Internet and Higher Education 13 (2010) 37–44

Contents lists available at ScienceDirect

Internet and Higher Education

Subject matter effects and the Community of Inquiry (CoI) framework: An exploratory study

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ARTICLE INFO

Keywords:
Community of Inquiry
Disciplinary differences in teaching and learning
Online learning

ABSTRACT

This paper integrates the emerging literatures of empirical research on the Community of Inquiry (CoI) framework and disciplinary effects in online teaching and learning by examining the disciplinary differences in perceptions of social, teaching, and cognitive presence of over 1500 students in seven disciplines at two U.S. institutions. Our results found significant disciplinary differences, particularly regarding cognitive presence, in soft, applied disciplines relative to other disciplines. These initial results suggest the possibility that the CoI framework may be more applicable to applied disciplines than pure disciplines. Our findings suggest interesting opportunities for future researchers to consider how the individual elements of the CoI framework may influence and be influenced by academic disciplines and how the framework may need to be refined or modified to explain effective course conduct in pure disciplines.

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), the emergence of a dominant theoretical framework that explains online learning effectiveness has yet to occur (Larreamendy-Joerns & Leinhardt, 2006). One framework that has attracted increasing attention during the last decade is the Community of Inquiry (CoI) framework developed by Garrison, Anderson and Archer (2000). Google Scholar shows that Garrison et al.'s initial article describing the framework has been cited in other works at least 518 times as of February 2009, making it by far the most cited article from the journal *The Internet and Higher Education*. However, although the CoI framework is now somewhat familiar among education scholars (De Smet, Van Keer, & Valcke, 2008; Han & Hill, 2007; Schrire, 2006; Shea, 2006; Ho & Swan, 2007), studies that examine the framework's generalizability to online learning in other disciplines still is somewhat limited. A rapidly emerging stream of empirical research on the CoI model (Arbaugh, 2008; Shea & Bidjerano, 2009) suggests that its elements are distinct, measureable constructs, addressing Garrison and Arbaugh's (2007) recent call for this stream of research to move from early exploratory and descriptive studies toward rigorous empirical analysis. To date, however, these empirical studies have not examined disciplinary impacts on the CoI. Also, the CoI framework only considers course conduct and participant behaviors, whereas recent research suggests that characteristics such as the course management system, academic discipline, and course design and pedagogy also may be significant predictors of course outcomes in online and blended learning (Alavi, Marakas, & Yoo, 2002; Arbaugh, 2005b; Arbaugh & Rau, 2007; Cao, Crews, Lin, Burgoon, & Nunnamaker, 2008; Hansen, 2008; Johnson, Hornik, & Salas, 2008; Webb, Gill, & Poe, 2005). For these reasons, examining the dimensions of the Community of Inquiry (CoI) framework in multi-disciplinary, multi-institution, graduate course-level research settings appears to be warranted.

This article's other focus is to examine subject matter effects in online learning and education. Somewhat surprisingly, research on this topic is just beginning to receive empirical attention (Arbaugh, 2005a, Arbaugh & Rau, 2007; Hornik, Sanders, Li, Moskal, & Dziuban, 2008; Smith, Heindel, & Torres-Ayala, 2008). Even conceptual models of online learning tend to address content issues only in generalities based upon technological approaches to content delivery (Anderson, 2003; Benbunan-Fich, 2002), the development and flexibility of content (Rungtusanatham, Ellram, Siferd, & Salik, 2004), or the extent to which content is able to generate participant interaction (Brandon & Hollingshead, 1999; Garrison et al., 2000; Roblyer & Wiencke, 2004). This lack of attention to subject matter effects can be attributed in part to the methodological approaches used in online learning research. Historically, empirical research in online education has relied extensively upon single-course or single-discipline studies (Berger, 1999; Brower, 2003; Ellram & Easton, 1999; Piccoli, Ahmad, & Ives, 2001). Studies that have considered multiple disciplines either have incorporated them as part of the background while examining

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1096-7516/$ – see front matter © 2009 Elsevier Inc. All rights reserved.
doi:10.1016/j.iheduc.2009.10.006

other characteristics (Coppola, Hiltz, & Rotter, 2002; Shea, 2006), or have argued that process-based approaches could be used to apply similar teaching methods across dissimilar course content (Helmi, Haynes, & Maun, 2000).

This article examines the extent to which perceptions of social, teaching, and cognitive presences vary across disciplines. After a brief review of the literatures on the Community of Inquiry and disciplinary effects in online education, we propose discipline-related differences in student perceptions of CoI elements. We then report the preliminary results of studies of subject matter effects on perceptions of the CoI presences from two American institutions.

2. Theoretical frameworks and literature review

2.1. The Community of Inquiry framework

It is important that multiple learning domains are a foundation in a model explicating online teaching practice and student learning. One model with such an orientation is the Community of Inquiry (CoI) framework developed by Garrison et al. (2000). Lipman's (1991) initial work on communities of inquiry is a central foundation of the CoI model, and key to the integration of online and mobile learning. According to Lipman, engagement that supports learning is critical, creative and caring. All three of these criteria must co-exist with the facilitation process of letting the argument lead in order for engagement to emerge. In demonstrating care for the discussion process, the dialogue becomes critical and creative. Whatever delivery mode, whatever context, and for any content, these premises hold. The CoI framework provides a process-oriented, comprehensive theoretical model that can inform both research in online learning and the practice of online instruction. It assumes that effective online learning requires the development of a community (MacDonald & Thompson, 2005; Rovai, 2002; Shea, 2006) supporting meaningful inquiry and deep learning along all three domains.

The model views community as something that emerges in support of online learning. It emerges in the relationship between three elements: social presence, teaching presence and cognitive presence. *Social presence* is defined as the degree to which learners feel socially and emotionally connected with others in an online environment; *cognitive presence* describes the extent to which learners are able to construct and confirm meaning through sustained reflection and discourse. The central organizing element is *teaching presence*: the design, facilitation, and, most importantly the direction of cognitive and social processes for the realization of personally meaningful and educationally worthwhile learning outcomes. The CoI framework provides a process-oriented, comprehensive theoretical model that can inform both research in online learning and the practice of online instruction. Each of these elements has multiple components that are described in further detail below.

2.1.1. Social presence

The categories of social presence are affective expression, open communication and group cohesion. Affective expression specifically refers to mechanisms for injecting emotion into the environment in lieu of visual or oral cues, such as emoticons or parenthetical metalinguistic cues such as “hmmm” or “yuk” (Gunawardena, 1995; Hiltz, 1994; Walther, 1992). Of the three types of presence in the CoI framework, the role of social presence in educational settings has been the most extensively studied, both in online and face-to-face course settings (Gunawardena & Zittle, 1997; Richardson & Swan, 2003; Rourke, Anderson, Garrison, & Archer, 2001; Walther, 1992).

2.1.2. Teaching presence

Anderson, Rourke, Garrison, & 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. Although recent empirical research debates whether teaching presence has two (Shea, 2006) or three (Arbaugh & Hwang, 2006) sub elements, the general conceptualization of this CoI element has been supported by subsequent research (Coppola et al., 2002; LaPointe & Gunawardena, 2004; Stein, Wanstreet, Calvin, Overtoom, & Wheaton, 2005).

2.1.3. Cognitive presence

Garrison, Anderson, and Archer (2001) argued that cognitive presence in online learning is developed as the result of a four phase process. These phases are: (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; and finally (4) resolution, where learners apply the newly gained knowledge to educational contexts or workplace settings. Garrison et al. (2001) proposed that participant interactions primarily reside in the first two phases and that moving beyond the exploration phase typically requires enhanced teaching presence to probe and diagnose ideas so that learners will move to higher level thinking in developing their ideas (Pisutova-Gerber & Malovicova, 2009; Schrire, 2006). Of the three CoI elements, cognitive presence has been the least studied empirically to date (Garrison & Arbaugh, 2007). Although recent research debates whether such higher order learning can take place in virtual learning environments (Pisutova-Gerber & Malovicova, 2009; Rourke & Kanuka, 2009; Schellens & Valcke, 2006; Schrire, 2006), it is likely that much more research into the interaction of the CoI elements is needed before the question of higher order learning can be definitively resolved.

Another factor that may predict the likelihood of higher order learning is the nature and level of the course content. To date, the relationship between subject matter and the CoI remains unexamined. In the next section, we will examine the emerging literature on disciplinary effects in online learning to see how subject matter might interact with the CoI elements.

2.2. Subject matter effects in online learning

Historically, researchers and practitioners of online learning have, for the most part, tended to treat course content as a constant (Coppola et al., 2002; Hartman, Dziuban, & Moskal, 2000; Palloff & Pratt, 2001) and seek approaches to online learning effectiveness that are applicable regardless of discipline (Davis & Wong, 2007; Gorski & Caspi, 2005; Hornik et al., 2008). This practice reflects a broader omission of failing to consider the implications of disciplinary characteristics on teaching regardless of the medium (Neumann, 2001; Shulman, 1993). Assuming course content to be a constant may be problematic for several reasons. First, subject matter could be a confounding variable in the comparison studies of online vs. face-to-face courses (Sitzmann et al., 2006; Zhao et al., 2005). Since most comparison studies have focused on a single course or courses within a single discipline, it is impossible to make definitive assertions on the impact of disciplinary effects. Second, much of online learning research to date has focused on participant perceptions and behaviors rather than on course content effects. While this research has produced some useful findings, unless there is further study of the relationship between the instructor's knowledge of course content and the delivery medium (Anderson, 2003), one might conclude that as long as an instructor cultivates participant interaction, establishes a clear course structure, and engages in conduct to reduce the social distance between him/herself and his/her students, that instructor is qualified to teach anything from engineering to the liberal arts to business in an online setting (May & Short, 2003; Shea, Fredericksen, Pickett, & Pelz, 2003; Swan, 2003). Third, several authors have raised concerns about the viability of teaching more quantitatively or