development: The importance of teaching presence. In J. Bourne & J. C. Moore (Eds.), *Elements of quality online education: Into the mainstream, Volume 5 in the Sloan C Series* (pp. 39–59). Needham, MA: Sloan Center for Online Education.
- Sherry, A. C., Fulford, C. P., & Zhang, S. (1998). Assessing distance learners’ satisfaction with instruction: A quantitative and a qualitative measure. *American Journal of Distance Education*, 12(3), 4–28.
- Short, J., Williams, E., & Christie, B. (1976). *The social psychology of telecommunication*. London: Wiley.
- Sitzmann, T., Kraiger, K., Stewart, D., & Wisher, R. (2006). The comparative effectiveness of web-based and classroom instruction: A meta-analysis. *Personnel Psychology*, 59, 623–664.
- Stein, D. S., Wanstreet, C. E., Calvin, J., Overtoom, C., & Wheaton, J. E. (2005). Bridging the transactional distance gap in online learning environments. *American Journal of Distance Education*, 19(2), 105–118.
- Stodel, E. J., Thompson, T. L., & MacDonald, C. J. (2006). Learners’ perspectives on what is missing from online learning: Interpretations through the Community of Inquiry framework. *International Review of Research in Open and Distance Learning*, 7(3). Retrieved May 4, 2007 from <http://www.irrodl.org/index.php/irrodl/article/view/325/743>
- Swan, K. (2003). Developing social presence in online discussions. In S. Naidu (Ed.), *Learning and teaching with technology: Principles and practices* (pp. 147–164). London: Kogan Page.
- Swan, K. (2004). Learning effectiveness: What the research tells us. In J. Bourne & J. C. Moore (Eds.), *Elements of quality online education: Practice and direction, Vol. 4 in the Sloan C Series* (pp. 13–45). Needham, MA: Sloan Center for Online Education.
- Swan, K., & Shih, L. F. (2005). On the nature and development of social presence in online course discussions. *Journal of Asynchronous Learning Networks*, 9, 115–136.
- Tallent-Runnels, M. K., Thomas, J. A., Lan, W. Y., Cooper, S., Ahern, T. C., Shaw, S. M., et al. (2006). Teaching courses online: A review of the research. *Review of Educational Research*, 76, 93–135.
- Thompson, T. L., & MacDonald, C. J. (2005). Community building, emergent design and expecting the unexpected: Creating a quality eLearning experience. *The Internet and Higher Education*, 8(3), 233–249.
- Tuckman, B. W., & Jensen, M. C. (1977). Stages of small-group development revisited. *Group and Organization Studies*, 2, 419–427.
- Varnhagen, S., Wilson, D., Krupa, E., Kasprzak, S., & Hunting, V. (2005). Comparison of student experiences with different online graduate courses in health promotion. *Canadian Journal of Learning and Technology*, 31(1), 99–117.
- Vaughan, N. D. (2004). *Investigating how a blended learning approach can support an inquiry process within a faculty learning community*. Unpublished doctoral dissertation, University of Calgary.
- Vaughan, N., & Garrison, D. R. (2005). Creating cognitive presence in a blended faculty development community. *Internet and Higher Education*, 8, 1–12.
- Vaughan, N., & Garrison, D. R. (2006). How blended learning can support a faculty development community of inquiry. *Journal of Asynchronous Learning Networks*, 10(4), 139–152.
- Wagner, E. D. (2006). On designing interaction experiences for the next generation of blended learning. In C. J. Bonk & C. R. Graham (Eds.), *The handbook of blended learning: Global perspectives, local designs* (pp. 41–55). San Francisco, CA: Pfeiffer.
- Wallace, R. M. (2002). Online learning in higher education: A review of research on interactions among teachers and students. *Education, Communication, and Information*, 3(2), 241–280.
- Walther, J. (1992). Interpersonal effects in computer mediated interaction: A relational perspective. *Communication Research*, 19(1), 52–90.
- Williams, E. A., Duray, R., & Reddy, V. (2006). Teamwork orientation, group cohesiveness, and student learning: A study of the use of teams in online distance education. *Journal of Management Education*, 30, 592–616.
- Wu, D., & Hiltz, S. R. (2004). Predicting learning from asynchronous online discussions. *Journal of Asynchronous Learning Networks*, 8(2), 139–152.
- Xin, C., & Feenberg, A. (2006). Pedagogy in cyberspace: The dynamics of online discourse. *Journal of Distance Education*, 21(2), 1–25.
- Yoo, Y., Kanawattanachai, P., & Citurs, A. (2002). Forging into the wired wilderness: A case study of a technology-mediated distributed discussion-based class. *Journal of Management Education*, 26, 139–163.