Manifestations of Cognitive Presence in Blended Learning Classes of the Philippine K–12 System

Juliet Aleta R. Villanueva
University of the Philippines Open University

Petrea Redmond
Linda Galligan
University of Southern Queensland

Abstract
Through an exploratory case study, this research sought to determine the applicability of the Community of Inquiry in the K–12 setting. There are research gaps to leverage support for blended learning and flexible learning options to benefit Filipino youth and school-leavers under the Alternative Delivery Mode of the Philippine K–12 system. This study was driven by the following research questions: How is cognitive presence manifested in the blended learning interactions? In what ways do the interactions of cognitive presence with the other presences characterize learning community building? Three blended learning classes were examined based on data collected through surveys, student focus group discussions, teacher interviews, class observations and archived data. Through constant comparison analysis and descriptive statistics, evidence revealed cognitive presence across its categories in the form of connectedness, collaborative work, trust and reciprocation, and shared views on technology by K–12 teachers and learners. The analysis affirmed "regulating learning" as the intersection of cognitive presence and teaching presence. Implications for practice and recommendations for further research are discussed through the study's proposed modifications on the cognitive presence categories, indicators, and the survey instrument for the K–12 setting where teacher-directed pedagogies or collaborative inquiry processes have not been thoroughly co-opted.

Keywords: cognitive presence, blended learning, Community of Inquiry, K–12 Philippines, self-regulation, shared metacognition

Research gaps exist in the context of learning communities at the K–12 levels, which have increasingly introduced flexible modes of delivery referred to as cyber schools or virtual schools in Western countries (Borup et al., 2020; Molnar et al., 2019) or open high schools and alternative delivery modes in developing countries (Villanueva, 2021). These settings need to ensure student interaction through computer-mediated communications and other media technologies to accommodate a growing population of marginalized secondary-level learners seeking access to education and alternative ways to learn. Unlike undergraduate or graduate-level students, adolescent learners are generally described as nascent while acquiring skills in metacognition and self-regulation (Meusen-Beekman et al., 2015) and therefore in need of support and encouragement within learning communities. However, research into blended and online learning at the K–12 levels need frameworks to guide its pedagogy and practice (Barbour, 2018). There have been few frameworks formulated for K–12 blended learning (BL) which draw from the longstanding work of Garrison et al.'s (2001) Community of Inquiry (CoI) validated in higher education. Research into CoI and BL environments has been recommended (Harrell & Wendt, 2019), and likewise in the K–12 setting (Garrison, 2017).

As such, the purpose of this study was to apply the CoI and its elements to understand the teacher and student BL interactions and experiences in the Philippine K–12 system. This article particularly examines the manifestations of cognitive presence (CP) and analyzes its interaction with the other CoI elements in three BL classes. The initial section covers a summary of research in CP, the CoI framework and its corresponding instrument. Then, the methodology briefly outlines the participants' profile and qualitative data collection and analysis entailed. The findings elaborate on CP through its categories and indicators as well as the constructs of self-regulation and co-regulation. The discussion analyzes the CP manifestations and reveals learning community building through the interactions of the presences. The final section discusses proposed modifications to the CP indicators and the survey instrument. It includes implications for practice and recommendations for further research on the CoI to inform K–12 BL practices and teacher professional development.

Community of Inquiry

The CoI's primary function is "to manage and monitor the dynamic for thinking and learning collaboratively" (Garrison, 2017, p. 24), indicated through the interplay of its three elements or presences. Teaching presence (TP) is reported to sustain the balance among the other elements towards the achievement of learning outcomes (Garrison & Cleveland-Innes, 2005) and particularly valuable in K–12 learning community building (Villanueva, 2021). Social presence (SP) "is the ability of participants to identify with a group, communicate openly in a trusting environment, and develop personal and affective relationships progressively by way of projecting their individual personalities" (Garrison, 2017, p. 25). CP is 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 et al., 2001, p. 11) and the most critical element indicative of higher-order learning (Layne & Ice, 2014). Hence, research continues to understand its role within learning communities.

Castellanos-Reyes (2020) indicated that research on the CoI has spanned two decades, with 2000 to 2009 as the initial phase for establishing the framework in higher education. Research in this period revolved around the content analysis of transcripts, with TP being proven to influence CP and SP greatly. The next phase, 2010 to 2019, included further research to test the applicability of the CoI instrument. Studies have shown the CoI survey instrument as valid and

reliable in higher education (Arbaugh et al., 2008; Stenbom, 2018). While most research has transpired in Canada and the U.S. being English speaking countries, to date, the CoI instrument has been translated to Chinese (Ma et al., 2016), Korean (Yu & Richardson, 2015), Portuguese (Moreira et al., 2013), Turkish (Olpak & Kiliç Çakmak, 2018) and adapted in Filipino for the K–12 (Villanueva, 2020).

The second decade of research using the CoI also involved criticism on the framework which resulted in calls for additional presences (Castellanos-Reyes, 2020; Kozan & Caskurlu, 2018), namely emotional presence (Cleveland-Innes & Campbell, 2012; Majeski et al., 2018), autonomy presence (Lam, 2015) and learning presence (Pool et al., 2017; Shea et al., 2012). These proposed presences were in addition to the three existing elements, but a consensus has not eventuated. Reflection as an indicator of CP was also proposed, a process valuable to high-level thinking and deeper learning (Redmond, 2014). Hence, further application of the CoI to address these gaps have been suggested (Castellanos-Reyes, 2020; Kozan & Caskurlu, 2018), particularly for K–12 blended and online learning in keeping with earlier recommendations by Garrison (2017).

Very few studies have assured the framework's applicability at the K–12 (Harrell & Wendt, 2019). For example, Villanueva (2021) proposed for further research its modified CoI framework with changes to the TP categories and indicators and a CoI teacher self-reflection tool. A recent study by Sanders and Lokey-Vega (2020) applied the CoI among teachers in a virtual high school in the U.S. and proposed a modified K–12 CoI through an additional presence termed as collegial presence. This presence referred to supervising adults, support staff or tutors considered as colleagues who assist students in their learning. Findings from the study, however, were only limited to teacher perspectives. Hence, the K–12 setting remains to be a robust area for the sustained application of the CoI.

Cognitive Presence

Within CP lies the practical inquiry cycle of critical self-reflection and conscious use of strategies for higher learning through the phases of inquiry, namely: triggering events, exploration, integration, and resolution. Studies have revealed the challenge of elevating participant engagement towards integration and resolution phase (Anderson & Kanuka, 1999; Vaughan & Garrison, 2005), raising questions about whether meaningful and deep learning can be achieved in learning communities. Morueta et al. (2016) found that in CP, the most common student actions were exploration and integration, while the least common were triggering actions and resolution and suggested the need to ensure the interaction of CP with the other presences within the CoI. Chen et al. (2019) found that students maintained low-level CP while engaged in peer-facilitation and concluded that the types of questioning pursued by peers can positively affect the quality of CP.

Akyol and Garrison (2011) aimed to build on CP by validating the construct of metacognition. Metacognition is viewed as intentional actions to assess the learning process critically; hence they claimed that within the model, there is an embedded practical inquiry cycle. Garrison and Akyol (2015b) elaborated on the dimensions of metacognition as knowledge of cognition, monitoring cognition, and regulation of cognition. A "Shared Metacognition Questionnaire" was developed for use alongside the CoI instrument by Arbaugh et al. (2008), which included self-regulation and co-regulation. Self-regulation includes skills in planning and organizing one's learning, monitoring one's understanding of tasks and strategies to direct one's learning (Zimmerman, 1990). Co-regulation entails actions or behaviors from an abled member

to support others while interacting and working on tasks considered as "solo, cooperative or collaborative products" (Hadwin et al., 2011, p. 69). The current CoI has the intersection of CP and TP as monitoring and regulating learning (Akyol & Garrison, 2011) over the initial intersection ascribed as selecting content by Garrison et al. (2001). These suggestions have given new focus and purpose to the role of self-regulation and metacognition within blended and online learning communities.

Despite studies validating the CoI survey instrument to measure all presences (Arbaugh et al., 2008), there is still a lack of research and theoretical analysis that establishes how the presences work in unison (Parker & Herrington, 2015). Thus, this study sought to address this gap by applying the CoI framework where BL is emerging in contexts still dominated by traditional and didactic instruction (Espiritu & Budhrani, 2019). Some Filipino adolescent learners are engaged in alternative learning programs at the secondary level (DepEd Order No. 54 s.12, Phils), where social learning and self-regulation are valuable (Matuga, 2009; Wong, 2019). Positive experiences resulting from their BL interactions may lead them to consider flexible learning options in higher education. Hence, this study found potential in drawing from a valid framework in online higher education research, such as the CoI, to ascertain ways the framework can be used to inform K–12 BL practices and teacher professional development.

Research Questions

This study posits that perspectives on BL interactions and experiences of both students and teachers as members of K–12 learning communities are important to affirm the place of the CoI in K–12 BL research. Therefore, this article pursued this through the following research questions:

(1) How is CP manifested in the BL interactions?
(2) In what ways do the interactions of CP with the other presences characterize learning community building?

Examining CP along these lines are needed to further establish the CoI as applicable to the K–12 setting, especially where BL is emerging to include its possibilities to inform and guide the professional development of teachers for BL.

Methodology

This exploratory case study was undertaken in three public schools within one urban district supervised by one City School Division Office of the Department of Education in the capital region of the Philippines. Purposeful and convenience sampling were used to identify the case sites. Network sampling, a common form of purposeful sampling, may be carried out by identifying selected participants, which can easily refer other schools or programs while convenience sampling allowed for selection based on location and availability of respondents (Merriam, 2009). As such, courtesy calls and informal school visits were undertaken through the researcher's known network of educators. Two prospective school sites were identified by teachers themselves and the Division of City Schools. Another site was referred by these schools which were conveniently situated within the researcher's locality. Unlike most schools in the district, these three schools satisfied certain criteria set, namely having either a school-administered LMS or a class subject or teacher-driven group on a social media platform demonstrating online interaction with content and/or interaction with peers and teachers.

Students also had email accounts and access to the internet, laptops, computers, or mobile phones whether in school or at home.

The data collection in this study entailed a mixed method approach from three BL classes, with school and participant profiles depicted in Table 1. The schools were designated letter codes as A, B, and C.

Table 1
Summary of Participants Across Data Collection Methods

Classes and Grade Level	Kind of BL Program	CoI Survey Part 1	CoI Survey Part 2	Student FGD	Teacher Interviews	Class Observations
		n= 40 students	n = 24 students	n= 8 groups 29 students	n = 5 teachers	n = 3 classes
School A Grade 10 Class	Open High School Class level BL	7	4	1 (4 students)	1	1
School B Grade 7 Class	School-wide eLearning program	18	13	3 (11 students)	2	1
School C Grade 10 Class	Block section in a Science High School with an eLearning program	15	7	4 (14 students)	2	1

Table 1 presents the demographics of the classes in the study. Less than half of the total student population in each class participated in the study, with parental approval for those below 18 years of age. Data collection from the students included a bilingual version (Filipino and English) adapted from Arbaugh et al.'s (2008) CoI survey instrument as Part 1 (five-point Likert-scale) and a Part 2 (open-ended questions). Examples of CoI Part 2 questions to elicit BL experiences were: "What do you like about your blended learning experiences? Feel free to mention positive experiences with having blended learning" and, "Are there instances when you need to monitor or co-regulate each other's online work and behavior as classmates? If so, in what ways?" The focus group discussions (FGD) with students were also undertaken for 30 to 45 minutes per session to elicit descriptions of BL in both face-to-face and online scenarios, for example, "How would you describe the class interactions while doing blended learning?" and "Which learning activities would you say encouraged you to interact and learn more during your face to face/online learning?"

In addition, teachers in the BL classes of the student participants were interviewed for 30 to 45 minutes using semi-structured questions to gather in-depth data on BL experiences. Teachers also completed a questionnaire with corresponding questions closely similar to the student FGD questions that relate to the presences. Due to hectic schedules, teachers could only devote limited time to undertake the interview, hence a questionnaire was provided to ensure sufficient data collection from the teacher's perspective. Class observations of actual BL interactions were undertaken using an observation template to document manifestations of the presences. Archived data of virtual class interactions in their learning management system

(LMS) and Facebook Messenger were also gathered, guided by the CoI protocol validated in prior research.

Qualitative studies aim to produce knowledge and interpretations deemed as trustworthy while emphasizing the uniqueness of settings and contexts (Wahyuni, 2012) but takes on a different form through characteristics of credibility, consistency, and reflexivity (Krefting, 1991). To further increase the credibility of the findings, triangulation was applied through the use a mixed method approach based on multiple data sources, ensuring thick and accurate descriptions of human experience (Merriam, 2009; Stake, 1995). Descriptive statistics for the CoI survey Part 1 were generated using the SPSS software and the Lime Survey program, which included mean, median, and standard deviation. These results supported the qualitative findings.

For the qualitative data, constant comparison analysis was used as a systematic process to examine varied meanings to generate a set of themes based on textual data (Leech & Onwuegbuzie, 2008). Relationships among portions of the data were identified (Merriam, 2009) and through the coding process, which entailed three phases: open coding, axial coding, and selective coding (Saldaña, 2016). Open coding was employed manually on the FGD transcripts that became the basis for summative notes, both of which were furnished the participants for proper member checks. Thus, an intra-coder reliability was attained, with the researcher as the sole coder maintaining consistency in the coding at the CoI category level and indicator level, followed by participant validation. These actions were described as a proper alternative to inter-coder reliability (Castleberry & Nolen, 2018).

Another round of coding was undertaken through the NVivo software for electronic coding, which facilitated axial and selective coding. The axial coding meant going beyond the initial coding to interpret meanings (Merriam, 2009), and writing analytical memos to reflect on the codes generated, their patterns and connections, and the coding process (Saldaña, 2016). Responses which fall in either of the two presences or elements within the CoI were mapped out within the intersections of the presences, then coded at the category level and indicator level. These guided the data analysis of the intersections of the presences to reveal its confluences.

Findings

Findings from the CoI Survey Parts 1 and 2 survey and class observations highlighted the manifestations of CP across its categories and indicators. The interaction of CP with the other presences was revealed through the teacher interviews and student FGDs. The following sections expound on these.

Findings from the CoI Survey

The CoI framework posited that students actively participated in their learning through the collaborative inquiry cycle (Garrison, 2017). CP of this nature is ascertained through specific results from the CoI Survey Part 1. Items in this portion of the survey are framed from the students' view. Out of the 12 items under CP in the survey, five items started with "I", as seen in Table 1. These items signify the individual learner as an active participant of their learning through critical thinking, exploration, and application of knowledge and problem-solving. Among all CoI Part 1 Survey items, CP items gained the highest mean ratings compared to SP and TP items (on a scale of 1 to 5, with 5 as the highest). CP items indicated even ratings and positive results, as seen in Table 2. Selected items under CP covered the whole range, with isolated 'Strongly disagree' and 'Disagree' responses. Generally, the mean scores are high, and the SD results skewed left towards 'Strongly agree' and 'Agree' responses.

Table 2

Descriptive Statistics of CP Items of the CoI Survey Part 1

CP Category	Survey Item	*M*	*SD*
Triggering event	CP23 The problems posed increased my interest in issues tackled in class.	3.63	1.102
	CP24 The online learning activities engaged my curiosity.	4.13	0.822
	CP25 I felt motivated to explore content-related questions.	4.02	0.920
Exploration	CP26 I utilized a variety of information sources to explore problems posed in this subject.	4.05	0.904
	CP27 Brainstorming and finding relevant information helped me resolve content related questions.	4.27	0.506
	CP28 Online discussions were valuable in helping me appreciate different perspectives.	4.10	0.841
Integration	CP29 Combining new information helped me answer questions raised in the class activities.	4.38	0.667
	CP30 Learning activities helped me construct explanations/solutions.	4.33	0.764
	CP31 Reflection on content and discussions helped me understand fundamental concepts in this subject.	4.23	0.660
Resolution	CP32 I can describe ways to test and apply the knowledge created in this subject.	4.00	0.751
	CP33 I have developed solutions to problems that can be applied in practice.	4.15	0.802
	CP34 I can apply the knowledge created in this subject to my other classes or other related activities in school.	4.28	0.716

Most students believed that their experiences of participating in BL were challenging and engaging in piquing their curiosity and motivation to explore questions indicated by high mean ratings in Items CP24 and CP25. The lowest mean score was found in the category of Triggering Event, with Item CP23 having 3.63. This item referred to problem-posing to gain interest in discussion and participation compared to other CP items. It is possible that problem-posing activities were not the usual ways to introduce a new subject content to gain student interest.

The category of Integration gained the highest ratings at 92% (combined agree and strongly agree) with Items CP29-CP30 with the highest mean as seen in Table 2. Item CP29 is related to the connection and convergence of ideas in response to questions discussed in class. Items CP30 and CP31 imply knowledge construction and reflection as part of critical thinking among students. The three CP items under Resolution also received high ratings at 83% (combined agree and strongly agree) based on the average results across three schools. These items referred more to student effort and action to apply knowledge. For example, item CP33 included problem-solving and knowledge application, while Item CP34 was about the broader application of knowledge to other subjects. However, Item CP32 under Resolution received a range of top three responses. This item referred to the student's ability to describe ways to apply and test knowledge.

Responses to the CoI Survey Part 2 revealed positive experiences related to CP with students, indicating that their ability to think more broadly was tested through the BL modules, learning activities, quizzes, and assessments. Students felt more actively engaged in their learning while working on different content and learning activities thereby fulfilling role expectations. Students attested how their teachers also ensured cooperative and collaborative learning to enhance their online and face-to-face experiences. There were also teacher-driven discussions and facilitation, which mainly triggered thinking and engagement through varied questions.

Findings from Student FGD

Data from student FGD also provided support for students engaging in group work and collaborative learning. To qualify further manifestations of these interactions, data were examined in the light of CP categories and indicators. Samples revealed explicit actions students take to attain shared goals, to accomplish the required work, or to co-regulate learning. The student responses also indicated the interaction of CP and TP and CP and SP, especially during group work and collaboration, with examples of co-regulation and metacognition.

Students related their group learning experiences with the use of technology. For example, students at School A and School C indicated that they engaged in group chats mainly to exchange information, discuss ideas, or work together to understand a lesson further. Grade 10 students at School C mentioned:

> We do group works mostly online or meeting up when we do not have classes. We usually talk using social media apps like Facebook and FB Messenger. We assign tasks to each member and encourage them to participate with the group. We get references from the lessons posted in the platform or we follow the instructions/activity given by the teacher through the platform.

> Being together for 4 years, I can say that our bond has been strengthened, we know each other more now. We can expand our knowledge using our platform and with the help of our teachers.

Students at School B engaged in cooperative and collaborative learning activities but more in their face-to-face classes. One student described group work, stating, "It's fun, noisy, chaotic and yet we are able to do what is asked of us." However, collaborating online is not without its challenges. A Grade 10 student from School A mentioned, "Sometimes we have group work or collaborative work given while online … the quality is not so good because the others do not help or participate in the work." Though students from School B described their interactions as mostly constructive and positive, issues arose relating to their work quality and peer relations. Students themselves perceived these to be part of undertaking group work, recognizing their similarities and differences.

Student responses were also considered in the light of metacognition as part of CP reported in research by Garrison and Akyol (2015a). Student descriptions of online work implied forms of metacognition through self-regulation, as seen in Table 3.

Table 3

Aligning Items: Samples of CP with Self-Regulation and Co-Regulation

CP Survey Items Arbaugh et al. (2008)	Student Responses on questions related to: peer support, regulation of behavior, group work and collaboration, the role of ICTs	Shared Metacognition Questionnaire Items Garrison and Akyol (2015a) SR – Self-regulation CR – Co-regulation
Exploration 26. I utilized a variety of information sources to explore problems posed in this subject.	I see to it that I write every reminder or work given by the teacher so that I am able to pass to a classmate the activities. (Student_A)	SR11 I apply strategies. CR 8 I request information from others.
28. Online discussions were valuable in helping me appreciate different perspectives	They ask, and I get to answer them correctly, and I can also contribute my answers, and so we learn more. (Student_B)	CR 7 I look for confirmation of my understanding from others. CR 9 I respond to the contribution others make. CR 11 I challenge others' perspectives
Integration 29. Combining new information helped me answer questions raised in the class activities.	I do the research and tasks for us. (Student_B) I am able to explain so that they will be able to understand more each problem. (Student_B)	SR11 I apply strategies. CR12 I help the learning of others.
Resolution 32. I can describe ways to test and apply the knowledge created in this subject.	By watching tutorials regarding this certain app and applying it until I master it, then upgrading to another app that can boost my creativeness much further. (Student_C)	SR6 I am aware of my existing knowledge. SR11 I apply strategies.

In Table 3, items from the Shared Metacognition Questionnaire of Garrison and Akyol (2015a) were added to show corresponding self-regulation and co-regulation taking place. Students attested to regulating their learning when online and working independently. In addition, one student indicated, "I am more comfortable by myself because I am able to focus." Another student said, "Sometimes I prefer that I study on my own because I feel I can understand more. It seems like his way of teaching is different. She/he has her/his own different ways, while mine is different."

At the same time, students also revealed that completing online work was a challenge to keeping focused on the task at hand as they get distracted with Facebook, YouTube, Wattpad, and having multiple tabs open while engaged in online work. Other students also mentioned delaying work by playing online games. To cope with distractions, students have indicated ways to manage their time better, such as taking note of deadlines. They also passed on reminders and announcements to each other, especially to those who had been absent during their face-to-face sessions.

In summary, findings from student participants revealed varied ways CP is manifested, which were interpreted alongside the categories and indicators within the CoI framework. Results also indicated the interaction of CP with TP and SP, especially during group work and collaboration, with examples of co-regulation and metacognition.

Findings from the Teacher Interviews and Questionnaire

Data from the teacher participants were necessary to provide evidence on what entailed as learning with academic goals in mind given the ways in which content and instruction were organized and delivered. The construct of CP in research is explained through the practical inquiry which Filipino teachers may not consciously be aware of but perhaps experience. As such, the study brought these to light in ways the participants describe the interactions in their BL classes. Manifestations of CP based on teacher participant responses alluded to CP as critical thinking and reflection among students taking place within the BL classes, as described below:

> Through critical thinking, students focus on the processes of learning rather than just attaining facts about phenomena. Critical thinking helps learners to create and apply new knowledge to real-world situations. The elearners think critically and become actively responsible for their own education. (School C Teacher)

> In terms of encouraging them to reflect on their learning, I usually do it face-to-face by asking them how they are going to apply what they have learned to their everyday lives. And if there is still time, I let them do some activities in connection to the lesson. (School B Teacher)

Ms. Lota, the Filipino teacher at School C, felt that critical thinking was innate for those capable students who were predisposed to use it. As such, it may affect the outcomes of their BL experiences. She indicated: "If the students are quite intelligent or knowledgeable or capable, then BL becomes more appropriate, especially among those who can really rely on their own thinking…It's really meant for those who are more capable." These responses revealed that teachers put value on the kind of thinking they encourage among students through the corresponding learning content and activities. These findings were aligned with the students' ratings and descriptions of their BL experiences based on the CoI survey results.

Findings from Class Observations and Archived Virtual Classroom Data

In terms of the CP categories and specific indicators, Information Exchange and Connecting Ideas were manifested across the three schools because teachers described them and witnessed them in the class observations. Data from the class observations were counted and juxtaposed with archived data coding frequency count. Data were gathered through live class observations, with the researcher jotting down notes on a class observation template, then writing field notes and memos thereafter. The CP indicators were summarized against coding frequency counts indicating a total count of 48 across the categories of CP in the class observations and archived online class data. The CP category of Exploration received the highest coding count at 22 for both face-to-face and online class interactions, while Integration and Resolution received the least, with eight counts each.

These findings provided evidence of CP among students when they were engaged in Exploration but mainly through information exchange in face-to-face class observations and archived data of virtual classes. The category of Triggering Event was manifested minimally in both the class observations and archived data. For example, Facebook Messenger posts poll activities where students recorded and justified their responses with explanations in English, giving way to essay-writing activities during their face-to-face time. Integration was also indicated through convergence among group members and through connecting ideas during

small group discussions. Manifestations of Resolution were primarily found in face-to-face classes. In contrast, Reflection as an indicator of CP was found in face-to-face class observations and archived data.

Thus far, manifestations of CP among students were primarily evidenced through findings from student and teacher participants and face-to-face class observations. Unfortunately, minimal results supported CP through online work due to limitations in the archived virtual classroom data. Overall, however, findings revealed manifestations of CP through collaborative work, critical thinking, self-regulation, co-regulation, and metacognition.

Discussion

RQ1: How is CP manifested in the BL classes?

This article sought to apply the CoI framework to understand BL experiences at the K–12 levels through the manifestations of CP. Manifestations of CP were evident as attested by students and teachers across the categories of triggering event, exploration, integration, and resolution, supported by positive results based on quantitative measures of CP in research. Teachers described learning activities which promote critical thinking and reflection in their BL classes. Students mainly experienced CP through their collaborative work and interacting with content, teachers, and peers. Among the categories, exploration was highly evident in both face-to-face and online classes and through initiating online facilitation, regulating their online browsing, monitoring the status of group work, checking on a peer's understanding and searching for additional information to help themselves learn. These were revealed through group work and collaborative activities but mostly observed in face-to-face classes. Overall, students felt that their BL experiences kept them active and curious to learn more and challenged their ways of thinking and working with others.

RQ2: In what ways do the interactions of CP with the other presences characterize learning community building?

In terms of the interactions of CP with the other presences, this study demonstrated student actions in cooperative and collaborative learning tasks that may lead to improved cognition, reflection, and knowledge creation expected of collaborative inquiry. Though these outcomes were not elaborately described in this study due to the limited classroom observations, its link to learning community building were justified based on the findings that relate to the interactions of CP with the other presences. Learning communities are not just defined by social interactions, shared values, and shared roles to achieve common goals. The learning and reflection are valuable within a community of inquiry. Within the CoI, these are said to be manifested through dialogue, reflection, and critical discourse as members of the learning community engage in the cycle of collaborative inquiry (Garrison, 2017; Redmond, 2014; Reilly, 2014). Critical thinking and other high order learning skills are examined through the construct of CP (Layne & Ice, 2014; Richardson & Ice, 2010) within learning communities. Though the complete cycle of the phases of practical inquiry has not been completely covered by this study, the presence of critical thinking may be inferred as taking place through the manifestations of CP. As for dialogue, reflection and critical discourse, this study revealed minimal evidence through classroom observation and archived data to validate the teachers' responses.

This study found learning community building as characterized by CPs interactions with the other presences through the evidence of cooperative and collaborative work driven by the CP among the students. These collaborations resulted in connectedness and the attainment of shared goals indicative of learning communities (Villanueva, 2021). The results revealed that students

anticipated going to school to be with their classmates and teachers and not merely to socialize. This emphasized the school setting as a place to learn from and with each other. The students indicated their sense of connectedness and belongingness while engaged in BL. As they learned together within a shared space, students' "collective identity" was acknowledged because they contributed to each other's learning as it became seen and felt. Kennedy and Kennedy (2013) discussed collective identity concerning community building among group members through metacognitive goals and reflexivity. Learning community, therefore, was a matter of thinking about attaining social and cognitive goals. In this study, the collective identity was reinforced through a combination of student-initiated small-group work online and teacher-planned group activities when in school.

The BL environment in the Philippine K–12 system provided the context to further examine the interactions of CP with TP and SP through the constructs of self-regulation and co-regulation as studied by Garrison and Akyol (2015b). As such, this study affirms the stance of Garrison (2017) to maintain the integrity of the three presences while recommending further research into the meanings placed by learning community members on the intersections of the presences to assure the applicability of the CoI framework in other settings. The following sections unpack these further by discussing regulating learning and supporting discourse as the intersections of the presences, thus revealing learning communities.

Regulating learning: The intersection of TP and CP

Self-regulation is a valuable area of research among primary and secondary school students (Blume et al., 2021; Meusen-Beekman et al., 2015). This is particularly relevant given the growth of BL and online learning for younger students (Halverson et al., 2017; Martin et al., 2021) and limited studies on the CoI's applicability in the K–12 setting (Sanders & Lokey-Vega, 2020). This study found evidence of self-regulation and co-regulation as seen through the examples of interaction with content and interaction with students. Swan (2003) referred to these types of interactions as the space where CP and SP exist. Through their individual and collaborative work, student manifestations of CP were re-examined to match with the CP categories and Shared Metacognition Questionnaire formulated by Garrison and Akyol (2015a). Samples of CP were found in student responses through the CoI Survey Part 2 and student FGD. These samples identified the explicit actions taken by the students to monitor their learning and guide that of others, particularly when they were working in groups. The students were accountable for their actions and contributions in pursuit of their learning goals.

Findings also revealed that the manifestations of CP among K–12 student participants were aligned with the definitions and examples of self-regulation in research (Blume et al., 2021; Schunk & Zimmerman, 2012). These self-regulated learning strategies correspond to seeking information, keeping records, and monitoring and seeking social assistance from others. BL meant greater opportunities for student control and flexibility in how students could interact with content and with peers and as afforded by technology. Due to the flexibility allowed by BL, students attested to learning time management, discipline, and responsibility while improving their technology skills for learning (Villanueva, 2021). These skills also imply self-regulation as CP manifested by adolescent learners in this study.

Shared metacognition was defined as the construct that signifies "an awareness of one's learning in the process of constructing meaning and creating understanding associated with self and others" (Garrison, 2018, p. 2). The construct was described to capture two distinct but interrelated elements of self-regulation and co-regulation. In this study, finding manifestations of CP revealed that the construct of one could not be studied independently from the other. This

study supports Garrison and Akyol's (2011) proposed regulating learning as the intersection of TP and CP with evidence from the K–12 setting. Therefore, exploring the use of categories and indicators alongside the constructs of shared metacognition of CP contributed to the understanding of BL in the K–12 setting.

Supporting discourse: The intersection of CP and SP

Supporting discourse is at the intersection of CP and SP within the CoI framework. In an earlier study, Morueta et al. (2016) examined the relationship between CP and SP. Their study reported the positive relationship between SP and CP, especially when TP is inaccessible or not visible. Similarly, in this study, CP and SP are positively related, with students further qualifying the group cohesion and collaborative learning they have experienced as a highlight of their BL experiences. To some extent, students have indicated the role of technology and the choice of media which support their positive views of BL. For example, students have mentioned sustaining online interactions with their classmates on days they are not in school and learning independently afforded by the school's LMS platform and Facebook Messenger. The choice of social networking technologies reported among higher education students enabled the interactions to take place (Bateman, 2021) and enhanced their face-to-face discussions and sense of community (Milošević et al., 2015). The same is valid within the K–12 context.

This study also revealed that BL interactions entailed explicit student actions to help themselves learn. Lam (2015) also found similar student behaviors through a case study that explored student experiences in a higher education BL course. The study gathered qualitative data through interviews and field notes but without the use of the CoI instrument. It concluded by proposing an extension of the CoI framework to include "autonomy presence," defined as "the drive to inquiry that leads to sharing and discussion initiated by individuals" (Lam, 2015, p. 51). However, this current study's findings characterized these student-driven actions as co-regulation amidst small group social interactions. Hence, this study asserts that 'autonomy presence' need not be accommodated within the CoI as a separate presence. Some studies will go as far as to suggest the inclusion of collegial presence (Sanders & Lokey-Vega, 2020) and learning presence (Pool et al., 2020; Shea et al., 2012). This study instead argues for a better understanding and appreciation of the intersections of the presences.

Implications for Practice and Recommendations for Future Research

Meaningful learning community building through the interactions of the presences have been documented in this study. This study therefore recommends teacher professional development in the areas of instructional design including the development of study guides, assessment guides, learning modules that would be grounded on the development of the presences. In addition, teacher training workshops could be implemented for the course design team to revisit and improve current learning modules to integrate learning community building strategies for a more engaging teaching and learning experience. As COVID continues to impact on learning and teaching across the globe, teachers and students need to understand how to create presence in an online space and teachers should understand how to facilitate discussion and learning online.

This research is limited due to the small sample size and small geographical location; however, the range of different data collection devices assists in overcoming these limitations.

This research demonstrated meaningful use of valid measures of learning communities through the CoI framework and widened its applicability in educational environments in

developing countries such as the Philippines and within the K–12 context. However, it was found that the CP items of the CoI survey did not explicitly reveal the self-regulating task students can perform. Aspects of self-regulation and co-regulation were not accounted for within the CoI categories nor the CoI instrument. In addition, student actions while learning independently were manifested as TP under the proposed category of self-direction of students (Villanueva, 2021).

Hence, this study suggests that in the context of K–12 BL, the categories and indicators of CP undergo modification as indicated in Appendix A (in yellow highlights). Self- and Co-regulation and Reflection have been included as CP categories within the CoI. These new categories have corresponding items for accommodation as indicators. For example, under CP is Reflection as a category with indicators of 'reflecting on content' and 'reflecting on the learning process' made explicit. The other categories from the collaborative inquiry under CP have been replaced with the category 'Critical Thinking and Dialogue', but its corresponding indicators are maintained. These proposed changes are based on the manifestations of indicators found in the study but not necessarily on how it is defined through a constructivist learning theory. Keeping the indicators within the framework will provide support for K–12 BL programs transitioning to constructivist learning communities. Consequently, the suggested modification will also apply to the K–12 CoI survey instrument proposed by Villanueva (2020) and with the corresponding CP items suggested in this study (see Appendix B). Further research on these proposed changes is recommended to gain a greater understanding of ways to develop self-regulation and metacognition among younger students.

Conclusion

This study has initiated the application of the CoI survey instrument adapted for use in the Philippine K–12 setting which resulted to a deepened understanding of BL interactions through the element of CP within the CoI framework. This resulted in an interpretation of CP through self-regulation and co-regulation, leading to an appreciation of the interaction of CP with the other presences. Evidence of learning communities as outcomes of BL interactions was examined through meanings and manifestations of CP drawn from shared experiences of connectedness, collaborative work, and shared views on technology from Filipino K–12 teachers and learners. Overall, this study provided evidence of learning community building which has implications for future research on the applicability of the CoI in the K–12 setting. This study addressed the call for keeping the integrity of the presences within the CoI while exploring the potential to strengthen it in learning environments where either BL programs are still emerging amidst teacher-directed pedagogies or where the collaborative inquiry cycle has not been thoroughly co-opted.

References

Akyol, Z., & Garrison, D. R. (2011). Assessing metacognition in an online community of inquiry. *The Internet and Higher Education, 14*(3), 183–190. https://doi.org/10.1016/j.iheduc.2011.01.005

Anderson, T., & Kanuka, H. (1999). Using constructivism in technology-mediated learning: Constructing order out of the chaos in the literature. *Radical Pedagogy, 2*(1), 1–25. http://radicalpedagogy.icaap.org/content/issue1_2/02kanuka1_2.html

Arbaugh, J. B., Cleveland-Innes, M., Diaz, S. R., Garrison, D. R., Ice, P., Richardson, J., & Swan, K. (2008). Developing a community of inquiry instrument: Testing a measure of the community of inquiry framework using a multi-institutional sample. *The Internet and Higher Education, 11*(3), 133–136. https://doi.org/10.1016/j.iheduc.2008.06.003

Barbour, M. (2018). A history of K–12 distance, online, and blended learning worldwide. In K. Kennedy & R. E. Ferdig (Eds.), *Handbook of research on K–12 online and blended learning* (2nd ed., pp. 21–40). Carnegie Mellon University ETC Press.

Bateman, T. (2021). Using academic social networks to enhance the student experience in online education. *Online Learning, 25*(4), 295–323. https://doi.org/10.24059/olj.v25i4.2532

Blume, F., Schmidt, A., Kramer, A. C., Schmiedek, F., & Neubauer, A. B. (2021). Homeschooling during the SARS-CoV-2 pandemic: The role of students' trait self-regulation and task attributes of daily learning tasks for students' daily self-regulation. *Zeitschrift für Erziehungswissenschaft*, *24*(2), 367–391. https://doi.org/10.1007/s11618-021-01011-w

Borup, J., Walters, S., & Call-Cummings, M. (2020). Student perceptions of their interactions with peers at a cyber charter high school. *Online Learning, 24*(2), 207–224. https://doi.org/10.24059/olj.v24i2.2015

Castellanos-Reyes, D. (2020). 20 years of the Community of Inquiry framework. *TechTrends*, *64*, 557–560. https://doi.org/10.1007/s11528-020-00491-7

Castleberry, A., & Nolen, A. (2018). Thematic analysis of qualitative research data: Is it as easy as it sounds?. *Currents in Pharmacy Teaching and Learning, 10*(6), 807–815. https://doi.org/10.1016/j.cptl.2018.03.019

Chen, Y., Lei, J., & Cheng, J. (2019). What if online students take on the responsibility: students' cognitive presence and peer facilitation techniques. *Online Learning, 23*(1), 37–61. https://doi.org/10.24059/olj.v23i1.1348

Cleveland-Innes, M., & Campbell, P. (2012). Emotional presence, learning, and the online learning environment. *The International Review of Research in Open and Distributed Learning, 13*(4), 269–292. https://doi.org/10.19173/irrodl.v13i4.1234

Espiritu, J., & Budhrani, K. (2019). Cultivating an e-learning culture. *Scientia Pedagogica Experimentalis, 56*(1), 3–32. https://www.lotuswebtec.com/en/spe/current-issue-spe.html

Garrison, D. R. (2018, October 28). Shared metacognition. *The Community of Inquiry*. http://thecommunityofinquiry.org/editorial16

Garrison, D. R. (2017). *E-learning in the twenty-first century: A community of inquiry framework for research and practice*. Routledge.

Garrison, D. R., & Akyol, Z. (2011). Assessing metacognition in an online community of inquiry. *The Internet and Higher Education, 14*(3), 183–190. https://doi.org/10.1016/j.iheduc.2011.01.005

Garrison, D. R., & Akyol, Z. (2013). The community of inquiry theoretical framework. In M. G. Moore & W. C. Diehl (Eds.), *Handbook of distance education* (pp. 122–138). Routledge.

Garrison, D. R., & Akyol, Z. (2015a). Developing a shared metacognition construct and instrument: Conceptualizing and assessing metacognition in a community of inquiry. *The Internet and Higher Education, 24*, 66–71. https://doi.org/10.1016/j.iheduc.2014.10.001

Garrison, D. R., & Akyol, Z. (2015b). Thinking collaboratively in educational environments: Shared metacognition and co-regulation in communities of inquiry. In J. Lock, P. Redmond, & P. Danaher (Eds.), *Educational developments, practices and effectiveness* (pp. 39–52). Palgrave Macmillan. https://doi.org/ 10.1057/9781137469939_3

Garrison, D. R., Anderson, T., & Archer, W. (2001). Critical thinking, cognitive presence, and computer conferencing in distance education. *American Journal of Distance Education, 15*(1), 7–23. https://doi.org/10.1080/08923640109527071

Garrison, D. R., & Arbaugh, J. B. (2007). Researching the community of inquiry framework: Review, issues, and future directions. *The Internet and Higher Education, 10*(3), 157–172. https://doi.org/10.1016/j.iheduc.2007.04.001

Garrison, D. R., & Cleveland-Innes, M. (2005). Facilitating cognitive presence in online learning: Interaction is not enough. *The American Journal of Distance Education, 19*(3), 133–148. https://doi.org/10.1207/s15389286ajde1903_2

Hadwin, A., Järvelä, S., & Miller, M. (2011). Self-regulated, co-regulated, and socially shared regulation of learning. In D. H. Schunk & B. Zimmerman (Eds.), *Handbook of self-regulation of learning and performance* (pp. 65–84). Routledge. https://doi.org/10.4324/9780203839010

Halverson, L. R., Spring, K. J., Huyett, S., Henrie, C. R., & Graham, C. R. (2017). Blended learning research in higher education and K–12 settings. In M. J. Spector, B. B. Lockee, & M. D. Childress (Eds.), *Learning, design, and technology: An international compendium of theory, research, practice, and policy* (pp. 1–30). Springer. https://doi.org/10.1007/978-3-319-17727-4

Harrell, K., & Wendt, J. (2019). The impact of blended learning on community of inquiry and perceived learning among high school learners enrolled in a public charter school. *Journal of Research on Technology in Education*, *51*(3), 259–272. https://doi.org/10.1080/15391523.2019.1590167

Kennedy, D., & Kennedy, N. S. (2013). Community of philosophical inquiry online and off: Retrospectus and prospectus. In *Educational communities of inquiry: Theoretical framework, research and practice* (pp. 12–29). IGI Global.

Krefting, L. (1991). Rigor in qualitative research: The assessment of trustworthiness. *American Journal of Occupational Therapy*, *45*(3), 214–222. https://doi.org/10.5014/ajot.45.3.214

Kozan, K., & Caskurlu, S. (2018). On the Nth presence for the community of inquiry framework. *Computers & Education, 122*, 104–118. https://doi.org/10.1016/j.compedu.2018.03.010

Lam, J. Y. (2015). Autonomy presence in the extended community of inquiry. *International Journal of Continuing Education and Lifelong Learning, 8*(1), 39–61. https://search.informit.org/doi/10.3316/INFORMIT.705821081676347

Layne, M., & Ice, P. (2014). Merging the best of both worlds: Introducing CoI-TLP model. In B. Sutton & A. Basiel (Eds.), *Teaching and learning online: New models of learning for a connected world* (Vol. 2, pp. 3–20). Routledge.

Leech, N. L., & Onwuegbuzie, A. J. (2008). Qualitative data analysis: A compendium of techniques and a framework for selection for school psychology research and beyond. *School Psychology Quarterly, 23*(4), 587–604. https://doi.org/10.1037/1045-3830.23.4.587

Ma, Z., Wang, J., Wang, Q.Z, Kong, L., Wu, Y., & Yang, H. (2016). Verifying causal relationships among the presences of the Community of Inquiry framework in the Chinese context. *International Review of Research in Open and Distributed Learning, 18*(6), 213–230. https://doi.org/10.19173/irrodl.v18i6.3197

Majeski, R. A., Stover, M., & Valais, T. (2018). The community of inquiry and emotional presence. *Adult Learning, 29*(2), 53–61. https://doi.org/10.1177/1045159518758696

Martin, F., Bacak, J., Polly, D., & Dymes, L. (2021). A systematic review of research on K12 online teaching and learning: Comparison of research from two decades 2000 to 2019. *Journal of Research on Technology in Education,* 1–20. https://doi.org/10.1080/15391523.2021.1940396

Matuga, J. M. (2009). Self-regulation, goal orientation, and academic achievement of secondary students in online university courses. *Journal of Educational Technology & Society, 12*(3), 4–11. https://www.jstor.org/stable/jeductechsoci.12.3.4

Merriam, S. B. (2009). *Qualitative research: a guide to design and implementation*. Jossey-Bass.

Meusen-Beekman, K.D., Joosten-ten Brinke, D. & Boshuizen, H.P. (2015). Developing young adolescents' self-regulation by means of formative assessment: A theoretical perspective. *Cogent Education, 2*(1), 1071233. https://doi.org/10.1080/2331186X.2015.1071233

Milošević, I., Živković, D., Arsić, S., & Manasijević, D. (2015). Facebook as virtual classroom—Social networking in learning and teaching among Serbian students. *Telematics and Informatics, 32*(4), 576–585. https://doi.org/10.1016/j.tele.2015.02.003

Molnar, A., Miron, G., Elgeberi, N., Barbour, M. K., Huerta, L., Shafer, S. R., & Rice, J. K. (2019). *Virtual Schools in the U.S. 2019*. National Education Policy Center. http://nepc.colorado.edu/publication/virtual-schools-annual-2019

Moreira, J., Ferreira, A., & Almeida, A. (2013). Comparing communities of inquiry of Portuguese higher education students: one for all or one for each? *Open Praxis, 5*(2), 165–178. https://www.learntechlib.org/p/130639/

Morueta, R., López, P., Gómez, Á., & Harris, V. W. (2016). Exploring social and cognitive presences in communities of inquiry to perform higher cognitive tasks. *The Internet and Higher Education, 31*, 122–131. https://doi.org/10.1016/j.iheduc.2016.07.004

Olpak, Y. Z., & Kiliç Çakmak, E. (2018). Examining the reliability and validity of a Turkish version of the community of inquiry survey. *Online Learning, 22*(1), 147–161. https://doi.org/10.24059/olj.v22i1.990

Parker, J., & Herrington, J. (2015, November 29). *Setting the climate in an authentic online community of learning* [Conference presentation]. Annual Meeting of the Australian Association of Research in Education, Notre Dame University, Fremantle, Western Australia. https://files.eric.ed.gov/fulltext/ED593827.pdf

Pool, J., Reitsma, G., & Van den Berg, D. (2017). Revised community of inquiry framework: Examining learning presence in a blended mode of delivery. *Online Learning, 21*(3), 153–165. http://doi.org/10.24059/olj.v21i3.866

Redmond, P. (2014). Reflection as an indicator of cognitive presence. *E-Learning and Digital Media*, *11*(1), 46–58. https://doi.org/10.2304/elea.2014.11.1.46

Reilly, C. (2014, October 27). *Online teaching as the art of hosting: Designing social interactions to promote engagement* [Conference presentation]. E-Learn: World Conference on E-Learning in Corporate, Government, Healthcare, and Higher Education, New Orleans, LA, United States. https://www.learntechlib.org/p/148876/

Republic of the Philippines, Department of Education. (2012). *Policy guidelines on the implementation of alternative delivery modes*. DepEd Order No. 54 s.12. https://www.deped.gov.ph/2012/06/15/do-54-s-2012-policy-guidelines-on-the-implementation-of-alternative-delivery-modes-adms/.

Richardson, J., & Ice, P. (2010). Investigating students' level of critical thinking across instructional strategies in online discussions. *The Internet and Higher Education, 13*(1), 52–59. https://doi.org/10.1016/j.iheduc.2009.10.009

Saldaña, J. (2016). *The coding manual for qualitative researchers*. Sage.

Sanders, K., & Lokey-Vega, A. (2020). K–12 community of inquiry: A case study of the applicability of the community of inquiry framework in the K–12 learning environment. *Journal of Online Learning Research, 6*(1), 35–56. https://www.learntechlib.org/primary/p/210589/

Schunk, D. H., & Zimmerman, B. J. (2012). *Motivation and self-regulated learning: Theory, research, and applications*. Routledge.

Shea, P., Hayes, S., Smith, S. U., Vickers, J., Bidjerano, T., Pickett, A.,Gozza-Cohen, M., Wilde, J. & Jian, S. (2012). Learning presence: Additional research on a new conceptual element within the community of inquiry (COI) framework. *The Internet and Higher Education, 15*(2), 89–95. https://doi.org/10.1016/j.iheduc.2011.08.002

Stake, R. E. (1995). *The art of case study research*. Sage.

Stenbom, S. (2018). A systematic review of the community of inquiry survey. *The Internet and Higher Education, 39*, 22–32. https://doi.org/10.1016/j.iheduc.2018.06.001

Swan, K. (2003). Learning effectiveness online: What the research tells us. In J. Bourne & J. C. Moore (Eds.), *Elements of Quality Online Education, Practice and Direction* (pp. 13–45). Sloan Center for Online Education.

Vaughan, N., & Garrison, D. R. (2005). Creating cognitive presence in a blended faculty development community. *The Internet and Higher Education, 8*(1), 1–12. https://doi.org/10.1016/j.iheduc.2004.11.001

Villanueva, J. A. R. (2021). Teaching presence in K–12 blended learning classes under the alternative delivery mode. *International Journal on Online Distance and eLearning 7*(1), 31–52. https://ijodel.com/june-2021-issue/

Villanueva, J. A. R. (2020). *Investigating experiences and outcomes of K–12 blended learning classes through the Community of Inquiry framework* [Doctoral dissertation, University of Southern Queensland]. USQ ePrints. https://eprints.usq.edu.au/40350/

Wong, R. (2019). Basic psychological needs of students in blended learning. *Interactive Learning Environments*, 1–15. https://doi.org/10.1080/10494820.2019.1703010

Yu, T., & Richardson, J. (2015). Examining reliability and validity of a Korean version of the community of inquiry instrument using exploratory and confirmatory factor analysis. *The Internet and Higher Education, 25*, 45–52. https://doi.org/10.1016/j.iheduc.2014.12.004

Zimmerman, B. J. (1990). Self-regulating academic learning and achievement: The emergence of a social cognitive perspective. *Educational Psychology Review, 2*(2), 173–201. https://doi.org/10.1007/BF01322178

Appendix A

Additional Tables

Table A.1

Proposed Changes within the CP of the CoI: Categories and Indicators for the K–12 (Villanueva, 2021)

CoI Element	Categories	Indicators
Cognitive Presence*	• Self- and Co-regulation • Reflection • Critical Thinking and Dialogue	• Monitoring/Managing cognition • Reflecting on content/learning process • Sense of puzzlement • Information exchange/Exploration • Connecting ideas • Applying new ideas

Note. Adapted from Garrison and Arbaugh (2007). Adapted with permission from Elsevier.

Table A.2

Proposed Changes to the Cognitive Presence Items of the K–12 CoI Survey Instrument (Villanueva, 2020)

Cognitive Presence Category and Survey Items	Indicators
Self-and co-regulation+	
(1) I am aware of my effort and motivation.	Monitoring cognition
(2) I assess how I approach the problem.	
(3) I look for confirmation of my understanding from others.	Monitoring cognition
(4) I challenge the perspectives of others.	Managing cognition
Reflection+	
(5) I reflect upon the comments of others.	Reflecting on the learning process
(6) I reflect on the content and discussion to help me understand concepts in the subject.	Reflecting on the content
Critical thinking and dialogue	
(7) Learning activities engaged my curiosity.	Sense of puzzlement
(8) Brainstorming and finding relevant information helped me and my classmates resolve content-related questions.	Information exchange
(9) New concepts were explored sufficiently in this subject.*	Exploration
(10) Group interactions and discussions were valuable in helping me, and my classmates appreciate different perspectives.	Connecting ideas
(11) Combining new information helped me answer questions raised in-class activities.	Connecting ideas
(12) Learning activities helped me construct explanations or solutions.	Applying new ideas
(13) I can apply the knowledge created in this subject to my other classes or school-related activities.	Applying new ideas

Notes. Adapted from "The CoI Survey" from Arbaugh et al. (2008). *TP item rewritten and moved to CP; +Proposed items under this category from D. R. Garrison and Z. Akyol (2015a). Copyright 2015 by Elsevier. Adapted with permission.