Cognitive Presence in Online Courses: Design and Facilitation of Collaborative Learning

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Abstract

With increased interest in collaborative learning on asynchronous online courses, the Community of Inquiry (CoI) framework has gained most attention from scholars and practitioners for its capability of guiding the design and structure of collaborative-constructivist learning (Park & Shea, 2020). According to the CoI framework, collaborative learning occurs at the intersection of the three presences—social presence, teaching presence, and cognitive presence (Garrison et al., 2000). Cognitive presence as part of the CoI is operated by the principles of the Practical Inquiry Model (PIM) to support and maintain a purposeful collaboration among members of the online community (Garrison, 2017). Therefore, it can be used as a guide to design the type of collaboration where members are able to experience the cognitive inquiry process from a low level of understanding up to the high level of reflection where new knowledge has been constructed together (Garrison, 2017). However, research states that cognitive presence has been one of the least examined presences among all three CoI presences (Sadaf, Wu, & Martin, 2021). Therefore, more research is needed to guide collaborative learning through the inquiry process (Garrison, 2022). This proceeding of the conference panel explores what previous research studies examined regarding design and facilitation of cognitive presence for collaborative learning. The findings of this literature review will help researchers and practitioners more effectively connect research to practice where cognitive presence is part of collaborative learning design and facilitation.

Introduction

With transition to new pathways in teaching and learning, e.g., HyFlex approach that provides flexible learning for students whether they prefer online attendance or in-class participation, course instructors need to be equipped with advanced evidence-based knowledge of how students learn and what instructional strategies can be designed and facilitated to help them learn. During the COVID-19 pandemic, courses moved to emergency-remote learning where instructors had to implement online teaching to continue the learning process (Lockee, 2021; Roitsch et al., 2021). Currently, the field of distance education is observing that more and more traditional face-to-face courses prefer to integrate online learning to provide more flexible options for their students.

However, to keep the benefits of face-to-face interaction, engagement, and constructive feedback in online teaching, researchers have been actively examining how students’ cognitive learning is being designed and facilitated when instructors use an online teaching approach. It is true that recent migration to online teaching showed that educators need more support from
professionals who have extensive experience combining research findings with practice. Expert recommendations on how the current research findings can be implemented into online courses are extremely needed.

The Community of Inquiry (CoI) framework has proved to have the capability to guide design and facilitation of meaningful online teaching with the emphasis on students’ cognitive learning (Garrison, 2022). The CoI framework consists of three overlapping presences: cognitive presence, teaching presence, and social presence (Garrison et al., 2010). The CoI framework is focused on the construction of both individual and collaborative understanding. However, the main core of the framework is to guide the collaborative learning process so that students can progress from low level of critical thinking to the higher order of learning together (Garrison, 2022). This main core is known as a cognitive presence that guides construction of collaborative meaning through reflection and discourse (Garrison et al., 2001). Cognitive presence is operationalized through the Practical Inquiry (PIM) model that supports the dynamics of reflective thinking and a collaborative inquiry process (Garrison et al., 2001).

In addition to cognitive presence, there are other two presences within the CoI framework: social presence and teaching presence. Social presence is known as the ability to project oneself as an actual person both socially and emotionally in an online collaborative environment (Garrison et al., 2000; Lowenthal & Moore, 2020). Teaching presence is known as “the design, facilitation, and direction of cognitive and social processes for the purpose of realizing personally meaningful and educationally worthwhile learning outcomes” (Anderson et al., 2001, p.5). Both social presence and teaching presence are essential to establishing and maintaining cognitive presence (Garrison et al., 2010b). In addition, both social presence and teaching presence can not only enhance students’ cognitive presence but also, they can predict students perceived cognitive presence (Akyol & Garrison, 2019). To support students to transition from social presence to cognitive presence, effective teaching presence through design and facilitation should be provided by an online facilitator or students themselves such as peer feedback (Killis & Yildrim, 2018).

This proceeding shares and discusses previous research found on actual and perceived students’ cognitive presence and what type of instructional strategies are effective to design and facilitate collaborative cognitive presence processes in online teaching.

**Perceived and Actual Cognitive Presence**

In this part of the proceeding, we will focus more on the findings about students' perceived and actual cognitive presence to explain and discuss how cognitive presence has been viewed and examined. Cognitive presence is based on the phases of Dewey’s (1933) reflective thinking and a collaborative inquiry process (Garrison et al., 2001): (1) triggering events: identifying a problem or an issue through initiating the inquiry process, (2) exploration: searching for relevant information and offering explanations, (3) integration: interpreting and constructing possible solutions to make decisions, and (4) resolution: providing or defending potential solutions by means of practical applications (Garrison, 2011; Moore et al; 2019; Moore & Miller, 2022).
Student Perceived Cognitive Presence

The recent study by Ozogul and colleagues (2022) entitled “Student Perceptions and Actuals of Cognitive Presence: A Case Study of an Intentionally Designed Asynchronous Online Course” examined perceived cognitive presence by using the CoI survey and by conducting the interviews. The findings revealed that students self-reported a high cognitive presence (4.25 out of 5 where 5 was strongly agreed according to the CoI Likert survey scale). According to Ozogul et al. (2022), the results of perceived high cognitive presence can be explained by students’ population nature as they were all high performing students who were admitted and selected for their graduate study; students shared similar proficiency level and interests. Findings from the interviews confirmed that students shared that despite the time they allotted to work on the course while balancing job, personal life, and school commitments, course assignments helped them stay cognitively present. Examples that helped students stay cognitively present included: (1) instructor created a dialogue in online discussion, (2) guest speakers, weekly recap, (3) orientation videos, (4) instructional feedback, (5) case-based online discussions, (6) meaningful hands-on activities, (7) hands-on online project, and (8) overall instructor presence in the course (Ozogul et al., 2022).

Moore and Miller (2022) in their systematic review “Fostering Cognitive Presence in Online Courses: A Systematic Review (2008-2020)” examined 24 articles that empirically analyzed cognitive presence in online courses. The authors identified the following studies that used the CoI survey to examine perceived cognitive presence: Bissessar et al.(2020), Choo et al. (2020), Ice et al. (2011), Joo et al. (2011), Kucuk and Richardson (2019), Leader-Janssen et al. (2016), Morueta et al. (2016), Patwardhan et al. (2020), Pillai and Sivathanu (2020), Poluekhtova et al. (2020), Saadatmand et al. (2017), Sağlık and Dikilitaş (2020), Shea et al. (2010), Shea and Bidjerano (2008, 2009). Out of these studies, the following studies focused on perceived cognitive presence: Bissessar et al. (2020), Leader-Janssen et al. (201), Poluekhtova et al. (2020), Saadatmand et al. (2017), and Shea and Bidjerano (2008) while the rest examined other factors, e.g., course satisfaction, enrollment, engagement, and course design (Moore & Miller, 2022).

Student Actual Cognitive Presence

In this section we will continue reviewing Ozogul et al (2022) findings about observed cognitive presence. However, before we share Ozogul et al. (2022) study findings, we would like to note that previous studies have been consistent in findings that student’s actual cognitive presence frequently stayed at low level of exploration phase more than at the higher levels of integration or resolution phases (Bissessar et al., 2020; Galikyan & Admiraal, 2019; Kilis & Yildirim, 2019). On the contrary, other studies found that actual students’ cognitive presence could stay at higher level of integration and resolution; it depends on the assignment type, facilitation style, and/or delivery mode (Akyol & Garrison, 2008; Chen et al., 2019; Molnar & Kearney, 2017; Sadaf et al., 2020). Findings that cognitive presence could stay at the higher levels of integration and resolution phases are consistent across both graduate and undergraduate students (Akyol et al., 2011; Olessova et al., 2016).

In their case study Ozogul et al. (2022) found that all designs they implemented, e.g., case discussion, guest speaker discussion, evaluation concepts, or evaluation models discussion could foster student actual cognitive presence. Ozogul et al. (2022) adopted Zhu et al.’s (2019) study to analyze actual cognitive presence in the form of cognitive engagement using cognitive
processes and analytic categories. Ozogul et al. (2022) found that students’ observed cognitive presence may stay at high levels due to the intentionally pre-designed activities or assignments in online courses, e.g., critical discourse, providing meaningful experiences, feedback, instructor video presence, and using case studies. This is consistent with previous studies where students’ actual cognitive presence also stayed at high levels when courses were intentionally pre-designed by using scripted roles, case-based discussions, and PIM-based question prompts (Olesova et al., 2016; Sadaf & Olesova, 2017; Sadaf et al., 2022).

Therefore, as the studies found evidence that the level of cognitive presence phases is closely related to how instructors designed and facilitated online activities and assignments in their online courses, the next section will overview findings from other studies where researchers examined what types of strategies could help promote student cognitive presence.
Fostering Cognitive Presence

Moore and Miller (2022) synthesized the literature focusing on the ways instructors can use to develop student cognitive presence. Moore and Miller (2022) found that even though reaching higher levels of cognitive presence phases – integration and resolution – was not common, it was still optimal. Moore and Miller (2022) confirmed that to promote higher levels of cognitive presence phases, instructors need to align their learning objectives with the learning outcomes at appropriate levels of cognitive presence phase. It should be noted that it is not necessarily the goal of any instruction to achieve the higher level of cognitive presence, it is the question of which learning objective can support specific levels of cognitive presence phase, i.e., exploration or integration. In addition, Moore and Miller (2022) recommended providing clear participation requirements, identifying multiple ways to integrate technology, and designing structured discussion forums in fostering the development of cognitive presence.

Sadaf and Olesova (in press) in their study “Strategies to Promote Cognitive Presence in Online Courses: A 20-Year Systematic Review of Empirical Research” provided a practical guidance for promoting cognitive presence through selecting appropriate instructional strategies in online courses. Based on the findings, Sadaf and Olesova (in press) identified five key themes that emerged from this systematic review that have implications for strategies to design and facilitate cognitive presence phases: (1) state high-level critical thinking learning outcomes, (2) create the learning tasks in alignment with the learning outcomes, (3) plan pre-structured learning process from low level of triggering events to the higher level of resolution phase based on the learning task, (4) add metacognitive scaffolding to support self-regulated learning that students can work independently through intentionally pre-structured learning, and (5) consider variety of students’ roles and responsibilities based on the levels of cognitive presence phases. Sadaf and Olesova (in press) recommended the following instructional strategies to foster cognitive presence for collaborative learning: (1) case-based discussions, (2) debate, (3) role-play, (4) inquiry-based discussions, and (5) problem-based discussions. The authors noted that the mentioned instructional strategies should be combined with instructional design elements, e.g., structured tasks, pre-structured process, and metacognitive scaffolding to help students engage in intentionally pre-designed collaborative inquiry while progressing through all four phases of cognitive presence to achieve higher level learning outcomes. This is consistent with what Ozogul et al. (2022) found in their study and recommended for practical implications to foster collaborative learning.

Discussion

Most studies on cognitive presence focused on graduate-level students, followed by undergraduate students, and then adult learners (Moore & Miller, 2022). Both course design and facilitation are indicators of teaching presence within the CoI. Moore and Miller (2022) found that cognitive presence and teaching presence were linked to student learning and satisfaction. Further, Moore and Miller (2022) also analyzed studies that focused on social presence, the third element within the CoI. Studies (Kucuk & Richardson, 2019; Shea et al., 2010; Shea & Bidjerano, 2009) found that teaching presence and social presence contributed to the observed levels of cognitive presence (Moore & Miller, 2022).

To facilitate cognitive presence in online courses, instructors usually use online discussions (Akyol et al., 2011; Akyol & Garrison, 2008; Chen et al., 2019; Cho & Tobias, 2016;
DuBois et al., 2019; Gašević et al., 2015; Kumar et al., 2011; Molnar & Kearney, 2017; Moore, 2016; Rolim et al., 2019) where they design collaborative activities that students can actively participate (Moore & Miller, 2022). Students also can participate as moderators of online discussions; in this case, they play the role of facilitator and promote teaching presence themselves (Garrison, 2022; Sadaf & Olesova, in press). Students can use the following facilitation techniques: (1) playing an expert role, (2) summarizing online discussions, and (3) sharing information with their peers (Chen et al., 2019; Olesova et al., 2016). However, to foster cognitive presence, instructor’s participation is needed, for example, posing discussion prompts, branching conversations, coordinating online activities to bring students together, mentoring students and organizing collaborative groups (Moore & Miller, 2022).

**Future Research and Conclusion**

Future research on cognitive presence is entering a new phase where a more careful consideration of how cognitive presence can be designed and facilitated in collaborative learning to enhance the inquiry process. This proceeding overviewed the current research to further explore cognitive presence in online courses, specifically, when new forms of learning become available, e.g., HyFlex that we mentioned earlier. In addition, new technologies, e.g., social media has become affordable to support student collaborative learning (DuBois et al., 2019; Saadatmand et al., 2017).

This proceeding found that studies usually report the final outcomes in terms of the frequency of posts per cognitive presence phase. It could be reasonable to pay closer attention to the type of the inquiry task and how it facilitates the process of cognitive presence. For example, researchers stated that intentionally designed courses can foster the cognitive presence process (Moore & Miller, 2022; Ozogul et al., 2022; Sadaf & Olesova, in press).

Further, researchers can pay more attention to how course design, facilitation techniques, and instructional strategies guide the process of students’ collaborative progression through all the phases of cognitive presence. Finally, studies can examine how intentionally designed collaborative inquiry learning environments allow learners to regulate cognitive processes.


