



Externally-facilitated regulation scaffolding and role assignment to develop cognitive presence in asynchronous online discussions



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ABSTRACT

This paper describes a study that looked at the effects of different teaching presence approaches in communities of inquiry, and ways in which student–student online discussions with high levels of cognitive presence can be designed. Specifically, this paper proposes that high-levels of cognitive presence can be facilitated in online courses, based on the community of inquiry model, by building upon existing research in i) self-regulated learning through externally-facilitated regulation scaffolding and ii) computer-supported collaborative learning through role assignment. We conducted a quasi-experimental study in a fully-online course ($N = 82$) using six offerings of the course. After performing a quantitative content analysis of online discussion transcripts, a multilevel linear modeling analysis showed the significant positive effects of both externally-facilitated regulation scaffolding and role assignment on the level of cognitive presence. Specifically, the results showed that externally-facilitated regulation scaffolding had a higher effect on cognitive presence than extrinsically induced motivation through grades. The results showed the effectiveness of role assignment to facilitate a high-level of cognitive presence. More importantly, the results showed a significant effect of the interaction between externally-facilitated regulation scaffolding and role assignment on cognitive presence. The paper concludes with a discussion of practical and theoretical implications.

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1. Introduction

Benefits of social interaction are well-documented in educational research. With the development of (educational) technology, especially computer-mediated communication, many benefits of social interaction are demonstrated in online education such as increased sense of community (Dawson, 2008), creative potential (Dawson, Tan, & McWilliam, 2011), critical thinking (Garrison, Anderson, & Archer, 2001), and integration into learning communities (Haythornthwaite, 2002). The community of inquiry model is one of the best studied theoretical frameworks in online education. Aiming to promote the ideals of higher education (Garrison, Anderson, & Archer, 1999; Garrison & Arbaugh, 2007), the model inspired many researchers to conduct studies and produce empirical evidence about the effectiveness of the model (e.g., for development of critical thinking and problem solving skills). Most of the existing studies focused on investigating effects of different instructional strategies to promote desirable learning outcomes – referred to as cognitive presence in the community of inquiry model – through engagement in asynchronous online discussions. However, limited research is available that investigated the effects of different

instructional strategies on the knowledge construction of every individual student involved in a community of inquiry. Thus, the question arises about the equitable learning opportunities for all students in a community of inquiry (Rovai, 2007). Likewise, most of the studies emphasized the importance of leadership role of instructors and direct instruction in order to facilitate high-level learning outcomes through asynchronous online discussions (Garrison & Cleveland-Innes, 2005). While instructional involvement is important for an educational experience, research evidence shows that student–student discussions lead to deeper learning than instructor-centered discussions (Schrire, 2006). Cost effectiveness and scalability of classes is another important concern attributed to direct involvement of instructors in online discussions (Anderson & Dron, 2011).

This paper proposes that the consideration of self-regulated learning and computer-supported collaborative learning (CSCL) research can offer important insights in order to address the above concerns related to the community of inquiry model. For the self-regulated learning perspective, it is important to recognize the lack of learners' skills to self-regulate own learning (Bjork, Dunlosky, & Kornell, 2013). In particular, this study investigates the effects of *externally-facilitated regulation scaffolds* that are already shown as effective in Web-based learning (Azevedo, Moos, Greene, Winters, & Cromley, 2008). From the perspective of the CSCL research, the emerging script theory of guidance (Fischer, Kollar, Stegmann, & Wecker, 2013) indicates that student–

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student discussions can be facilitated and high-level of knowledge construction can be achieved through scripting¹ and assigning roles to students (De Wever, Keer, Schellens, & Valcke, 2010; Schellens, Keer, Wever, & Valcke, 2007). To empirically validate this proposition, the paper reports on the results of a study in which the effects of externally-facilitated regulation scaffolding and role assignments were investigated in a fully-online master's level course throughout its six consecutive offerings from 2008 to 2011.

2. Background

2.1. Community of inquiry model

Being social constructivist in nature, the community of inquiry model is concerned with higher-order learning – an ideal of higher education – through computer-mediated interaction of learners and educators (Garrison & Arbaugh, 2007; Garrison et al., 1999, 2001). According to Garrison et al. (2001, p. 7), a community of inquiry “involves (re)constructing experience and knowledge through the critical analysis of subject matter, questioning, and the challenging of assumptions (Dewey, 1959; Lipman, 2003).” An effective educational experience in such a community is facilitated through the interaction of the three cornerstones of the model: *cognitive presence*, *social presence*, and *teaching presence*. Focused on higher-order thinking rather than an individual learning outcome, cognitive presence is defined as “the extent to which the participants in any particular configuration of a community of inquiry are able to construct meaning through sustained communication (Garrison et al., 1999, p. 89)”. Cognitive presence is explained through the model of critical thinking, i.e., practical inquiry model (PIM) (Garrison et al., 1999). Similar to the work of Duffy, Dueber, and Hawley (1998), PIM distinguishes the four phases of cognitive presence (Garrison et al., 2001): i) triggering event – the initiation of a critical inquiry; ii) exploration – a move from the private world of an individual to the shared world of social exploration in critical inquiry; iii) integration – a construction of meaning based on the information shared in the exploration phase; and iv) resolution – a solution to the idea/dilemma through a direct or vicarious action. Indicators of each of the four phases of cognitive presence were identified by Garrison et al. (2001).

Social presence is a necessary antecedent of an effective educational experience in a community of inquiry (Garrison & Arbaugh, 2007; Garrison, Cleveland-Innes, & Fung, 2010). Social presence of learners is established by providing learners with opportunities to develop “the ability to project their personal characteristics into the community of inquiry, thereby presenting themselves as ‘real people’ (Garrison et al., 1999, p. 4)”. By establishing social presence, the participants of a community of inquiry create a safe environment in which they can be engaged in a practical inquiry with the members of the community. For example, Rovai (2002) showed that a strong sense of community increased cognitive learning, while a positive causal relationship between perceived measures of social and cognitive presence was empirically confirmed by Garrison et al. (2010).

2.2. Establishing and maintaining cognitive presence in online discussions

Importance of teaching presence for “establishing and sustaining an online learning environment and realizing intended learning outcomes” (Garrison et al., 2010, p. 35) is confirmed in numerous studies (Garrison, 2011; Garrison & Arbaugh, 2007; Garrison & Cleveland-Innes, 2005; McKenzie & Murphy, 2000; Meyer, 2003; Pawan, Paulus, Yalcin, & Chang, 2003; Rovai, 2007). Moreover, Garrison et al. (2010) confirmed

a causal relationship from teaching presence to both social and cognitive presence, and thus, reinforced the hypothesis that social presence is a mediating variable between teaching and cognitive presence. Consistent with this, early studies of online discussions observed that the students without explicit guidance would engage in “one-way interaction (serial monologs)” (Pawan et al., 2003, p. 135) and only exchanging commentaries without responses to peers’ posts (McKenzie & Murphy, 2000). Cognitive presence in such discussions was reported as low with the great majority of posts remaining in the triggering and exploration phases (Kanuka, 2011; Pawan et al., 2003). Thus, the inquiry process of a community would not lead to the desirable learning outcomes and higher order thinking.

Teaching presence is theorized to consist of three components (Anderson, Rourke, Garrison, & Archer, 2001): instructional design, facilitation, and direct instruction. Arbaugh and Hwang (2006) reported the result of a study that confirmed the validity of this construct and its concomitant components. The positive effect of these three dimensions for reaching higher levels of cognitive presence is reported in numerous studies (Garrison & Cleveland-Innes, 2004, 2005; Pawan et al., 2003; Rovai, 2007; Young, 2006). However, developmental factors can make it difficult for some populations of learners (e.g., undergrads vs. graduate students) to distinguish between facilitation and direct instruction (Garrison et al., 2010). For example, Shea, Sau Li, and Pickett (2006) showed that teaching presence is best described by two factors of teaching presence – instructional design and directed facilitation (a combination of facilitation and direct instruction). Integrating the findings of several studies about facilitation of cognitive presence in online discussions, Garrison and Cleveland-Innes (2005) identified instructional design (create structured and cohesive discussions) and clearly defined roles (leadership of instructors in particular) as critical.

2.3. Research questions

Our literature review revealed the following two research gaps, which motivated the formulation of our research questions. First, most of the present studies report frequency distribution of the four phases of cognitive presence for entire groups involved in the studies. Those studies were mainly done through quantitative content analysis by coding online discussion transcripts with the four phases of cognitive presence (Garrison et al., 2001; Pawan et al., 2003; Richardson & Ice, 2010). However, our research did not reveal a study, in which the effects of specific instructional strategies were analyzed for each individual student. Although group learning and problem solving is important and students can have learning benefits through so-called vicarious participation (Sutton, 2001), it is at least equally important for each individual student to be deeply involved in the knowledge construction process and highly active cognitive processing operations (Bjork et al., 2013; Schellens & Valcke, 2005). This is especially important in situations in which students are provided with the benefits of social construction, while working on personalized problems that are assessed individually.

Second, the leadership role of instructors, their high participation in discussions, and in general facilitation and instruction as critical components of teaching presence for engaging students in deep learning and high cognitive presence (Garrison & Arbaugh, 2007; Garrison & Cleveland-Innes, 2005). While effective, such an approach to facilitating discussions might not be scalable (Anderson & Dron, 2011). However, student-led discussions and student–student interactions can offer important education benefits (Johnson, 1981) as illustrated through the following findings (a) effect size of student–student interaction on achievement was found to be higher than those of student–instructor and student–content in a meta-analysis of interaction types in distance education (Bernard et al., 2009); (b) cognitive presence of students in student–student discussion threads was found to be higher than in student–instructor discussion threads (Schrire, 2006); and (c) stronger integration of students in learning communities can increase the level of student retention in classes (Tinto, 1997). Unfortunately, a recent

¹ Collaboration scripts are recognized as the key scaffolding approach in CSCL, whereby a script can be defined as “a more detailed and more explicit didactic contract between the teacher and the group of students regarding to their mode of collaboration (Dillenbourg, 2002, sec. Introduction, para. 3).”

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