

Shared Metacognition in a Community of Inquiry

D. R. Garrison

University of Calgary, Canada

Abstract

The article begins with a review of the shared metacognition construct and its function within the Community of Inquiry theoretical framework. The primary focus of the shared metacognition construct is the role of learners to take responsibility and control for monitoring and managing learning in a community of inquiry. Pragmatic challenges are explored through an analysis of recent research and a discussion of implementation issues. It is emphasized that shared metacognition is shaped by the teaching presence construct (planning, facilitation, and direction instruction) and its overlap with cognitive presence operationalized by the phases of the Practical Inquiry model (problem defining, exploration, integration, and resolution). The manuscript concludes with a discussion of the potential for future research associated with shared metacognition and the use of a quantitative shared metacognition questionnaire.

Keywords: shared metacognition, community of inquiry framework, self-regulation, co-regulation, cognitive presence, teaching presence, practical inquiry, shared metacognition questionnaire

Garrison, D. R. (2022). Shared metacognition in a Community of Inquiry. *Online Learning*, 26(1), 6-18. DOI: 10.24059/olj.v26i1.3023

There is considerable research to date that supports the validity and pragmatic value of the Community of Inquiry (CoI) framework (Garrison, 2017). This includes confirmation of its constructs (social, cognitive, and teaching presences) along with the nature of the interaction among the presences. In addition, we have gained insight into how the presences evolve over time in a variety of contexts. While much is known about the CoI framework across contexts, there is one new area of research that has shown considerable insight in providing greater depth of understanding regarding the dynamics and ultimate goals of collaborative inquiry. This is the research associated with *shared metacognition* and its essential function in a community of inquiry.

The core dynamic of a CoI is critical thinking focused on constructing personal meaning and shared understanding. The cognitive presence construct operationalized through the Practical Inquiry model reflects this dynamic, and that of an effective educational experience. However, what has not been emphasized sufficiently until recently is the role of metacognition in developing the necessary awareness and regulation for responsible thinking and learning in a collaborative learning environment. Specific to a CoI, metacognition is central to cognitive presence and effective collaborative inquiry. That is, deep and meaningful learning experiences in a learning community are dependent upon the ability to monitor and manage the inquiry process.

Defining Shared Metacognition

Historically, metacognition has been strongly associated with self-regulation. However, the focus on “self” creates difficulties in a socially shared and collaborative learning environment. In this regard, there has been a recent move away from the exclusive focus on self-regulation. Instead, there is an increasing acknowledgement of metacognition as socially situated and shared (Dindar et. al., 2020). From the perspective of CoI, metacognition must be seen as arising from reflection and discourse among individuals within a shared learning environment. Clearly this dynamic is not an individual process nor is any worthwhile educational experience intended to be such. Therefore, development of metacognitive awareness and regulation in a learning community is both a personally reflective and shared collaboration.

Shared metacognition is a construct that emerged from the CoI framework. Metacognition is shared during CoI where thinking and learning is a collaborative experience. Shared metacognition demonstrates the greatest potential for understanding and developing thinking and learning in a collaborative setting. The primary reason for this is that deep and meaningful learning is best achieved through discourse and an inherent need for the ability to monitor and manage the collaborative inquiry process. From an educational and practical perspective, knowledge of shared metacognition can guide the implementation of effective facilitation techniques in the collaborative inquiry environment and realizing deep and meaningful learning outcomes. Longer term, shared metacognition is key to learning how to learn in a collaborative inquiry environment.

From a theoretical perspective, shared metacognition has considerable potential to develop a deeper understanding of the CoI framework. The essence of the CoI framework is the connectedness of the participants that stimulate insight and innovative thinking through critical discourse. The CoI framework sets the conditions for thinking and learning collaboratively. As such it shapes the learning dynamic but not in an entirely predictable or immutable manner. Inquiry provides the process for exploration and discovery in ways unanticipated in traditional

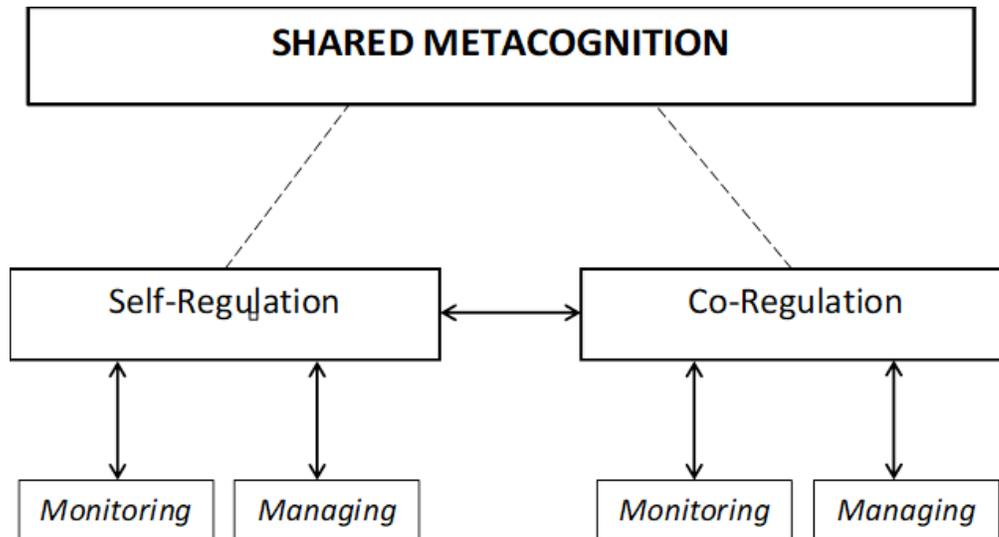
information transmission contexts. Inquiry necessitates that the participants take responsibility and control for the learning transaction. To take responsibility and control for collaborative inquiry requires an awareness and responsibility for monitoring and managing a complex shared learning dynamic. Providing insight into this shared metacognitive dynamic is the goal of shared metacognition.

The challenge in developing and understanding the benefits of the CoI framework is to search for the essential elements and dynamic constants in a collaborative learning environment. For example, we need to explore the constants of the interplay between personal reflection and shared discourse. This is the essence of collaborative inquiry that thrives in a climate of trust and curiosity and represents the interplay between cognitive and teaching presence. For shared metacognition to apply to an educational setting, it must go beyond self-direction or self-regulation. The need to go beyond the individual is what precipitated our work in developing the shared metacognition construct that is consistent with the collaborative constructivist foundational assumptions of a community of inquiry. The important premise here is that developing metacognitive awareness and ability is core to becoming an effective inquirer and essential to collaborative inquiry.

Metacognition is central to any form of learning but is essential to inquiry. A community of inquiry, however, adds an important dimension to metacognition in that monitoring and managing learning collaboratively is both a personal and shared experience. For this reason, shared metacognition is a crucial line of research in the psychology of thinking and learning in collaborative environments. The power and essence of a CoI is the connectedness of the participants, who have an enormous advantage to think critically and creatively. Innovation has the greatest opportunity to emerge from collaborative thinking experiences. We describe shared metacognition as an awareness of one's learning in the process of constructing meaning and creating understanding associated with self and others. From the perspective of the CoI framework, shared metacognition exists at the intersection of the cognitive and teaching presence constructs and goes to the heart of an educational learning experience. As such the shared metacognition construct has enormous potential to refine and expand our understanding of the core dynamic of a CoI (collaborative inquiry) and to inform both the theoretical and practical implications of learning in a collaborative environment.

Metacognition has been generally accepted as consisting of two components—awareness of the inquiry process and implementation strategies (regulation). Awareness allows the learner to monitor and actively manage or regulate the inquiry process. In short, metacognition awareness and implementation abilities provide the knowledge and strategies to monitor and manage effective inquiry. Most importantly, in a collaborative learning environment, awareness and implementation strategies are developed through critical discourse and the requirement of participants to explain and justify one's thinking to self and others. The approach to developing a viable metacognition construct for collaborative learning environments is to subsume self and shared awareness and regulatory functions within a single construct. We have defined the shared metacognition construct as reflecting the interdependent dimensions of self and co-regulation, each exhibiting a monitoring (awareness) and a managing (strategic action) function (see Figure 1).

Figure 1
Shared Metacognition Model



(Garrison & Akyol, 2015a, p. 68)

It is important to reiterate that self-regulation in isolation does not recognize the collaborative essence of a community of inquiry (Kilis & Yildirim, 2018a). Similarly, focusing exclusively on learning or learner presence violates the fundamental collaborative-constructivist principle of the CoI framework. Regulation of inquiry is both a personal and social responsibility. Self-regulated learning in a community of inquiry must be fused with a co-regulative function if there is to be effective monitoring and management of collaborative inquiry. Therefore, it is important to advocate for further research that focuses on both self and co-regulation in a community of inquiry. This research must be conducted in a truly collaborative learning environment and with a construct that reflects shared metacognition. We cannot expect to find shared metacognition in a context where learners at best engage in optional discussion forums and are judged on surface outcomes.

Metacognition means increasing awareness of the learning process and taking responsibility to manage the learning process. In the context of a community of inquiry this is a shared experience that considers the transactional environment. To explore the practical implications of shared metacognition we must focus on the intersection of cognitive and teaching presence. This begins with the crucial appreciation that teaching presence is a responsibility of all participants in a learning community. The shared metacognition construct reflects the collaborative premise and nature of a community of inquiry. As such it highlights the collaborative essence of teaching presence. While we have made progress in defining and measuring the construct of shared metacognition, we are in the infancy of describing specific and effective implementation and support for the dynamic of metacognitive awareness and regulation in a collaborative learning environment.

Implementing Shared Metacognition

As defined, shared metacognition exists primarily at the intersection of teaching and cognitive presence. More specifically, the teaching presence categories of planning, facilitation, and direct instruction overlap with the cognitive presence construct operationalized by the phases of the Practical Inquiry model (problem defining, exploration, integration, and resolution). This provides the context in which to explore pragmatic challenges concerning the monitoring and managing of the inquiry process. Zepeda et. al (2019) provided us with clues as to where we might begin focusing our implementation efforts regarding metacognitive support and conceptual development. The first insight was that “teachers are more effective when engaged in metacognitive talk than teachers in low conceptual growth classrooms” (Zepeda et al., 2019, p. 534). The idea is that cognitive talk (discourse) gets students to think about their understanding and become open to sharing their thinking. This, of course, resonates very much with the essence of CoI. The study also suggests that the process of questioning encourages learners to metacognitively think about how they are approaching the learning process.

Planning

At the outset it is crucial to appreciate that planning is a key metacognitive skill. The focus on planning brings to the fore the importance of design and organization and associated principles (Garrison, 2017; Vaughan et al., 2013):

- (1) Plan for the creation of open communication and trust.
- (2) Plan for critical reflection and discourse.
- (3) Establish community and cohesion.
- (4) Establish inquiry dynamics (purposeful inquiry).
- (5) Sustain respect and responsibility.
- (6) Sustain inquiry that moves to resolution.
- (7) Ensure assessment is congruent with intended processes and outcomes.

The second, fourth, and sixth principles reflect the need to plan for collaborative inquiry. The first, third, and fifth principles reflect social presence issues that are essential for shared metacognition engagement. That said, our focus here is on teaching presence as it relates to teaching presence responsibilities as it relates to cognitive presence (the essence of the shared metacognition construct). Regarding planning for critical reflection and discourse, it is extremely important to provide a metacognitive map of the inquiry process as defined by the cognitive presence construct (Practical Inquiry model). In this way learners become aware of and understand the dynamic of purposeful inquiry (fourth principle). This will create an important awareness of their role in the progression of their activities and tasks as well as provide greater assurance of efficiency and effectiveness in monitoring and managing the achievement of intended learning outcomes. It has been shown that awareness of this type of engagement and contribution encourages students to reflect on their thinking, explore metacognitive regulation, and encourage productive activities (Garrison, 2017). The practical advantage of shared metacognition awareness is the facilitation and direction of timely progression through the inquiry phases and achievement of intended outcomes.

An essential aspect of planning is to ensure an introduction and understanding of the process of Practical Inquiry (i.e., metacognitive awareness) as an essential predicate to implementing and supporting shared metacognition. Furthermore, this overview of inquiry should be done collaboratively to enhance and reinforce an awareness and appreciation of the

phases of inquiry. Understanding of inquiry encourages and supports the assumption of responsibility and control for the inquiry process.

Facilitation

The facilitation component of teaching presence that relates to metacognition is the responsibility for implementing and supporting of shared metacognition. The value of this is highlighted in a study of metacognition where it was suggested “that there might be benefits to conceptual learning when teachers support metacognition, particularly those supports that focus on personal knowledge, monitoring, evaluating, directive manners, and domain-general frames” (Zepeda, et al., 2019, p. 536–537). Moreover, they state that “Teachers in classrooms with high-growth scores on a conceptual learning assessment used more metacognitive talk than teachers in classrooms with low-growth scores” (p. 522). These findings support the argument that metacognitive talk (“discourse” in CoI terminology) concerning the inquiry process and task goals have enormous value, pragmatically, in understanding and promoting shared metacognition in a collaborative learning environment. This supports the conclusion that communities of inquiry have enormous opportunities to exploit shared metacognition through critical reflection and discourse.

Metacognition is dependent upon effective teaching presence to monitor and manage the inquiry process. That is, learners must assume responsibility to shape, facilitate, and direct the inquiry process. Successful learners exhibit teaching presence by taking responsibility for their and others’ progress through the inquiry cycle. Metacognitively aware learners shape the discourse by sharing information, critiquing ideas, offering solutions, and directing the inquiry process. In this regard, a study by Jansson et. al (2021) explored how students support inquiry collaboratively. The encouraging results were

... that the students supported both their own process of inquiry as well as other students’ process of inquiry. Furthermore, the results indicate that students acquired metacognitive development through self- and co-regulation when they expressed teaching presence. (p. 1)

Looking more closely at the manifestation of teaching presence the study concluded that by “answering questions, clearing up misunderstandings, and helping peers, students also supported other students’ process of inquiry ... [and] students were willing to aid other students by helping them regulate their learning by giving them direction and support” (p. 8). This is supported by another study that found feedback in discourse had a significant effect on the students’ awareness of their reflective thinking skills. Yilmaz (2020) concluded that “students can gain awareness of their behaviours during the online learning environment” (p. 910) and “that sending feedback ... had a statistically significant effect on the students’ perceptions of community of inquiry and reflective thinking skills” (p. 909).

To reiterate, shared metacognition begins with relevant, puzzling, and challenging questions manifested through discussions that precipitate reflection and strategic direction of the inquiry process. Practices that encourage shared metacognitive monitoring and management will enhance responsibility and control of the inquiry process and the effectiveness of the learning process and outcomes. More specifically, facilitating inquiry through participant-shared metacognition of the participants regularly identifying and labeling their contributions from the perspective of the phases of inquiry effectively moves discourse toward intended outcomes in a timely manner. In short, the facilitation function represents the strategic enactment and management of the inquiry process that includes setting goals, questioning ideas, considering

alternate hypotheses, and ensuring progression. Facilitating self and co-regulation of learning go to the essence of shared metacognition and the facilitation of a community of inquiry.

Direct Instruction

Direct instruction is the third category of teaching presence that needs to be explored to understand and support shared metacognition in a learning community. Direct instruction from a shared metacognitive perspective should be approached with the intent of improving collaborative inquiry competence through the awareness and management of inquiry leading to higher levels of academic achievement. Direct interventions that support effective and efficient learning experiences are predicated upon “a pedagogically experienced and knowledgeable teacher who can identify worthwhile content, organize learning activities, guide the discourse, offer additional sources of information, diagnose misconceptions, and provide conceptual order when required” (Garrison, 2017, p. 76). Directing instruction is an essential dynamic to guide learners in monitoring and managing the inquiry process. To be clear, shared metacognition must be assumed by all members of a learning community. Working symbiotically, individual and group direction will ensure the productive progression of inquiry toward purposeful learning outcomes. Not to be neglected, this includes sustaining social presence to ensure collaborative inquiry that moves to resolution.

The value of direction for metacognitive awareness and management was demonstrated in a study by Vuopala et al. (2019), where they concluded that “prompting regulation activities among students, such as task-related monitoring, teachers can support students to engage in metacognitive processes that are related to high-level knowledge co-construction” (p. 247). Moreover, regarding metacognitive training, Emory and Luo (2020) state that “Although direct instruction can be effective, cognitive modeling offers the possibility to further engage the learner, and potentially develop skills more effectively” (Implications). This also suggests that caution must be exercised in that direct instruction must always be well timed and propitious.

Direct instruction is productive when it stimulates reflection about ideas and the qualitative progression of inquiry. Deep and meaningful learning depends on diagnosing misconceptions and formative evaluation. This can mean intervention to present relevant content and regulatory arguments that provide a metacognitive perspective. At the same time, paradoxically, research has shown that too much direct instruction may seriously limit metacognitive reflection and discourse (Garrison, 2017). The point is that students must accept their responsibility to monitor and manage the inquiry process individually and collaboratively. This requires judgement where the situation may call for learner management, while at other times the discussion may need to end to achieve developmental progress. Direct instruction must encourage participants to not only collaboratively look deeper into a topic but understand shared metacognitive monitoring and management.

We need to continue to explore the positive and negative influences of direct instruction on shared metacognitive awareness and management of inquiry. It is important to make sound judgements as to what kind of direct interventions enhance metacognitive awareness and stimulate discourse that moves collaborative inquiry forward. Conversely, this includes knowing when interventions may restrict the progression of inquiry. Discretion is required to use direct intervention to encourage further reflection before providing answers that risks curtailing discourse. Teaching presence in general and especially direction must be distributed and assumed collectively. In this regard, it is important to metacognitively pause and get an overview of the inquiry process and assess if a new tactic is warranted.

Assessment

The final area associated with the practical implications of shared metacognition is assessment that helps focus and sustain collaborative inquiry. It is well known that assessment can have a significant impact on how students approach learning, especially regarding encouraging personal and shared responsibility of the inquiry process. Sustained, formative evaluation is required to address the complexity of the development of a community of inquiry. This is important from both a cognitive and social presence perspective. At the end of a course, it is often appropriate to extract key concepts, assess the inquiry process, and direct students to further learning challenges. Summative assessment can create a sense of accomplishment, offer direction for further study, and provide a record of achievement. Finally, it is only through rigorous and systematic assessment and evaluation that shared metacognition is possible to develop an understanding of the complex issues associated with judging the dynamics of an educational experience.

Shared metacognition is associated with assessment and feedback that informs individuals and the group how they could improve their approach to learning and intended outcomes. This was supported in a study that found metacognitive monitoring was significantly related to learning outcomes. Zhao and Ye (2020) concluded “that metacognitive calibration is significantly related to learning performance, which is consistent with prior literature and indicates that students with more accurate metacognitive calibration also tend to perform better on online learning tasks” (p. 447–448). The goal in a learning community is to create an environment based on authentic and constructive feedback that can inform the development of collaborative thinking and learning.

Needed Research about Shared Metacognition

The CoI theoretical framework provided the context to define socially shared metacognition as well as the means to rigorously test the construct conceptually and operationally for its structural and transactional integrity. The shared metacognition construct offers the theoretical foundation and genesis of a quantitative instrument to explore the complex transaction of a community of inquiry. This instrument has the potential for significant theoretical and practical insights into the pragmatic complexities of CoI. The shared metacognition construct has been operationalized and the resulting Shared Metacognition Questionnaire validated (Garrison & Akyol, 2015a, 2015b). Moreover, the questionnaire has been further validated through confirmatory factor analysis (Kilis & Yildirim, 2018b). This reinforces our expectation that the Shared Metacognition Questionnaire is a stable and worthwhile tool to research the dynamics of shared metacognition in collaborative learning environments that go beyond self-regulation of learning (see Appendix).

The primary research question beyond confirming the shared metacognition construct should be to study how to develop awareness and management of shared metacognition and how this awareness can be used to achieve deep learning outcomes. Vaughan & Wah (2020) pioneered this line of research and concluded that teaching presence must “intentionally design, facilitate, and direct a collaborative constructive learning environment in order for students to learn how to co-regulate their learning (shared metacognition)” (p. 1). Considering this, any number of practical research issues evolve from an awareness of shared metacognition. For example, from a teaching presence perspective we could explore the effect of shared metacognitive awareness on cognitive and social presence. All indications are that shared

metacognitive awareness expedites the inquiry process and creates an efficient and effective outcome. Similarly, regarding social presence, it is expected that metacognitive awareness enhances open communication through an understanding of the integral role of reflection and discourse. There are any number of specific examples of ideas that link shared metacognitive awareness to practical inquiry, learner characteristics, and disciplinary demands. These ideas should be explored through practical applications suggested by the shared metacognition construct.

Metacognitively, the educational challenge is how best to develop the awareness and regulatory strategies to monitor and manage inquiry in a collaborative learning environment. The primary question is how we can develop shared metacognitive awareness and regulation in a community of inquiry to enhance the inquiry process and learning outcomes. The following is an initial list of possible research questions with practical implications:

- Can shared metacognitive instructional awareness expedite the inquiry process (move through phases efficiently)?
- Can shared metacognitive instructional awareness of the inquiry process enhance the effect of the presences in a CoI?
- How does shared metacognition evolve over the duration of a course?
- Will shared metacognition awareness enhance intended learning outcomes?
- What effect will a shared metacognitive awareness have on the dynamic balance of personal and shared metacognition?

Additional areas for exploring shared metacognitive monitoring and management of a community of inquiry from a cognitive presence perspective are related to the expectations of assessment of cognitive development; organization and limitation of curriculum; selection of appropriate learning activities; provision of time for reflection; integration of small discussion groups and sessions; provision of opportunities to model and reflect upon the inquiry process; design of higher-order learning assessment rubrics.

Beyond these research questions there are any number of important issues that can provide insight into the shared metacognition construct and its practical implications. Suggestions about how to proceed with research to understand approaches to design shared metacognitive strategies can be enormously valuable. Cacciamani et. al (2021) offer suggestions in the context of a study that addresses metacognition from a pragmatic collective cognitive perspective that assesses knowledge individually and collectively. The problem addressed is “how to design instruction in the online learning environment to promote students’ collective cognitive responsibility for Knowledge Building ...” (Introduction). While they do not use the terms “shared metacognition” and “co-regulation,” they address shared metacognition by focusing on students monitoring “not only their own but also other students’ progress towards the shared goal to create new knowledge for the community” (Self-Regulation Skills). Specific design insights for successful collective cognitive responsibilities (shared metacognition) are to provide an online discussion forum for more time to reflect and promote knowledge and strategy assessment. This is more than consistent with a CoI, and an example how to design a study to better understand shared metacognition.

Shared metacognition training should be a high priority for those committed to developing our understanding of the CoI framework and designing shared metacognitive learning experiences. This must begin with an understanding of a community of inquiry and the

practical inquiry dynamic, specifically. Beyond this, Emory and Luo (2020) cautioned that “the complexities involved in metacognitive training as an intervention ... should specifically consider the timing, format, and intensity of such training ...” (Implications). That is, training should be continuous, with the community reflecting periodically on their strategies and progress. It must be kept in mind that shared metacognition goes to the essence of CoI. Therefore, considerable research to support the training and development of communities of inquiry through shared metacognition is warranted.

Finally, from the perspective of studying shared metacognition, it is important to emphasize that we have invaluable tools at the ready. The *Shared Metacognition Questionnaire* can quantitatively assess the self and co-regulation components of the construct. However, shared metacognition should be studied in the context of the larger community of inquiry. In this regard, the *Community of Inquiry Questionnaire* can be extremely useful adjunct to explore how the shared metacognition components relate to and impact CoI presences. Together, these instruments can be used to analyze the relationships of these dynamics to learning outcomes. Both instruments have been validated (Garrison, 2017). That said, it is also important not to discount gathering qualitative data to provide context in understanding the dynamics of monitoring and managing collaborative inquiry.

Conclusion

The centrality and importance of shared metacognition in a community of inquiry cannot be overstated. Inquiry would be serendipitous and less productive without conscious intention to take responsibility and control of the inquiry process. Shared metacognition drives collaborative inquiry and can only function effectively with competent shared metacognition. It is hard to see effective inquiry without awareness and strategies associated with the inquiry process. Self and co-regulation of the inquiry process drives knowledge development and deep approaches to learning. In a modern connected society, learners must be cognizant of the collaborative process of thinking and learning. Shared metacognition provides the construct to understand how learners can actively manage inquiry and collaboratively constructing deep and meaningful learning.

Declarations

The author(s) declared no funding was provided for this research.

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

This work did not require ethics board approval.

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Appendix

Shared Metacognition Questionnaire

When I am engaged in the learning process as an individual: SELF-REGULATION

- I1: I am aware of my effort
- I2: I am aware of my thinking
- I3: I know my level of motivation
- I4: I question my thoughts
- I5: I make judgments about the difficulty of a problem
- I6: I am aware of my existing knowledge
- I7: I assess my understanding
- I8: I change my strategy when I need to
- I9: I am aware of my level of learning
- I10: I search for new strategies when needed
- I11: I apply strategies
- I12: I assess how I approach the problem
- I13: I assess my strategies

When I am engaged in the learning process as a member of a group: CO-REGULATION

- G1: I pay attention to the ideas of others
- G2: I listen to the comments of others
- G3: I consider the feedback of others
- G4: I reflect upon the comments of others
- G5: I observe the strategies of others
- G6: I observe how others are doing
- G7: I look for confirmation of my understanding from others
- G8: I request information from others
- G9: I respond to the contributions that others make
- G10: I challenge the strategies of others
- G11: I challenge the perspectives of others
- G12: I help the learning of others
- G13: I monitor the learning of others