Toward the development of a metacognition construct for communities of inquiry

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A R T I C L E   I N F O

A B S T R A C T

Metacognition is a required cognitive ability to achieve deep and meaningful learning that must be viewed from both an individual and social perspective. Recently, the transition from the earliest individualistic models to an acknowledgement of metacognition as socially situated and socially constructed has precipitated the study of metacognition in collaborative learning environments. This study presents the results of research to develop and validate a metacognitive construct for use in collaborative learning environments. The metacognitive construct was developed using the Community of Inquiry framework as a theoretical guide and tested by applying qualitative research techniques in previous research. It has been tested in this research by way of developing a metacognition questionnaire. The results indicate that in order to better understand the structure and dynamics of metacognition in emerging collaborative learning environments, we must go beyond individual approaches to learning and consider metacognition in terms of complementary self and co-regulation that integrates individual and shared regulation.

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1. Introduction

With the increasing emphasis on interaction and advances in technologies enabling interaction, there has been a shift from individual approaches to more collaborative approaches to learning. Collaboration and community building have recently flourished as theoretical constructs for online learning due to increasing evidence of their effect on learning and satisfaction (Garrison, 2011; Kim, 2011; Palloff & Pratt, 2005; Rovai, 2002). In addition, metacognitive researchers have also emphasized sharing cognitive experiences and collaboration. As Larkin (2009) indicates, there is a movement in metacognition theory that is beginning to see a transition from the earliest individualistic models to an acknowledgement of metacognition as socially situated and socially constructed. While the historical definitions of metacognition emphasize "self" and "individual", Iiskala, Vauras, Lehtinen, and Salonen (2011) suggest that in order to adapt to this transition to socially situated cognition, metacognition could be described as the product of interaction between an individual or among individuals and a surrounding context, rather than seeing it as merely an individual process.

The activation and development of metacognition is dependent upon cognitively and motivationally engaged learners. Lajoie and Lu (2012) state that a "key mechanism in improving metacognition or self-regulation is the ability to observe and listen to other perspectives"

(p. 46). In social metacognition as described by Chiu and Kuo (2009), group members monitor and control one another's knowledge, emotions and actions; they agree or disagree with each other's ideas and influence each other's actions through questioning or commands. The premise here is that sharing and collaboration are important activities to develop and sustain metacognition (Brown, 1987; Larkin, 2009; Schraw, 2001; Wade & Fauske, 2004; White, Frederiksen, & Collins, 2009). This position leads us to the conclusion that we need a conceptual and analytical framework to develop a metacognitive construct consistent with a collaborative learning environment. Similarly, the challenge with social models of self-regulated learning (SRL), as indicated by Hadwin and Oshige (2011), is that "there is great diversity in where social is positioned in the [SRL] model" (p. 242). Therefore, there remain significant questions about the constructs and dynamics of metacognition in online learning contexts.

The purpose of this research is to focus on the cognitive/metacognitive tradition of self-regulated learning and provide an integrative perspective that is consistent with the emergence of interactive and collaborative forms of learning. This is consistent with the larger goal of the field to provide "an inclusive definition of self-regulation of learning" (Zimmerman & Schunk, 2011, p. 4). However, our approach to integration is to subsume regulatory functions within the construct of metacognition. While the traditional hierarchy is to see self-regulation of learning as the overarching construct, this does raise issues in the context of collaborative learning environments. Viewing regulatory functions within the metacognitive construct is not inconsistent with the inclusivity goals of the SRL field. Moreover, it has the potential to accommodate metacognitive processes that may or may not include self-regulation (see Winne, 2011) that becomes an increasing reality in collaborative

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learning environments. These issues will be explored in the Discussion section of this paper.

The present study is the second stage of a research project conducted by Akyol and Garrison (2011) exploring the development and validation of a metacognitive construct for use in a collaborative online learning environment. Using the Community of Inquiry (CoI) theoretical framework (Garrison, 2011; Garrison, Anderson, & Archer, 2000) to interpret metacognition in online collaborative inquiries, Akyol and Garrison (2011) developed a metacognitive construct (derivative of existing literature on metacognition) consisting of three interdependent dimensions: knowledge, monitoring and regulation of cognition. It was hypothesized that this metacognitive construct represents the knowledge and skills needed to monitor and regulate cognitive processes of both self and others. In the initial study, Akyol and Garrison (2011) tested the metacognitive construct and verified indicators for each of the dimensions qualitatively.

This paper describes the second stage in the development of a metacognition construct and survey instrument to measure metacognition in collaborative communities of inquiry.

2. Theoretical framework

Online and blended approaches to learning with their interaction record provide enormous possibilities to both enhance collaborative learning and study metacognitive processes and support. There is growing evidence that students with metacognitive skills stay focused and can better assess the legitimacy of online information (Weigel, Straughn, & Gardner, 2010). Researchers are exploring strategies to support metacognition and ultimately learning in these environments such as peer questioning and scaffolding strategies to facilitate metacognition during online discussions (Choi, Land, & Turgeon, 2005). For example, the study of Chen, Chiu and Wang (2012) provided evidence that social metacognition supports the creation of correct, new ideas in online mathematics discussion.

It is essential during the inquiry process for the individual to make judgments about his/her own learning progress and how the group can facilitate cognitive awareness and development. This has become a central issue in collaborative online and blended learning designs and raises the question about the nature of the learning community that supports and sustains metacognitive development. The literature provides several frameworks and models for developing learning communities. The Community of Inquiry (CoI) theoretical framework was selected specifically as a theoretical base for this research project for the following reasons: (i) its ability to describe the inquiry process to achieve deep and meaningful learning, and (ii) its emphasis on both the personal (reflective) and shared (collaborative) worlds of experience. In comparison to other models, the practical inquiry process described by the CoI theoretical framework was found to be the most relevant to capture the knowledge building process in an online environment (Schrire, 2004; Buraphadeja & Dawson, 2008; Oriogun, 2009). Jezegou (2010) also noted that the CoI framework is the most advanced e-learning model to date.

The CoI theoretical framework represents a process of creating a deep and meaningful (collaborative–constructivist) learning experience through the development of three interdependent elements — social presence, cognitive presence and teaching presence (Garrison, 2011). It provides the context to conceptually and operationally define cognition and metacognition. Cognition is operationalized through the CoI's Practical Inquiry model (cognitive presence) and its four phases of cognitive inquiry (triggering event, exploration, integration, resolution). The metacognition construct is crucial to the development of the CoI framework. Metacognition in a community of inquiry is seen to mediate between internal knowledge construction and collaborative learning activities (Akyol & Garrison, 2011). According to Akyol and Garrison (2011), the essence of the metacognitive construct takes place at the intersection of the cognitive (inquiry process) and teaching presences (metacognitive awareness) elements while social presence creates the affective environment for the emergence of socially shared cognition. These elements are essential to understand and assess the metacognitive knowledge and regulatory skills of learners in a community of inquiry. Moreover, as White et al. (2009) indicate, developing the various types of metacognitive knowledge and skills is critical for one to become an effective inquirer since the inquiry process is associated with a regulatory process that monitors how well the process is being carried out and whether another process needs to be invoked to deal with arising issues.

3. The CoI and self-regulation of learning

In a recent article the question was asked "whether the CoI model [sic] adequately explains effective learner behavior" (p. 1) and then suggested that a new concept, "learning presence" that reflects self-regulation behaviors, would enhance the CoI framework (Shea et al., 2012). This needs to be addressed from the perspective of co-regulation and maintaining the integrity of the CoI framework. Considering the theoretical premise of a collaborative community of learners, it is difficult to understand the rationale for creating a construct that does not explicitly recognize the importance of co-regulation or reflect the collaborative nature of a community of inquiry. We argue that this proposed "enhancement" is without commensurate theoretical considerations of the CoI framework (violates fundamental assumptions of the CoI framework) and it also fails to move us forward with regard to the inherent co-regulated environment of an educational community of inquiry. It is the intersection of cognitive, teaching and social presences that manifests roles and responsibilities associated with metacognition operationalized through the constructs of self and co-regulation for all participants.

In the CoI framework, learners do not learn in isolation and participants are not solely responsible for their own learning. Therefore, we must move beyond self-regulated student behavior in a socially shared learning environment. The basic issue is that we must consider the dynamic relationship of self and co-regulation of learning concurrently. This is the strength of the metacognitive construct offered here. Moreover, this is consistent with the CoI framework and collaborative–constructivist approaches to learning. A key feature of the CoI framework is the integration of personal and shared cognitive and teaching presences. Regulation is central to both cognitive and teaching presences. All participants are both learners and teachers. That is, each participant not only has the responsibility to construct personal meaning but assume the role and responsibility to facilitate and direct that process individually and collaboratively (i.e., teaching presence). Without these co-responsibilities we simply do not have a community of learners. Only when we integrate cognitive and teaching presence do we fully appreciate and realize the importance of both self and co-regulation. As such, metacognition is both an individual and a social process. Therefore, from a metacognitive perspective it would be a mistake to focus exclusively on self-regulation. More importantly, it would violate the basic premise of the CoI framework.

4. Metacognitive construct

The three dimensions of the metacognitive construct developed in the first phase of this research project were: 1) *knowledge of cognition* (KC) as an entering metacognitive state that reflects knowledge and motivation associated with the inquiry process; 2) *monitoring of cognition* (MC) as reflection on action and associated with assessing the learning process (this includes assessing progression and effort with regard to goals and expectations); and, 3) *regulation of cognition* (RC) as the enactment and control of the learning process (reflection in action) which requires employment of strategies to achieve meaningful learning outcomes. *Knowledge* of cognition represents personal resources that the individual brings to the learning community; therefore,