Assessing metacognition in an online community of inquiry

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ABSTRACT
Metacognition is an important aspect of human intelligence and higher learning. There is the recognition that metacognition is not just a private internal activity but also socially situated. In this context, the purpose of this research is to develop and validate a metacognitive construct that provides the opportunity to assess metacognition in online discussions. Furthermore, the Community of Inquiry (CoI) theoretical framework provided the conceptual coherence to construct, operationalize and interpret metacognition in an online collaborative inquiry. The results provided evidence of metacognition indicators in student discussion postings and the frequency of these indicators increased over time.

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1. Introduction

The search for meaning is at the core of any educational enterprise. In higher education this process requires high levels of critical thinking and inquiry. Critical thinking and inquiry is predicated upon an awareness and ability for learners to take responsibility and control to construct meaning and confirm knowledge. This awareness and ability has been labeled metacognition. According to Tobias and Everson (2009), metacognition is “a higher-order, executive process that monitors and coordinates other cognitive processes engaged during learning, such as recall, rehearsal, or problem solving” (p.108). Research into metacognition over the last 30 years does suggest that learners with metacognitive awareness and ability are more successful in academic settings (Stewart, Cooper, & Moulding, 2007). In summarizing this research, Young and Fry (2008) state: it “appears that when metacognition is assessed through calibration of performance measures there is support for the relationship between metacognitive skills and measures of academic achievement” (p. 4).

While considerable metacognitive research has been conducted in traditional learning environments, the same cannot be said of understanding metacognition in asynchronous online learning environments. The importance of understanding metacognition in text-based online learning contexts becomes apparent when considering the increased responsibility for self-regulation. As such, it has been argued that participation in deep levels of discussion in online discussion forums require metacognitive strategies (Topçu & Ubuз, 2008). Notwithstanding the apparent need for metacognition in online learning, it has also been noted that research into metacognition has been constrained by “a lack of reliable instruments, frameworks or models for use in the identification or promotion of MC [metacognition] in the context of … online discussions …” (Murphy, 2008, p. 11).

While there has been a paucity of research and instrumentation associated with studying metacognition in online learning contexts, there is a theoretical framework with an associated cognitive model that is widely accepted to guide the research and practice of online and blended learning experience; this is the Community of Inquiry (CoI) framework (Garrison & Anderson, 2003; Garrison & Vaughan, 2008). Considerable work has been done to validate this framework (Arbaugh et al., 2008; Ice et al., 2007) and it provides a model of cognition that operationalizes inquiry with the potential to contextualize and understand metacognition in an online learning environment. Considering the acceptance and use of the CoI framework, it is argued here that this theoretical framework and cognitive model is the best choice upon which to develop and validate a metacognitive construct associated with online communities of inquiry.

With this in mind, the purpose of this study is to develop and validate a metacognitive construct grounded in the educational psychology literature and that reflects the learning process specifically in an online community of inquiry. The dimensions of the metacognitive construct and respective indicators used here were adapted from the CoI theoretical framework. Using this construct, our goal is to explicate how students demonstrate metacognition during discourse in an online learning environment.

2. Literature review

Metacognition is an important aspect of human intelligence and higher learning and has been closely linked to critical thinking. Critical thinking is considered to be thinking about thinking and “more
metacognitive than cognitive" (Sharma & Hannafin, 2004, p. 182). Critical thinking is also seen to be an inherent element of inquiry. It is hard to imagine engaging in an inquiry approach to learning without the need to exercise critical thinking in the form of metacognitive knowledge and skills (White, Frederiksen, & Collins, 2009). Lipman (1991) states that “All inquiry is self-critical practice ...” (p.229). In this regard, Lipman (1991) suggests that for metacognition to be inquiry-based it must be critical or self-corrective thinking (p. 121).

Further, Martinez (2006) considers critical thinking as one category of metacognition. According to Martinez, “critical thinking is evaluating ideas for their quality, especially judging whether or not they make sense” (p. 697), and this evaluation process itself reflects metacognition. Metacognition must, therefore, go beyond simply thinking about thinking and awareness. Inquiry-based metacognition must include self-corrective strategies which make it an essential element of critical thinking and higher learning.

2.1. The metacognitive construct

Conceptualization of metacognition is typically comprised of two dimensions (Flavell, 1987, Garrison, 2003; Hacker, 1998; Murphy, 2008; Paris & Winograd, 1990; Schraw, 2001). In this view, “metacognition consists of knowledge and regulatory skills that are used to control one’s cognition” (Schraw, 2001, p. 6). However, others have more recently suggested that there are three essential dimensions: knowledge of processes, cognitive and affective states; the ability to monitor the inquiry process; and the willingness to regulate the inquiry process (Borkowski, Chan, & Muthukrishna, 2000; Pintrich, Wolters, & Baxter, 2000). As such, metacognition is intended to provide the knowledge, awareness and strategies to critically assess the learning process.

Pintrich et al. (2000) assess metacognition in three dimensions: metacognitive knowledge, metacognitive monitoring, and self-regulation. In their model, the authors make a distinction between metacognitive and metacognitive awareness which are used synonymously in some models. According to the authors, metacognitive knowledge is more static and similar to other kinds of knowledge in long-term memory. They believe that metacognitive awareness connotes a more “online”, “in the moment” or “conscious experience” and should be considered an aspect of metacognitive monitoring and judgment. A more online measure of metacognitive monitoring would involve students’ judgments of their learning. Unlike the static nature of metacognitive knowledge, metacognitive judgments and monitoring are more process related and reflect metacognitive awareness and ongoing metacognitive activities individuals may engage in as they perform a task.

Recognizing the importance of distinguishing between static and dynamic aspects of metacognition, heretofore the structure of metacognition in an online community is described as constituting of three interdependent dimensions – knowledge of cognition, monitoring of cognition, and regulation of cognition (see Fig. 1). Knowledge of cognition (KC) is considered a pre-task metacognitive state. KC includes knowledge about cognition, cognitive strategies, and tasks as well as affective states such as motivation and self-efficacy. Monitoring of cognition (MC) is reflection on action. Monitoring is reflectively assessing task, understanding, and progress of the inquiry process. It represents awareness of factual (task, content), procedural (inquiry process) and conditional knowledge (strategies). Regulation of cognition (RC) is reflection in action. Regulation represents the controlling strategies of setting goals, questioning, and evaluating the inquiry process. The regulation dimension is the enactment and control of the inquiry process through the employment of strategies to achieve meaningful learning outcomes. Although it is possible to distinguish between monitoring that involves activities for assessing understanding and regulating that involves activities and strategies to change cognition or behavior in line with goals and task demands (Pintrich et al., 2000), they are inseparable in practice as learners move imperceptibly between the reflective and experiential world. Metacognition in a community of inquiry is a collaborative process where internal and external conditions are being constantly assessed.

As Larkin (2009) indicates, there is now an increasing recognition of the early individualistic developmental and cognitive models to acknowledge metacognition as socially situated. Building on this recognition, the metacognitive construct presented in this article is constructed within an online learning community. Therefore, the activities of each dimension are not only reflecting individual metacognition but also one’s awareness (external manifestations) and shared regulation of others’ metacognition. Considering all these aspects, metacognition in an online learning community is defined as the set of higher knowledge and skills to monitor and regulate manifest cognitive processes of self and others. Also, it is generally accepted that motivation initiates, directs and maintains the activities controlling learning. However, as Tobias and Everson (2009) indicate, motivation can affect learning only by engaging the metacognitive processes. In line with this, the metacognitive construct developed here encompasses motivational states as an attribution of metacognitive processes. The three dimensions of metacognition are described in greater detail next.

2.1.1. Knowledge of cognition

Knowledge of cognition refers to awareness of self as a learner in a broad sense. Knowledge includes entering knowledge and motivation associated with the inquiry process, academic discipline, and expectancies. It covers the knowledge and skills concerning one’s cognitive processes. In this regard, KC is considered a more general aspect of metacognition observed anytime, whereas MC and RC are observed during the learning process. Notwithstanding that KC will evolve during the learning experience, the important characteristic of KC is that it represents the pre-task metacognitive state. On the other hand, the other two dimensions are more reflective and activity-based metacognitive states. Examples of KC are students’ assessment of how they learn best, what they know or do not know about the subject matter, or how they feel with regard to the task or their ability.

2.1.2. Monitoring of cognition

The reflective dimension of metacognition is the awareness of the thinking and learning process. This is conceptualized as the monitoring dimension of metacognition. The monitoring dimension specifically includes the awareness and willingness to reflect upon the learning process. Assessment of task, understanding progression and effort required is an important monitoring function. In practical terms, monitoring is facilitated by knowledge of practical inquiry (see next section) and clear expectations of the learning tasks. Taking responsibility for teaching presence enables students to reflect on each other’s contributions and their contribution to the developmental progress toward the intended goals while they are engaged in discourse.

2.1.3. Regulation of cognition

The regulation dimension of metacognition is on the action dimension of the learning experience. It is the enactment and control of the learning process through the employment of strategies to achieve meaningful learning outcomes. In an educational environment, successful regulation is greatly enhanced when students are provided control with facilitative modeling of metacognitive strategies. Metacognitive regulation of learning is a collaborative process where internal and external conditions are being constantly assessed. Regulation of cognition is the interactive aspect of metacognition. Students are engaged in asking for help or suggesting help to others to reciprocally enhance the learning experience and the realization of intended outcomes.

Metacognition is operationalized from an inquiry process in the next section. For this task, the focus is on cognitive and teaching
presence as defined by the Community of Inquiry theoretical framework. Consistent with the previous discussion, the premise here is that there is a strong need to understand the role of metacognition in a constructivist online learning community.

3. Metacognition and the community of inquiry framework

Metacognitive researchers emphasize the importance of sharing cognitive experiences (Schraw, 2001; Wade & Fauske, 2004; White et al., 2009). There is the recognition that metacognition is not just a private internal activity. Flavell (1987) notes that metacognition is congruent with wanting or needing “to communicate, explain, and justify” one’s thinking to self and others; and “these activities clearly require metacognition” (p. 27). Brown (1987) also believes that metacognition includes the ability to communicate and discuss an idea. Similarly, Larkin (2009) states that metacognition is seen as facilitated through collaborative tasks and talk.

Therefore, metacognition is seen to mediate between internal knowledge construction and collaborative learning activities. Discourse is necessary to reveal knowledge, misconceptions and learning strategies. Discourse critically reveals and collaboratively supports the development of metacognitive knowledge and strategies. As students find that their peers have different interpretations, they are forced to confront alternative perspectives and understandings and to negotiate personal understandings in collaboration with others (Wade & Fauske, 2004). Also, seeking help or using other forms of instructional support when a learning impasse occurs in a learning community is useful behavioral indices of metacognition because they suggest students' recognition that their learning is in need of repair (Tobias & Everson, 2009). In this regard, a community of inquiry provides the framework for collaborative constructivistic approaches that support and sustain discourse with the potential to contextualize metacognition in an online learning environment.

The Community of Inquiry theoretical framework (see Fig. 2) was developed in the context of the literature on teaching and learning in higher education and “is becoming increasingly influential for explaining and prescribing the effective conduct of online learning” (Arbaugh et al., 2008, p. 133). The framework consists of three dynamic interdependent elements. The first element is social presence which describes the learning climate through open communication, cohesion and inter-personal relationships. The second element and of central importance here, is cognitive presence. Cognitive presence is defined in terms of four phases of the Practical Inquiry model — triggering event, exploration, integration and resolution. This conceptualization is consistent with a collaborative constructivist educational experience. The third element is teaching presence and key to creating and sustaining social and cognitive presence and a community of inquiry. Teaching presence is defined by design, facilitation and instructional direction responsibilities.

The CoI framework provides the conceptual coherence to guide and interpret metacognitive research within an online community of...
inquiry. It provides a model of inquiry that can provide the means to operationalize and assess metacognition within an online learning community. More specifically, we find the essence of the metacognitive construct at the intersection of the cognitive and teaching presence elements. These elements are essential to better understand and assess metacognitive knowledge and skills of learners in an online community of inquiry. Cognitive presence represents the cycle and the structure of the inquiry process, while teaching presence is essential to describe the regulatory roles and responsibilities of an online student in a community of inquiry.

3.1. Cognitive presence

Cognitive presence is reflective of a collaborative constructivist perspective. At a structural level, practical inquiry is defined by the deliberation–action and perception–conception dimensions (see Fig. 3). That is, it is defined in terms of the iterative process of reflection and discourse and analysis (insight) and synthesis (understanding) as learners work their way through the phases of inquiry. Interestingly, the dimension of reflection and action parallels the structure of metacognition in terms of its dimensions of monitoring and regulation as described previously. Metacognition mediates between reflection and action. The essence of the educational experience occurs at the interface of reflection and discourse. An educational experience, however, is not abstractly bifurcated in terms of internal awareness and external strategic action — they are one in a true educational experience.

Within this structure, the four phases of inquiry are operationalized. The first phase is the triggering event where an issue or problem is identified and defined. The second phase, exploration, is a process where learners explore individually and collaboratively information and ideas that might provide insight into the particular problem. The third phase, integration, is where learners construct meaning from ideas generated and share these within the community. The fourth phase, resolution, is where learners collaboratively confirm solutions to the dilemma or problem posed. It is through this process we see learners constructing meaning from a collaborative educational experience. For students to become metacognitively aware they must understand the inquiry process. Awareness of these phases of inquiry can be extremely useful in selecting specific learning strategies.

3.2. Teaching presence

The responsibilities of teaching in any context are multi-faceted. In a community of inquiry these responsibilities are shared among all the participants. The activities in the design and organization category of teaching presence include building curriculum materials, re-purposing materials and designing and administering group and individual learning activities. Facilitating discourse is critical to maintaining interest, motivation and engagement. It enables and encourages the construction of personal meaning as well as shaping and confirming mutual understanding. Direct instruction goes beyond that of a facilitating role by providing scholarly leadership and sharing timely subject matter knowledge with participants. The activities pertaining to metacognition are the activities of facilitating discourse and providing direct instruction. These activities very much overlap with regulation of cognition. In a recent study in a community of inquiry context, student facilitation of online discussions was found to be valuable in terms of metacognition and enhancing understanding by students (Akyol & Garrison, 2009). One student stated that s/he enjoyed having a chance to facilitate the discussions, found it good in terms of her/his own metacognition, and in terms of providing better understanding.

It is more than interesting to note the commonality between the dimensions of teaching presence and those of metacognition in terms of knowledge, monitoring and regulation. Each of the categories of teaching presence reflects knowledge of the subject. While this may initially be under the purview of the instructor, all members of the community have the opportunity to contribute to shared understanding and completion of tasks. Teaching presence is not solely the description of teacher’s activities; it emphasizes distributing the responsibilities and roles of a teacher among participants (Anderson, Rourke, Garrison, & Archer, 2001). The responsibilities and roles of teaching presence map directly onto metacognition processes. That is, each participant in a community of inquiry is expected to assume teaching presence responsibilities and those responsibilities include contributing knowledge, monitoring the inquiry process and actively regulating the progress of the inquiry. It is through the teaching presence construct that participants become metacognitively aware and assume the
regulatory responsibilities for successfully completing the inquiry process.

4. Methodology

The literature on metacognition research raises important questions and issues about the validity of the different constructs and instruments measuring dimensions and processes of metacognition. Pintrich et al. (2000) indicate that there is no perfect measure of metacognition. Tobias and Everson (2009) discuss the two principal ways used to study metacognition — observing students’ performance on cognitively complex tasks and using self-report inventories. Tobias and Everson question the assumptions underlying these approaches that students are aware of the metacognitive processes used during learning or introspective judgments are accurate reflections of what goes on in students’ heads as they learn.

The purpose of this study was to develop and test a construct to assess metacognition in an online learning context when the only medium was text-based discussion boards. Within an iterative process, the metacognitive construct and the indicators for each dimension were developed. Initial behavioral indices were first developed utilizing the previous research results and considering the dynamics of an online community of inquiry. After careful readings of the transcripts of online discussions from an exploratory perspective, additional indices were added. Final indices were arrived at by consensus after deliberate discussions on the initial coding process.

The context of this research was an online graduate course on the topic of “Blended Learning.” There were 16 students enrolled in the course. The course was designed and developed applying the strategies identified by the CoI theoretical framework to develop social, teaching and cognitive presence. For example, in order to develop effective teaching presence, students shared the roles and responsibilities of the course instructor by leading the online discussions. There were nine weeks of online discussions, a final course redesign project, and article reviews comprised the final grades of the students. The first, fifth and ninth week of online discussion were chosen to assess metacognition in an online community of inquiry. This also enabled the researchers to observe possible changes in metacognition over time.

Transcript analysis was applied using the indicators developed for each dimension of the metacognitive construct described previously. In line with the purpose to assess students’ metacognitive presence in online discussions, the instructor’s messages were excluded from the first week of discussion as this discussion was facilitated by the course instructor. The total number of messages for each week was respectively, 53, 82 and 76. Metacognition was coded for knowledge, monitoring and regulation of cognition. The unit of analysis was each single message and each message was coded for all three dimensions of metacognition. The discussions were coded by one researcher and checked and verified by the second researcher to ensure the codings are representing the metacognitive indices thoroughly.

5. Results

The analysis explored indications of metacognition in discussion postings of the students. The table below indicates the percentages of each metacognitive dimension found in the messages for each of the three sampled weeks of discussion. The percentages were calculated by dividing the total number of messages by the total number of messages that included the particular dimension of metacognition. The least amount of metacognitive activity was observed as knowledge of cognition while both monitoring and regulation of cognition were high. Also, the table indicates a decrease on knowledge of cognition while there is a steady increase of regulation of cognition over time.

As shown in Table 1, most of the messages included one or more dimensions of metacognition (not surprising since they are interdependent). It is also important to note that monitoring of cognition and regulation of cognition were observed together sequentially in most of the messages. One clear example of this is: “I am not certain why this is true a priori. Would you mind giving me an example of what you mean here?” The following sentences are some coding examples for each of the dimensions of metacognition.

Knowledge of cognition:

…Based on a combination of my past reading and experience, I define …

…I’m also thinking of all the weekend workshops I have done and how much more I would have taken away from the experience if I was able to tune in before the face-to-face component, or continue my learning journey in a more formalized way afterwards.

…I remember in my first year teaching online …. It highlighted for me the importance of engaging activities. Requiring interaction through frequent responses, discussions and even leading a part of the class became routine ways for me to ensure students were engaged throughout the course.

….In case we were provided with an agenda and moved through the topics quickly. Any time you felt yourself being tempted o multi task you were quickly drawn in…. 

…I found the sessions where we are required to be more participatory to be the better quality learning experiences for me personally.

….What I found that works for me is offering PD that appeals to different levels of users…. 

….Looking forward to read lots about how to set up blended learning

Monitoring of cognition:

…I have understood blended learning to be a …

…I like your eloquently worded definition …

…Good points. 

….well today I have learned something about a possible disadvantage of blended learning…. 

….I think I have been able to think of an example for almost each of the models presented in the Twigg article…. 

….You make an interesting point when you observe …

….Your comments about Perry and other cultures gave me a lot of food for thought…. You made some excellent points and reminded me that we need to …. 

….I am not certain why this is true a priori. 

….I am just curious about the social processes that take place in the classroom and how they might help learning. 

…I am interested in reading from Tom’s list. 

….I’m also curious to hear about your online collaboration experiences. I’m interested to know what…. 

….I enjoyed reading your post and …

<table>
<thead>
<tr>
<th>Table 1</th>
<th>Percentages of dimensions of metacognition in online discussions.</th>
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<tbody>
<tr>
<td></td>
<td>Number of messages</td>
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<tr>
<td>Discussion Week 1</td>
<td>53</td>
</tr>
<tr>
<td>Discussion Week 5</td>
<td>82</td>
</tr>
<tr>
<td>Discussion Week 9</td>
<td>76</td>
</tr>
</tbody>
</table>
Regulation of cognition:

...Your thoughts?
...I enjoyed reading your post and really agree with the advantages you listed...
...I think I need to see more supporting research for the idea that....
...I was wondering if you could comment on your experience with Moodle... Is this a cheap version...
...One of your solution is.... Would it be feasible within....
...I agree with you completely that........
...Would you mind explaining what an "LMS" is?
...Also, I think I am going to need help in understanding how an auditory and kinesthetic learners can be helped by online approaches.
...Do you think that the lecture is significantly less successful online than it is in a classroom?
...What do you think is missing and do you think that could be addressed in the future?
...I am just curious about the social processes that take place in the classroom and how they might help learning.
...I have a couple of comments about brain research. Is there any reason why you focused your connection to this line of research to online forms of learning alone? Wouldn't this apply to classroom learning as well?

6. Discussion

Stressing the importance of metacognition in online higher learning, this study aimed to explore how students demonstrate their metacognitive knowledge and skills in an online community of inquiry. To do this, the researchers developed and validated a metacognitive construct which provided the opportunity to identify and assess metacognition in online discussions. The results provided evidence for the practical utility of the metacognitive construct to identify indicators of metacognition in online discourse.

First and foremost, it is important to note that transcript analysis indicated that students' metacognitive behaviors are observable in online learning environments. The ability to explore metacognition through written communication and the metacognitive construct developed in this study is promising and has the potential to enhance our understanding of metacognition in an online community of inquiry. The analysis yielded indicators of each dimension of the metacognitive construct in an online discussion forum. It was observed in all three discussions that were analyzed that students were aware of themselves as a learner (i.e., knowledge), they were able to monitor their thinking and learning process, and they were able to regulate their cognitive processes through the employment of strategies when needed.

Knowledge of cognition was observed least in the online discussions and decreased over time. This result is not surprising considering that knowledge of cognition is an entering metacognitive state and relatively static while monitoring and regulation are more dynamic during the inquiry process. When students adjust the inquiry process within a community of inquiry, the focus is more naturally on developing shared cognition which inherently requires more executive processes (i.e., monitoring and regulation).

The indices for the monitoring of cognition and regulation of cognition were found high at similar levels in the online discussions. As indicated earlier, these aspects of metacognition are inseparable in practice as learners move imperceptibly between the reflective and experiential world. These aspects of metacognition are interdependent and interact with each other continuously. For example, it was observed in the online discussions that when students expressed uncertainty or impasse about their learning (i.e. monitoring), they also applied a cognitive strategy such as asking for more clarification or explanation (i.e., regulation). This result could also provide indirect support for one of the key assumptions of all theories of metacognition — that knowledge (in the sense of awareness) and regulation of cognition are mutually correlated and compensatory (Schraw & Dennison, 1994). According to Cornoldi (2009), metacognitive knowledge has an impact on the selection and use of specific strategies and control processes, which in turn affect overall performance.

One of the important findings of this study is the increase in regulation of cognition over time. In other words, students became metacognitively mature through explaining, questioning, clarifying, justifying or providing strategies reciprocally within a community of inquiry. This enhancement could be attributed to the collaborative constructivist approaches associated with the Community of Inquiry theoretical framework. Kramarski and Dudaí (2009) also found that group feedback is a beneficial tool to improve metacognitive skills. In their study the students who provided and received group feedback outperformed the students who applied self-explanation strategy and the students who did not get any metacognitive support. According to the authors, this result confirms the assumption that metacognitive regulation needs feedback about strategy use. The increase on regulative activities in this research also provides support for the beneficial effect of collaboration on regulation.

At this point it is also important to emphasize the role of social presence in developing a supportive learning environment in which students feel comfortable. The study of Wade and Fauske (2004) provides a clear example for this. In their study, the participants developed an inclusive, supportive and relational stance which helped them express their agreement, acknowledge others' values, build on them, offer explanation and advice when it was asked for, and challenge various positions. In our case, all three elements of the CoI framework helped students to increase their metacognitive awareness and their ability to monitor and regulate cognition.

6.1. Self-regulation and self-efficacy

Before leaving the discussion of metacognition, it is important to briefly identify and assess other related constructs and how they relate to metacognition and the CoI theoretical framework. From this perspective, Shea and Bidjerano (2010) recently drew attention to the constructs of self-regulation and self-efficacy in an attempt to refine and enhance the CoI framework. Consistent with the collaborative nature of the CoI framework, they also referenced “co-regulation” and the degree to which students are metacognitively, motivationally and behaviorally engaged in the learning process. However, they make a conceptual leap when they “suggest that this constellation of behaviors and traits may be seen as elements of a larger construct ‘learning presence’” (p. 1723).

The justification for introducing the learning presence construct into the CoI framework is not clear. Shea and Bidjerano (2010) describe learning presence as representing “elements such as self-efficacy as well as other cognitive, behavioral, and motivational constructs supportive of online learner self-regulation” (p. 1721). They then chose to focus on self-efficacy without a clear theoretical rationale. Furthermore, they argue that “a positive relationship exists between elements of the CoI framework and between elements of a nascent theoretical construct that we label learning presence” (Shea & Bidjerano, 2010, p. 1721) and suggest “that learning presence should be associated with teaching and social presence” (p. 1727). As noted, the rationale is not clear and this raises serious doubts as to whether this enhances or challenges the integrity of the CoI framework.

Apart from the decision to focus on self-efficacy, this raises the important question as to the need to introduce another presence into the CoI framework. A major conceptual difficulty that is missed is that all participants in a community of inquiry reflect varying degrees of each of the three presences. That is, each participant assumes teaching,
cognitive and social responsibilities. In the CoI theoretical framework there are no independent teacher and learner presences; all participants assume teaching and learning roles and responsibilities to varying degrees (Garrison, 2011). Through co-regulation students assume increasing teaching presence and become more efficacious as manifested through increased metacognitive awareness and strategies. As such, it is difficult to see how a construct such as learning presence could be coherently integrated into, and manifest itself, in the dynamics of the CoI framework.

The basic premise of a CoI is that learner agency is shared. Shared agency is important for students to monitor and regulate their learning in a community of inquiry. This is consistent with the premise that metacognition includes sharing and justifying ones thinking (Schunk, 1994). Therefore, it is argued here that during the educational process, in a collaborative learning community, co-regulation and shared efficacy should be considered. As such, self-efficacy per se may be best viewed as a cause and consequence that is modified and influenced by the collaborative nature of the educational experience in a community of inquiry. This distinguishes between participants entering personal traits and the shared metacognitive processes of a collaborative educational experience. Self-efficacy becomes shared efficacy in a co-regulated environment. Efficacy is seen to be manifested through the collaborative and reflective processes of the inquiry process and the dimensions of the metacognitive construct. The metacognitive construct incorporates self-regulation and is properly placed at the intersection of teaching and cognitive presence.

In summary, a core principle of the CoI theoretical framework is that all participants (teachers and students) assume teaching and learning roles and responsibilities (Garrison, 2011). These are reflected primarily in the teaching and cognitive presence constructs. The creation of a learning presence construct would implicitly assign teaching presence to only that of the teacher. Not only is this in conflict with the metacognition construct as reflecting both teaching and cognitive presence responsibilities that all participants should assume (i.e., be your own teacher), but it would bring us immediately back to the teacher centered approach that is incongruent with the premise of a community of inquiry. In essence, the risk is to perpetuate the artificial fissure between teaching and learning and the purpose of self-regulation and self-efficacy. The creation of a fourth presence would undermine the integrity of the CoI framework and would not enhance or refine its theoretical foundation. From a process perspective, it is believed that metacognition is more congruent with the assumptions and elements of a community of inquiry and, therefore, it is argued that it has greater potential to refine and enhance the CoI theoretical framework.

7. Conclusion

This research aimed to explore metacognition in learning environments where the communication is not verbal by analyzing online discussions using the metacognitive construct developed here. The construct was tested by analyzing transcripts of online discussions when students were not given any instructions or training with regard to expressing metacognition. Therefore, while most of the indicators were observed, the analysis did not yield examples for each indication. It is anticipated that other strategies such as think-aloud or interviewing could further verify the indicators of each dimension of metacognition. In addition, the research was conducted in a specific learning context focusing on online discussions. It is suggested that future studies could use the metacognitive construct in different online learning contexts with different students and tasks to enhance the validity and reliability of the framework. As a next step, it is aimed to develop quantitative instrument to measure metacognition in an online community of inquiry. By this, it is anticipated that the possible relationships between the CoI elements and metacognitive dimensions could be explored as well as more experimental studies would be made possible. Also, the causal relationships between the dimensions of metacognition could be investigated.

While the theoretical construct of metacognition and its relationship to other associated constructs such as self-regulation and self-efficacy may be complex, the process of metacognition is simply having students think about their learning, how they approach specific tasks, and the success of their strategies. White et al. (2009) argue that to become an effective inquirer, a person must develop the various types of metacognitive knowledge and capabilities which can be gained through and promoted by education. This could be done individually and collaboratively, however, the essence of most practices to improve metacognitive skills is to engage students in collaborative activities such as peer assessments, collective reflection, and modeling metacognitive processes (Choi, Land, & Turgeon, 2005; Kramarski & Duda, 2009; White et al., 2009). Here again, it is argued that the community of inquiry approach inherently embraces all these strategies that facilitate effective inquiry and foster metacognition. The instructors or instructional designers can utilize the principles and guidelines of the CoI framework to develop an effective learning community which will enable students to be metacognitively present as well. Other strategies such as getting students to take time to reflect, invent and investigate metacognitive processes themselves or using a metacognitive tool, such as a research journal, to promote students to plan, monitor and reflect on their work could also be applied to foster metacognitive thinking and development (White et al., 2009).

Metacognition is inherent to communicating, explaining, and justifying one’s thinking. Learning in an educational context is socially situated and therefore involves community and sharing thinking. This in turn encourages the development of metacognition. Communities have an enormous advantage to support metacognition through questioning, feedback and direction. From a process perspective, we see both cognitive presence (monitoring) and teaching presence (regulating) having metacognitive responsibilities. While the individual must assume responsibility to construct meaning, this is greatly afforded by a collaborative structure that can provide multiple sources of information, sharing thinking, and the diagnosis of misconceptions. A community of inquiry provides an important function to diagnose and correct participants thinking.

References


