CHAPTER 2: LITERATURE REVIEW

Overview

The present chapter presents a literature review that explores Community of Inquiry Framework (CoI Framework) (Garrison & Akyol, 2013a; Garrison, Anderson, Archer, 2000, 2001, 2010; Garrison & Arbaugh, 2007) and Cognitive Load Theory (CLT: Chandler & Sweller, 1991; Sweller, 1988, 1994, 2005; Sweller, Ayres, & Kalyuga, 2011; Sweller, van Merriënboer, & Paas, 1998), the two theoretical frameworks, that provide the theoretical context for the present study. To this end, the review first presents previous work on CoI Framework, and then CLT. Additionally, the review focuses on a discussion of how and why the constructs of presence and cognitive load can relate to each other in order to foster learning in online learning environments. In other words, it provides insights into how to connect presence and cognitive load in the light of the existing empirical and conceptual understandings of both presence and cognitive load. These are based on empirical or conceptual studies that incorporated either cognitive load and presence, or cognitive load and community of inquiry in online learning environments and blended learning environments to a great extent. In addition, the review provides insights into face-to-face learning environments including laboratory experimental settings informed by earlier work on presence and cognitive load. The aim is to provide a general picture of cognitive load and presence research as well as insights into possible associations between the two.

Community of Inquiry (CoI) Framework

Maddrell (2011) stated that the CoI Framework has a social-constructivist theoretical basis and does not align with behavioral or cognitive accounts of learning.

Researchers working on the CoI Framework also stated that CoI has a social constructivist nature (e.g., Akyol, Ice, Garrison and Mitchell, 2010; Akyol & Garrison, 2011b; Akyol et al., 2009; Swan, Garrison, & Richardson, 2009; Swan &Ice, 2010). Likewise, Shea et al. (2011b) stated that, according to the CoI Framework, learning is “socio-cognitive” (p. 102). Consequently, Akyol et al. (2009) and Swan et al. (2009) asserted that the CoI Framework focuses on the process of learning.

 According to Ertmer and Newby (1993), constructivism differs from behaviorism and cognitivism in that knowledge is not fully independent of a learner`s interpretation or an objective entity that can be directly transferred or acquired. Then, it is reasonable to assume a social-constructivist learning approach to focus on a collaborative interpretation of what to learn including what may seem to be an objective reality to human sensation.

Moreover, regarding the theoretical orientation of the CoI Framework, Annand (2011) stated that its original social constructivist approach to learning has evolved into an objectivist identity that can be empirically tested. It seems that the CoI Framework has been evolving since its birth, which is a natural process for any theoretical stance. Therefore, a closer look at the origins of the CoI Framework might be useful at this point.

Garrison et al. (2010) stated that:

 It is important to emphasize that this framework emerged in the specific context of computer conferencing in higher education-i.e., asynchronous, text-based group discussions-rather than from a traditional distance education theoretical perspective assumed that students worked independently from each other. (p. 5)

Despite originating from asynchronous online discussions, there have been attempts to apply the CoI Framework in different learning contexts including blended learning environments (e.g., Garrison & Vaughan, 2008, as cited in Archer, 2010, p. 69; Vaughan & Garrison, 2005) and whole online courses instead of discussion threads only (e.g., Archer, 2010; Shea et al., 2011b). These attempts seem to be in their infancy or still maturating since Shea et al. (2011b) suggested further research focus on not only discussion threads but also other communication-based processes as well as learning outcomes. Moreover, the need to extend the CoI Framework beyond online discussions, according to Archer (2010), stems from the relatively less diagnosed higher levels of cognitive presence due to “looking for these phases in the wrong place.” (p. 69). After all, students seem to save their best ideas for other course assignments including papers than online discussions (Archer, 2010).

Despite these extension efforts, name of the CoI Framework itself inherently seems to have attracted attention to online discussions especially during the early years of the CoI Framework research. This might have been particularly because of the expression community of inquiry for which online discussions might constitute a natural habitat due to their group-based nature to discuss a topic. In this respect, Garrison et al. (2010) stated that the CoI Framework was based on John Dewey`s earlier work, and that “community of inquiry” was taken from “Lipman (1991)” which is informed by John Dewey`s previous work too (p. 6).

Regarding a “community of inquiry”, Swan et al. (2009) stated that “Together, the two constituting notions of community and inquiry form a pragmatic organizing framework of sustainable principles and processes for the purpose of guiding online educational practice.” (p. 45). Besides, Garrison and Akyol (2013a) stated that a community of inquiryinvolves both “independence” and “interaction” (p. 105). The authors also defined an educational community of inquiryas “a group of individuals who collaboratively engage in purposeful critical discourse and reflection to construct personal meaning and confirm mutual understanding.” (p. 105).

Therefore, it seems that criticalness is an important asset of a community of inquiry or an educational community of inquiry. According to Garrison et al. (2001), a critical community of inquiry is “the hallmark of higher education” and it is “an extremely valuable, if not essential, context for higher-order learning.” (p. 7). Based on such a community of learning that fosters higher order thinking and learning, the CoI Framework, first introduced by Garrison et al. (2000), consists of three core elements or presence types: cognitive presence, social presence and teaching presence. The following sections present these consecutively below:

Cognitive Presence

Cognitive presence is the indispensable part of a community of inquiry(Akyol & Garrison & Akyol, 2013a). According to Garrison et al. (2000), cognitive presence is the ultimate purpose of higher education and it is of crucial importance for critical thinking. Garrison (2003) contended that an effective learning environment depends on not only cognitive processes involved but also factors moderating them, and that in order for deep and meaningful leaning to occur, it is essential to understand cognitive presence. Therefore, it is reasonable to gain insights into what cognitive presence is and what it covers.

Cognitive presence has been defined as the learners` capability of building and authenticating meaning out of a learning experience by involving in continuous reflection and communication (Garrison et al. 2000, 2001). Furthermore, approximating John Dewey`s idea of reflective thought (Garrison et al., 2010) and emanating from his “reflective thinking model” (Garrison & Akyol, 2013a, p. 108), cognitive presence has been operationalized by means of the practical inquiry model (Garrison & Akyol, 2013a; Garrison & Arbaugh, 2007; Garrison et al., 2001, 2010). The model by Garrison et al. (2001) comprises four interrelated and iterative stages:

1. A triggering event that encapsulates posing a problem to solve.
2. Explorationwhich involves critical exploration of the problem on the part of the learners.
3. Integrationrefers to integration of ideas identified during exploration by forming meaning and solutions as they relate to the existent problem or problems.
4. Resolutionis evaluating the solutions figured out, choosing the best one or ones, and applying these.

Swan et al. (2009) stated that the stages involved in the model of cognitive presence are separate, and that they have an iterative or non-linear relationship among themselves. The interrelations and iterative nature of the four phases or practical inquiry model of cognitive presence can be seen in Figure 1 on the next page:



 Figure 1 Phases of or practical inquiry model of cognitive presence (Adapted from Garrison & Akyol, 2013a, p. 109).

Buraphadeja and Dawson (2008) listed the practical inquiry model as one of the mostly used frameworks to assess critical thinking. In a case study using Bloom`s taxonomy, the SOLO taxonomy and the practical inquiry model or cognitive presence, Schrire (2004) reported that the practical inquiry model was the best fit to analyze cognitive processes involved in knowledge construction. Moreover, previous research tried to diagnose each of these cognitive presence phases based on some indicators. Akyol and Garrison (2008) provided the phases and their sample corresponding indicators as follows (p. 4):

Table 1

*Cognitive Presence Indicators*

|  |  |
| --- | --- |
| Phase | Sample Indicators |
| Triggering event | Sense of puzzlement |
| Exploration | Sharing Information  |
| Integration | Connecting ideas thus forming new ideas |
| Resolution | Applying new ideas |

From the perspective of the practical inquiry model, cognitive presence includes intentional and iterative transition through triggering events, exploration, integration and resolution or application (Garrison & Arbaugh, 2007). In other words, cognitive presence is the ultimate level of a critical community of inquiry and learners need to involve in all the phases of the practical inquiry model (Garrison & Aksoy, 2013a).

Contrasting Garrison`s (2003) claim that asynchronous online learning can lead to higher levels of cognitive presence thus encouraging effective learning, previous research referred to the less existence of integration and resolution phases especially compared to exploration stage in online discussions (e.g., Arnold & Ducate, 2006; de Leng, Dolmans, Jöbsis, Muijtjens, & van der Vleuten, 2009; Garrison et al., 2001; Kanuka, Rourke, & Laflamme, 2007; McKlin, Harmon, Evans, & Jones, 2002; Meyer, 2003; Pawan, Paulus, Yalcin, & Chang, 2003), or chats (e.g., Stein et al., 2007), and both face-to-face and online discussions (e.g., Vaughan & Garrison, 2005). Of these, Pawan et al. (2003) did not find any examples of resolution, and Meyer (2004) reported a smaller percentage of online discussions in resolution phase compared to both integration and exploration phases.

These relatively fewer instances of higher level cognitive presence found in earlier research has been attributed to teaching presence (Garrison, 2007; Garrison & Akyol, 2013a; Garrison & Arbaugh, 2007; Garrison & Cleveland-Innes, 2005; Vaughan & Garrison, 2005) or the role instructors employ (Celentin, 2007). Specifically, according to Garrison and Akyol (2013a), such findings relate to teaching presence on the basis of (a) task design; (b) pushing discussions forward on time; (c) provision of essential information. Similarly, Garrison and Arbaugh (2007) highlighted the importance of facilitation and direction aspects of teaching presence and task design regarding resolution phase of cognitive presence.

Alternatively, Meyer (2004) reported that of the online discussions classified as pertaining to resolution, a large portion (40%) was based on problem solving questions (p. 110). According to Meyer (2004), this implies that type of questions also impact the type of student responses. Likewise, Arnold and Ducate (2006) stated that resolution cases were found in the discussion that asked for “a solution to a problem.” (p. 57). Types of questions or tasks employed in this study seemed to have affected the cognitive involvement of the participants (Garrison & Arbaugh, 2007). In the same vein, Pisutova-Gerber and Malovicova (2009) pointed to the possibility of reaching integration and resolution when guided by appropriate instructional prompts.

Likewise, Murphy (2004a), a study which specifically focused on developing an instrument that would help gaining insights into collaborative problem formation and solving in asynchronous online discussions, explicitly encouraged problem formation and resolution in online discussions through such strategies as asking participants to compare their ideas with others` ideas. Moreover, the online learning environment used in the study was specifically designed for fostering collaborative problem formulation and resolution in workplace practice. An analysis of online messages revealed more problem resolution cases than problem formation thus showing that learners moved to higher levels of cognitive activity. According to Garrison and Arbaugh (2007), such insights refer to the need for designing appropriate activities (e.g., problem solving) accompanied by unambiguous instructions and effective teaching presence to reach resolution. Similarly, Murphy (2004b) suggested explicit and effective encouragement of higher-level collaborative processes in online asynchronous discussions.

 Murphy`s (2004a) step of identifying solutions described as a part of resolution seems to correspond more to integration phase of cognitive presence just as evaluating solutions and acting on solutions seem to align more with resolution. Among these, identifying solutions covered 58.5% and evaluating solutions covered 51.1% of the online discussion messages while acting on solutions included 3.2% only. In other words, using cognitive presence terminology, it seems that even in an online learning environment that purports to enhance problem solving and resolution, and that consists of discussion prompts explicitly encouraging these, resolution in terms of applying or implementing solutions can be limited to a certain extent. There may be different reasons for this.

One plausible reason is that application of the solutions might require going out of online discussions and applying them off-line in the workplace or any other real context. These seem to partly support the claim that integration and resolution/application should be searched for outside online discussions (Archer, 2010; Shea & Bidjerano, 2009a; Shea et al., 2010) in that even though integration and resolution in terms of evaluation of ideas developed might be encouraged through informing and appropriate discussion prompts or activities, evidence for application might exist in real contexts where the solutions are necessary.

Additionally, Richardson and Ice (2010) pointed out that duration of online discussions may not be long enough to encourage learners to reach the end of cognitive presence cycle independently of discussion topic. Likewise, Shea and Bidjerano (2009a) and Shea et al. (2010) asserted that in order to find instances of integration and resolution, researchers should look at other course activities than online discussions. In this regard, Archer (2010) stated that online discussions are not the correct place to trace higher levels of cognitive presence, and that students save their best ideas not for online discussions but for such assignments as papers due to higher marks associated with these.

Some other recent research, however, was indicative of more integration and resolution phases when combined as a total and especially compared to the exploration phase in online discussions (e.g., Akyol & Garrison, 2008; Richardson & Ice, 2010). In completely online or blended courses, as based on a Likert-type CoI survey, Shea & Bidjerano (2009a) reported that more than 70% of participants on average indicated integration or resolution phases. Particularly, Akyol and Garrison (2011b) not only found connections between cognitive presence and perceived and actual learning consequences but also that higher levels of cognitive presence and learning are achievable in both online and blended learning contexts. From a metacognitive perspective, Akyol & Garrison (2011a) found more and increasing instances of managing cognition as a part of metacognition in written discussions.

Among these studies, it should also be noted here that Akyol and Garrison (2008), Pisutova-Gerber and Malovicova (2009), and Richardson and Ice (2010) reported higher integration levels than resolution. On the other hand, in Shea and Bidjerano (2009a), slightly more participants strongly agreed that they went through resolution than integration while again a slightly higher number of participants agreed that they experienced integration compared to resolution. Suffice to say here, such comparisons should be approached with careful caution though. The reason is that theoretical phases of cognitive presence appear to be consecutively interrelated to some extent in that for one to go through resolution, she or he must have gone through previous stages as well. It is not clear whether previous research focused on this by paying attention to a learner`s transition from triggering events to resolution based on a specific discussion topic.

Recently, there have been studies suggesting some instructional conditions under which integration and resolution may be encouraged more: Under obligatory participation in online discussions “as part of an assignment” (p. 8), for instance, Pisutova-Gerber and Malovicova (2009) reported higher percentages of integration and resolution. On the other hand, de Leng et al. (2009) provided evidence of highly increased levels of especially resolution when a particular week of online discussions was devoted to “verification and resolution” (p. 11) with voluntary participation. Claiming that metacognition is a must for deep and meaningful learning, Garrison and Akyol (2013b) argued that metacognition should comprise “both individual and shared learning activities.” (p. 87). This implies that it would be necessary to employ both individual and collective or collaborative learning activities in order to tap metacognition or higher-level cognitive activity. In the same vein, Garrison and Akyol (2013a) argued that when students` metacognitive awareness of what cognitive presence is as a whole process, and what each phase asks for increases, it can be easier for them to move to higher levels of cognitive presence.

Moreover, Garrison and Cleveland-Innes (2005) showed that when instructor involvement is high, assignments encourage critical thinking, and interaction includes critical discourse, learners can develop a deep approach to learning despite voluntary participation and less interaction. The authors concluded that “design and teaching approach” (p. 140) greatly impact the development of a deep and meaningful approach to learning on the part of students.

In a similar vein, Kanuka and Garrison (2004) listed both external and internal factors that would enhance higher-level learning in internet-based asynchronous written communication. The external factors are “discourse”, “collaboration”, and “management” while the internal ones are “reflection”, “monitoring” and “knowledge construction” (p. 21). The results revealed that instructors are expected to take a role in (a) guiding discourse; (b) encouraging collaboration; (c) helping students with self-management; (c) modeling and facilitating reflection; (d) helping students with monitoring or self-assessing their performance; (e) helping learners to construct knowledge. All these appear to highlight the importance of the instructors` role in both design and actual teaching phases.

These suggestions align with others such as (a) providing conflicting ideas and drawing conclusions (Jeong, 2003); (b) employing intentional cognitive coaching (Lueebeck & Bice, 2005) in order to promote critical or higher-level thinking in online discussions; (c) using a scaffolded online discussion strategy to trigger resolution while using debate and role play strategies for exploration and integration (Darabi, Arrastia, Nelson, Cornille, & Liang, 2011); (d) employing multi-purpose discussions in order to lead to more social interactions as well as both class and group discussions in order to encourage both cognitive and social presence (Ke, 2010).

Overall, given all these, it is a not surprising that Vaughan and Garrison (2005) described cognitive presence as “the element within a community of inquiry which reflects the focus and success of the learning experience.” (p. 8). It also seems that in order to achieve the high levels of cognitive presence and learning, we need a certain level of teaching presence that facilitates critical thinking (Garrison & Akyol, 2013a). Next section presents insights into teaching presence by referring to previous research.

Teaching Presence

Regarded as a significant driver for learner satisfaction, perceived learning, and understanding or awareness of a learning community (Garrison & Arbaugh, 2007), earlier CoI Framework research provided cumulative evidence pointing to the importance of teaching presence (Garrison & Akyol, 2013a; Garrison et al., 2010). According to Garrison and Akyol (2013a), it is of great importance not only in terms of learning consequences but also of aligning social and cognitive presence with each other. Garrison and Akyol (2013a) further contended that independent of the type of learning context (i.e., online, blended, face-to-face), an instructor is always needed to “structure, shape and assess the learning experience” (p. 113).

So, what is teaching presence all about? Anderson, Rourke, Garrison, and Archer (2001) defined teaching presence as “the design, facilitation, and direction of cognitive and social processes for the purpose of realizing personally meaningful and educationally worthwhile learning outcomes.” (p. 5). This definition provides clues regarding the components of teaching presence. In other words, teaching presence categories are design and organization, facilitating discourse, and direct instruction (Akyol & Garrison, 2008; Anderson et al., 2001; Garrison & Akyol, 2013a).

Anderson et al. (2001) described design and organization as the design of “the process, structure, evaluation and interaction” (p. 5) characteristics of an online learning environment and “providing guidelines and tips and modeling” (p. 6). According to Akyol and Garrison (2013a) and Garrison (2011), design and organization relate to the larger e-learning context that includes technology and necessitates adaptation of existing learning and teaching approaches. Consequently, design and organization may be more challenging in online learning environments (Garrison, 2011; Garrison & Akyol, 2013a). Similarly, Vonderwell and Turner (2005) stated that “Strategic planning and integration of pedagogical activities is perhaps the most important aspect of online teaching.” (p. 68).

Facilitating discourse, moreover, involves fostering reflective and sustained communication, and “interest, motivation, and engagement” of learners as well as evaluating the effectiveness (Anderson et al., 2001, p. 7). Being different from discussion (Anderson et al., 2001), discourse is a collaborative attempt that tries to resolve cognitive conflicts through critical and reflective dialogue (Garrison, 2013). Accordingly, facilitating discourse comprises encouraging students` “interest, motivation, and engagement” as well as developing and maintaining a community of inquiry, and assessing the whole learning experience (Anderson et al., 2001).

As for direct instruction, it refers to both catching and dealing with misunderstandings (Garrison & Akyol, 2013a). Specifically speaking, it includes teachers` use of their content area and pedagogy knowledge when necessary as in the case of misunderstandings as well as guiding students to further resources and resolving technical issues (Anderson et al., 2001). This sounds to entail providing scaffolding or feedback more directly whenever necessary in order to enhance learning without annihilating the facilitative aspect of discourse.

Moreover, each category of teaching presence seems to be the precursor of a specific role: (a) designer under design and organization; (b) facilitator under facilitating discourse; (c) instructor under direct instruction. In line with these, claiming that teaching presence covers more than what Anderson et al.`s (2001) definition suggests “in discussion-based online courses”, Wang, Chen, and Liang (2011) highlighted the roles of “a designer, host, summarizer, evaluator, and counselor” (p. 435).

Each of these components or categories of teaching presence has some indicators (Garrison & Akyol, 2013a) that point to their existence. Akyol and Garrison (2008) provided the following matching of teaching presence components with their corresponding sample indicators (p. 4):

Table 2

*Teaching Presence Indicators*

|  |  |
| --- | --- |
| Phase | Sample Indicators |
| Design and organization | Establishing Curriculum and Methods |
| Facilitating discourse | Managing constructive exchange |
| Direct instruction | Dealing with and resolving issues |

Even though categorization of teaching presence functions seem to make them appear isolated, a closer look at them indicates that they can be integrated to some extent. For instance, according to Garrison (2011), and Garrison and Akyol (2013a), there is no point in disconnecting instructional design from instructional delivery since collaborative constructivism requires attention to students` approach towards both the content of instruction and how that content is handled in online learning. The best way of achieving this occurs through a design and organization that can easily adapt to the changing situations (Garrison, 2011; Garrison & Akyol, 2013a).

Furthermore, according to Garrison et al. (2000), the basic function of teaching presence is to maintain cognitive and social presence through two main responsibilities: designing instruction, and facilitating the learning experience. Among these, instructional design seems to be much more the business of a teacher while facilitation responsibilities can be shared with others (Garrison et al., 2000; Garrison & Arbaugh, 2007). The instructional design job includes planning and getting prepared for the learning experience, and indicates that teaching presence duties start before the actual educational experience does (Anderson et al., 2001).

Additionally, teaching presence continues throughout the learning experience, which involves the teacher`s facilitation of the discourse and provision of direct instruction when necessary (Anderson et al., 2001). Consequently, Garrison (2011) contended that, as implied by Anderson et al.`s (2001) definition, teaching presence combines all components of a critical community of inquiry into a steady and working whole that aligns with learning outcomes as well as what learners need and can do. Garrison (2011) further stated that doing so is a very demanding task, and that it may be more challenging in online learning.

As to who would undertake teaching presence, Garrison et al. (2000) stated that even though teaching presence is firstly on the shoulders of a teacher, anyone in a learning community can go for it. Similarly, Garrison (2011) stated that teaching presence is undertaken by all members of a community of inquiry even though it is usually the teacher. Garrison (2011) added that all members have a stake in every stage of all presences, and that the ideal is for learners to take more responsibility for teaching presence over time therefore achieving more self-regulated learning. In this regard, Stenbom, Hrastinski, and Cleveland-Innes (2012) stated that teaching presence consists of both learner-to-learner and instructor-to-learner teaching. On the other hand, Dennen (2007) claimed that both instructor presence and position affect learner expectations, and that without instructors` modeling, it is unlikely for learners to put themselves into instructor position that goes beyond the conventional instructor role.

 Consequently, needless to say, previous research referred to the importance of teaching presence for a community of inquiry in an educational setting (Garrison & Akyol, 2013a) even though there seem to be some methodological concerns involved. For instance, in a study comparing online and blended learning environments in terms of the presences, Akyol, Garrison, and Ozden (2009), based on a quantitative content analysis, detected almost no cases of design and instruction for online and blended environments whereas online discussions appeared to include more instances of facilitating discourse and direct instruction than blended discussions. However, further statistical significant difference analyses indicated that these differences were non-significant.

Moreover, Akyol et al. (2009) also employed the CoI survey, and statistical analyses showed that blended learning environment embodied more teaching presence compared to the online learning environment involved in the experiment. In addition to the small sample size (Akyol et al., 2009), a word of caution needs to be stated here about the discrepancy among the results of this study: Content analysis led to no teaching presence differences between online and blended learning environments whereas analyses on the survey data indicated higher perceived teaching presence in the blended environment. Similarly, even though survey data pointed to no differences in terms of social presence and cognitive presence, analysis run on content analysis data yielded differences in terms of some categories of social presence and cognitive presence.

It is also worthy of questioning the extent to which some studies associated with teaching presence can really inform us about teaching presence while reading results. For instance, Garrison and Akyol (2013a) listed Paechter, Maier, and Machter (2010) as a study showing the importance of teaching presence “for the acquisition of knowledge” (p. 111). Applying a multiple regression analysis based on a student survey, Paechter et al. (2010) revealed that, among the six instructor-related items included in the survey, instructor support item (i.e., “My instructor supports and counsels me with regard to my learning processes”) significantly related to knowledge construction and course satisfaction (p. 226). The same results also indicated that an instructor`s e-learning experience item (i.e., “My instructor has a high level of expertise in the implementation of e-learning courses”) also had significant relations with learning acquisition, media competence and course satisfaction (p. 226). These two items and others used by Paechter et al. (2010) may relate to or reflect teaching presence partially though.

Some other studies, on the other hand, provided more specific insights into how teaching presence can manifest itself in terms of achieving such desirable outcomes as more learner interactions. To illustrate, An, Shim, and Lim (2009) yielded that when participation in online discussions is a part of course requirements and the instructor participation in the discussions is kept at a low level, both number and quality of the postings seem to increase. On the other hand, in an online mathematics learning context, Bliss and Lawrence (2009) produced the following significant positive correlations between (a) instructor presence and student participation; (b) the number of student posts and instructor presence; (c) the number of student posts and feedback; (d) the number of student posts and quality post guidelines by the instructor. Interestingly enough, despite these, quality of posts significantly related to feedback but not to instructor presence or quality and quantity guidelines.

Regarding the results of the second study above, two things seem to be worth mentioning: (a) given the number of significant results, it is not clear whether any variable would have affected the relationship found between two other variables thus being a covariate; (b) calculating number of quality posts was based on the ratio of educationally valuable posts to total posts (students + instructor) while instructor presence referred to the ratio of the number of instructor posts to the number of students participating in discussions.

There have also been some studies providing insights into different levels of teaching presence across different subject areas. Arbaugh, Bangert, and Cleveland-Innes (2010), for instance, found that even though teaching presence scores did not differ significantly between online and blended course deliveries, it did significantly differ across some content areas except for “Allied Health/Technical and Science/Math disciplines” and between “Allied Health and Technical and Education” in one school context (p. 41). In the second online research context consisting of business-related courses, the results revealed that “Marketing and “Other”” course takers reported significantly higher teaching presence levels. Interestingly, in the first school, independent of course delivery mode (i.e., online versus blended), most of the different disciplines were associated with different teaching presence levels.

In a similar vein, but using quantitative content analysis not the CoI framework survey, Gorsky, Caspi, Antonovsky, Blau, & Mansur (2010) examined “the impact of disciplinary difference on the dialogic behavior of the representative forums.” (p. 54). These researchers controlled for some potential confounding variables ranging from “course policy” to “group size”, and employed adjusted values based on the percentage of the participating students (p. 54). Gorsky et al.`s (2010) results showed that science students showed a higher level of teaching presence in the forums than their counterparts in the humanities forum. This finding becomes eye catching especially given that instructors` teaching presence did not differ significantly across all categories of it.

All these seem to suggest that teaching presence may be more observable within applied sciences (Arbaugh et al., 2010) and hard sciences (Gorsky et al., 2010). Varnhagen, Wilson, Krupa, Kasprzak, and Hunting (2005), a study conducted in the health promotion field at a graduate level, also appears to support this: Results of the study indicated that courses that were directly related to the field of study incorporated higher teaching presence levels compared to one another course that also related to the field but that was mainly oriented towards research methods.

From a community development perspective, moreover, in their multi-case study, Brook and Oliver (2007) claimed that instructor-driven strategies such as “Establishing real-world contexts” that foster communication and participation also foster community development among learners in online learning environments as well (p. 361). Another recent study that checked the connection between teaching presence and community formation was Shea, Li, and Pickett (2006). This study utilized multiple regression analysis two times in order to check how teaching presence and another relevant variable (i.e., employment status) related to students` sense of community in an asynchronous online learning environment. Similar to the findings of Shea (2006), after eliminating the non-significant contributors, the results of the second regression analysis indicated that design and organization, and directed facilitation significantly relate to possible increases in educational community thereby explaining 62% of variance.

 In other words, Shea et al. (2006) pointed to the possibility of a two-part teaching presence including design and organization, and directed facilitation. However, Garrison and Arbaugh (2007), and Diaz, Swan, Ice, and Kupczynski (2010) stated that directed facilitation is the combination of “facilitation and direct instruction” (p. 165). Further, using a very similar instrument, Arbaugh and Hwang (2006) found out the original three components of teaching presence. Garrison and Arbaugh (2007) claimed that this difference between the two studies is more likely to have stemmed from the sample differences in that undergraduates participating in Shea et al.`s (2006) study might not have separated facilitation from direct instruction as opposed to MBA-level students who participated in Arbaugh and Hwang (2006).

What is more, some previous research highlighted the relationship between teaching presence and (a) learners` satisfaction and perceived learning (e.g., Arbaugh, 2010; Shea, Pickett, & Pelz, 2003; Wu & Hiltz, 2004); (b) the number of student posts, student participation, the amount of starting discussion threads (e.g., Bliss & Lawrence, 2009); (c) sense of a learning community (e.g., Ice, Curtis, Phillips, & Wells, 2007; Shea, 2006; Shea, Li, Swan, & Pickett, 2005); (d) learners` intellectual engagement (e.g., Shi, 2005); (e) interactive learning, and forming and sustaining a learning community (e.g., Maor, 2003); (f) providing techno-pedagogical and learner regulation (e.g., Torras & Mayordomo, 2011); (g) unclear instructions related to students` negative experiences and non-participation (e.g., Youngblood, Trede, & Corpo, 2001); (h) cognitive learning (e.g., Shin, 2001); (i) student perceptions of support and help-seeking as well as course grades (e.g., Whipp & Lorentz, 2009); (j) both quantity and quality of student participation (e.g., de Bruyn, 2004); (k) cognition, affective learning, and motivation (e.g., Baker, 2010); (l) student success (e.g., Kupczynski, Ice, Wiesenmayer, & McCluskey, 2010); (m) course length (e.g., Laves, 2010; Nagel & Kotze, 2010); (n) learning outcomes measured through teacher grades (e.g., Shea & Vickers, 2010); (o) level of engagement in online discussions (Pawan et al., 2003); (p) comprehending content and satisfaction when accompanied by mini audio presentations (e.g., Dringus, Snyder, & Terrell, 2010); (r) learner engagement in web-enhanced classes (e.g., Lear, Isernhagen, LaCost, & King, 2009).

 In this regard, Shea et al. (2003) diverged from most other studies in that regarding facilitating discourse and direct instruction, the participants rated not only their instructors but also their peers. Design and organization part significantly and largely correlated with both students satisfaction and reported learning. In terms of facilitating discourse, students` ratings of both their instructor and peers correlated significantly with student satisfaction and perceived learning; however, the correlation coefficients between peers` facilitating discourse, and student satisfaction and perceived learning were not as high as the ones between instructors` ability to facilitate discourse, and student satisfaction and perceived learning. The same conclusion held true for direct instruction as well. It seems that students had a tendency to assign more responsibilities to their instructors in terms facilitating discourse and providing direct instruction in online learning (Shea et al., 2003), despite the small response rate and the fact that authors do not seem to have compared whether the correlation values significantly differ from each other. These results replicated or confirmed the previous preliminary study by Shea, Fredericksen, Pickett, and Pelz (2003) that ran the same analyses.

 What is presented regarding teaching presence so far shows that teaching presence as both a teacher and student function relate to both cognitive presence and social presence. In other words, it seems that teaching presence can mediate both cognitive presence (e.g., Garrison et al., 2001; Garrison et al., 2010) and social presence (e.g., Garrison et al., 2010) to a certain extent. In the next section, the present review focuses on social presence by providing insights into previous research.

Social Presence

Social presence refers to the extent members of a community of inquiry can represent themselves in a way that they can be perceived as actual people (Garrison et al., 2000). Further, social presence is assumed to be a crucial element for a community of inquiry(Garrison et al., 2010) since it does not refer to encouraging only social engagement or interaction or a socialization process but it serves creating a learning environment that houses critical thinking and that aims at achieving higher level learning outcomes (Garrison & Akyol, 2013a).

Similarly, pointing to the difference between physical presence, sense of physically being in a place, and social presence, sense of being and interacting with another person, Rogers and Lea (2005) stated that social presence is not the interpersonal relationships between and among learners but it emanates from the cognitive portrayal of a learning community. This implies that what matters for social presence would be not interpersonal ties or communications that would flourish but a group or social identity that resides in each community member (Rogers & Lea, 2005). Still though, these might be interrelated to some extent since Caspi and Blau (2008) found medium to large significant relationships between group identification and (a) affective communication; (b) open communication and cohesion.

As a result, according to Garrison and Akyol (2013a), there has been a need to revise what social presence is in order to tie it more with “collaboration and critical discourse.” (p. 107). This led Garrison (2009) to redefine social presence as an evolving process or ability of establishing relationships, identifying with the community, and employing meaningful communication in a trustful way through representing oneself (as cited in Garrison & Akyol, 2013a, p. 107). At this point, Garrison (2011) claimed that through a written communication channel, due to the non-existence of non-verbal cues, forming social presence can be challenging. In contrast, Rogers and Lea (2005) argued that the lack of non-verbal communication can foster social presence by favoring formation of a group or community identity over an individual one.

Like cognitive presence and teaching presence, social presence has categories too. Garrison et al. (2000) listed social presence categories as “emotional expression, open communication, and group cohesion” (p. 99). Affective or emotional expressions using different orthographic features such as emoticons reflect interpersonal communication (Garrison & Akyol, 2013a). Garrison and Akyol (2013a) further stated that affective expressions may not be a deterministic aspect of social presence but may contribute to the formation of the learning community at the beginning. Beside, open communication involves mutual and courteous communication exchanges (Garrison et al., 2000). Finally, group cohesion refers to establishment and maintenance of a feeling of being a group or community which is enriched by a sense of belongingness and in which membership of a group comes before individuality (Garrison et al., 2000). This aligns with Rogers and Lea`s (2005) emphasis on identification with the group or social identity.

Each of these social presence categories has their own indicators especially in online discussions. Table 3 on the next page displays these indicators and their corresponding social presence categories adapted from Akyol and Garrison (2008, p. 4).

Table 3

*Social Presence Indicators*

|  |  |
| --- | --- |
| Phase | Sample Indicators |
| Affective/Personal Communication | Expressing emotions and/or self |
| Open Communication | Learning atmosphere/safe expression |
| Group cohesion | Social identity/collaboration |

The progressive development of these social presence categories underscores the dynamic nature of social presence (Garrison & Akyol, 2013a). In their research seeking to determine the change in the presences over time, Akyol and Garrison (2008) showed that time had a deteriorating effect on affective communication while it had a positive effect on group cohesion. To put it another way, the researchers found that the amount of affective expressions decreased while that of group cohesion increased over a nine-week period in a fully online learning environment. Both Garrison and Akyol (2013a), and Garrison (2011) claimed that these findings concur with Garrison`s (2011) theoretical prediction that open communication should decrease over time slowly while cohesion and affective communication should increase and then level off. However, as stated above, Akyol and Garrison (2008) reported that affective communication “decreased over time while the group cohesion category increased over time” (p. 8). This finding seems to align with the prediction that cohesion should increase and then become stable over time only.

Previous research also pointed to the relationship between social presence and (a) perceived interaction, satisfaction with the instructor and perceived learning (e.g., Swan & Shih, 2005); (b) cognitive presence (e.g., Caspi & Blau, 2008); (c) overall learner satisfaction with computer conferencing (e.g., Gunawardena & Zittle, 1997); (d) some perceived learning concepts such as skills and sharing opinions (e.g., Caspi & Blau, 2008); (e) retention and final grades in a course (e.g., Liu, Gomez, & Yen, 2009); re-enrollment or retention in an online program (e.g., Boston, Diaz, Gibson, Ice, Richardson, & Swan, 2009); (f) perceived learning and satisfaction with the instructor (e.g., Richardsan & Swan, 2003); (g) user interface, social cues, and learning interaction (e.g., Wei, Chen, & Kinshuk, 2012). ; (h) intrinsic goal orientation, self-efficacy, and task value (e.g., Yang, Tsai, Kim, Cho, & Laffey, 2006); (i) deep and meaningful learning (e.g., Rourke, Anderson, Garrison, & Archer, 1999); (j) computer-mediated communication, personal perceptions, engagement in online interaction, and sense of privacy (e.g., Tu, 2001); (k) online interaction (e.g., Tu, & McIsaac, 2002); (l) computer-mediated communication tools (e.g., Tu, 2002); Twitter or interactions occurring promptly (e.g., Dunlap & Lowenthal, 2009); (m) learners` medium-based interaction perceptions (e.g., Gunawardena, 1995); level of participation or activity on the part of learners (e.g., Kehrwald, 2008); (n) learner interest and cognitive absorption (e.g., Leong, 2011); (o) different types of computer-mediated communication environments (e.g., Ko, 2012).

There have also been studies that included social presence aspects ranging from interaction to group projects, and that referred to possible relationships between these and such learning-related concepts as perceived learning and satisfaction. To illustrate, Arbaugh (2005) reported significant, positive and large relationships between course interaction, and perceived learning and satisfaction with the instructional medium. Similarly, Williams, Duray, and Reddy (2006) yielded significant positive relationships between both overall learning, and team orientation and group cohesion, and between team-source learning, and team orientation and group cohesion. This research also revealed that group cohesion is a mediator variable for the relationship between teamwork orientation and overall student learning. Besides, another study, Arbaugh and Benbunan-Fich (2006), showed that an objectivist orientation towards teaching accompanied by collaborative learning activities led to higher student perceived learning and satisfaction with medium or the internet.

 Among such studies, Rovai (2002b) employed sense of a community as a variable that included connectedness, basically referring to cohesion and learning, in the sense of both traditional understanding, and sharing what they feel about the learning process. The instrument used, classroom community scale, was developed by Rovai (2002a) which also established its validity and reliability. This study produced significant and large correlations between perceived learning and (a) the overall community sense; (b) connectedness or cohesion category; (c) learning category. These results align with Benbunan-Fich and Arbaugh (2006) in that collaboration or collaborative activities seem to be associable with higher perceived learning. In terms of learning measured as the final grades, however, Benbunan-Fich and Arbaugh (2006) found that existence of either construction of knowledge or collaborative activities may foster learner performance with a lack of a better combined effect of the two. Finally, as stated by Rovai (2002b), it should be kept in mind that the correlational insights do not guarantee a cause-and-effect relationship between community sense and perceived cognitive learning.

Interestingly enough, Rovai (2002b) also produced a significant gender effect: In terms of connectedness and perceived learning, female online students reported higher ratings than their male counterparts. This appears to be in line with the significant relation found between gender and social presence by Richardson and Swan (2003) to some extent. These authors stated that female participants in their study had a higher level of social presence compared to the male participants. According to Richardson and Swan (2003), this finding might relate to possible gender effects on learning as well as being specific to the study sample or possible instrument biases. Aside from these, the results of Rovai (2002b) did not lead to any ethnicity or content-related differences regarding community sense and perceived learning.

There have been some critiques of previous social presence research as well. Garrison and Arbaugh (2007), for example, emphasized that most of previous social presence research concentrated on social presence alone without paying attention its possible interrelationships with teaching presence and cognitive presence. Further arguing that it is not for only social reasons to engage in a learning community, and that social and cognitive presence interaction is of greater concern, Garrison and Arbaugh (2007) also stated that “A sense of community is based upon common purposes and inquiry.” (p. 159). In this regard, claiming that focus should be more on quality of social interaction instead of amount, Garrison and Cleveland-Innes (2005) stated that even though social presence appears to be an important precursor for learning and a learning community, it may not function to the extent it does when accompanied with both teaching presence and cognitive presence.

Furthermore, in his critique of social presence, Annand (2011) argued that the extent of role social presence may play in online higher education might have been exaggerated. Annand (2011) further argued that a deep look into previous CoI framework research reveals that evidence supporting the effect of social presence on educational experience is not very conclusive like the effect of collaboration on social presence. However, in a response to Annand (2011), Garrison (n. d.) contended that even though social presence needs further refinement, it is still an essential component of the CoI framework from a collaborative constructive perspective. Specifically speaking, one of the studies on which Annand (2011) based his claims is Shea et al. (2010).

 Shea et al. (2010) stated:

 (…) several specific indicators of social presence are very difficult to interpret reliably. (…) the social presence construct is somewhat problematic and requires further articulation and clarification (…) raise additional questions about the relation of social presence to learning. These results also raise some concerns about the viability of other aspects of the social presence component of the model. (p. 17)

Still though, Shea et al. (2010) claimed that social presence carries great importance for online education and deserves further focus. Like Swan et al. (2009), these researchers also diagnosed testing each presence separately by previous research as a limitation. Consequently, previous mixed results concerning the role of social presence in online learning may have been stemmed from eliminating possible interaction or combined effects of social presence and at least one of the other two presences.

In addition, some previous research suggested that there can be a limit to the extent to which social presence can be helpful for learning. For instance, Jahng, Nielsen, and Chan (2010) stated that “there may be an appropriate level of social communication that supports collaborative activity more generally directed at a learning goal” (p. 54). Referring to this same sentence, Garrison (2011) interpreted a learning goal as cognitive presence, which is in line with the assumption that it is a precursor for learning (Shea et al., 2010), and contended that too much focus on interpersonal relationship aspects such as personal identities instead of the group identity may damage learning. Therefore, it might be the case that we can let social presence grow genuinely and normally in the habitat of a community if inquiry (Garrison, 2011).

These also seem to be in tandem with the claim that social presence seems to happen frequently especially during communications that diverge from the topic or content (Nippard & Murphy, 2007). These insights seem to increase importance of teaching presence for a learning community (Garrison et al., 2010), and for both social presence and cognitive presence. The idea of an optimal level of social presence also appears to align with previous claims that it depends on course design (e.g., Swan & Shih, 2005), type of communication tool used (e.g., Nippard & Murphy, 2007), teaching presence (e.g., Garrison et al., 2010; Shea & Bidjerano, 2009b; Shea et al., 2010), and teacher social presence (e.g., Shea et al., 2010; Swan & Shih, 2005).

Likewise, Garrison and Arbaugh (2007) argued that social presence should exceed social interactions and relationships since group cohesion entails more. They further stated that “social presence in a community of inquiry must create personal but purposeful relationships” (p. 160). Fewer instances of higher levels of cognitive presence highlighted by previous work (e.g. de Leng et al., 2009; Kanuka et al., 2007; McKlin et al., 2002) may also relate to such a social presence that is somehow limited to interpersonal communications or interactions only. In any way, as suggested by Shea et al. (2010), social presence appears to deserve and warrant further research basically taking its interrelations with teaching and cognitive presences into account.

Furthermore, Garrison and Arbaugh (2007) also asserted that there is a need for gaining insights into how social presence progresses in an online learning community. This implies that another factor that could explain the mixed findings regarding social presence would relate to its developmental nature consisting of fluctuations over time. In this sense, Swan (2003) reported an increase in affective and open communication categories while a reduction in group cohesion (as cited in Garrison & Arbaugh, 2007, p. 160). On the other hand, in a blended learning environment, Vaughan (2004) revealed that social presence goes from affective expression to group cohesion. More specifically, Vaughan (2004) detected reductions in affective and open communication and an increase in group cohesion only in computer-supported discussions based on content analysis. It should also be noted that there was no significant changes observed in social presence categories in face-to-face discussions. Moreover, the changes observed disappeared on the basis of survey analysis results. These seem to indicate that the dynamic nature of social presence may also depend on the type or characteristics of a learning environment as well.

Another alternative explanation that sounds to be simpler but appears to be quite strong to the present author came from Garrison (n. d.). This also seems to be related to research design as well. Garrison (n. d.) stated that one of the primary concerns pertaining to CoI framework research is regarding all blended or online learning environments as real learning communities or communities of inquiries despite low levels of the presences. This critically suggests that it may not be very useful to judge social presence or other assumptions of the CoI framework when there is not enough quality of a community of inquiry in a learning environment.

Moreover, given that the definition of cognitive presence primarily focuses on reflective or critical discourse, social interaction may ease the process of tapping such a discourse but may not guarantee that the discourses will be critical enough for learning to occur out of it. Some research seems not to support this implication to some extent. For instance, a grounded theory study, Molinari (2004) suggested that even interactions that are irrelevant to learning tasks may encourage problem-solving, and that encouraging such engagements at the beginning may contribute a lot to the later problem-solving performance. All these imply that attempts to enrich such social interactions may also serve reaching desirable learning outcomes (Molinari, 2004). In a similar vein, Rovai (2007) stated that “creating a safe learning environment” is the building block for “equitable and effective discourse” (p. 86). Accordingly, Rovai (2007) suggested creating two separate online discussion arenas: (a) one for socio-emotional interactions that may serve community sense; (b) another for content- and task-related topics.

All these raise the importance of interrelationships between and among the presences to which we can turn our attention in the following section. Accordingly, the next section focuses on previous research insights into the relationships between and among teaching, social, and cognitive presences.

Interrelationships Between and Among the Presences

Cognitive Load Theory

Connecting Community of Inquiry Framework and Cognitive Load Theory

Summary

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