

Scholarship of Teaching and Learning Grant Proposal

**Exploring the Relationship Between Teaching Presence and Shared Metacognition to
Enhance the Quality of Online Learning Across Disciplines**

Dr. Ayesha Sadaf (PI)

Associate Professor, Department of Educational Leadership, College of Education

Dr. Sijia Zhang (Co-PI)

Assistant Professor, Department of Educational Leadership, College of Education

December 1, 2022

Abstract

With the rapid growth of online education and increasing interest in socio-cognitive views of education, there is a need to develop students' shared metacognition— skills to monitor and regulate cognitive processes of self and others—within online collaborative learning environments. Many instructors, however, struggle to support their students in developing metacognitive skills in their online courses. The Community of Inquiry (CoI) framework (Garrison et al., 2001) offers insights for addressing these issues through its three components: social presence (SP), cognitive presence (CP), and teaching presence (TP). TP specifically has the potential to provide guidelines for instructional design, facilitation of learning, and feedback to promote students' metacognitive skills. Although metacognition is an important intellectual skill, research on how metacognition is established in online learning environments is limited. In this survey-based research, we will investigate how TP can promote students' metacognition in online courses across different disciplines. We will collect data through the TP construct of the CoI survey and the metacognition questionnaire. The predictive effects of students' perceived TP on their metacognition will help online instructors use pedagogical strategies to design and facilitate courses, thus benefitting students in higher education across diverse fields of study to achieve better learning outcomes. Project's overarching goal is to maximize the quality of teaching and learning in online courses at UNC Charlotte across disciplines. Online instructors may use this knowledge as a guideline to enhance their TP and best practices in course design, facilitation, and feedback to promote shared metacognition in online courses.

Budget Request Page
January 15, 2023 to June 30, 2023

Lead Principal Investigator: Ayesha Sadaf

Principal Investigator 800#: 961467

Title of Project: Exploring the Relationship Between Teaching Presence and Metacognition to Enhance the Quality of Online Learning Across Disciplines

Allocate operating budget to Department of: Educational Leadership

Fiscal Year One (January 15, 2023 to June 30, 2023)		
Faculty Stipend	Paid directly from Academic Affairs fund on May 15, 2023	\$3,850 for Dr. Sadaf and \$3850 for Dr. Zhang
911250	Graduate Student Salaries	\$3,800
911300	Special Pay to Faculty other than Grantee	
915000	Student (Undergraduate or Graduate) Temporary Wages	
915900	Non-student Temporary Wages	
920000	Honorarium (Individual(s) not with UNCC)	
921160	Subject Incentive Fee	\$500
925000	Domestic Travel	\$4,000 (\$2,000 for Dr. Sadaf; \$2,000 for Dr. Zhang)
926000	Foreign Travel	
928000	Communication and/or Printing	
930000	Supplies	
942000	Computing Equipment	
944000	Educational Equipment	
951000	Other Contracted Services	
Total Amount Requested		\$16,000

Budget Narrative

Faculty Stipends (\$7,700)

The budget includes summer stipend support of \$3,850 for the Principal Investigator (Dr. Sadaf) and Co-Principal Investigator (Dr. Zhang). Dr. Sadaf will be responsible for the overall coordination of the study, supervising the graduate research assistant, development of instruments, and data collection. Dr. Zhang will be responsible for data analysis, data management, and final reporting of the study's findings. The Co-PIs will also be involved in the analysis of the data and the preparation of conference presentations and manuscripts in Summer and Fall 2023.

Travel – Domestic (\$4000)

In order to disseminate the findings from this project, \$2,000 for each faculty is requested to cover the expenses associated with the dissemination (publication and presentation) of findings at the AECT's 2023 annual conference.

Subject Incentive Fee (\$500)

We are requesting \$500 in subject incentive fees in order to obtain the participants needed for sufficient data collection and analysis in the proposed study. Potential survey participants will be informed that they can enter their name in a random drawing to receive one of twenty \$25 Amazon gift cards.

Graduate Assistant Stipend (\$3,800)

We are requesting \$3,800 summer stipend for a graduate assistant who will be responsible for helping with analyzing data, preparing conference proposals, and writing the manuscript to be submitted for publication.

- Has funding for the project been requested from other sources? ___ Yes ___ X No.



November 27, 2022

Dear SoTL Committee Members,

I am pleased to recommend the Scholarship of Teaching and Learning Grant proposal, “Exploring the Relationship Between Teaching Presence and Metacognition to Enhance the Quality of Online Learning Across Disciplines”, as proposed by Drs. Ayesha Sadaf and Sijia Zhang. This project has the potential to improve the quality of online teaching and learning in the Cato College of Education, at UNC Charlotte and across the nation. Led by Drs. Sadaf and Zhang, this project seeks to investigate the relationship between students’ perceptions of the impact of teaching presence (course design, feedback, and facilitation) on shared metacognition (self-regulation and co-regulation) in online courses across different disciplines.

The project leads will share the information gained with faculty on campus by offering workshops. The guidelines for online instructors seeking to enhance metacognition in online courses to guide the improvement of online teaching would benefit instructors throughout this department and college. This project also provides opportunities for our faculty to collaborate with the Distance Education Office and the Center for Teaching and Learning to share expertise in the areas of teaching presence, student metacognition, and learning outcomes in online environments.

Dr. Sadaf has published ten articles related to online teaching and learning strategies and how they contribute to students’ cognition and metacognition. Additionally, Dr. Zhang’s expertise in educational research further ensures a high-quality project.

I recommend this project as it will assist in adding to our knowledge base about quality online teaching and learning strategies. The two faculty have the experience and expertise, and are well-positioned to conduct the proposed project, while informing the college, university, and UNC System. I am fully supportive of this effort.

Sincerely,

A handwritten signature in black ink that reads 'Malcolm B. Butler'.

Malcolm B. Butler, Ph.D.
Dean and Professor of Science Education

Project Narrative (Word Count: 2,498)

A. Specific Aims

1. **Purpose** - The purpose of this project is to investigate 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.
2. **Objectives** - The specific objectives to be achieved are as follows:
 1. Examine the relationship between students' perception of teaching presence and shared metacognition.
 2. Explore the differences in students' perceptions of teaching presence and shared metacognition across disciplines.
 3. Qualitatively explore students' perceptions of the relationship between teaching presence and shared metacognition across disciplines.
 4. Provide guidelines for facilitating metacognition in online courses at UNC Charlotte across disciplines.
3. **Research Questions** - The following research questions will guide this study:
 1. 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 courses?
 2. What is the difference in student perceptions of teaching presence and metacognition between different disciplines?
 3. How do students describe the relationship between teaching presence and shared metacognition across different disciplines?

4. **Rationale** – 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 best 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, this project will fill this gap by examining the relationships between teaching presence and students’ shared metacognition to guide the improvement of online instructional delivery that enhances student learning in online courses across disciplines.

This project will support UNC Charlotte’s strategic plan in two ways. First, it will support UNC Charlotte’s commitment to *Academic Excellence* by providing an exemplary academic experience in online courses through improved teaching presence. Second, it will contribute to the *Discovery, Innovation, and Creativity* by engaging in inquiry to generate new knowledge, understanding, and solutions to society's significant challenges. The rapid transition of instruction from classrooms to online education during COVID-19 pandemic highlighted the necessity for effective online instruction making this research project one of the significant challenges that UNC Charlotte needs to address.

5. **Impact** – This study will impact all UNC Charlotte students who take online or hybrid courses across different disciplines. This research will enhance the quality of online teaching and learning by providing guidance for faculty to improve teaching presence in facilitating shared metacognition in online courses. Instructors who are considering improving their teaching presence in their online courses may use the knowledge from this study to guide students to develop metacognition skills. Instructional designers may use this knowledge to recommend best practices for using practical strategies for online course design, facilitation, and feedback. The knowledge gained from this study will add to the body of online education research and provide a benchmark for improving online teaching practices to facilitate metacognition, thus benefiting students in higher education across diverse fields of study to achieve better learning outcomes.

B. Literature Review

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

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

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). 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 only focused on students enrolled in a specific course/program. Specific focus on teaching presence elements and considering the perspectives of students enrolled in varied disciplines might provide more insight and strengthen the results of the previous studies.

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 metacognition in online learning.

C. Methods

Participants

Participants in the study will consist of online students (approx. 200-250) who will represent different disciplines (e.g., Education, Engineering, Math, Social Studies, Science, and Technology) to understand their perception of the relationship of teaching presence and metacognition from different perspectives. The population of interest will simply be a convenient sample of students who have taken at least one online course in higher education.

Data Collection

The data will be collected using an online survey during Spring 2023. A survey invitation email will be sent by UNC Charlotte Distance Education through the director of distance education. Also, the invitation will be extended to Association of Educational Communications and Technology and American Educational Research Association email/membership listserv,

and faculty who teach online to distribute this survey with their students to participate in this study.

Measurement/Instrument

The Community of Inquiry (CoI) Survey and the metacognition questionnaire will be used to collect data. Students' perceptions of teaching presence will be measured using the CoI survey developed by Arbaugh et al. (2008). The CoI survey consists of 34 five-point, Likert-type items (teaching presence: 13- items, social presence: 12-items, cognitive presence: 9-items). Because the focus of this study is only on teaching presence, 13 items that measure teaching presence will selectively be used in this study. Students' perceptions of metacognition will be measured using the metacognition questionnaire developed by Garrison and Akyol (2015) which includes 26 five-point, Likert-type items in two dimensions: 13 items that measure self-regulation and 13 items that measure co-regulation. Each item in both surveys employ a 5-point Likert-type scale, with 1 = strongly disagree and 5 = strongly agree. Students will be asked to respond to three sets of survey questions: with a reflection on teaching presence, self-regulation, and co-regulation. Simple demographic information will also be collected such as gender, age, prior experience with online courses, program, and the discipline to which a student belongs.

Qualitative data will be collected to provide context in understanding the dynamics of monitoring and managing collaborative learning. Four open-ended questions about shared metacognition and teaching presence will be included in the survey. In the open-ended questions, students will be asked to describe how their self and co-regulated learning (shared metacognition) was either encouraged or discouraged by the three aspects of teaching presence (course design, facilitation, and feedback).

Analysis

- 1. To what extent are students' perceptions of metacognition explained by teaching presence in online courses?*

Descriptive statistics and a correlation matrix involving all the variables present in research question 2 will be provided. Providing such statistics is a standard procedure to give readers some basic understandings of the data for this study. To answer this research question, a multivariate multiple (linear) regression will be performed. Put simply, a multivariate multiple regression is used when researchers want to use multiple variables to predict multiple outcome variables. It is also utilized to determine the numerical relationships between the 2 sets of variables. In our study, the three elements (course design, facilitation, and feedback) are used as independent variables (predictor variables); on the other hand, self-regulation and co-regulation from students' metacognition are used as the dependent variables (outcome variables) in our regression model. When performing this comprehensive regression model, all the assumptions, such as linearity, normality of residuals, and multicollinearity among the variables will also be checked.

- 2. Do student perceptions of teaching presence and metacognition vary based on different disciplines?*

To examine whether or not students' perceptions of teaching presence and metacognition exhibit statistically significant mean differences across different disciplines, a MANOVA will be performed. Previous literature indicated that these variables are correlated, thus MANOVA is used to evaluate research question. First, an overarching MANOVA will be performed to examine discipline differences in terms of teaching presence and metacognition. Second, since we are able to further break down teaching presence (course design, facilitation, and individual

feedback) and metacognition (self-regulation and co-regulation) into some sub-elements, another series of MANOVA will also be performed for each variable to obtain a more detailed understanding in order to see which element showcases more differences.

3. *How do students describe the relationship between teaching presence and their shared metacognition across different disciplines?*

To further explain the quantitative results by exploring students' views in greater depth, qualitative data from the four open-ended questions about shared metacognition and teaching presence will be analyzed using Miles and Huberman's (1994) constant comparison approach. First, the data will be coded by segmenting and assigning labels to the text passages. Then the similar codes will be categorized into the three elements of the teaching presence themes that provided further understandings of the shared metacognition. Because this study sought to understand student perceptions of teaching presence as they relate to shared metacognition across disciplines, the narrative data will be presented based on the three elements of teaching presence based on different disciplines.

D. Evaluation

Evaluation for each of the project goals is described below. The aim of this project is to evaluate the relationships between teaching presence and shared metacognition. By exploring these relationships, we will be able to gain a better understanding of which specific aspects of teaching presence serves as a major contributor to students' shared metacognition, how different disciplines may differ in terms of how teaching presence impacts shared metacognition. Finally, by exploring students' thoughts and descriptions from open-ended questions about the relationship between metacognition and teaching presence will provide additional detail and explanation to the quantitative findings.

Project Goals	Statistical Evaluation Methods	Instruments	Variables
1. Examine the relationship between the sub-elements of teaching presence and metacognition (self-regulation, and coregulation)	<ul style="list-style-type: none"> • Descriptive statistics • Correlation • Multivariate multiple (linear) regression 	<ul style="list-style-type: none"> • CoI survey • Shared metacognition survey 	<ul style="list-style-type: none"> • Teaching presence (subscale) from the CoI survey • Shared metacognition survey
2. Explore the differences in the perceptions of teaching presence and metacognition across disciplines.	<ul style="list-style-type: none"> • Descriptive statistics • Correlation • MANOVA 	<ul style="list-style-type: none"> • CoI survey • Shared metacognition survey 	<ul style="list-style-type: none"> • Teaching presence (subscale) from the CoI survey • Metacognition survey
3. Explore the differences of students' perceptions of teaching presence and metacognition across discipline and other facets	<ul style="list-style-type: none"> • Constant comparative method 	<ul style="list-style-type: none"> • Open ended survey responses 	<ul style="list-style-type: none"> • Teaching presence (subscale) from the CoI survey • Shared metacognition

E. Knowledge Dissemination

Researchers will participate in dissemination efforts of presenting at conferences and also publishing the results in a number of venues in the area of instructional technology. Effective online course design, facilitation, and feedback strategies will be shared with the faculty in the university through the center for teaching and learning (CTL) and the office of distance education. Some of the specific venues for dissemination include:

- **UNC Charlotte:**
 - Participation in UNC Charlotte's annual SOTL Showcase
 - Workshops through the Center for Teaching and Learning
- **Professional Conferences:**
 - Association for Educational Communications and Technology (AECT)

- American Educational Research Association (AERA)

- **Publications:**

- The American Journal of Distance Education
- The Internet and Higher Education

F. Human Subjects

To ensure for the protection of human subjects, UNC Charlotte Institutional Review Board (IRB) approval will be sought prior to implementing the project.

G. Extramural Funding

Based on the findings from this pilot study, we plan to apply for a grant from the Spencer Foundation (https://www.spencer.org/grant_types/small-research-grant).

H. Timeline

Timeline	Research Activities
Spring 2023	<ul style="list-style-type: none"> ● Survey Development ● IRB approval ● Data collection
Summer 2023	<ul style="list-style-type: none"> ● Data Analysis ● Prepare presentation(s) and publication(s)
Fall 2023	<ul style="list-style-type: none"> ● Present findings and finalize publication(s)

References

- Akyol, Z. (2013). Metacognitive development within the Community of Inquiry. In Z. Akyol & D. R. Garrison (Eds.), *Educational communities of inquiry: Theoretical framework, research and practice* (pp. 30–44). IGI Global.
- Anderson, T., Rourke, L., Garrison, D. R., & Archer, W. (2001). Assessing teacher presence in a computer conferencing context. *Journal of Asynchronous Learning Networks*, 5(2), 1–17.
- Arbaugh, J. B., Cleveland-Innes, M., Diaz, S. R., Garrison, D. R., Ice, P., Richardson, J. C., & Swan, K. P. (2008). Developing a community of inquiry instrument: Testing a measure of the community of inquiry framework using a multi-institutional sample. *The internet and higher education*, 11(3-4), 133-136.
- Caskurlu, S., Maeda, Y., Richardson, J. C., & Lv, J. (2020). A meta-analysis addressing the relationship between teaching presence and students' satisfaction and learning. *Computers & Education*, 157, 103966.
- DiDonato, N. (2013). Effective self- and co-regulation in collaborative learning groups: An analysis of how students regulate problem solving of authentic interdisciplinary tasks. *Instructional Science*, 41(1), 25–47. <https://doi.org/10.1007/s11251-012-9206-9>
- Garrison, D. R. (2022). Shared metacognition in a Community of Inquiry. *Online Learning*, 26(1), 6–18. <https://doi.org/10.24059/olj.v26i1.3023>
- Garrison, D. R., & Akyol, Z. (2015). Toward the development of a metacognition construct for the community of inquiry framework. *Internet and Higher Education*, 24, 66–71. <https://doi.org/10.1016/j.iheduc.2014.10.001>
- Garrison, D. R., Anderson, T., & Archer, W. (2001). Critical thinking, cognitive presence, and computer conferencing in distance education. *American Journal of Distance Education*, 15(1), 7– 23.
- Garrison, D. R., Cleveland-Innes, M., & Fung, T. S. (2010). Exploring causal relationships among teaching, cognitive and social presence: Student perceptions of the community of inquiry framework. *The Internet and Higher Education*, 13(1–2), 31–36. <https://doi.org/10.1016/j.iheduc.2009.10.002>
- Kilis, S., & Yıldırım, Z. (2018). Investigation of community of inquiry framework in regard to self-regulation, metacognition and motivation. *Computers & Education*, 126, 53–64. <https://doi.org/10.1016/j.compedu.2018.06.032>

- Kizilcec, R. F., Pérez-Sanagustín, M., & Maldonado, J. J. (2017). Self-regulated learning strategies predict learner behavior and goal attainment in Massive Open Online Courses. *Computers & education, 104*, 18-33.
- Koehler, A. A., Cheng, Z., Fiock, H., Wang, H., Janakiraman, S., & Chartier, K. (2022). Examining students' use of online case-based discussions to support problem solving: Considering individual and collaborative experiences. *Computers & Education, 179*, 104407. <https://doi.org/10.1016/j.compedu.2021.104407>
- Miles, M. B., & Huberman, A. M. (1994). *Qualitative data analysis: An expanded source book* (2nd ed.). Thousand Oaks: Sage.
- Sadaf, A., Kim, S. Y., & Olesova, L. (2022). Relationship between metacognition and online Community of Inquiry in an online case-based course. *Online Learning, 26*(4), 78-93. DOI: 10.24059/olj.v26i4.3474
- Vaughan, N., & Wah, J. L. (2020). The Community of Inquiry framework: Future practical directions-shared metacognition. *International Journal of E-Learning & Distance Education, 35*(1), 1–25.
- Vuopala, E., Näykki, P., Isohätälä, J., & Järvelä, S. (2019). Knowledge co-construction activities and task-related monitoring in scripted collaborative learning. *Learning, Culture and Social Interaction, 21*, 234–249. <https://doi.org/10.1016/j.lcsi.2019.03.011>
- Xu, D., & Xu, Y. (2019). The promises and limits of online higher education: Understanding how distance education affects access, cost, and quality. <https://files.eric.ed.gov/fulltext/ED596296.pdf>.