

**The Community of Inquiry framework: Future directions in the Covid-19 Era**  
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**Abstract**

Over the past couple of years, the majority of higher education institutions have pivoted to a form of remote or emergency learning due to the Covid-19 pandemic. Unfortunately, the possibilities and constraints associated with these blended and online approaches to learning were in many ways unfairly put to the test as many educators lacked a research-based framework to guide the redesign of their courses and programs. The purpose of this study was to investigate how the Community of Inquiry (CoI) framework (Garrison, Anderson, & Archer, 2000) and the Shared Metacognition (MC) construct (Garrison & Akyol, 2015a) could be used to intentionally design, facilitate, and direct a collaborative constructive learning environment in order for students to learn how to co-regulate their learning (shared metacognition).

**Introduction**

The reality of the COVID-19 pandemic and the resulting widespread adoption of blended and online learning has necessitated a rapid and radical rethinking of the teaching-learning transaction. The pandemic resulted in a forced test of the potential of blended and online learning. The possibilities and constraints associated with these approaches to learning were in many ways unfairly put to the test as many educators lacked a research-based framework to guide the redesign of their courses and programs.

The key was to provide guidance and support to educators to migrate their curriculum and activities to an online learning environment. The enormity of the migration challenge and associated time constraints quickly became apparent. The tragedy was that faculty were too often left to their own devices or simply offered superficial teaching tips without a coherent understanding of the possibilities for an effective teaching-learning transaction online. Opportunities for both social and cognitive presence needed to be developed to effectively facilitate interpersonal relationships and intellectual discourse.

In this confusion, the Community of Inquiry (CoI) framework (Garrison, 2017) attracted considerable attention. This framework offered a coherent representation and approach to online learning. It is for this reason that educators have turned to the CoI framework to provide perspective and guidance. The CoI framework has been shown to be a widely studied and adopted framework for blended and online education (Google Scholar, 2021). Considering the rapid developments in learning online, there is a growing need for a theoretical grounding of approaches and practices. In this regard, the CoI framework provides a map and rationale to rethink and migrate teaching and learning online. We need to look beyond the technology and focus on the pedagogical assumptions and principles of practice associated with collaborative online learning.

In addition, an ongoing focus in higher education has been the topic of student engagement and this has become particularly acute in the Covid-19 era and the rise of remote or emergency learning (Gierdowski et al., 2020). In order to address this issue, many over the years have been advocating for the importance of course redesign in order to re-engage students (Twigg, 2013). Littky and Grabelle (2004) emphasize a redesign that stresses relevance, relationships, and rigour (3R's of engagement). It has been suggested that such a redesign would enable students to meaningfully engage in sustained learning experiences that may lead to a state of optimal flow. Csíkszentmihályi (1997) defines optimal flow as "the mental state of operation in which the person is fully immersed in what he or she is doing by a feeling of energized focus, full involvement, and success in the process of the activity" (p.9).

At the core of meaningful student engagement is the concept of metacognition, which is simply "thinking about one's thinking" (Chick, 2013, n.p.). Metacognition is key to learning how to learn. Metacognition means increasing awareness of the learning process and taking responsibility to control the learning process (Garrison, 2017). Metacognitive approaches to learning start with designing and planning the learning experience.

Recently, the focus in higher education has shifted from an individualistic to a more collaborative approach to learning (Kromydas, 2017). Consistent with this, Garrison and Akyol (2015a) have developed a shared metacognition construct, which is based on the Community of Inquiry framework (Garrison, Anderson, & Archer, 2000).

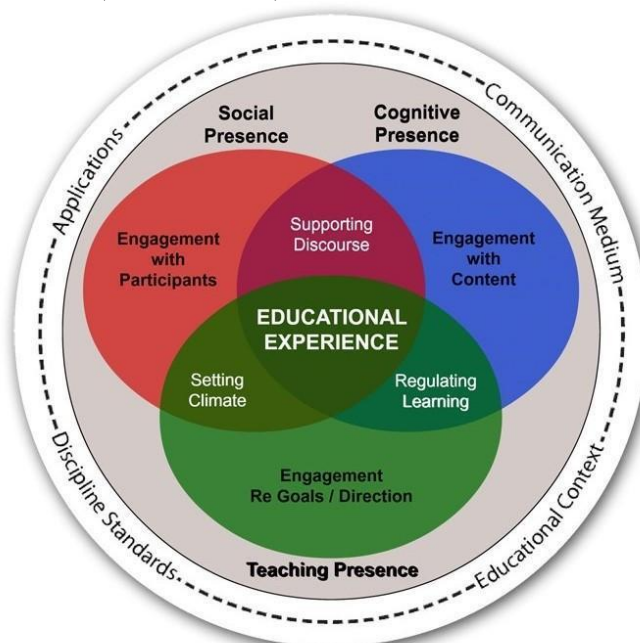
This research study used the CoI framework and Shared MC construct in order to compare and contrast two versions of a 3<sup>rd</sup> year educational technology course. The first version was offered during the fall 2019 semester in a blended format (pre Covid-19 pandemic) while the second version was offered during the fall of 2020 in a remote (online) format (during Covid-19 pandemic). The purpose of the research was to investigate the similarities and differences in teaching, social, and cognitive presences between the two versions of the course in order to help other teachers design, facilitate, and direct higher education courses that help students develop their capacity for shared metacognition.

### Community of Inquiry Framework

Garrison (2017) states that the Community of Inquiry (CoI) theoretical framework can provide the “context to conceptually and operationally define and operationalize metacognition in a socially shared environment” (p. 62). The three key elements or dimensions of the CoI framework are – social, cognitive, and teaching presence (Figure 1). It is at the convergence of these three mutually reinforcing elements that a collaborative constructivist educational experience is realized. Social presence creates the environment for trust, open communication, and group cohesion. Cognitive presence has been defined “as the extent to which learners are able to construct and confirm meaning through sustained reflection and discourse in a critical community of inquiry” (Garrison, Anderson, & Archer, 2001, p. 11). It has been operationalized through the developmental phases of inquiry – triggering events, exploration, integration, and resolution. The third and cohesive element, teaching presence, is associated with the design, facilitation, and direction of a community of inquiry. It is the unifying force that brings together the social and cognitive processes directed to personally meaningful and educationally worthwhile outcomes.

**Figure 1**

*Community of Inquiry Framework (Garrison, 2017)*



Shared metacognition (MC) exists at the intersection of the cognitive and teaching presence constructs and goes to the heart of a deep and meaningful educational learning experience (Figure 2). Thus, it is important to understand shared MC and its role in a community of inquiry.

**Figure 2**

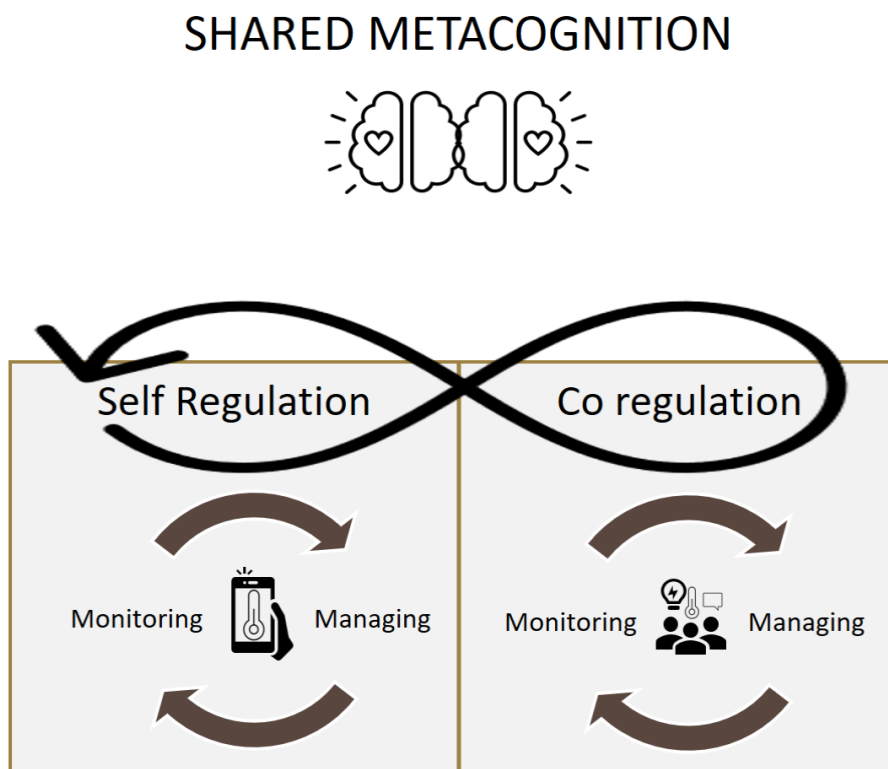
*Community of inquiry elements, categories and indicators*

ELEMENTS	CATEGORIES	INDICATORS (examples only)
<b>Social Presence</b>	Open Communication Group Cohesion Affective Expression	Risk-free expression Encourage collaboration Emoticons
<b>Cognitive Presence</b>	Triggering Event Exploration Integration Resolution	Sense of puzzlement Information exchange Connecting ideas Apply new ideas
<b>Teaching Presence</b>	Design & Organization  Facilitating Discourse Direct Instruction	Setting curriculum & methods Sharing personal meaning Focusing discussion

In terms of understanding shared MC and its role in a CoI the premise is that developing metacognitive awareness and ability is core to becoming an effective inquirer. Metacognition has generally been accepted as consisting of two components – awareness of the inquiry process (monitor) and implementation strategies (regulation). Awareness allows the learner to monitor and actively manage/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 regulatory functions within a single construct. This shared metacognition construct (Garrison, 2017; Garrison & Akyol, 2015a, 2015b) reflects the dynamic dimensions of self and co-regulation each exhibiting a monitoring (awareness) and a managing (strategic action) function (Figure 3).

**Figure 3**

*Shared Metacognition Construct*



To explore the practical implications of shared MC, it is important to focus on the intersection of Cognitive Presence (CP) and Teaching Presence (TP). That begins with a consideration of TP categories (planning & organization; facilitation; and direction) as they overlap with CP operationalized through the phases of Practical Inquiry (triggering event, exploration, integration, and resolution). While there has been progress in defining and measuring the construct of Shared MC, there has been an absence of research investigating the effective implementation and support for this process in different formats (e.g., blended and remote), which is the focus of this study (Garrison & Akyol, 2015a).

#### **Research Context**

Mount Royal University in Calgary, Alberta, Canada offers a four-year Bachelor of Education program. In the fall of the third year, teacher candidates are engaged in a series of campus, place-based, and practicum experiences that focus on integrating Science, Technology, Engineering, Arts, Math, and Indigenous (STEAMI) education.

Usually, the semester begins with the teacher candidates spending the first week in their practicum placements, helping their mentor teachers start the new school year with their K to 12 students. The teacher candidates then spend one day a week in their mentor teacher's classroom culminating in a five-week practicum experience. During the fall of 2019, the teacher candidates were able to complete all of these face-to-face activities but during the fall of 2020, they were only able to participate in their five-week practicum due to Covid-19.

For the fall of 2019, the teacher candidates were engaged in a series of on-campus STEAMI education courses that were connected to weekly field trips. These trips included field work at the Ann and Sandy Cross Conservation Area (2021), Tim Hortons Children's Ranch (The Compass, 2021), and the Telus SPARK Science Centre (2021). The teacher candidates were also able to spend a full day teaching STEAMI lessons to children at the Nakoda Elementary School (2021) on the Stoney Nakoda First Nations Reserve.

Unfortunately, during the fall of 2020 the students were not able to participate in any on-campus classes or face-to-face field trips. All the courses were offered remotely (online) and an effort was made to conduct the field trips virtually.

This research study focuses on the fall 2019 (blended, pre-pandemic) and fall 2020 (online, pandemic) versions of the educational technology course, which is part of the STEAMI semester. The purpose of this course is to provide an overview of technological influences in education. It is designed to assist prospective teachers in critically examining current and evolving applications of technology relevant to the teaching and learning process.

### Research Objective

The primary objective of this research study was to use the CoI framework and shared MC construct to investigate the similarities and differences in teaching, social, and cognitive presences between the two versions of the educational technology course (blended pre-pandemic vs online pandemic). The hope being that despite the course format a set of recommendations could be created to help teachers in higher education design, facilitate, and direct their courses to help students develop their capacity for shared metacognition through the use of digital technologies.

### Methodology

An action research methodology was used for this study. This approach involved teacher candidates reflecting on how the shared metacognition construct could be developed in two versions of a higher education course. The intent of this research framework was to have some practical outcome related to the lives or work of the participants, which in this case was the growth and development of shared metacognition for higher education students (Stringer, 2014).

A mixed methods research approach guided the collection and analysis of the study data. Three sections of the educational technology course were offered in both the fall 2019 and 2020 semesters and the co-investigator invited the third year teacher candidates in both semesters to participate in this research study.

For the fall 2019 semester, there were seventy-nine students enrolled in the course, seventy female (89%) and nine male (11%). Ninety-one percent of the students (n=72) agreed to participate in the study. During the fall 2020 semester, there were eighty-nine students enrolled in the course, eighty-one female (91%) and eight male (9%). Sixty-four percent of the students (n=64) agreed to participate in the study, which received Mount Royal University Human Research Ethics Board (HREB) approval.

In terms of quantitative methods, the validated Shared MC and CoI surveys were both utilized in an online format using *Google Forms*. The Shared Metacognition survey (n=72 for fall 2019, n=64 for fall 2020) was deployed at the end of October in both semesters, just before the teacher candidates began their five week practicum placements in order to determine how they learned from each during the actual course component. The CoI survey was administered at the end of the fall 2019 and 2020 semesters in order to observe how the teacher candidates had integrated their course experiences with their practicum placements (n=56 for fall 2019 and n=65 for fall 2020). Descriptive statistics (frequencies, means, and standard deviations) were calculated for individual survey items using *Google Spreadsheets*.

With regards to qualitative methods, at the end of the fall 2019 and fall 2020 semesters the teacher candidates created a final blog posting where they reflected on how they contributed to the learning of others in the course as well as what they had learned from their peers. This data was copied and pasted into a *Google Document* and the researchers used a constant comparative approach when reviewing the blog posts in order to identify patterns, themes, and categories of analysis that "emerged out of the data rather than being imposed on them prior to data collection and analysis" (Patton, 1990, p. 390).

### Findings

The study findings about shared metacognition are reported using the three sub-elements or categories of the CoI's sphere of teaching presence – design, facilitation, and direction.

### Design & Organization

Course design is a planning process that includes consideration of many content and process issues. The focus of the planning process for this research study was specifically on the monitoring and managing of shared metacognition.

At the beginning of the semester, the course instructor for the educational technology course had the students in both versions of the course create an initial blog posting where they described and shared their

personal learning goals for the course as they related to the MRU B.Ed. program's five teaching competencies (planning, facilitation, assessment, classroom environment, professional roles and responsibilities). At the end of the semester, the students were required to demonstrate and describe how they had achieved these learning goals by presenting the teaching competency pages of their professional learning plan or ePortfolio (Figure 4).

**Figure 4**

*Planning for learning page: Professional learning plan*

Home About Me Teaching Evaluations Teaching Philosophy

# Planning

## Third Year Fall Semester:

**Starting Goal:**

Create lessons that clearly connect to the program of studies and student learning goals. I want to ensure that my students are not only engaged but are having to think deeply and creatively. This will also include having to plan for differentiation as not all students learn in the same way or are at the same starting point.

**Growth:**

Throughout practicum I learned a lot about how to plan lessons as well as how important it is to over plan and be flexible when arranging each lesson. Some students will find they need more time to fully understand concepts or to finish up work, whereas other students breeze through certain material and need something more challenging. This is where really knowing and understanding each student's needs becomes vital as I learned how to differentiate for which students would need extra help and which students would need more of a challenge. I was also able to differentiate for students that needed more small group or one on one learning and even began adjusting material for particular students to help ease them into certain concepts. I also think I was able to give students several authentic learning opportunities that allowed for learning to be done through inquiry and a more hands on approach. Because of this, they were more engaged and had to think on a much deeper level.

**Future Goal:**

In the future, I want to be able to provide students with even better differentiated material. Although I was able to try this tactic during this placement, I want to be more experienced in doing it and have more strategies for creating the best learning opportunities for all students. I would also like to continue to expand my resources and planning materials so that my lessons may continue to follow inquiry based learning strategies as well as incorporate strong integration when possible.

**Equality vs. Equity Diagram:**

The diagram shows two trees with fruit. In the 'Equality' scenario, three people of different heights stand on the ground, and only the tallest person can reach the fruit. In the 'Equity' scenario, the tallest person stands on the shoulders of the medium person, and the medium person stands on the shoulders of the shortest person, allowing all three to reach the fruit.

When thinking of differentiation, although I may refer to giving all students an equal opportunity, in reality equity is the best way to achieve that. Equity allows for students to get what they need in order to reach success and when looking at differentiating a classroom of students, that is exactly what I aim to do.

I also included a picture of the MRU lesson template as this is something that I became very familiar after this practicum. Although it was sometimes a pain to have to do every time, it did get me thinking about what I would do for differentiation and just helped me to plan each lesson better.

The very bottom picture is of my science unit plan that was created for my IOP project and really helped me to feel more prepared and ready for practicum. I had no idea what I was going to do until I had completed that plan and then I felt like I knew what I had to do.

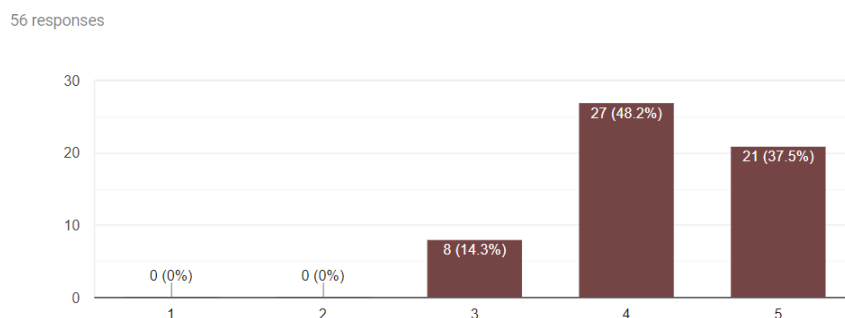
**Sample Lesson Plan Template:**

Sample Lesson Plan Template 2019-2020	
Lesson Title: Date: Grade Level/Subject: Time:	
<b>What are the goals of the lesson?</b>	
<ul style="list-style-type: none"> <li>What is the point of the lesson?</li> <li>How does this build on student prior knowledge and previous learning?</li> <li>What do learners know now? What should learners be able to do at the end of the lesson?</li> </ul>	
<b>Learning Objectives:</b>	
<ul style="list-style-type: none"> <li>What are learners expected to know? Cite outcomes from the Alberta Education Program of Studies</li> <li>Include a statement using students' "can..." statements.</li> </ul>	
<b>Instructional Strategies:</b>	
<ul style="list-style-type: none"> <li>How will you differentiate instruction to meet learner needs? (Consider both those who will need extra help and those who will finish early and need enrichment.)</li> <li>What are the specific students you need to take care of so they can be successful in your lesson? (Consider English language learners, identified learning needs, social/emotional needs, gender, students from different cultural backgrounds, Indigenous learners, ...)</li> <li>Record what you are planning to do before with these students (Use Student A, Student B, ...)</li> </ul>	
<b>ASSESSMENT</b>	
<b>Formative &amp; Summative Prior Knowledge</b>	<b>Assessment Evidence</b>
<ul style="list-style-type: none"> <li>How will you communicate this...</li> </ul>	<ul style="list-style-type: none"> <li>How will students demonstrate...</li> </ul>

The survey results and final blog postings suggest a different level of teaching presence in the two versions of the course. For the blended course version in the fall of 2019, the study participants indicated these activities were useful on a personal level but several commented on the importance of the teacher "going over all assignments at the beginning of the semester to allow students to ask questions and also give us time to wrap our heads around the key concepts and goals of the course" (Shared MC survey fall 2019, participant 25). This comment was also reflected in the results from question two of the fall 2019 version of the Community of Inquiry (CoI) survey, which asked students if their teacher clearly communicated important course goals (Figure 5).

**Figure 5**

*The teacher clearly communicated important course goals (CoI survey, Fall 2019)*



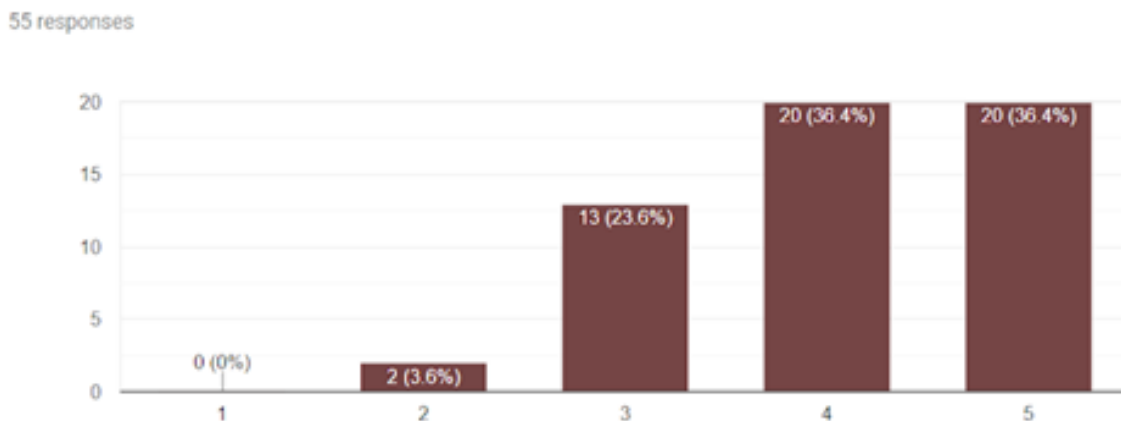
The 5 point Likert-type scale for this figure ranges from strongly disagree (1) to strongly agree (5). Figure 6 indicates that the majority of students thought the teacher clearly communicated the course goals but fourteen percent of the participants were ambivalent (on the fence). Interestingly, in the final blog posting several students identified the benefit of group work in gaining a clearer understanding of the course and assignment expectations. “It made it easier to understand the course expectations and added more perspectives as to how to approach assignments when we worked in groups” (Student blog posting 59, Fall 2019). Another student commented that group work “ensures everyone is on the same page regarding assignment expectations” (Student blog 23, Fall 2019).

For the fall 2020, remote (online) version of the course, the CoI survey results indicate that students perceived a higher level of teaching presence for all the related questions, including communication of course topics, goals, assignment instructions, and deadlines. This may have been due to the increase in digital communication. All the recordings from the synchronous sessions (e.g., *Google Meet*) were shared with the students and there was a weekly “to do” email from the teacher.

The students in the fall 2020 semester specifically highlighted the quality and timeliness of the teacher feedback. Figure 6 and 7 provide a comparison of the results for the student responses to the teaching presence question about the quality of the teacher’s feedback.

#### Figure 6

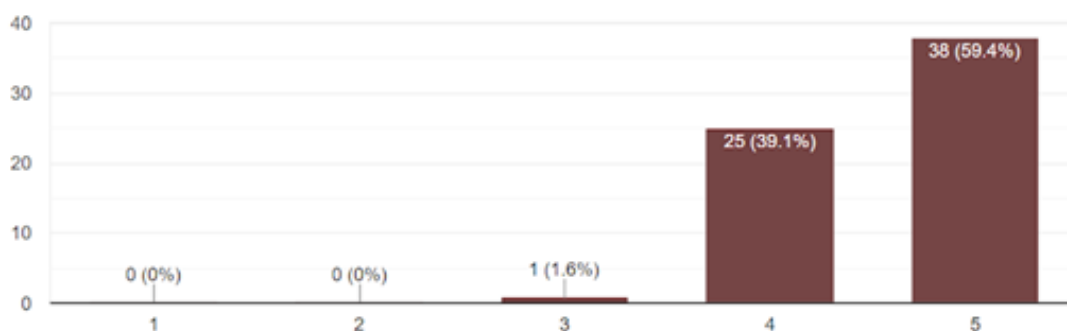
*The teacher provided feedback that helped me understand my strengths and weaknesses relative to the course’s goals and objectives (CoI survey, Fall 2019)*



#### Figure 7

*The teacher provided feedback that helped me understand my strengths and weaknesses relative to the course’s goals and objectives (CoI survey, Fall 2020)*

64 responses



In their final blog postings, several students also commented on how much they appreciated the timely feedback in the remote version of the course during the Covid-19 pandemic “I really valued how the teacher provided weekly feedback on my course assignments. This really helped reduce my stress and anxiety with this online course as I always knew if I was on track and moving forward with my learning” (Student blog 44, Fall 2020).

### Facilitation

Facilitation is the central activity in an educational community of inquiry for developing shared metacognition through the interactions among students and the teacher. Facilitative actions, “on the part of both the students and the teacher, create the climate, support discourse, and monitor learning. In the act of facilitation learners connect with each other, engage with the content, are cognitively present as intellectual agents, and carry out all actions central to the development and maintenance of the learning community” (Vaughan, Cleveland-Innes, & Garrison, 2013, p. 46). In essence, the teacher is responsible for modelling the growth and development of shared metacognition in a course.

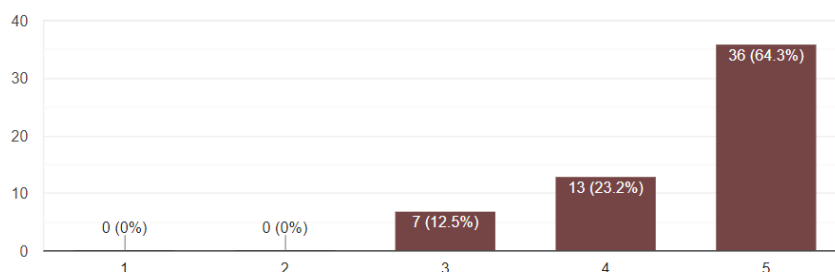
For the educational technology course, the students selected critical friends at the beginning of the semester. The role of the critical friend was to provide constructive feedback and support for all of the course assignments. In addition, each of the course assignments had a group component where students were required to work together to solve problems and test solutions related to teaching with technologies

For the fall 2019 semester, the majority of research participants indicated that these collaborative activities helped them get to know the other students in course, which gave them a sense of belonging (Figure 8) and allowed them to feel comfortable interacting with their peers (Figure 9).

### Figure 8

*Getting to know the students in this course gave me a sense of belonging (CoI survey, Fall 2019)*

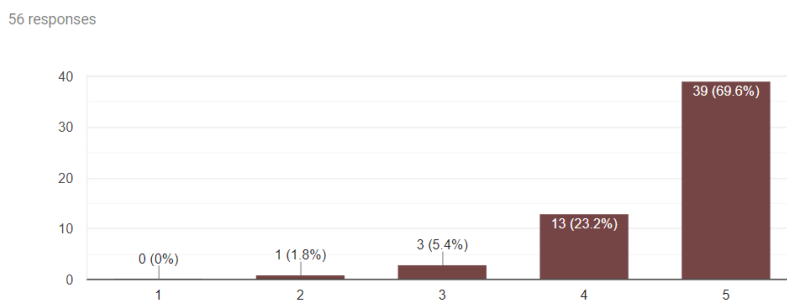
56 responses



Highlighting the results of Figure 9, one student commented in their final blog posting that through group work “we were able to gain confidence about our individual ideas with support from our peers” (Student blog 71, Fall 2019).

### Figure 9

*Comfortable interacting with the other students in my course (CoI survey, Fall 2019)*

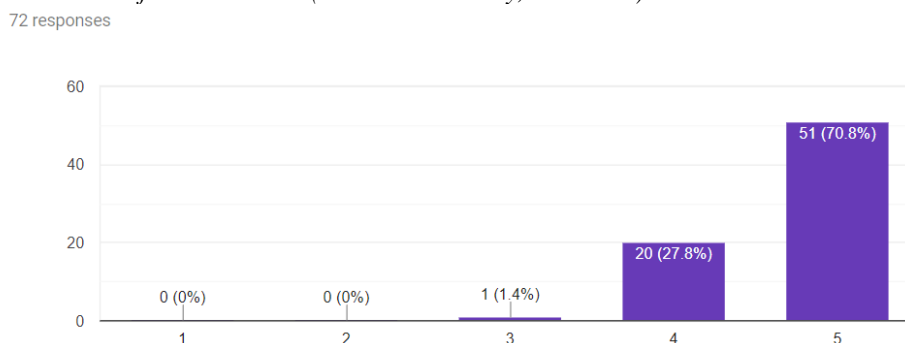


Another student indicated that their high level comfort in group work contributed to “Creating stronger working connections with peers, sharing ideas and resources, and receiving critical feedback, and strategies to improve teaching and planning” (Student blog 13, Fall 2019).

In turn, over the fall 2019 semester this sense of a safe, blended learning environment allowed the students to be more willing to listen to the comments of others (Figure 10) as well as considering the feedback of their peers (Figure 11).

**Figure 10**

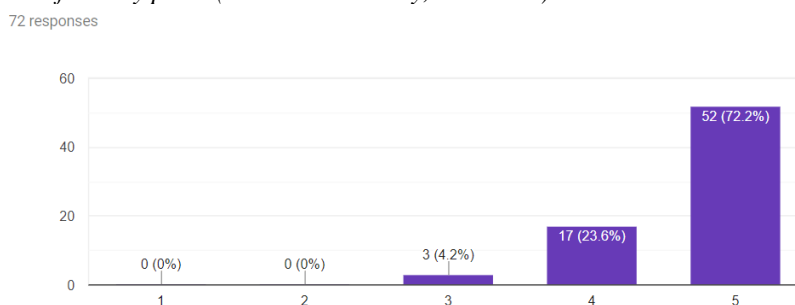
*I listen to the comments of other students (Shared MC survey, Fall 2019)*



One participant emphasized that not only did she listen to others in the course “I got to learn from others. I was also able to get new ideas and I was also able to share my ideas to others in my group” (Student blog 27, Fall 2019).

**Figure 11**

*I consider the feedback from my peers (Shared MC survey, Fall 2019)*



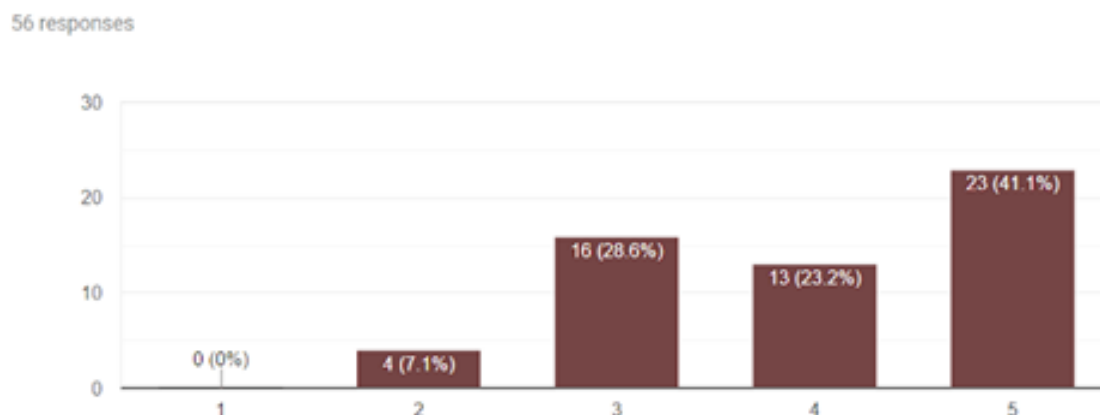
Many of the participants in this study indicated that they had limited experience with peer feedback on assignments. For some, this requirement for all course assignments was revelational. “Working on an assignment and submitting it with zero feedback is a source of anxiety for me. However, having group members to give me constructive feedback on my assignments was the biggest advantage for me with group work” (Student blog 36, Fall 2019).

Students who experienced the remote (online) version of the course during the fall 2020 semester reported a lower sense of social presence in the course than the fall 2019 blended version. For example, students in the fall 2019 had a more positive response to the statement about the ability of online or web-based communication is an excellent medium for social interaction than the students in the fall 2020 semester (Figure 12 and 13).

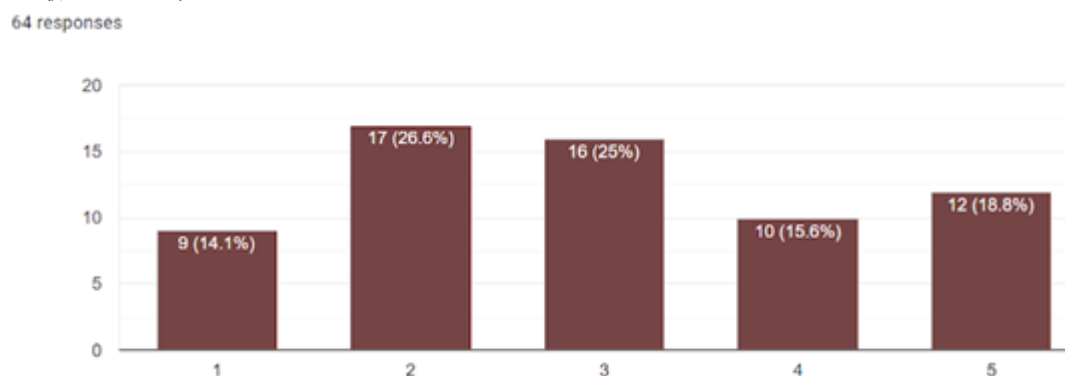


**Figure 12**

*Online or web-based communication is an excellent medium for social interaction*  
(CoI survey, Fall 2019)

**Figure 13**

*Online or web-based communication is an excellent medium for social interaction*  
(CoI survey, Fall 2020)



In their final blog postings, the students in the fall 2020 remote course version wrote extensively about the social presence challenges and limitations of the online course. For example, “Having the course completely online was challenging for me to develop meaningful relationships and to engage in strong and passionate discussions” (Student blog 14, Fall 2020). Another student commented, “Naturally, not having those in-person interactions decreased the social presence in this course. There were so many lost opportunities to explore, such as the workshops and field trips with our peers” (Student blog 27, Fall 2020).

Additionally, the blog postings from the students in the fall 2020 semester identified the challenges of collaborating with their peers in the online environment. One student stated, “We only managed to get together and collaborate in the breakout rooms during class time and most of the time it is hard to engage online when individuals are not actively engaged in the conversation” (Student blog 35, Fall 2020). Moreover, “Some challenges of working with a constructive friend or in groups are that I find it becomes difficult to be heard in a virtual setting. In-person I am able to say my thoughts and connect through body language; however, online I find some people just do not listen to others” (Student blog 51, Fall 2020).

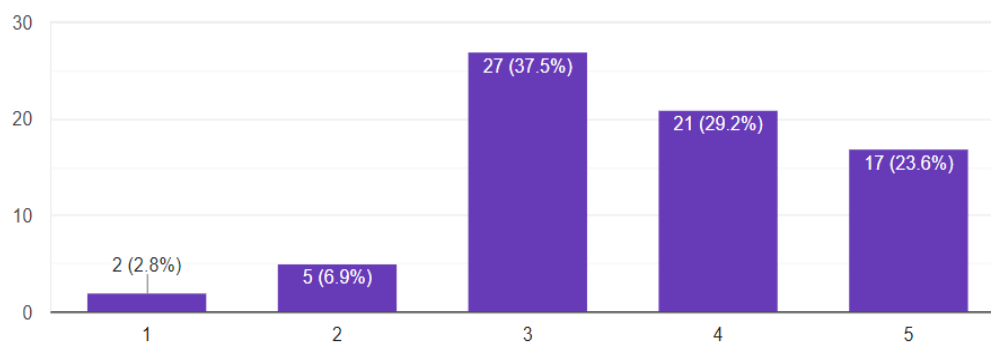
### **Direct Instruction**

Direct instruction is not about lecturing. Direct instruction is about ensuring the students achieve the intended learning outcomes of a course or program. It is an essential ingredient in any formal educational experience in order to help students learn how to collaboratively manage and take responsibility for their learning (shared metacognition). It has been shown that students expect structure and leadership in higher education courses and the roles and responsibilities for direct instruction should be shared by all members of a Community of Inquiry (Garrison & Cleveland-Innes, 2005).

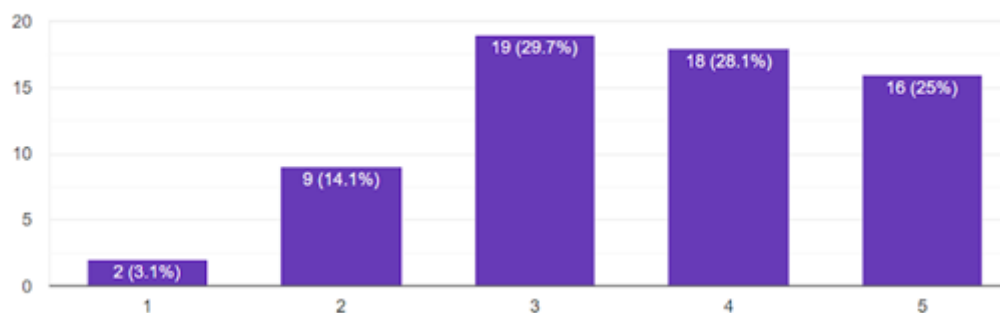
It is interesting to note the results from the Shared MC survey were almost identical for both the blended fall 2019 and remote version of the fall 2020 course. In regards to shared metacognition, some study participants in both versions of the course indicated that they found it difficult to challenge their peers’ strategies and perspectives (Figures 14, 15, 16 and 17).

**Figure 14***Challenging the strategies of my peers (Shared MC survey, Fall 2019)*

72 responses

**Figure 15***Challenging the strategies of my peers (Shared MC survey, Fall 2020)*

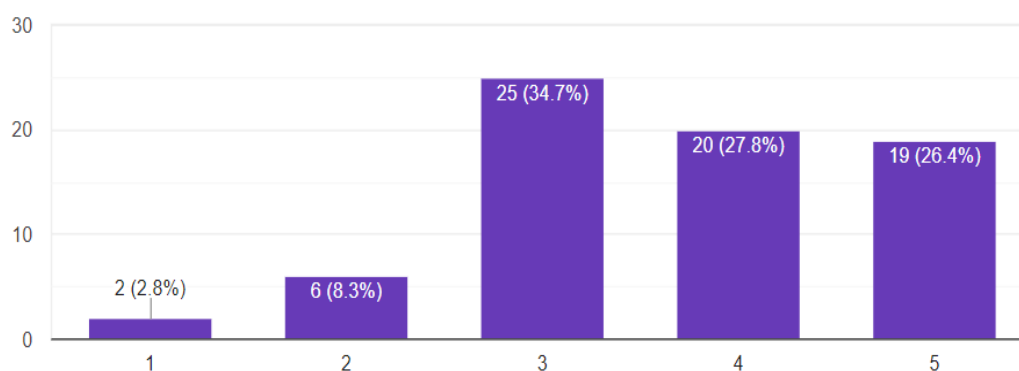
64 responses



In terms of strategies, the participants commented specifically on work ethic and quality of work. Several of the students quoted the Pareto principle (Azad, 2013) where 20% of the group does 80% of the work “usually one or two people ended up doing the work while other group members didn’t do anything” (Student blog 11, Fall 2019). And, in terms of quality, one participant commented that “being able to trust others and their level of work is something I found difficult. I always want to try to strive for perfection (even when unattainable) so if I feel others are not as invested or do not put in as much work/effort it makes me upset” (Student blog 52, Fall 2019).

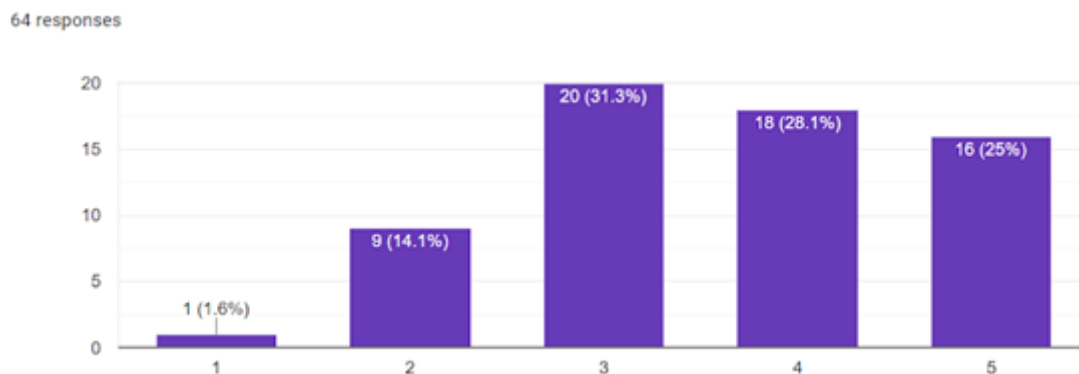
**Figure 16***Challenging the perspectives of my peers (Shared MC survey, Fall 2019)*

72 responses



**Figure 17**

*Challenging the perspectives of my peers (Shared MC survey, Fall 2020)*

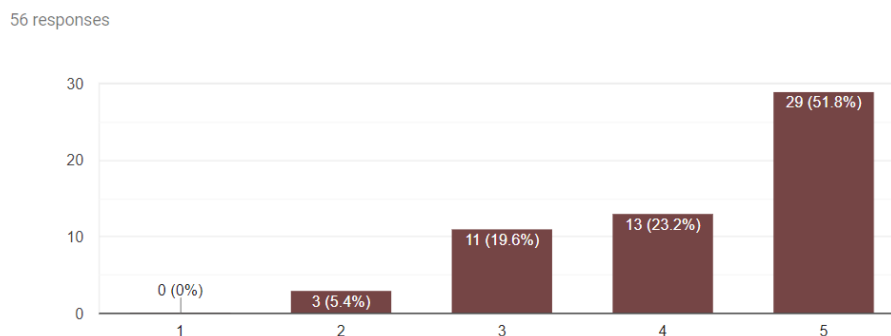


There were several comments about the challenge of negotiating different perspectives during group work. For example, one participant stated, “sometimes it can be difficult to cooperate with others that have different ideas and values. However, this is still a valuable experience” (Student blog 13, Fall 2019). Another student explained how overcoming this type of challenge can be an important learning experience. “I had some group members that were quick to shut down others' ideas without backing up why. This was frustrating and at times hard to deal with, but it taught me to speak up and skills to positively work through an uncomfortable situation” (Student blog 33, Fall 2019).

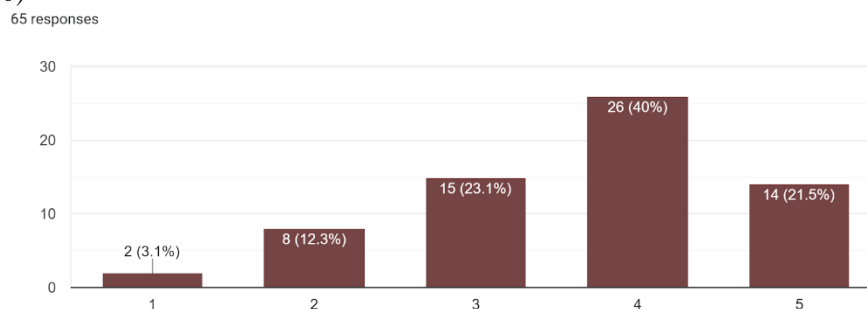
Finally, students are often unwilling to disagree or challenge each other in a higher education course, especially in online discussion forums as they do not want to offend or hurt anyone’s feelings, a sense of “pathological politeness” (Garrison, 2017. p.53). From the CoI survey results and the final blog postings, it appears that the students in the fall 2019 blended version of the course became more comfortable with providing direct instruction to each other than those in the fall 2020 remote section (Figure 18 and 19).

**Figure 18**

*I felt comfortable disagreeing with other students in this course while still maintaining a sense of trust (CoI survey, Fall 2019)*

**Figure 19**

*I felt comfortable disagreeing with other students in this course while still maintaining a sense of trust (CoI survey, Fall 2020)*



A student in the fall 2019 blended version of the course stated that “I got to know more students in my program and made new friendships. These friendships helped me by providing me with people I trust to go to for information. They are people that I feel comfortable sharing my ideas with and taking risks with in terms of disagreements” (Student blog 47, Fall 2019). Another student commented that, “this course helped me to

formulate my teaching philosophy that knowledge is co-constructed through shared learning experiences. By working in groups I didn't feel like I was working to build understanding alone" (Student blog 63, Fall 2019).

Conversely, students in the fall 2020 remote version were somewhat more ambivalent about their comfort level in providing direct instruction to each other but they did comment about how the collaborative group work provided them with virtual support and encouragement throughout the semester. "I really appreciated the group work because it gave me a chance for some virtual social interaction and support, which was nice as we don't get that too often with having virtual classes" (Student blog 41, Fall 2020). In addition, another student emphasized how her peers "provided feedback on all of my work, checked in on my mental status, and encouraged me throughout the semester" (Student blog 17, Fall 2020).

### Recommendations

Based on the findings from this study a series of recommendations are made below for how the CoI framework and digital technology applications can be used to design, facilitate, and direct both a blended and remote (online) version of a course in higher education in order to help students develop their capacity for shared metacognition.

#### Design and Organization

In terms of student engagement, Littky and Grabelle (2004) emphasize the importance of establishing *relevance* at the beginning of a course (1st R of engagement). They indicate that students should have a sense of curiosity and connectedness with the learning outcomes for the course. This can be achieved by having students complete an online needs assessment survey, share their relevant experiences in an online discussion forum, and create their own learning goals for the course in a blog.

Prior to the commencement of the course, the teacher can have students complete an anonymous needs assessment survey where they are asked about their expectations for the course. Questions could include the following:

1. What are your goals for this course; bottom line - what do you want to 'take away' from your course experience?
2. What do you expect will happen during the class sessions? What will the professor do in class and what will you do?
3. What type of work do you expect to do outside of the classroom for this course, if any?
4. How do you think your learning in this course will be assessed?
5. What type(s) of assistance with your learning do you expect to receive in this course and from whom?

This online survey can be constructed using applications such as *Google Forms* and *SurveyMonkey*. The key is to share and discuss the survey results with the students during the first class. The teacher can assign the students to small groups where they discuss the results and then share key findings with the entire class.

#### Facilitation

The second R of engagement that Littky and Grabelle (2004) advocate for is *relationships*. Creating a sense of community and collaboration are key for helping students develop their capacity for shared metacognition. Unfortunately, studies indicate that many students in higher education have little formal experience working collaboratively in groups (Chang & Brickman, 2018). Thus, the teacher must model the type of engagement behaviours they expect from the students and provide opportunities for students to learn how to work successfully in groups.

For example, collaborative activities can be designed that allow students to experience all five stages of Tuckman's (1965) group development model (e.g., forming, storming, norming, performing, and adjourning). Ideally, this should be a low-stakes activity that takes place at the beginning of the semester so that students can obtain a first attempt in learning (FAIL) experience. In the case of an educational technology course, this could involve students collaboratively working together on a case study in order to come up with a solution to a school-related problem or issue (Schoology Exchange, 2017).

#### Direct Instruction

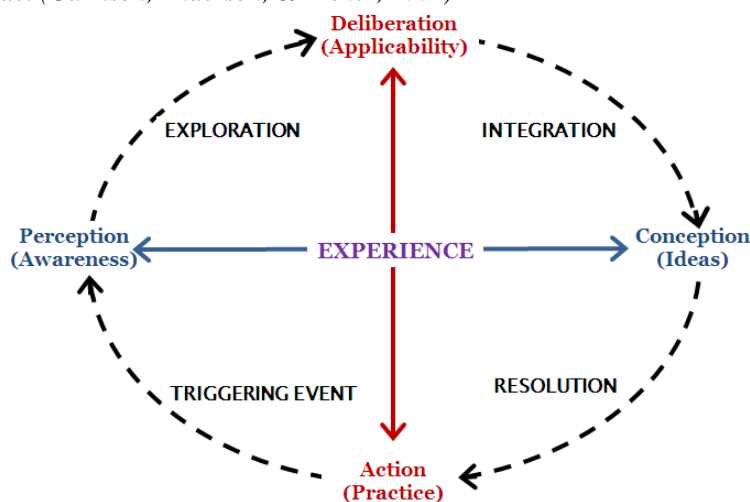
Littky and Grabelle's (2004) third R of engagement is *rigour*. In a higher education course, this can involve students completing a challenging problem, task or assignment that forces them to confront different perspectives and new ways of thinking. This process involves the teacher 'nudging' the students forward in their academic studies (Thaler & Sunstein, 2008). For example, students are often content to share and discuss ideas with each other but require a 'gentle nudge' to integrate and apply those ideas in course assignments and everyday life.

One recommendation for direct instruction is the explicit use of Garrison, Anderson, and Archer's (2001) Practical Inquiry (PI) Model for course assignments. This model is based on the cognitive presence

sphere of the Community of Inquiry framework and involves four phases of inquiry; triggering event, exploration, integration, and resolution (Figure 20).

**Figure 20**

*Practical inquiry model (Garrison, Anderson, & Archer, 2001)*



In online discussion assignments, students can use the PI model to self-code their forum posts in order to help them develop their metacognitive awareness and abilities. For example, they can label their postings as being either a triggering event, an exploration, integration, or resolution comment.

### Conclusion

The Covid-19 era has demonstrated to us humans that when we collaborate at an international level we can solve global problems. The hope is that we can now apply these global collaboration strategies to begin solving the climate crisis. In the higher education context, the historical ideal of education has been to learn in collaborative communities of inquiry, which can foster the growth and development of shared metacognition (Lipman, 1991).

The World has been turning to Indigenous Ways of knowing for climate change solutions and our concept of shared metacognition aligns with many Indigenous approaches to learning around the World. For example, the Maori of New Zealand refer to this as the concept of *ako*, which means to both teach and learn. (Alton-Lee, 2003). *Ako* recognizes the knowledge that both teachers and students bring to learning interactions, and it acknowledges the way that new knowledge and understanding can grow out of shared learning experiences. Hattie and Yates (2014) refer to this process as visible teaching and learning “When teachers SEE learning through the eyes of their students and when students SEE themselves as their own teachers” (p. 14).

Within the Canadian context, the Mi'kmaw Nation of Nova Scotia has developed a “two-eyed seeing” process in order to collaboratively weave Indigenous and Western ways of knowing. “To see from one eye with the strengths of Indigenous ways of knowing, and to see from the other eye with the strengths of European ways of knowing, and to use both of these eyes together” (Bartlett et al., 2012, p. 335). They further indicate that the mind is like a parachute as it only works when it is open to new ideas and ways of knowing.

In conclusion, this research study has demonstrated the potential of using digital technologies and the Community of Inquiry framework (Garrison, 2017) to recapture this collaborative vision for blended and online courses in higher education. The key is to use digital technology applications to redesign our courses for active and collaborative learning experiences that enable students to take responsibility for their learning and collaboratively validate their understanding through discourse and debate with their peers.

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