RELATIONSHIP BETWEEN TEACHING PRESENCE AND SHARED-METACOGNITION IN ONLINE CASE-BASED COURSES

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ABSTRACT

This study investigated student perceived shared-metacognition–self-regulation and co-regulation–as explained by three teaching presence sub-elements–*Instructional Design, Direct Instruction, and Facilitation*–in an online case-based course. 113 online graduate students enrolled in an advanced instructional design course participated in the study. Data were collected through the Community of Inquiry survey and a shared metacognition questionnaire survey. The findings revealed that students perceived *Direct Instruction* as a significant predictor of their shared-metacognition (self-regulation and co-regulation) in online case-based courses. The findings highlight the importance of teaching presence for *Direct Instruction* to increase self and co-regulation for maximizing the quality of online case-based instruction. The findings of this study will be helpful for researchers and practitioners who design and teach online courses to promote metacognition.

KEYWORDS

Shared-Metacognition, Case-Based Instruction, Online Courses, Online Learning

1. INTRODUCTION

Rapid growth of online learning and access to information communication technologies has led to a growing need to understand the process of collaborative thinking and learning in an increasingly connected world (Garrison & Akyol, 2015). Yet, instructors struggle with issues of quality due to the "requirement of higher-level self-directed learning skills and greater difficulties in enabling effective human interactions" (Xu & Xu, 2019, p. 26). To enhance the quality of online courses and to create a meaningful experience for students, it is important to understand strategies that can support the development of students' metacognitive processes in shared learning environments (Garrison, 2022).

Metacognition is an important intellectual skill that plays a critical role in enhancing student online learning outcomes through monitoring and regulating their own learning. However, online instructors face the challenge of using strategies to help students regulate and manage their learning in a collaborative online learning environment. Effective teaching presence can provide guidance in encouraging students to take responsibility for their learning through facilitating discourse and resolving issues collaboratively (Garrison & Akyol, 2015). Researchers suggest a need for more research on how to develop the awareness and regulatory strategies to monitor and manage learning process that enhance student learning outcomes (Garrison, 2022; Sadaf et al., 2022). Therefore, the results of this study will enhance the quality of teaching and learning used in online courses and provide guidelines for instructors looking to enhance shared metacognition to guide the improvement of online case-based instruction.

2. LITERATURE REVIEW

Metacognition is defined as "a set of higher knowledge and skills to monitor and regulate cognitive processes of self and others" (Garrison & Akyol, 2015, p.184). It requires learners to set their learning goals and monitor their progress towards those goals (DiDonato, 2013; Akyol, 2013). According to Kizilcec et al. (2017), metacognitive strategies assist learners to plan, monitor, and regulate their learning process to accomplish goal setting, self-monitoring, and self-evaluation. Metacognitive reflection and discourse with self and co-regulation can inform students how they can improve their approach to learning (Garrison, 2022). Studies have examined metacognitive processes in collaborative learning contexts recognizing the importance of individual and social regulatory processes within a community of inquiry (Kilis & Yildirim, 2018; Koehler et al., 2022). Collaborative learning environment requires more engaged approaches to help learners construct new meaning and share understanding with others (Garrison & Akyol, 2015). Therefore, Garrison (2022) emphasized the importance of exploring shared learning environments and strategies that can support the development of students' metacognitive processes.

Teaching presence is one of the core elements of the community of inquiry (CoI) framework that provides the theoretical and methodological tools to understand the complexities of metacognition in collaborative learning environments (Garrison & Akyol, 2015). Teaching presence is defined as "design, facilitation, and direction of cognitive and social processes for the purpose of realizing personally meaningful and educational worthwhile learning outcomes" (Anderson et al., 2001, p. 5). Teaching presence within the CoI framework has been conceptualized by the following elements (See Table 1):

1. Instructional design and organization refer to the designing and planning the online course structure, process, the interactions between students, and assessment components (Anderson et al., 2001). Examples could include developing course materials, designing course activities, and organizing the course.
2. Direct instruction refers to providing subject matter expertise to support students' learning rather than directly lecturing students. According to Anderson et al., (2001), direct instruction can be achieved through facilitating reflection and discourse by organizing content, and using various forms of assessment and feedback.
3. Facilitating discourse focuses on facilitating learning to "maintaining the interest, motivation and engagement of students in active learning" (Anderson et al., 2001, p. 7.). Examples could include working to achieve consensus and understanding, sharing meaning, and ensuring the efficacy of the process (Miller et al., 2014).

Table 1. Subcategories or indicators of the main elements of teaching presence

Elements of Teaching Presence	Subcategories of teaching Presence
Instructional design/organization	Setting curriculum Designing methods Establishing time parameters Utilizing the medium effectively Establishing netiquette
Direct instruction	Presenting content and questions Focusing the discussion Summarizing the discussion Confirming understanding Diagnosing misperceptions
Facilitating discourse	Identifying areas of agreement and disagreement Seeking to reach consensus and understanding Encouraging, acknowledging, and reinforcing students' contributions Setting the climate for learning Drawing in participants and prompting discussion

Adapted from Shea et al. (2003)

While teaching presence within the CoI framework is not limited to course instructors only but can rather be distributed across teachers and students, for the specific purpose and questions of our study, we focused on teaching presence behaviors of online course instructors.

With regards to metacognition, the *Design* component focuses on design for critical reflection and discourse to provide a metacognitive map of the learning process; *Facilitation* component relates to the implementing and supporting metacognition; and *Direct Instruction* focusses on improving collaborative learning through the awareness and management of learning processes leading to higher levels of academic achievement (Garrison, 2022). Therefore, teaching presence can help in establishing and maintaining social and cognitive process of learning that can lead to metacognition (Garrison et al., 2010). Vaughan & Wah (2020) concluded that teaching presence should "intentionally design, facilitate, and direct a collaborative constructive learning environment in order for students to learn how to co-regulate their learning (metacognition)" (p.1). Vuopala, et al., (2019) concluded that "prompting regulation activities among students, such as task-related monitoring, teachers can support students to engage in metacognitive processes that are related to high-level knowledge co-construction" (p. 247).

Although, there have been studies suggesting a strong association of students' perceived teaching presence and learning outcomes in online courses (Arbaugh, 2008; Caskurlu et al., 2020), there is only one study exploring the relationship between three presences (teaching, social, and cognitive) and shared metacognition in an online case-based course (Sadaf et al., 2022). The results showed that teaching presence revealed no statistically significant relationship with metacognition suggesting that students with higher perceived teaching presence are relatively less likely (or unlikely) to have higher metacognition. Although Sadaf et al., (2022) study shed some light on the relationship between teaching presence and shared metacognition, research focused all three presences and on students enrolled in one course/program. Specific focus on teaching presence elements and considering the perspectives of students enrolled in varied courses/programs might provide more insight and strengthen the results of the previous studies.

2.1 Theoretical Framework

The Community of Inquiry was used as the theoretical framework because it emphasizes both the personal (reflective) and shared (collaborative) worlds of a learning experience (Garrison et al., 2001). The CoI framework has been created to help examine construction of individual and group learning experiences in online and blended learning environments (Garrison, 2022). The CoI assumes that learning occurs at the intersection of the three presences– social presence, teaching presence, and cognitive presence (Garrison et al., 2001). In addition, self-regulation and co-regulation are seen as important mediators among the three presences. For this study, we focused on the relationship between teaching presence and shared-metacognition in online learning. The predictive effects of students' perceived teaching presence on their metacognition will help online instructors use pedagogical strategies to design and facilitate courses.

2.2 Purpose of the Study

The purpose of this study is to explore students' perceptions of the role of teaching presence in determining their shared metacognition (self-regulation and co-regulation) in an online case-based course. The following questions guided this study: To what extent are students' perceptions of shared metacognition (self-regulation and co-regulation) explained by teaching presence (course design, facilitation, and feedback) in online CBI?

1. To what extent are students' perceptions of self-regulation explained by the sub-elements of teaching presence in online CBI?
2. To what extent are students' perceptions of co-regulation explained by the sub-elements of teaching presence in online CBI?

3. METHODS

3.1 Participants

A purposeful sample of 113 graduate students (19 males and 90 females) enrolled in an Instructional Design course were selected to participate in this study. The sample was included in the study because students were enrolled in the online graduate course designed based on a case-based instruction to learning instructional design (ID). About half (n = 52) of them were more than 36 years old. The majority (n=98) of the participants had taken more than 3 online courses. All of the participants rated themselves as being very comfortable with participating in online courses.

3.2 Context of the Study

"Advanced Instructional Design" is a course required for students in the Learning Design and Technology graduate program. In this course, students engage in authentic design activities via participation in an online community of inquiry and participate in two instructor-facilitated case studies at the beginning of the term, followed by participation in four student-led case discussions. Prior to participation in the case discussions, students complete individual case analyses in which they reflect on and respond to a number of specific prompts. The prompts are designed for students to give key issues careful consideration before participating in the whole class discussions. Then, students participate in weekly discussions and propose/develop relevant solutions to the issues presented in a case. Finally, at the end of the course, students reflected on their expertise in solving cases. Course activities and assignments were designed to help students develop the knowledge, strategies, and attitudes needed to become effective instructional designers. Learning experiences revolved around two major activities: 1) The analysis and synthesis of, and reflection on, instructional design case studies and 2) Ongoing reflection on the development of students' instructional design expertise. The course is designed for students to take responsibility for their own learning by identifying their own learning goals, finding and utilizing resources to help them meet those goals, and continually monitor their progress.

3.3 Data Collection and Analysis

Data were collected from an online survey administered at the end of Spring/Fall 2021 semesters and Spring 2022. Students' perceived teaching presence was measured using CoI survey questions and metacognition was measured using the shared metacognition questionnaire survey. Each item employs a 5-point Likert-type scale, with 1 = strongly disagree and 5 = strongly agree. Simple demographic information was also collected such as gender, age, prior experience with online courses, and the program to which a student belongs. Students were asked to respond to three sets of survey questions including teaching presence, self-regulation, and co-regulation.

A series of multiple linear regressions were performed with the three sub-elements of teaching presence as an independent variable and self-regulation and co-regulation as dependent variables in the model. Ratings on each of self-regulation and co-regulation was represented by 13 items. For teaching presence, "Design and Organization" was measured with 4 items, "Facilitating Discourse" was with 5 items, and "Direct Instruction" was assessed using 4 items. The assumptions of linearity, homoscedasticity, and no presence of outliers were tested and found to be met by data. Stepwise regression was used to achieve the parsimony of the final model, while selecting the most significant predictors.

4. RESULTS

4.1 Students' Perceptions of Self-Regulation Explained by Teaching Presence

Results of stepwise multiple linear regression showed that *Direct Instruction* was significantly related to self-regulation, explaining 13.4% variance of the outcome variable, F(1, 111) = 17.154, $p < .001$ (see Table 2). The other two variables, *Design and Organization*, and *Facilitating Discourse* were not found to be a significant predictor of self-regulation. The estimated standardized beta coefficient indicated that one unit increase in *Direct Instruction*, on average, led to .366 unit increase in self-regulation ($t = 4.142$, $p < .001$). This suggests that students participating in an online CBI course perceive *Direct Instruction* to increase their self-regulation.

Table 2. Summary of regression analysis (Model 1)

Analysis of Variance	Dependent variable: Self-Regulation			
Source	**Sum of Squares**	**DF**	**Mean Square**	**F**
Model	553.497	1	553.497	17.154***
Residual	3581.565	111	32.266	
Total	4135.062	112		
Predictors	**Estimate (standardized)**	**Std. Error**	**t**	**Prob > |t|**
(Intercept)	47.029 (-)	2.524	18.630	.000***
Direct Instruction	0.618 (.366)	0.149	4.142	.000***

Note. $* p < .05,\ ** p < .01,\ *** p < .001; R = .366, R^2 = .134, adjusted\ R^2 = .126$

4.2 Students' Perceptions of Co-Regulation Explained by Teaching Presence

Similar to the results of self-regulation, results of co-regulation identified *Direct Instruction* as the only significant predictor. This variable alone explained 12.7% of the variance of co-regulation, R^2=.127, $F(1, 111) = 16.501$, $p < .001$ (see Table 3). Specifically, one unit increase in *Direct Instruction* led to .356 unit increase in co-regulation on average (standardized coefficient beta, $\hat{\beta} = .356$, t < 4.014 $p < .001$). This shows that students perceive *Direct Instruction* helps them better monitor and manage shared learning dynamic or co-regulated learning during CBI.

Table 3. Summary of regression analysis (Model 2)

Analysis of Variance	Dependent variable: Co-Regulation			
Source	**Sum of Squares**	**DF**	**Mean Square**	**F**
Model	611.945	1	611.945	16.111***
Residual	4216.055	111	37.982	
Total	4828.000	112		
Predictors	**Estimate (standardized)**	**Std. Error**	**t**	**Prob > |t|**
(Intercept)	43.255 (-)	2.739	15.793	.000***
Direct Instruction	0.650 (.356)	0.162	4.014	.000***

Note. $* p < .05,\ ** p < .01,\ *** p < .001; R = .356, R^2 = .127, adjusted\ R^2 = .119$

5. DISCUSSIONS

Students participating in an online CBI course perceive *Direct Instruction* – presenting content and questions, focusing the discussion, confirming understanding, and diagnosing misperceptions – to increase their shared metacognition. According to Garrison (2022), *Direct Instruction* focusses on improving collaborative learning through the awareness and management of learning processes leading to higher levels of academic achievement.

Findings of this study show that students perceive *Direct Instruction* to help them better monitor and manage shared learning dynamic in both self-regulated as well as co-regulated learning during CBI. This can be due to the strategies instructor used that required students to co-analyze instructional design problems, develop solutions to real problems via cases, and give and receive constructive feedback from peers and instructor. Students completed individual case analyses in which they reflected on a number of specific prompts designed for students to consider key case issues and their conscious choices for solving those issues before participating in the whole class case-discussions. Through these reflective strategies, students contributed to case-based inquiry to develop self and co-regulatory metacognition processes (Garrison & Akyol, 2015). This finding is aligned with Koehler et al. (2020) who found that within the CBI context, students rely on instructor-set course requirements to guide their solutions and trust instructor's feedback.

Results of this study are supported by other studies that found CBI can help in facilitating deep and meaningful learning through shared collaborative experiences (Koehler et al., 2022; Sadaf, et al., 2021) where students can be aware of (monitor) and regulate (manage) thinking through the shared inquiry processes. The analysis and reflection on instructional design case-studies and ongoing reflection on the development of students' instructional design expertise helped students increase their self-regulation that led to better monitoring and managing co-regulated learning during CBI. Koelher et al., (2020) suggested that instructors need to support other students' engagement and progression in their case learning process and train them so that they can gain the benefits of the CBI. Students may need more instructional encouragement or support to become metacognitively aware and active in terms of monitoring and managing the inquiry process depending on their experiences (Garrison & Akyol, 2015).

6. CONCLUSION

This study makes a significant contribution in terms of student perceptions of shared metacognition (self-regulation and co-regulation) as explained by three sub-elements of teaching presence–planning, direct instruction, and facilitation–in an online CBI, as framed by the CoI framework. First, *Direct Instruction* is a significant factor contributing to students' self and co-regulated learning. Second, this study sheds light on teaching presence attributes instructors can use to positively influence self-regulation and co-regulation in an online CBI. This study, therefore, serves as a base for further studies and opens up new directions to explore the types of *Direct Instruction* strategies instructors can use to improve shared metacognition in online CBI.

Looking at the results, one may conclude that students participating in an online CBI course perceive *Direct Instruction* to increase their self-regulation. In addition, students perceive *Direct Instruction* helps them better monitor and manage shared learning dynamic or co-regulated learning during CBI. In this regard, online instructors can use case-based instructional strategies that ask students to explore the problems, find and justify their solutions to facilitate high-levels of cognitive presence that may lead to deeper constructivist learning among students. Instructors can use strategies to prepare students to take responsibility of their own learning by identifying their own learning goals, finding and utilizing resources to help them meet those goals, and continually monitor their progress. Taking responsibility will enable students to reflect on each other's contributions to the developmental progress toward the intended goals while they are engaged in discourse (Akyol & Garrison, 2011). Overall, the findings in this study are valuable because they contribute to further effective design of online courses through the use of case-based scenarios for real-world learning.

This study has some limitations that may lead to future research efforts. First, this study is limited in generalizability of findings due to the sample of participants representing only one program and two universities. Follow-up studies could utilize large sample size with data collected across programs or institutions to further refine the results and implications of this study. In addition, researchers can explore strategies other than CBI to see how teaching presence plays a role in facilitating self and co-regulation. Additionally, research investigating the relationship between students' perceptions of the impact of teaching presence (course design, facilitation, and feedback) on shared metacognition (self-regulation and co-regulation) in online courses across different disciplines would be a promising direction for future studies.

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