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Using the Community of Inquiry Framework to Examine Instructor Strategies for Emergency Remote Online Teaching during the COVID-19 Pandemic

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Using the Community of Inquiry Framework to Examine Instructor Strategies for Emergency Remote Online Teaching during the COVID-19 Pandemic

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Dedication

To my family – for whom I rise.

To my mentors – who inspired, challenged, and, at times, carried me.

To teachers who persevered through the pandemic – you are upstanders, warriors, heroes.

To first generation academics – we belong here.

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Abstract

The pivot to emergency remote learning in response to the COVID-19 pandemic presented challenges for both students and instructors in the majority of higher education settings. Using the Community of Inquiry (CoI) framework and self-efficacy theory, this study examined the teaching practices of higher education instructors during emergency remote online learning in response to the COVID-19 pandemic during Spring 2020. Regarding the three CoI presences, both students and instructors reported high teaching presence and high cognitive presence, as well as moderate social presence during emergency remote online learning. Correlations were found between student CoI scores and student satisfaction and perception of learning, as well as between instructor CoI cognitive presence score and online teaching self-efficacy. Student and instructor results did differ significantly, with student scores being higher than instructor scores for overall CoI and for all three presences ($p < .01$). Interviews with 20 instructors provided further insight into their emergency remote online teaching practices. The results of this study support the use of the CoI framework for evaluating emergency remote learning, reveal several implications for future practice, and suggest future research is needed on how to operationalize indicators for social presence in an emergency remote online learning environment.

Keywords: Community of Inquiry (CoI), COVID-19 pandemic, emergency remote online teaching and learning, instructor self-efficacy, student satisfaction, instructor satisfaction, perception of learning

"We never learn in isolation." (Garrison, 2017)

Chapter 1: Introduction

Problem

Even before the coronavirus (COVID-19) pandemic, many higher education institutions (HEIs) had begun offering blended or fully online graduate-level courses and programs. In 2019, the U.S. Department of Education National Center for Education Statistics (USDOE NCES) reported that the percent of students participating in distance education was highest for private for-profit institutions (73%), followed by public institutions (34.1 %), and private non-profit institutions (30.4 %); however, only 16.6% of students were enrolled exclusively in distance learning courses. In 2019, Inside Higher Education (IHE) surveyed 1,967 higher education faculty, of which almost half (46 %) reported having taught at least one online course, and 38% reported having taught a hybrid or blended course. IHE (2019) also reported finding that 48% of instructors who taught online courses reported being early adopters of technology, with an increase to 62% if the instructor had been teaching online courses for more than 10 years.

Then, in Spring 2020, in response to the COVID-19 pandemic, almost all colleges and universities were forced to move to an *emergency remote online learning* format for all graduate and undergraduate courses. Most instructors had no prior experience with online teaching and little to no training in how to optimally design online learning experiences. Students who had no prior experience with online learning found themselves forced into online learning environments, the quality of which was largely dependent on the instructor's online teaching expertise.

Purpose of the Study

The purpose of this explanatory sequential mixed methods study was to use the Community of Inquiry (CoI) framework to explore and analyze instructor strategies for emergency remote online teaching during the COVID-19 pandemic. The setting of this proposed study was a private, urban, liberal arts university in the Pacific Northwest region of the United States. In this study, quantitative results were obtained from a survey of 65 student participants and 38 instructor participants, and then qualitative results were obtained by following up with 20 instructor participants. In the quantitative first phase of this study, the research questions focused on how the elements of the CoI framework, as well as selected internal and external variables (student-related, instructor-related, institution-related) could be used to identify teaching practices that contributed to student learning and satisfaction. In the qualitative second phase of this study, 20 instructors participated in follow-up interviews. In this phase, the research questions addressed how further exploration of the elements of the CoI framework through qualitative methods could better explain best practices in emergency remote online teaching.

This study contributes to the existing research on CoI through the use of CoI measurement tools, combined with an online teaching self-efficacy measurement, in an explanatory sequential mixed methods approach to examine how students and instructors in different contexts (undergraduate levels, graduate levels, disciplines or programs) responded to the emergency remote online teaching and learning environment, and whether there was a correlation between perceived success in that environment and elements of the CoI framework. The results of this study may be used to inform course

design at the school or program level and to develop professional learning opportunities for instructors (individual and group).

Furthermore, the larger context for this study—a global pandemic that forced the closure of school campuses—has never existed at the same time as the ability to switch to an online learning format. Researchers around the world have begun to document the effects on student learning (Baran & AlZoubi, 2020; Brown & Eaton, 2020; Gregg et al., 2020; Higgs et al., 2020; Lin & Gao, 2020; Zawacki-Richter, 2020), including research involving the CoI framework (Evmenova et al.; 2021; Oyarzun et al., 2021; Poluekhtova et al., 2020; Waddington & Porter, 2021; Williams & Corwith, 2021). It is important to investigate and document promising practices that contributed to effective learning for students during this event so that schools can prepare for future scenarios that would involve a shift to emergency remote online learning.

Terms and Definitions

In this study, three terms are discussed that are sometimes used interchangeably, but which have very different meanings to researchers in the field. An important understanding when discussing distance and online learning is how the mode of learning affects learner autonomy as related to (a) place: where the learning occurs both in physical space and time, (b) pace: the amount of time learners spend completing learning activities, and (c) path: the amount of agency students have in deciding how their learning happens, including which mediums/materials are used and whether learning happens either in collaboration with other learners or alone (Tucker, 2017).

Distance learning is the term that describes a mode of learning that has been in practice for quite some time, originally beginning with correspondence courses and

including online courses in the present day that incorporate asynchronous learning activities that can be completed over a period of time that may be entirely up to the student (Garrison, 2017; Moore et al., 2011).

Online learning is the term that describes a mode of learning that has been made possible by advances in computer technology. Online learning can be used in both distance learning and in-person learning environments. Examples include blended or completely online synchronous and asynchronous online learning activities (Senner, 2015).

Emergency remote online teaching/learning is the term that has emerged in the literature to describe the mode of teaching and learning that became necessary during the COVID-19 global pandemic. It describes the context in which teachers and students were not able to choose between in-person, blended, or completely online learning environments, and for which many teachers were completely unprepared in terms of experience, professional learning, and/or guidance (Hodges et al., 2020).

An important condition to understand when discussing emergency remote online teaching/learning, as it occurred during the COVID-19 pandemic, is that the majority of educators were unprepared to teach in an online format and in many cases needed to completely redesign their courses without the benefit of professional development or instructional design consultation. Furthermore, educators needed to conduct classes in a completely online format, through synchronous video conferencing and/or asynchronous use of learning management systems (LMS) and/or other digital platforms.

An equally important circumstance to understand is that students also had varying degrees of experience with online learning, ranging from zero experience to being

engaged in a program that was completely online prior to COVID-19. Therefore, the context of emergency remote online teaching/learning during the COVID-19 pandemic featured pairings of inexperienced or experienced online teachers with inexperienced or experienced online students, as well as any combination therein, and we must consider what each of these pairings meant for both the teachers and the students in terms of continuity and quality of learning.

Research Questions

The research questions are:

1. Is there a relationship between students' perception of emergency remote learning (as measured with the CoI Survey) and students' satisfaction and perception of learning in the emergency remote online learning environment during the COVID-19 pandemic?

   H_0: There is no statistically significant correlation between students' perception of emergency remote learning (as measured with the CoI Survey) and students' satisfaction and perception of learning in the emergency remote online learning environment during the COVID-19 pandemic.

   H_1: There is a statistically significant correlation between students' perception of emergency remote learning (as measured with the CoI Survey) and students' satisfaction and perception of learning in the emergency remote online learning environment during the COVID-19 pandemic.

2. Is there a relationship between instructors' perception of emergency remote online teaching (as measured with the CoI Survey) and instructors' self-efficacy with online teaching (as measured with eight Online Teaching Self-Efficacy Inventory [OTSEI] items)?

H_0: There is no statistically significant correlation between instructors' perception of emergency remote online teaching (as measured with the CoI Survey) and instructors' self-efficacy with online teaching (as measured with eight OTSEI items).

H_1: There is a statistically significant correlation between instructors' perception of emergency remote online teaching (as measured with the CoI Survey) and instructors' self-efficacy with online teaching (as measured with eight OTSEI items).

3. Is there a difference between students' and instructors' perception of emergency remote learning/teaching (as measured by the CoI Survey) during the COVID-19 pandemic?

H_0: There is no statistically significant difference between students' and instructors' perception of emergency remote learning/teaching (as measured with the CoI Survey) during the COVID-19 pandemic.

H_1: There is a statistically significant difference between students' and instructors' perception of emergency remote learning/teaching (as measured with the CoI Survey) during the COVID-19 pandemic.

4. How does the qualitative interview data provide further insight about the instructors' emergency remote online teaching practices during the COVID-19 pandemic?

Significance of this Study

Like other research about the CoI framework, this study used the CoI Survey and coding instruments to analyze online learning environments. Although research has been done to explore the application of the CoI framework in multiple disciplines, researchers have noted a limitation in the range of disciplines represented – largely due to which disciplines have begun to offer online courses – and have suggested that further research

is needed in this area (Arbaugh et al., 2010; Arbaugh, 2013). This study responds to the call for further research by attempting to gather a wider range of perspectives, including both undergraduate and graduate students and instructors from a wide variety of disciplines. Furthermore, the CoI Survey is designed to be administered to students, and only a few research studies have administered the CoI Survey to instructors or to both students and instructors (Stenbom, 2018). This study seeks to expand on the research in this area by administering the CoI Survey to both student and instructor participants and comparing the results from these participant groups.

CoI researchers have suggested that further research is needed for the CoI element of teaching presence, particularly regarding the relationship of specific teacher behaviors and student behaviors to this element (Befus, 2016; Garrison, 2017; Hayes et al., 2015; Shea et al., 2012; Stenbom, 2018). This study responds to the call for further research in this area by including an instructor survey element and qualitative data in the form of follow-up interviews with faculty designed to elicit specific teacher behaviors that align with the indicators for all three CoI presences.

Finally, this study was conducted in the context of a global pandemic that does not have a clear endpoint, and which may involve continuous pivoting between campus-based teaching/learning and emergency remote online teaching/learning. The value of research about how HEIs responded to this crisis is the compendium of data and resources for future planning, including the results of the current study. This study will add to the existing and continuing narrative about best practices in emergency remote online teaching and learning.

The results of this study will be of interest to higher education administration and instructors who are exploring methods for improving instructor self-efficacy with emergency remote online teaching and/or may be interested in incorporating the CoI framework as a guide for best practices in their response to a crisis.

Methods

An explanatory sequential mixed methods research design was used in which the researcher collected and analyzed quantitative data and then further explored the quantitative results by collecting and analyzing qualitative data (Creswell & Creswell, 2018, p. 15). The rationale for using this research design was that the quantitative results would allow the researcher to identify types of best practices, as well as associated independent variables, as reported by students and instructors (using the CoI framework as a guide) that occurred during emergency remote online learning, while the qualitative interview data would allow the researcher to gather in-depth information about which unique best practices were performed by instructors whose courses were nominated as effective online courses in Spring 2020.

One of the challenges of using this methodology is identifying which quantitative results will be further explored in the qualitative phase (Creswell & Creswell, 2018, p. 15); however, in the current study, this challenge was mitigated by the focus on the CoI framework and the use of associated measurement tools (surveys, interview questions, and coding instrument) to guide data collection in both the quantitative and qualitative research phases. Another challenge of using this methodology is the likelihood of unequal sample sizes in each phase of the study (Creswell & Creswell, 2018). In regard to the current study, because instructor participation in each phase was voluntary, there

was a good chance that the sample sizes could be unequal. However, in the current study, this challenge was mitigated by presenting the qualitative data as a composite narrative with the understanding that the qualitative data cannot be considered comprehensive or representative of the lived experiences of all the instructors in this study, let alone all instructors at the institution in this study, in the United States, or globally, regarding emergency remote online teaching during the COVID-19 pandemic. However, the qualitative data in this study does provide further insight into the teaching practices and experiences of instructors who may serve as social models for other instructors who might see themselves in and learn from what is shared.

In this study, the researcher used the purposive homogenous sampling technique, followed by the purposive extreme (or deviant) sampling technique in Phase 1 to select prospective participants who would be invited to take the survey in Phase 2, and the purposive homogenous sampling technique in Phase 2 to recruit prospective instructor participants who would participate in follow-up interviews (Laerd, 2012). Further details about the sampling techniques will be discussed in Chapter 3: Methods.

Quantitative data was collected using separate student and instructor surveys that comprised the complete 34-item CoI Survey Instrument (Arbaugh et al., 2008); eight items from the Online Teaching Self-Efficacy Inventory (OTSEI; Gosselin, 2009; instructor survey only); and two questions, one each about student or instructor satisfaction and perception of (student) learning. Additional demographic questions were included in both the student and instructor surveys. All survey items are reproduced in the Appendix and are discussed in detail in Chapter 3: Methods.

Qualitative data was collected using a phenomenological approach, in which the actual experiences of the instructors with the phenomenon, emergency remote online teaching during the COVID-19 pandemic, were examined to gain deeper insight into best practices that could be gleaned from their lived experiences (Creswell & Creswell, 2018). Qualitative data was collected using semi-structured interviews in which the researcher guided the conversation (Lichtman, 2013) using 14 questions that focused on the instructors' lived experiences through the lens of the three CoI presences (Damm, 2016). The instructor interview questions are reproduced in the Appendix and are discussed in detail in Chapter 3: Methods.

Limitations

The researcher identified several limitations to this study, which arose from the researcher's quantitative and qualitative methods choice, as well as from the sample sizes and study context. These limitations are described in detail in Chapter 5: Discussion.

Summary

This mixed-methods study will be presented in five chapters. Chapter 1 included an overview of the topic and problem, purpose statement, terms and definitions, research questions, significance of this study, and an overview of the methods and limitations of this study. Next, Chapter 2 will review the current literature involving the CoI framework, self-efficacy theory, and effective instructional practices in online learning. Chapter 3 will provide a detailed description of the research design and methods used in this study. Chapter 4 will summarize the quantitative and qualitative data collected for this study. Finally, Chapter 5 will present the conclusions as well as the limitations of this study and discuss study strengths and implications for future research and practice.

Chapter 2: Background and Literature Review

The purpose of this chapter is to present a summary of the literature that is relevant to this study and is organized into two sections. The first section, Theoretical Constructs, reviews the CoI framework and self-efficacy theory. The second section, Empirical Studies, examines the existing literature involving the use of the CoI framework and self-efficacy theory to study best practices in distance and online teaching and learning.

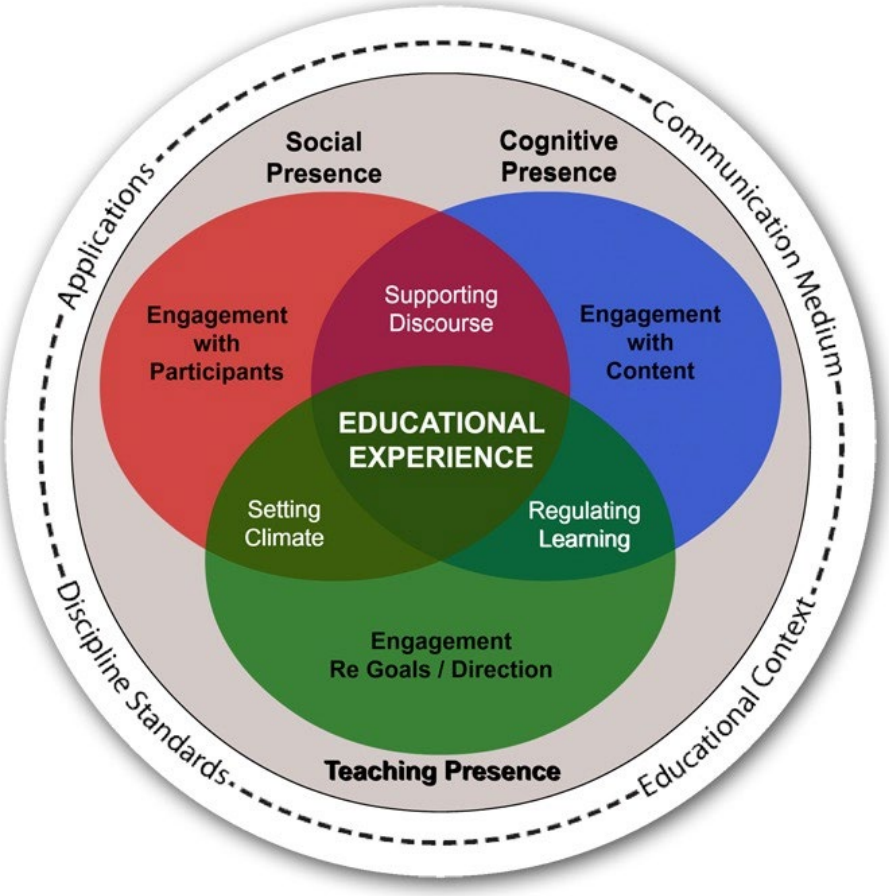
Theoretical Constructs

CoI Framework

The CoI framework (see Figure 1) has roots in collaborative constructivist theoretical beliefs that state learning is a socially situated and transactional experience (Dewey, 1910; Vygotsky, 1978). Dewey (1910) posited that learning has physical, social, and intellectual components, and that attention paid to all three is critical to a successful learning experience. Vygotsky (1978) expanded on the social nature of learning by noting that learning is transactional in nature, involving interactions between and among all members of the learning community, and as such is mediated by environmental factors (e.g., culture and other demographic variables, time, place, medium). These collaborative constructionist beliefs are connected to a central element of the CoI framework—that social interaction and cohesion between both the teacher and learners and among learners must be fostered before learning can take place (i.e., social presence; Garrison, 2017).

Figure 1

Community of Inquiry (CoI) framework (Garrison et al., 2000)



The CoI framework comprises the intersection of three elements: teaching presence, social presence, and cognitive presence (Garrison et al., 2000). Researchers have found correlations among the elements, as well as between perceived learning and student satisfaction and each of the presences (Akyol & Garrison, 2008; Garrison & Arbaugh, 2007). Additionally, each presence in the framework is operationally defined by the following categories, which examine choices made by the instructor regarding the design of the online course, as well as the online learning environment:

- Teaching presence: design and organization, facilitating discourse, direct instruction
- Social presence: personal/affective, open communication, group cohesion
- Cognitive presence: triggering event, exploration, integration, resolution (Akyol & Garrison, 2008).

In the CoI framework, teaching presence is defined as "the design, facilitation, and direction of cognitive and social processes for the purpose of realizing personally meaningful and educationally worthwhile learning outcomes" (Garrison & Akyol, 2015). Anderson et al. (2001) posited that teaching presence is chiefly the "responsibility of the instructor;" however, some researchers have noted that students may also cultivate and demonstrate this presence "as they organize their own learning, and facilitate and instruct peer students" (Stenbom, 2018). The indicators for teaching presence (design and organization, facilitating discourse, direct instruction) represent the way the instructor uses course platforms and other tools to facilitate the learning process, as well as how the instructor behaves when interacting with students in the learning environment. The instructor must be able to choose and use appropriate technologies, while also considering themselves to be the lead contributor to the social atmosphere of the course, whether through direct instruction or by facilitating collaborative learning activities. In the current study, the researcher was interested in examining how students rated instructors/courses and how instructors rated themselves on teaching presence (quantitative results). Additionally, the researcher was interested in identifying what methods were used by instructors to promote student engagement with the course materials and to foster a collaborative learning environment, which may have included

instances where instructors provided opportunities for students to cultivate and demonstrate teaching presence (qualitative results).

Social presence is defined as "the ability of participants to identify with the group or course of study, communicate purposefully in a trusting environment, and develop personal and affective relationships progressively by way of projecting their individual personalities" (Garrison, 2017). The indicators for social presence (open communication, group cohesion, personal/affective relationships) represent the way the instructor designs the social elements of the course, including how students initially get to know each other and build trust in their peers so that they feel comfortable participating in collaborative learning activities. For example, the instructor should provide multiple opportunities for participants to share personal information about themselves and/or their goals for learning and should make sure all voices are heard. The elements of social presence are designed to help students develop a sense of self as well as a sense of others in the online learning environment through social interactions and collaborative learning experiences (Eneau & Develotte, 2012; Jaber & Kennedy, 2017). Social presence is the glue of the CoI framework and has been found to be an important mediator between teaching presence and cognitive presence (Garrison et al., 2010). However, when educational experts have been asked to rank the skills of online instructors, social presence has been ranked lower while more traditional skills related to pedagogy and evaluation were ranked higher (Bawane & Spector, 2009; Tamim, 2020). Furthermore, researchers have found that instructors often struggle with social presence, attempt to replicate the in-person learning environment, and neglect the importance of social presence in the online learning environment (Sanga, 2018; Shearer et al., 2020; Tamim, 2020). In the current

study, the researcher was interested in examining how students rated instructors/courses and how instructors rated themselves on social presence (quantitative results), and in identifying what methods were used by instructors to create an online environment where students were able to sense the distinct personalities of their peers and the professor and felt as though their own distinct personality was sensed by others as well (qualitative results).

Cognitive presence is defined as "the extent to which learners are able to construct and confirm meaning through sustained reflection and discourse in a critical community of inquiry" (Garrison et al., 2001). The indicators for cognitive presence (triggering event, exploration, integration, resolution) represent the types of activities the instructor uses to guide the students through the learning process. The cognitive presence arc begins with a triggering event that spurs students to consider the purpose of the learning activity and then guides students through exploring resources for learning, synthesizing their learning, and finally, reflecting on their learning. It should be noted that the indicators for cognitive presence align with Dewey's (1910) five steps of reflection in learning. In the current study, the researcher was interested in examining how students rated instructors/courses and how instructors rated themselves on cognitive presence (quantitative results), as well as in identifying what methods were used by instructors to share learning materials with the students and promote inquiry and discussion about course topics (qualitative results).

Figure 1 illustrates the interplay of the three CoI presences, as well as the defining activities within each presence, and the contextual elements that make up the online learning environment (outer circle). No single presence is considered more important

than the others, as each are shown to contribute an equally important element to a successful educational experience; however, researchers have found important mediating relationships among the presences (Garrison et al., 2010; Shea & Bidjerano, 2013).

The CoI framework is considered useful in the study, description, and design of successful online higher education learning experiences (Akyol & Garrison, 2008; Castellanos-Reyes, 2020). Researchers who performed recent meta-analyses of CoI research reported that the founding articles of the CoI framework, as well as the follow-up research, continue to be useful in informing the literature about best practices for distance, blended, and online learning (Befus, 2016; Stenbom, 2018). The initial Garrison et al. (2001) article has been cited 3,129 times (according to Google Scholar results on May 4, 2021). After the initial development of the framework, Arbaugh et al. (2008) and Swan et al. (2008) developed and validated a CoI measurement tool: the CoI Survey Instrument. The CoI Survey Instrument has been used in numerous studies and researchers who have performed reliability and validity studies have reported that the CoI Survey Instrument continues to be a valid and reliable measurement tool (Bangert, 2009; Díaz, 2010; Heilporn & Lakhal, 2019; Stenbom, 2018; Swan et al., 2014; Yu & Richardson, 2015). Additionally, a robust CoI community of practice (CoP) exists and founding researcher Garrison and other members regularly curate content, including a corpus of CoI research, on the CoI website (https://coi.athabascau.ca/). Finally, as a young framework, CoI has called for and attracted researchers who have furthered its development, as well as questioned the existing constructs.

There has been some debate about whether a separate element should be added for learner presence (Hayes et al., 2015; Shea & Bidjerano, 2010; Shea et al., 2012; Shea

et al., 2014). Shea et al. (2012) reported that learner presence, defined by the researchers as the learner's self-regulatory cognitions and behaviors in the online learning environment mitigates the effect that teaching presence and social presence have on cognitive presence. Miller et al. (2014) performed a study to confirm the validity of the teaching presence construct and found that students were able to distinguish between direct instruction and facilitating discourse, which contrasts with studies (e.g., Shea & Bidjerano, 2010) that reported a lack of student ability to recognize these as distinct indicators. Arbaugh (2014) did not suggest the addition of a separate presence, but reported that student behaviors, operationalized in the study as social presence, were the only predictors that significantly predicted all three outcome variables in that study: course grades, perceived learning, and delivery medium satisfaction. However, Garrison (2017) rejects the addition of a fourth presence and holds that the existing element of teaching presence comprises actions performed by both the instructor, as the teacher of record, as well as the students, who gradually take on teaching roles as they become more comfortable and confident in the learning environment. That said, the debate about an "nth presence" in the CoI framework continues, as documented by Kozan and Caskurlu (2018), who reported on suggestions of other new CoI presences and presence dimensions that have been investigated in the literature. However, Kozan and Caskurlu (2018) concluded by noting the need for replication studies to confirm or reject the validity of any suggested additional presence.

In the current study, the CoI framework and survey instrument were used essentially in their current form. However, modifications were made to the CoI Survey to allow for instructors to take the survey as a reflection on their online teaching practice.

These modifications will be described in detail in Chapter 3: Methods. The CoI framework provides a structured approach to designing and facilitating an effective online course; however, a key component to being able to apply the CoI framework is instructors' abilities to master the skills necessary to be effective online teachers. The literature suggests that online teaching self-efficacy is a strong predictor of instructors' ability to master these skills (Horvitz et al., 2015). Therefore, in the current study, in addition to the CoI framework and associated measurement tools, the researcher also examined theories of self-efficacy and used an instructor online teaching self-efficacy measurement tool.

Self-efficacy Theory

Self-efficacy theory is an outgrowth of Bandura's (1977; 1986) social learning and social cognitive theories, which support the idea that learning is inherently a social activity and that people learn by observing the behavior of others. According to Bandura (1995), "perceived self-efficacy refers to beliefs in one's capabilities to organize and execute the courses of action required to manage prospective situations," and these beliefs "influence how people think, feel, motivate themselves, and act." During the COVID-19 pandemic, instructors were forced to shift to an emergency remote online teaching environment. For many instructors, the change from in person to online teaching required changes in ideologies, beliefs, attitudes, and practices (Ertmer & Ottenbreit-Leftwich, 2010). Rather than working towards competency and building confidence in their ability to become outstanding online teachers through multiple professional learning opportunities and practice, many instructors needed to immediately pivot to a teaching style that was very different from their previous daily practice. At the same time,

instructors who had previous online teaching experience may have needed to make little to no changes in their teaching style or daily practice and therefore could have served as models for effective online teaching. Moreover, even among instructors who were new to online teaching, there were some who were able to adapt more successfully than others, and who can also serve as models for effectively switching from a campus-based to an online learning environment.

Bandura (1995) noted that in a situation where some members of a group have more experience with a necessary skillset than others, vicarious experiences may serve to create and strengthen the efficacy beliefs of less experienced members. When members of a group witness the effort and perseverance of other group members as they succeed in mastering a skillset, the observers begin to believe that they are also able to achieve mastery (Bandura, 1995). Bandura (1995) noted that modeling influences do more than simply provide a social standard against which to judge one's own capabilities. In fact, the "undaunted attitudes exhibited by perseverant models as they cope with obstacles repeatedly thrown in their path can be more enabling to others than the particular skills being modeled" (Bandura, 1995). Furthermore, having a greater number of social models increases the chances that the less experienced observers will find a social model whom they believe they can emulate in order to succeed (Ertmer, 2005). The instructors in this study may serve as "social models" who embody the "who" that other instructors are striving to become (Bandura, 1995).

Regarding innovation, Bandura (1995) wrote that "innovative achievements also require a resilient sense of efficacy. Innovations demand heavy investment of effort over a long period with uncertain results" (p. 13). Therefore, instructors may benefit from

professional learning or coaching experiences in which a peer mentor models innovative uses of technology and exhibits a resilient sense of efficacy when faced with the challenges that are inherent to online teaching. Examples of these types of experiences include professional learning communities (PLCs) or peer mentors, ideally at the department or school level so that the teaching context of the mentor faculty matches the teaching context of the mentee (subject or discipline).

Instructor self-efficacy is a necessary ingredient to creating the conditions that mark successful online teaching according to the CoI framework, and the work of building self-efficacy is best done in partnership with peers and mentors.

Empirical Studies

The CoI framework has been used in multiple contexts as an approach to the design and implementation of online and blended learning (Stenbom, 2018). For this study, a literature search was performed in EBSCOhost (Academic Search Complete, Academic Search Ultimate, APA PsycInfo, APA PsycArticles, Education Source, ERIC) and Google Scholar using the search terms: community of inquiry; distance learning or e-learning or remote learning or online learning, or virtual learning; higher education or college or university or post-secondary or postsecondary; and teacher or instructor or faculty self-efficacy. A second search was performed using the search terms: social cognitive theory; distance learning or e-learning or remote learning or online learning or virtual learning; higher education or college or university or post-secondary or postsecondary. The search was limited to peer-reviewed academic journal articles published in English between 2000 and 2020 for which full text was readily available.

Additionally, the lists of CoI research publications available on the CoI website (https://coi.athabascau.ca/) yielded many articles relevant to the current study.

Social Cognitive Theory

In addition to the CoI framework, the current study focuses on Bandura's (1977, 1986, 1995) ideas about human agency—the degree to which individuals feel able to control the circumstances in their lives. These ideas were couched in Bandura's (1977, 1986, 1995) broader social cognitive and social learning theories, which were foundational to Bandura's (1977, 1986, 1995) self-efficacy theory. Of particular interest to this study is Bandura's (1977) idea that it is not enough for someone to know that an action will result in a desired outcome if they also do not believe themselves capable of taking the action necessary to achieve the outcome. Although self-efficacy theory is not limited to the realm of educational research, there have been numerous studies that have investigated the effects of teacher and student self-efficacy on learning outcomes (Zee & Koomen, 2016).

Self-efficacy Theory and Online Teaching

Self-efficacy in online teaching is a relatively new field of study and began when education researchers began to adapt methods that were being used to evaluate technology adoption in business environments, such as the Technology Access Model (TAM; Davis, 1989; Corry & Stella, 2018). Additionally, the Technological Pedagogical Content Knowledge (TPCK or TPACK) framework questionnaire, developed by Mishra and Koehler (2006) was modified to address teaching in online learning environments. Besides measurement tools that were based on the TAM or TPACK, an early online teaching self-efficacy measurement tool developed and validated by education

researchers was the Michigan Nurse Educators Sense of Efficacy for Online Teaching (MNESEOT), developed by Robinia and Anderson (2010). Because the MNESEOT was developed by nurse educators, it has mostly been used in studies involving nurse education (Corry & Stella, 2018; Hampton et al., 2020). However, Horvitz et al. (2015) used a modified version of the MNESEOT in their study and found that satisfaction with online teaching, perception of student learning, and being an instructor in a professional discipline (e.g., business, education, health, and aviation in their study) were "significant predictors of overall self-efficacy related to online teaching." Regarding satisfaction with online teaching, the researchers found that this was connected to the instructors' comfort level with using a computer and with the number of years of experience they had as an online teacher (Horvitz et al., 2015). Essentially, instructors who reported high self-efficacy with using computers and had extensive experience as online teachers also reported high satisfaction with online teaching (Horvitz et al., 2015). Regarding perception of student learning, the researchers noted that "it makes sense that an instructor who perceives that students are learning a great deal gains confidence in his/her ability to engage students in an online course" and that this points to the "critical nature of putting online instructors in positions to succeed through the provision of adequate resources and support when they are teaching online the first few times" (Horvitz et al., 2015). Horvitz et al. (2015) also suggested future research into the difference between instructors in professional disciplines and other disciplines, such as hard sciences and arts and humanities, is needed.

Meanwhile, Gosselin's (2009) dissertation introduced and validated the Online Teaching Self-Efficacy Inventory (OTSEI), which comprised 47 questions across five

scales designed to measure teacher self-efficacy in the context of online teaching. The OTSEI differs from the MNESEOT in that most of the questions on the OTSEI focus on instructor competencies and behaviors regarding the design, organization, and implementation of an online learning experience, whereas many of the questions on the MNESEOT focus on how the instructor directs student behaviors during the online learning experience. The OTSEI differs from the CoI Survey in that some of the questions on the OTSEI explicitly address instructors' specific technical competency skills, whereas the questions on the CoI Survey do not. Development of the OTSEI was guided by psychometric theories about the measurement of knowledge, abilities, attitudes, and personality traits (Gosselin, 2009). Research studies using the OTSEI have included a series of papers that documented the development of a professional learning program for novice teachers that was informed by both self-efficacy (as measured by the OTSEI) and threshold concepts developed by the researchers during the course of the studies (Gosselin et al., 2016; Northcote et al., 2011; Northcote et al., 2015), as well as a list of pedagogical guidelines that could be used to develop professional learning experiences for novice online teachers (Northcote et al., 2019).

In the current study, in addition to the instructor skills measured by the CoI Survey, the researcher was interested in including a measurement that specifically addressed instructors' self-efficacy with regards to technical knowledge and skills, and the eight items about instructor technological competencies selected from the OTSEI were deemed to be the best way to achieve this goal. These eight items will be further discussed in Chapter 3: Methods.

CoI and Self-Efficacy

The CoI framework addresses teacher efficacy in the online learning environment by providing a method for evaluating whether a teacher's practice has created the conditions necessary for optimal learning in an online context. However, the research on CoI and self-efficacy so far has had only students as the subjects of self-efficacy measurements.

As noted earlier in this dissertation, Shea (2011), Shea and Bidjerano (2010; 2012), and Shea et al. (2012; 2013; 2014) performed several research studies to explore learner presence as a possible fourth presence to be added to the CoI framework. Shea and Bidjerano (2010) examined the relationship between students' perception of their own self-efficacy and their ratings of the quality of online learning. They used the CoI Survey Instrument and the Motivated Strategies for Learning Questionnaire to collect data (Shea & Bidjerano, 2010). In addition to finding evidence of the existence of a learner presence, which represents the students' role within the CoI framework, the researchers reported that students' perception of teaching presence and perception of social presence were significantly correlated with students' perceived self-efficacy (Shea & Bidjerano, 2010).

In the current study, the second research question explored whether a relationship existed between instructor self-efficacy and instructor CoI. A modified version of the CoI Survey (redesigned to be taken by instructors as a metacognitive reflection on their own online teaching practice) in combination with an online teaching self-efficacy survey (eight items from the OTSEI) was used to collect data for this purpose.

CoI and Student Satisfaction and Perception of Learning

Both the CoI framework and CoI Survey focus on the student perspective in the online learning environment and previous research has been performed using CoI measurement tools, sometimes in combination with separate measurements of student satisfaction and perception of learning.

Akyol et. al (2009) reported that students could sense each of the CoI presences regardless of whether they were participating in a blended or online-only format. However, the researchers also reported that students in the blended course had a greater perception of all three presences (Akyol et al., 2009). They suggested that this finding could have resulted from the “students in the blended course [having] had opportunities to interact with the course instructor in face-to-face meetings” (Akyol et al., 2009). Interestingly, Akyol et al. (2009) noted that some students from both the blended and online-only courses “suggested a relationship between class size and social presence” and that “social presence was better in small groups." Regarding teaching presence, the researchers noted that “the design of both courses provided opportunities for students to share teaching presence by allowing them to lead and facilitate weekly discussions” and that students in both the blended and online-only courses “valued this opportunity, indicating that it provided a new way to participate, made the discourse richer with different backgrounds and experiences, and helped them to learn better" (Akyol et al., 2009). In the current study, the researcher used both quantitative and qualitative methods to explore what instructor practices, if any, led to greater instructor and student satisfaction and perception of (student) learning in the emergency remote online learning environment.

Rockinson-Szapkiw et al. (2010) used both the CoI Survey and the Perceived Learning Instrument (Richmond et al., 1987) to explore student perceptions of CoI in both synchronous and asynchronous online learning environments and reported that a combination of synchronous and asynchronous online learning experiences led to statistically significantly higher levels of perceived social presence than asynchronous-only experiences. They also reported that there was no difference in cognitive presence, teacher presence, or perceived learning between the two groups (Rockinson-Szapkiw, et al., 2010). Rockinson-Szapkiw et al. (2010) suggested that further research should examine both whether and how students are trained to use the tools available in synchronous and asynchronous online learning environments. In the current study, the qualitative data may yield further insight into the choices made by instructors regarding synchronous and asynchronous modes of teaching and instructor practices and experiences in those contexts. Additionally, for the current study, the researcher collected information from the institution's Educational Technology and Media (ETM) department about which types of technology learning resources were created to assist students and instructors with the switch to emergency remote online teaching and learning. Details about this will be shared in Chapter 3: Methods.

Rockinson-Szapkiw and Wendt (2015) performed a study to explore the relationship between the types of communication technologies used for group work in synchronous and asynchronous online learning environments and students' perceptions of CoI and learning. The researchers used the CoI Survey, with additional demographic questions, to collect data (Rockinson-Szapkiw & Wendt, 2015). Rockinson-Szapkiw and Wendt (2015) reported that students who used synchronous communication technologies

for group work had higher CoI than students who used asynchronous technologies. Specifically, "students who used synchronous technology to complete online group work differed significantly in their sense of social presence, cognitive presence, teaching presence, and course points when compared to students who used only asynchronous technology to complete online group work" (Rockinson-Szapkiw & Wendt, 2015). The researchers suggested further research was needed to examine the use of specific online communication technologies (text, audio, and visual tools) for the purpose of group work. In the current study, the qualitative data may yield further insight into the choices made by instructors regarding synchronous and asynchronous methods of facilitating group work and instructor perceptions about student learning in those contexts.

Shea and Bidjerano (2013) reported that social interactions were a statistically significant mediator of the relationship between students' perception of teaching presence and students' perception of learning. They also noted that students in hybrid courses gave a higher rating for teaching presence than students in fully online courses (Shea & Bidjerano, 2013). Additionally, they found that student age and experience with online learning were statistically significant predictors of student learning outcomes (Shea & Bidjerano, 2013). Shea and Bidjerano (2013) suggested that further research could explore how specific teacher behaviors, such as "providing students with clear course goals, topics, due dates, timely feedback and assisting them to collaborate in effective ways with their classmates" contribute to the development of CoI within a course and affect student learning outcomes. In addition to the quantitative analysis in this study which explored the relationship between CoI social presence and student satisfaction and perception of learning, the qualitative data may yield further insight into specific

instructor behaviors that encouraged social interactions among students, as well as into instructors' communication and student support practices.

Arbaugh (2014) performed a study to examine whether type of technology, learner behaviors (CoI social presence), or instructor behaviors (CoI teaching presence) best predicted student learning outcomes (course grades, perceived learning, and satisfaction with technology tools) in online courses, and reported that only student behavior (social presence) significantly predicted all three measures of student learning outcomes. They also reported that instructor behavior (teaching presence) was the strongest predictor of perceived learning and suggested further research to examine course design to improve opportunities for the development of social presence and the effect on student learning outcomes (Arbaugh, 2014).

Similarly, Lee et al. (2020) performed a study to explore the relationship between CoI and student satisfaction with online learning, as well as the role of teaching presence in predicting social presence and/or cognitive presence. They reported that while both social presence and cognitive presence were significantly related to students' e-learning satisfaction, cognitive presence had more influence, and teaching presence enhanced both social presence and cognitive presence (Lee et al., 2020). In the current study, the first research question explored whether a relationship existed between CoI and student satisfaction and perception of learning. Furthermore, as a secondary analysis of data collected for the second research question, the researcher explored whether there was a relationship between instructor satisfaction and perception of (student) learning and any of the CoI presences in the instructor data.

CoI and Comparison of Instructor and Student Survey Results

As stated earlier, both the CoI framework and CoI Survey focus on the student perspective in the online learning environment. The questions on the CoI Survey are directed towards students, and the survey has been predominantly administered to student participants. The researcher in the current study found mention in Stenbom (2018) of a modified CoI Survey, but no direct evidence in available published research of modification of the CoI Survey for instructor participants.

One study, performed by Diaz et al. (2010) asked student participants to rate not only courses (using the CoI Survey) but also the importance of each CoI Survey item, and reported that social presence items were perceived as the least important of the CoI subscales, while teaching presence items were perceived as the most important. This study was unique in asking students to evaluate the importance of CoI Survey items, rather than simply responding to the survey to evaluate a course. Diaz et al. (2010) suggested further research, especially qualitative research that may provide greater clarity about students' understandings of the items in each of the constructs. The researchers also suggested further research in which instructors would rate the importance of each CoI Survey item.

In the current study, the researcher administered the CoI Survey to both student and instructor participants and compared the results. Although not an analysis of item ratings, as suggested by Diaz et al. (2010), the data analysis in the current study may yield some insight about how students and instructors interpreted the items on the CoI Survey.

CoI and Course Design

Researchers have investigated whether the CoI framework can be linked to certain elements of course design, including length of course and type of technologies used, or used to create a course design template, either alone or in combination with other constructs.

Akyol et al. (2011) explored the effects of course duration on students' perception of CoI and reported statistically significant differences between the short- and long-term courses for all three CoI presences. Indicators for group cohesion (social presence) were found to be more frequent in the short-term course, while indicators for affective communication (social presence) were found to be more frequent in the long-term course (Akyol et al., 2011). Furthermore, indicators for the integration and resolution phases (cognitive presence) were higher in the long-term course than in the short-term course (Akyol et al., 2011). Indicators for the exploration and integration phases (cognitive presence) were almost equal in the short-term course, while in long-term course, students spent the most time in the integration phase (Akyol et al., 2011). There were significant differences in the categories facilitating discourse and direct instruction (teaching presence) between the short-term and long-term courses (Akyol et al., 2011). Design and organization (teaching presence) was the least coded category for both the short- and long-term courses (no statistically significant difference; Akyol et al., 2011). Akyol et al. (2011) noted that course length seemed to have the greatest effect on students' development and perception of cognitive presence. The researchers also noted the interesting result of higher group cohesion found in the short-term course (Akyol et al., 2011). Although the current study involved courses that were all the same length, the

length of the academic quarter was shortened by two weeks, and therefore the results may yield important information regarding the implications and considerations for shortening instructional time in response to an emergency.

Gutierrez-Santuiste et al. (2015) performed a study to examine students' perception of CoI as related to synchronous and asynchronous text-based methods of communication (chats, forums, and emails) and reported that cognitive presence is more strongly predicted by social presence than by teaching presence, and that cognitive presence is better explained by other presences in forums than in chats and emails. Gutierrez-Santuiste (2015) suggested further research into specific practices by teachers that can be used to encourage social presence in online learning environments. In the current study, the qualitative data may yield further insight into instructor practices that were used to encourage social presence in the emergency remote online learning environment.

Researchers who performed recent CoI validation studies suggested further research was needed to align course design elements with the CoI presences (Caskurlu, 2018), as well as to collect data on course design and instructional methods in order to gain a deeper understanding of the context of the online learning environment (Kozan & Richardson, 2014). Furthermore, Fiock (2020) created a guide for instructors to implement CoI practices by way of a literature review, including a table of strategies that reads as a combination of Sorensen and Baylen's (2009) seven principles of good practice, the CoI presences, and relevant research articles that highlight each strategy. In the current study, the qualitative data may yield further insight into instructor practices

that align with the CoI framework and can be used to create optimal learning experiences in an (emergency remote) online learning environment.

Summary

As the basis for this study, this literature review focused on presenting the CoI framework and self-efficacy theory as theoretical constructs, followed by studies that examined how the CoI framework has been used to evaluate and inform research and practice in online learning. Supported by this literature review, the current study seeks to respond to and extend the literature by using the CoI framework and self-efficacy theory to explore and analyze instructors' teaching practices in the emergency remote online teaching/learning environment during the COVID-19 pandemic. The specific research design used for this purpose will be discussed in Chapter 3: Methods.

Chapter 3: Methods

The purpose of this chapter is to describe the research design and methods of this study. This chapter reviews the research questions, expands on the research design, describes the participant selection methods and procedures, describes the data collection methods, and explains the data analysis procedures.

Research Questions

The purpose of this explanatory sequential mixed methods study was to use the Community of Inquiry (CoI) framework and self-efficacy theory to explore and analyze instructor strategies for emergency remote online teaching during the COVID-19 pandemic. Therefore, the research questions are:

1. Is there a relationship between students' perception of emergency remote learning (as measured with the CoI Survey) and students' satisfaction and perception of learning in the emergency remote online learning environment during the COVID-19 pandemic?

   H_0: There is no statistically significant correlation between students' perception of emergency remote learning (as measured with the CoI Survey) and students' satisfaction and perception of learning in the emergency remote online learning environment during the COVID-19 pandemic.

   H_1: There is a statistically significant correlation between students' perception of emergency remote learning (as measured with the CoI Survey) and students' satisfaction and perception of learning in the emergency remote online learning environment during the COVID-19 pandemic.

2. Is there a relationship between instructors' perception of emergency remote online teaching (as measured with the CoI Survey) and instructors' self-efficacy with online teaching (as measured with eight OTSEI items)?

H_0: There is no statistically significant correlation between instructors' perception of emergency remote online teaching (as measured with the CoI Survey) and instructors' self-efficacy with online teaching (as measured with eight OTSEI items).

H_1: There is a statistically significant correlation between instructors' perception of emergency remote online teaching (as measured with the CoI Survey) and instructors' self-efficacy with online teaching (as measured with eight OTSEI items).

3. Is there a difference between students' and instructors' perception of emergency remote learning/teaching (as measured by the CoI Survey) during the COVID-19 pandemic?

H_0: There is no statistically significant difference between students' and instructors' perception of emergency remote learning/teaching (as measured with the CoI Survey) during the COVID-19 pandemic.

H_1: There is a statistically significant difference between students' and instructors' perception of emergency remote learning/teaching (as measured with the CoI Survey) during the COVID-19 pandemic.

4. How does the qualitative interview data provide further insight about the instructors' emergency remote online teaching practices during the COVID-19 pandemic?

Research Design

The researcher used a mixed-methods research design, which combines quantitative and qualitative research methods and data, with the overall goal of using the

strengths of each method to minimize their weaknesses (Creswell & Creswell, 2018, p. 14). Specifically, the researcher chose to use an explanatory sequential mixed methods design, in which the researcher collected and analyzed quantitative data and then further explored the quantitative results by collecting and analyzing qualitative data (Creswell & Creswell, 2018, p. 15).

Context

The context for this study was the emergency remote learning environment in which the instructor and student participants engaged in teaching and learning during the Spring 2020 academic quarter. One of the documented challenges to online learning, even without the added stress of a global pandemic, is equitable technology access and support for both students and instructors (Kebritchi et al., 2017; Montelongo, 2019). To ensure equity of access, it is important to determine what level of support students need and to provide the appropriate supports (Kaur & Sidhu, 2010; Mayes et al., 2011; Tamir 2020). While enrolled, all students use the same LMS and have access to assistance from the institution's Computer and Information Systems (CIS) department through a common help desk. Additionally, all students have access to student technology learning modules that are offered through the Educational Technology and Media department (ETM) website. Furthermore, in response to the emergency switch to completely remote online learning, a student remote learning resources webpage was created that included links to tutorials, tips, and troubleshooting for remote online learning. Students also had access through the Canvas LMS to Student Essentials for Remote Learning courses that the ETM designed for each academic year level, including graduate students, and were available during the week prior to the Spring 2020 quarter start date. The ETM reported

that there was a higher average course completion rate for undergraduate courses (24%) than for the graduate course (9.5%; K. Park, personal communication, July 28, 2020).

While employed at the university in this study, all instructors have access to the same LMS, as well as various other online learning tools, and have access to CIS assistance through a common helpdesk. Additionally, all instructors have access to the same trainings about online learning that are offered through the ETM, as well as access to ETM staff members who provide just-in-time support and ongoing professional learning opportunities for instructors. Furthermore, in response to the emergency switch to completely remote online learning, a faculty remote learning resources webpage was created that included links to resources designed to improve instructors' effectiveness in online teaching. One webpage, titled "Instructor Presence in an Online Course," specifically referenced the CoI elements "social presence" and "cognitive presence" and provided guidance that aligned with CoI indicators for these elements. Finally, "ETM worked with the Faculty Life Office to provide an online learning in-service for all faculty and adjuncts" and, "offered a variety of recorded sessions to help faculty end winter quarter and prepare for spring quarter" (K. Park, personal communication, July 28, 2020). Research shows that when instructors engage in professional development (PD) for online learning, they build competencies in areas related to the three CoI presences (Bigatel & Edel-Malizia, 2018; Bigatel et al., 2012; Tamim, 2020). Additionally, PD for online learning also improves instructor self-efficacy, or belief in their own abilities, to be successful online teachers (Martin & Bollinger, 2018; Martin et al., 2019; Tamim, 2020).

Adding to the context of this study, as part of the response to the COVID-19 crisis, the university delayed the start of the quarter by two weeks to allow instructors extra time to prepare for emergency remote online teaching, which also truncated the Spring 2020 quarter and therefore impacted the amount of time instructors and students had to engage with course material.

Ethical Considerations

The IRB of the researcher's institution reviewed the research purpose, design, and data collection and sampling procedures and granted approval for this human subject research (IRB number 202101001). The researcher embedded the informed consent forms as the first item in the student and instructor surveys. The researcher reported in the IRB and communicated to the participants (via informed consent forms) minimal risk as well as no direct benefit as a result of participation in the study. Furthermore, participants were assured that their survey responses (student and instructor participants) would be anonymous, and that their interview responses (instructor participants) would be anonymized by the researcher. Participation in both the survey (student and instructor participants) and follow-up interview (instructor participants) was voluntary.

Student participants, upon completion of the survey, were given the option of entering a drawing for a $25 gift certificate. Instructor participants were informed that completing both the survey and a follow-up interview would make them eligible to receive a $10 gift certificate.

The informed consent forms, as well as all survey invitations and follow-up emails, for both student and instructor participants are reproduced in the Appendix.

Participants

The population of interest in this study was student and instructors in HEIs who engaged in emergency remote learning in Spring 2020. The sampling frame for this study comprised students and instructors at a private, urban, liberal arts university in the Pacific Northwest region of the United States. The student participants were both undergraduate and graduate students (some student participants may have graduated in Spring 2020). The instructor participants were instructors whose courses were nominated by students as part of a larger university study. The characteristics of the specific sample for this study are explained in detail below.

Sample Characteristics

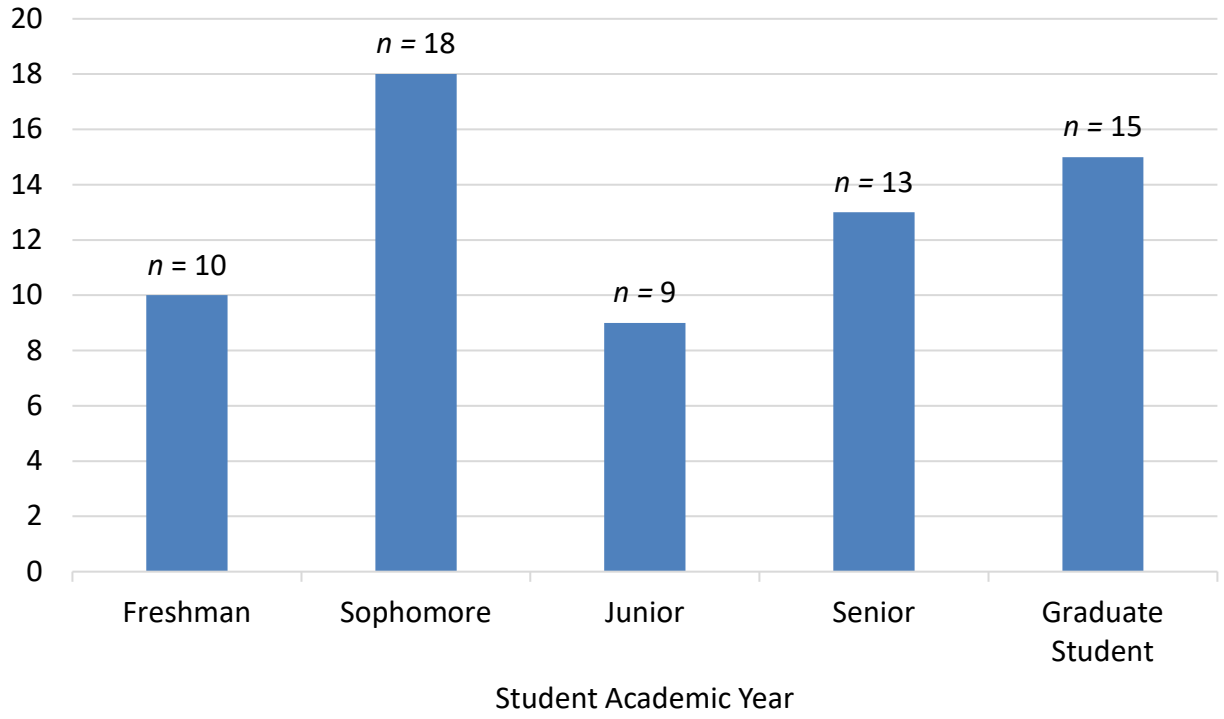
The sample for the quantitative aspect of this study comprised 65 student participants and 38 instructor participants, which corresponded to 49.6% and 74.5% response rates, respectively. The sample for the qualitative aspect of this study comprised 20 instructor participants (52.6% response rate). Although these were high response rates, the sample sizes were not high enough to meet statistical power requirements for quantitative research, as described later in this chapter, thereby potentially limiting the generalizability of the results. However, the sample size of 20 instructor participants was adequate for qualitative research requirements (Creswell & Creswell, 2018).

Student Participants. Figure 2 presents the characteristics of the student participants. The descriptive data in Figure 2 shows that slightly less than half of the student participants were in their first two years of university studies (freshman or sophomore; 43.1%; $n = 28$) and slightly more than half of the student participants were in

either their final two years of university studies or engaged in graduate level studies (junior, senior, or graduate student; 56.9%; *n* = 37).

Figure 2

Student Participants: Academic Year

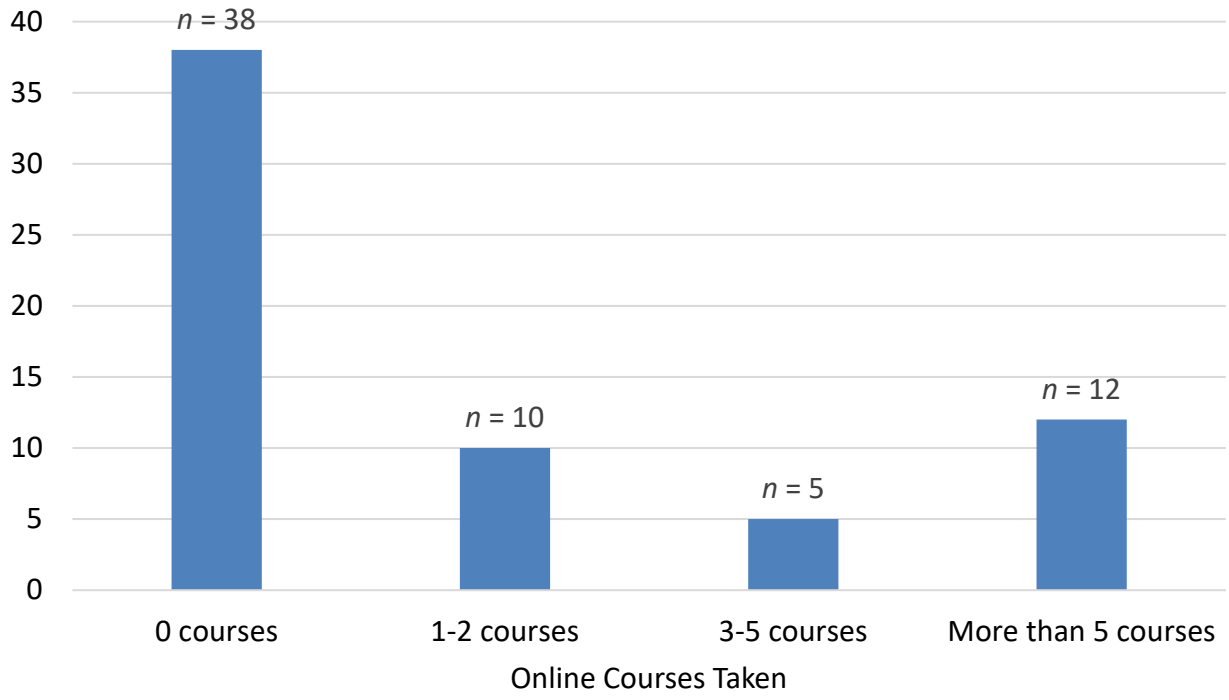


Note: *N* = 65.

The descriptive data in Figure 3 shows that more than half of the student participants had not taken any online courses prior to Spring 2020 (58.5%; *n* = 38) and that only 18.5% (*n* = 12) had considerable experience with online learning prior to Spring 2020 (e.g., had taken more than five online courses). That said, it was not within the scope of this study to investigate the nature and quality of the prior online course experiences of the student participants in this study, which could have affected their perception of the online learning environments investigated in this study.

Figure 3

Student Participants: Online Courses Taken Prior to Spring 2020

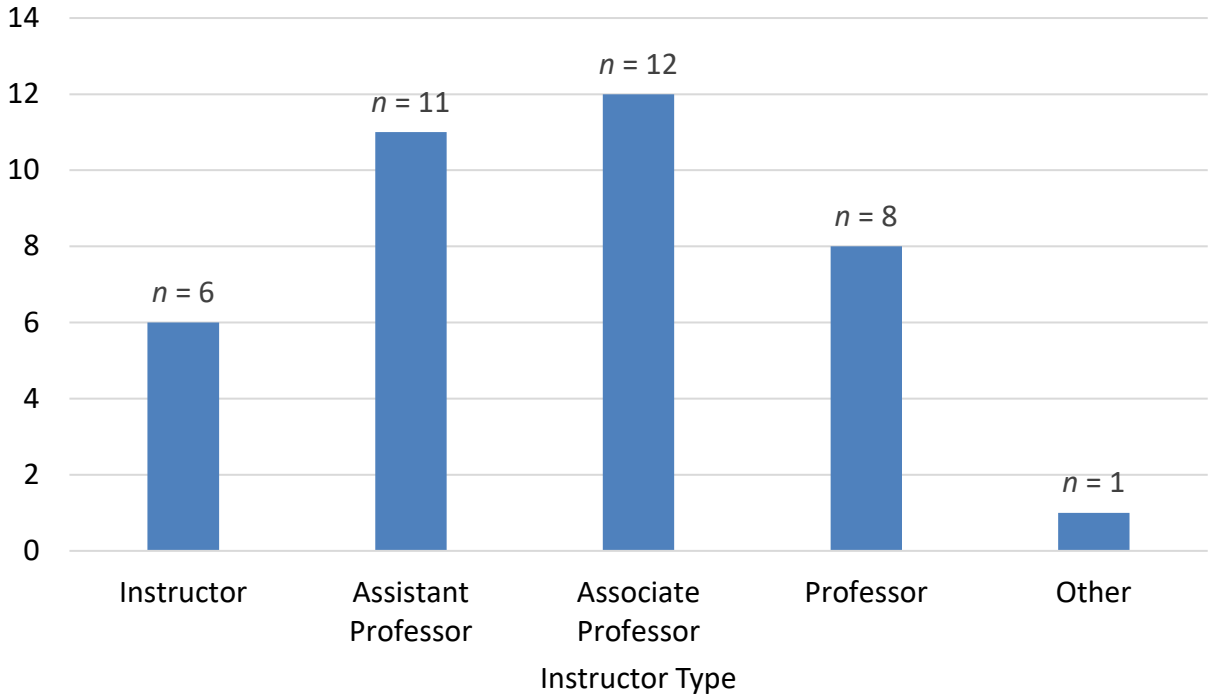


Note: $N = 65$.

Instructor Participants. Figures 4, 5, 6, and 7 present the characteristics of the instructor participants. The descriptive data in Figure 4 shows that most of the instructor participants held the rank of either associate professor (31.6%; $n = 12$) or assistant professor (28.9%; $n = 11$). The instructor participant who responded "other" reported the rank of "adjunct" in the open-ended item for this question.

Figure 4

Instructor Participants: Instructor Academic Appointment Type



Note: $N = 38$. The instructor academic appointment types were those assigned at the institution in this study at the time the study took place.

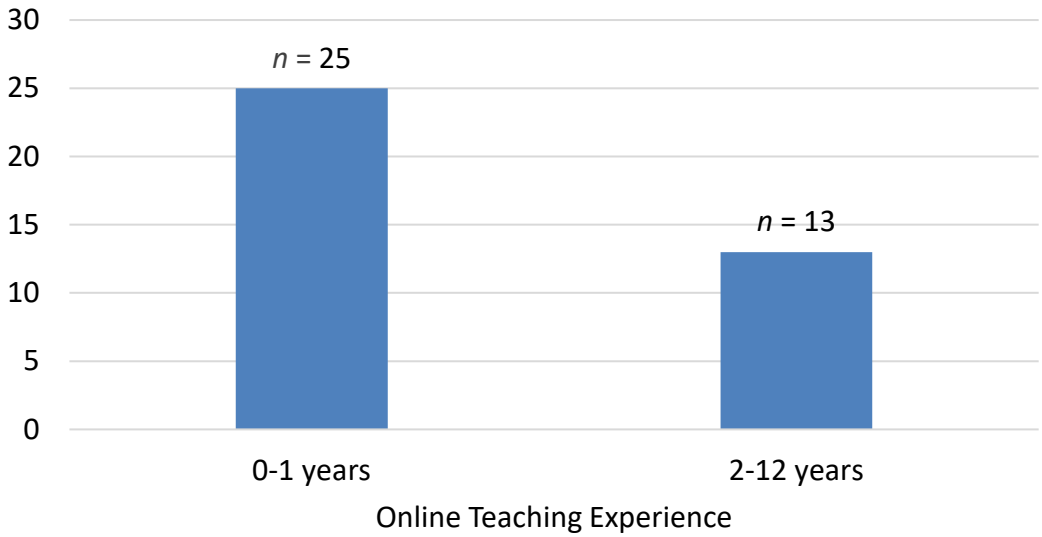
The survey items that were used to collect the data for the variables online teaching experience and higher education teaching experience were open ended. Initial descriptive statistics for online teaching experience showed that 57.9% of the instructor participants had zero online teaching experience prior to Spring 2020 ($n = 22$). Visual inspection of the histogram showed a flat curve, with a spike in the bar graph for zero years online teaching experience. Responses from the remaining instructor participants ($n = 16$) ranged from one to 12 years of online teaching experience. Initial descriptive statistics for higher education teaching experience showed an approximately normal

distribution, as assessed by visual inspection of the histogram. However, the responses ranged from one to 40 years of higher teaching experience, with frequencies ranging from one to five. To make the data for both of these variables more manageable for further statistical analyses, the data was recoded in SPSS to create two groups for online teaching experience and four groups for higher education teaching experience, based on output from the quartiles function in SPSS. The rationale for where to break the groups for online teaching experience was to group instructors who had no or very little online teaching experience together (0-1 years) and instructors with more online teaching experience (two or more years) together. Although, for obvious reasons, more years of experience likely means greater knowledge and skill in online teaching, the instructor responses that were two or more years for this item varied too widely to constitute further groupings. Furthermore, it was rationalized that an instructor who has taught an online course multiple times is in a much better place in terms of knowledge, skills, and confidence than an instructor who is teaching online for the first time or has only done so once before. For the higher education teaching experience, the quartiles function in SPSS yielded groups that matched what are usually considered to be experience groups in the field of education. The descriptive statistics for these recoded groups are further discussed below.

The descriptive data in Figure 5 shows that a majority of the instructor participants had zero to one years of online teaching experience (65.8 %; $n = 25$), with only 34.2% ($n = 13$) having between 2 and 12 years of online teaching experience. The descriptive data in Figure 6 shows approximately equal groups for the recoded higher education teaching experience variable.

Figure 5

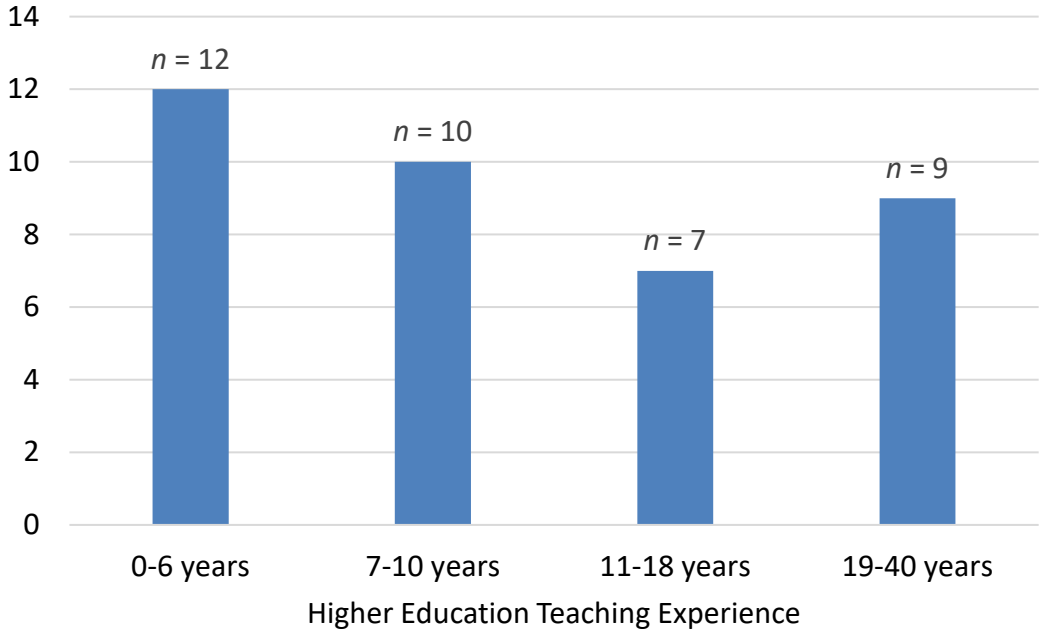
Instructor Participants: Online Teaching Experience (prior to Spring 2020)



Note: *N* = 38.

Figure 6

Instructor Participants: Higher Education Teaching Experience

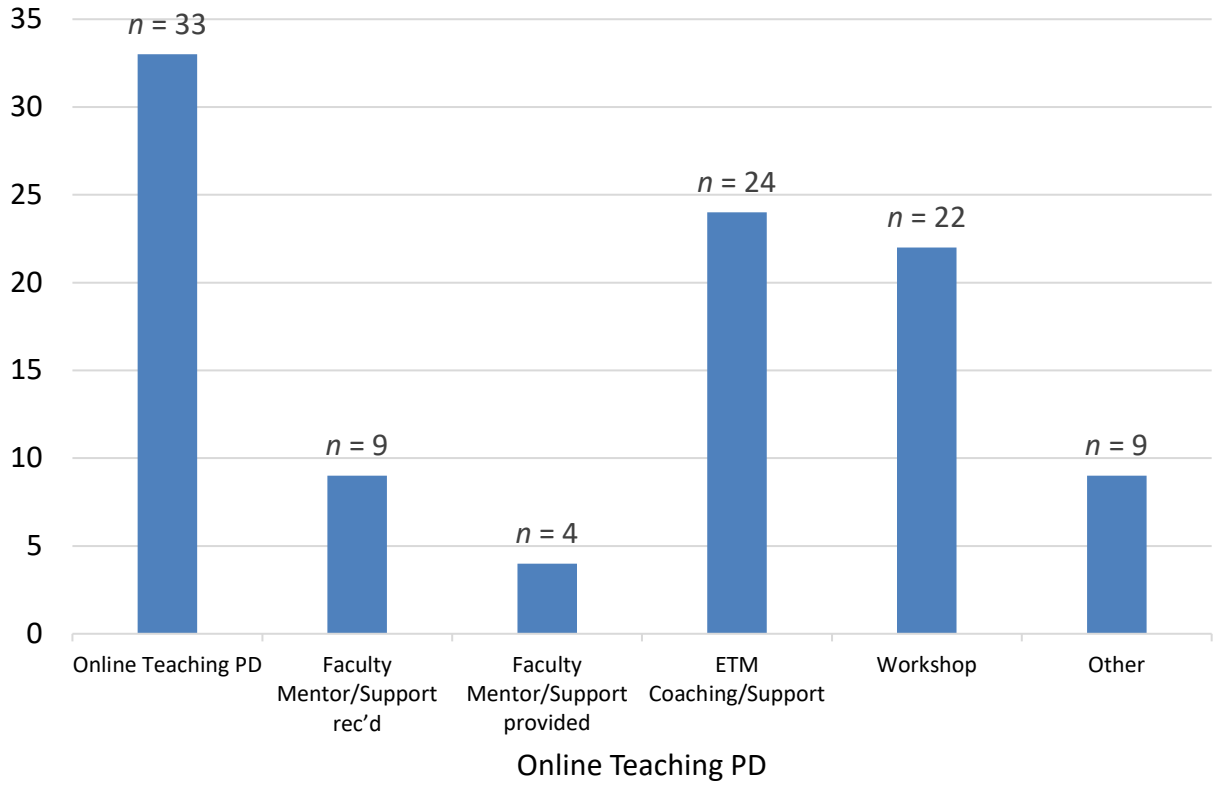


Note: N = 38.

An overwhelming majority of the instructor participants (86.8%, *n* = 33) reported engaging in some form of PD about online teaching. Instructor participants were able to choose as many answers as applied for this survey item and the results are presented in Figure 7.

Figure 7

Instructor Participants: Online Teaching Professional Development



Note: *N* = 38. Instructor participants could choose multiple answers for this item, therefore all values for *n* are out of 38 total instructor participants.

The descriptive data in Figure 7 shows that the most reported type of PD was coaching or support from the university's ETM department (63.2%; *n* = 24), followed by a university-based workshop (57.9%; *n* = 22). Only nine instructors (23.7%) received

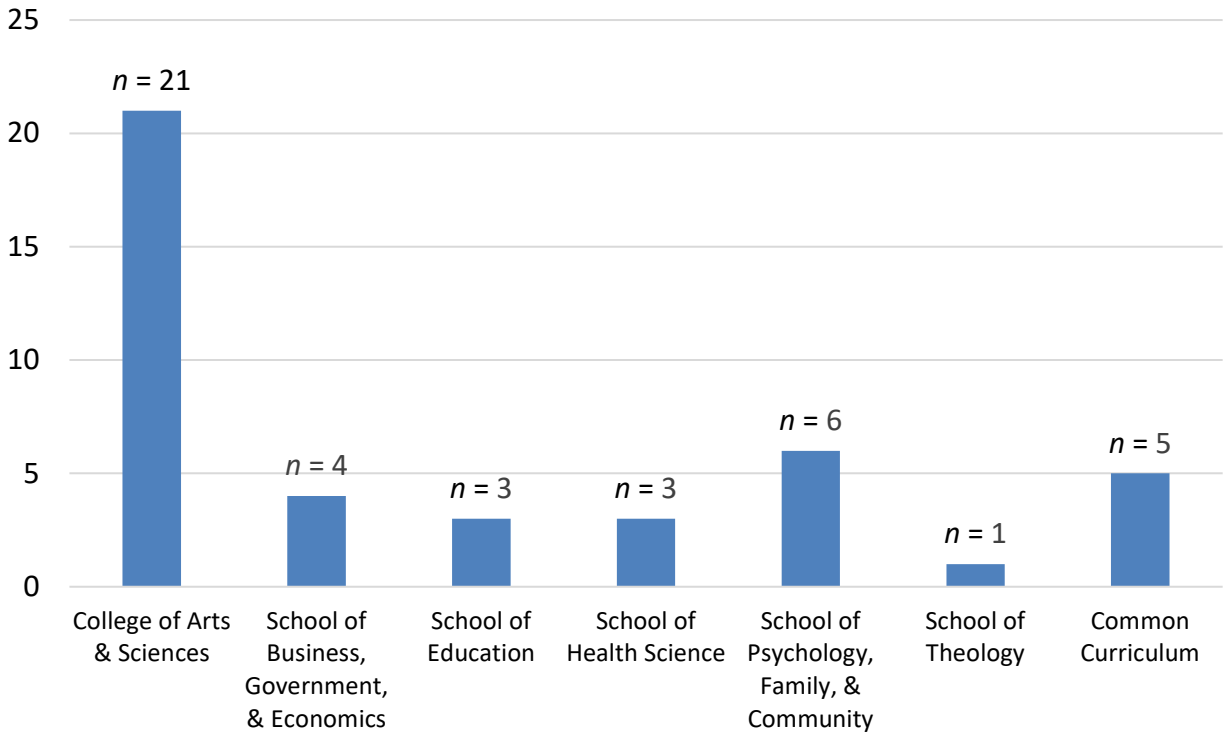
support from a faculty mentor, and only four instructors (10.5%) reported providing support to another faculty member. Nine instructors who selected “Other” and responded to the associated open-ended item reported engaging in webinars, online tutorials, YouTube videos, blogs, FAQs, and in-person learning (designed for K-12 educators) through a local school district, an online teaching course, conferences, and/or a university-based CoP. One instructor’s open-ended response revealed that they had extensive experience coaching other educators about online teaching, while another instructor reported facilitating an online teaching PD for their graduate student cohort.

Instructors were also asked about the timing of their professional learning and whether they felt it successfully prepared them for online teaching. Because the questions in the instructor survey were optional, not all of the participants responded to these questions; however, 17 instructors reported engaging in online teaching PD before the Spring 2020 academic quarter, 27 instructors reported engaging in online teaching PD during the Spring 2020 quarter, 28 instructors reported that they felt their online teaching PD successfully prepared them for online teaching, and five instructors reported that they did not feel that their online teaching PD successfully prepared them.

One of the goals of this study was to respond to the call for representation of a wider range of disciplines, including both arts/humanities and sciences, and both undergraduate and graduate levels. All the questions in both the student and instructor surveys were optional, and not all of the participants reported the course ID for the course they were evaluating for this study. The schools/colleges that were reported by student and instructor participants in this study are presented in Figure 8, and Table 1 includes the unique disciplines and academic level of the course (i.e., undergraduate or graduate).

Figure 8

Representation of Academic School/College



The descriptive data in Figure 8 shows that all six schools/colleges at the HEI in this study were represented in the data. Although it appears that there was an overrepresentation of the College of Arts & Sciences, this was based on this college comprising the widest range of unique programs/disciplines, as shown in Table 1.

Table 1

Representation of Academic School/College Including Discipline and Level

School/College/Discipline	No. of Courses	
	Undergraduate	Graduate
College of Arts & Sciences		
Art	2	
Biology	3	
Communications	1	
Criminology	1	
Electrical Engineering	1	
English	1	
Family & Consumer Sci.	1	
French & Francophone	2	
History	1	
Journalism	1	
Math	2	
Philosophy	1	
Physics	1	
Sociology	2	
Theatre	1	
School of Business, Government, & Economics		
Accounting	1	
Business		1
Economics	1	
Information Systems	1	
Political Science	1	
School of Education		
School Counseling		1
Special Education		1
Educational Administration*		1
School of Health Science		
Health and Human Perf.	2	
Nursing		1
School of Psychology, Family, & Community		
Marriage & Family Therapy		1
Industrial Org. Psych.		1
Psychology	4	
School of Theology		
Theology		1
Common Curriculum		
University Core	1	
University Foundations	3	
Writing	1	
Total	36	8

Note: N = 32 disciplines represented in this study; *Educational Administration course was identified through qualitative data collection.

The descriptive data in Table 1 shows that 32 unique disciplines were reported by student and instructor participants in this study, with 36 different courses at the undergraduate level and eight different courses at the graduate level represented. Not all participants reported the course ID in their surveys. Therefore, the researcher cannot report that the descriptive data about course representation completely reflects the range of courses represented in this study. However, the reported data shows representation of a wide range of disciplines and greater representation at the undergraduate than at the graduate level.

Sampling and Data Collection Procedures

At the end of the Spring 2020 quarter, all students at the institution where the current study took place were invited to participate in a separate study that was administered by the Higher Education Data Sharing Consortium (HEDS), in collaboration with the university (IRB approved). The data for the HEDS-university study was collected through a survey that was administered via email. One of the questions in the survey asked students to nominate one class they took in Spring 2020 quarter in which they felt they had the most fulfilling online learning experience. The results of this question were used to identify the courses that students considered to be effective in the emergency remote learning environment and yielded the initial pool of instructor and student participants for the current study.

Phase 1

The sampling techniques used in Phase 1 included purposive homogenous sampling, followed by purposive extreme (or deviant) sampling. Purposive homogenous sampling is used to select participants who share a common trait, which is being

addressed by the research question(s) (Laerd, 2012). Student and instructor participants were selected from an existing dataset from the HEDS-university study. From this dataset, the researcher obtained a list of 413 courses that were nominated by students as effective online courses, as well as the names of instructors who taught the nominated courses and the students who nominated the courses. The researcher was interested in collecting data across multiple academic disciplines and programs, and so the 413 courses collected from the HEDS-university study dataset were organized by program, discipline, number of unique course nominations, and number of unique instructor nominations. Purposive extreme (or deviant) sampling is used to focus on special or unusual cases, which may provide significant insight into the phenomenon being studied (Laerd, 2012).

Inclusion and Exclusion Criteria. From the list of 413 courses, the researcher identified 51 prospective instructor participants, based on the following selection criteria: (a) highest overall number of course nominations (10% rule applied based on average seats) and (b) highest number of course nominations within a discipline. For example, an instructor would be selected as a prospective participant if their course, within their program and/or school, received the highest number of nominations (at least four nominations, according to the 10% rule) and they also received the highest number of nominations within their discipline. All the instructors of the 413 nominated courses were eligible, regardless of employment status (e.g., part-time, full-time, contract) or academic appointment type (e.g., instructor, assistant professor, associate professor, professor, adjunct). Additionally, nine back-up prospective instructor participants were selected based on the following selection criteria: higher than average course nominations. The

back-up prospective instructor participants were invited to participate in the study only if it was determined that greater program or discipline representation was needed for their discipline (i.e., if no data was collected for their discipline from initial participant pool). The 131 prospective student participants selected for inclusion in the current study were the students who nominated the courses taught by the prospective instructor participants who were selected for inclusion in this study. The selection of nine back-up prospective instructor participants resulted in 19 corresponding back-up prospective student participants. The back-up prospective student participants were invited to participate in the study only if their corresponding back-up prospective instructor participants were selected for inclusion in the study.

Phase 2

Participants in Phase 2 of this study were a purposive homogenous sample, made up of participants from Phase 1 who chose to participate in follow-up measures. In Phase 2, the 51 prospective instructor participants and 131 prospective student participants were invited via email to complete an anonymous survey. The surveys were administered through Qualtrics XM, a cloud-based platform for creating, distributing, and managing data collection for web-based surveys. The student survey items comprised the complete CoI Survey Instrument (34 items; Arbaugh, 2008), and questions about student satisfaction and perception of learning (two items). The instructor survey items comprised a modified CoI Survey Instrument (34 items; adapted from Arbaugh, 2008), questions about online teacher self-efficacy (eight items from the OTSEI; adapted from Gosselin, 2009), and questions about instructor satisfaction and perception of student learning (two items). Additionally, instructor participants who completed the survey were

invited to further participate in a follow-up interview. Follow-up interviews were conducted via online conferencing (Zoom). A semi-structured interview tool (14 items; adapted from Damm, 2016; Appendix) was used to guide the conversation during the follow-up interviews and will be discussed in detail in the Instruments/Measures section of this paper.

The following additional information was gathered from student participants through quantitative methods: demographic data (experience with online learning, academic level) and information about the course setting (course topic/discipline, academic level).

The following additional information was gathered from instructor participants through both quantitative and qualitative methods: demographic data (academic department, instructor type; experience with higher education teaching; experience with online teaching) and information about the course setting (asynchronous, synchronous, course topic/discipline, academic level, course design, use of online teaching tools).

Measures

Higher Education Data Sharing Consortium (HEDS)-University COVID-19 Student Survey

In the Spring of 2020, the university in this study partnered with the HEDS to administer a survey (IRB approved) to all students to gather information about students' experiences during the COVID-19 pandemic, including their experiences with emergency remote online learning, so that the university could coordinate appropriate responses based on students' needs. All students were invited to participate in the survey via a link in an email that was sent by the university's Office of the Provost during the last week of

May 2020. The survey was administered by the HEDS through Qualtrics XM and had both a short version (approximately 5 minutes to complete) and a long version (approximately 10 minutes to complete), which included open-ended questions about students' emergency remote online learning experiences. Two open-ended questions on the survey asked students to identify (a) the Spring 2020 course that they considered to be most effective and (b) the name of the instructor(s) who taught the course. The students' responses to these questions in the HEDS-university survey data yielded the initial pool of prospective participants for the current study.

Community of Inquiry Survey

The CoI Survey is a validated survey instrument developed and first validated by Arbaugh et al. (2008) and Swan et al. (2008) in higher education environments. It comprises 34 items rated on a 5-point Likert scale, from 1 = *strongly disagree* to 5 = *strongly agree* (see Appendix). Sample items for the three presences include: "The instructor clearly communicated important course topics" (teaching presence: design and organization), "I felt comfortable conversing through the online medium" (social presence: open communication), and "I utilized a variety of information sources to explore problems posed in this course" (cognitive presence: exploration). In the CoI literature, the usual practice is for mean scores to be calculated for overall CoI and for each of the three presences. Higher scores indicate that the instructor/course being evaluated comprises the practices and conditions that are deemed necessary, according to the CoI framework, for optimal online learning. Both Arbaugh et al. (2008) and Swan et al. (2008) reported that Cronbach's alpha yielded internal consistencies equal to 0.94 for teaching presence, 0.91 for social presence, and 0.95 for cognitive presence. Akyol and

Garrison (2008) reported that CoI Survey results yielded significant relationships among all three presences and with students' satisfaction and perceived learning. Additional follow-up studies have demonstrated validity and reliability of the CoI Survey Instrument, including construct validity and both internal (Bangert, 2009; Carlon et al., 2012; Shea & Bidjerano, 2009) and external (Heilporn & Lakhal, 2019; Shea & Bidjerano, 2010) validity and reliability. Furthermore, studies also have been performed in which the CoI Survey has been translated to several other languages and tested for construct validity and both internal (Horzum & Uyanik, 2015; Yu & Richardson, 2015; Velázquez et al., 2019) and external (Moreira et al., 2013) validity and reliability.

The CoI Survey has been used in combination with measurements for other frameworks and theories, including technology acceptance (Arbaugh, 2014), self-regulated learning (Shea & Bidjerano, 2012; Cho et al., 2017), and perceived learning (Rockinson-Szapkiw et al., 2010). Additionally, a CoI Coding Instrument (Garrison, 2017) was created to facilitate analysis of qualitative artifacts (see Appendix).

In the current study, all 34 items of the CoI Survey Instrument (Arbaugh, 2008) were included in both the student and instructor surveys. For the instructor survey, the prompt for the questions was modified so that the instructor participants could reflect on their own teaching practice. For example, instead of answering from a student's perspective, "The instructor clearly communicated important course topics," the prompt was changed to "I clearly communicated important course topics." The versions of the CoI Survey that were added to the student and instructor surveys in this study are included in the Appendix.

For the current study, reliability for the CoI Survey items was rechecked using Cronbach's alpha. For the student survey, the complete 34-item CoI scale had a high level of internal consistency, as determined by a Cronbach's alpha of 0.96, as did each of the three presences, when analyzed as subscales: teaching presence (13 items), Cronbach's alpha of 0.92; social presence (nine items), Cronbach's alpha of 0.88; cognitive presence (12 items), Cronbach's alpha of 0.92. For the instructor survey, the complete 34-item CoI scale had a high level of internal consistency, as determined by a Cronbach's alpha of 0.91, as did each of the three presences, when analyzed as subscales: teaching presence (13 items), Cronbach's alpha of 0.73; social presence (nine items), Cronbach's alpha of 0.92; cognitive presence (12 items), Cronbach's alpha of 0.81.

Community of Inquiry Coding Instrument

The CoI Coding Instrument was developed by Garrison (2017) to aid researchers in the qualitative analysis of online learning data. In this study, the CoI Coding Instrument (Garrison, 2017) was used to analyze the instructor interview data. The CoI Coding Instrument is included in the Appendix.

Online Teaching Self-Efficacy Inventory

The OTSEI (Gosselin, 2009) comprises 47 questions on five scales rated on a continuum from 0 = *no confidence at all* to 10 = *complete confidence* (see Appendix). The questions are designed to measure instructor self-efficacy in the context of online teaching and sample items include, "[I can] select the online course technology that is most efficient for delivery of materials to students," and, "[I can] learn new technologies used in my courses without support from my institution (i.e., training, workshops, incentives, etc.)" (from the Selection of Technological Resources section/scale). Higher

scores indicate that the instructor feels confident in their knowledge of and ability to create the conditions necessary, according to the OTSEI, for optimal online learning. In the OTSEI literature, the usual practice is for mean scores to be calculated for overall OTSEI and for each of the five subscales. Gosselin (2009) reported factor loadings of at least 0.32 for the retained items corresponding with each of the five inventory scales and alpha reliability coefficients for each scale that ranged from 0.84 to 0.95. The OTSEI has been used (and further validated) in research studies by Gosselin et al. (2016) and others (Northcote et al., 2011; Northcote et al., 2015) to further explore instructor self-efficacy with online teaching. For the current study, eight items from the OTSEI (Gosselin, 2009) were revised to complement the context of the study and were added to the instructor survey. For example, the phrase "course technology" was replaced with "online technology" in some questions to better fit the emergency remote online learning context of the current study, and the question, "[I can] obtain the appropriate copyright permissions for the technology used in my courses" was modified to, "[I can] obtain the appropriate copyright permissions for sharing digital resources with my students" to better reflect the type of knowledge/skill the instructors in the current study would need to employ. The eight items from the OTSEI that were added to the instructor survey in this study are included in the Appendix. For the current study, reliability for the eight OTSEI survey items was rechecked using Cronbach's alpha. The eight-item OTSEI scale had a high level of internal consistency, as determined by a Cronbach's alpha of 0.91.

Student and Instructor Satisfaction and Perception of Student Learning

Measurements of student satisfaction and perception of learning have appeared in several CoI research studies to study the relationship between the CoI presences and

student outcomes in these areas (e.g., Arbaugh et al., 2014; Shea & Bidjerano, 2013). For the current study, two questions, one about satisfaction and one about perception of (student) learning, were added to both the student and instructor surveys. The question about satisfaction was directed towards either the student or the instructor regarding their personal satisfaction with either online learning (student) or online teaching (instructor). The question about perception of (student) learning was directed towards either the student or instructor but focused on their perception of their own (student) or their students' (instructor) learning in the course. Both student and instructor satisfaction and perception of (student) learning items were rated on a 5-point Likert scale, from 1 = *strongly disagree* to 5 = *strongly agree* (see Appendix). Higher scores indicate that the student or instructor feels a high level of satisfaction or a perceives a high level of (student) learning. In the literature, the usual practice is for mean scores to be calculated for each of these measures. The versions of these questions that were added to the student and instructor surveys are included in the Appendix. For the current study, reliability for the satisfaction and perception of learning survey items was rechecked using Cronbach's alpha. For the student survey, the two questions about student satisfaction and perception of learning had a medium level of internal consistency, as determined by a Cronbach's alpha of 0.68. For the instructor survey, the two questions about instructor satisfaction and perception of (student) learning had a high level of internal consistency, as determined by a Cronbach's alpha of 0.81.

Demographic Questions

The following additional information was gathered from student participants through quantitative methods (survey questions): demographic data (experience with

online learning, academic level) and information about the course setting (course topic/discipline, academic level).

The following additional information was gathered from instructor participants through both quantitative (survey questions) and qualitative methods (interview questions): demographic data (academic department, instructor type; experience with higher education teaching; experience with online teaching) and information about the course setting (asynchronous, synchronous, course topic/discipline, academic level, course design, use of online teaching tools).

Some of the demographic questions had fixed answer choices, some allowed for multiple answer choice selections, and others were open-ended. As is usual in the literature, descriptive statistical analysis was used to capture frequencies for the demographic data. The demographic questions that were added to the student and instructor surveys are included in the Appendix.

Semi-structured Interview

For the instructor interviews, a phenomenological approach was used, in which the interviewer seeks to gain deeper insight about some phenomenon from the lived experiences of the participants (Creswell & Creswell, 2018). Interviewers use a semi-structured or guided interview format, using the same general set of questions and format for each interview (Lichtman, 2013). This method was chosen so that the researcher/interviewer could be certain to ask questions that were aligned with the three presences of the CoI framework, using questions adapted from Damm (2016), thereby gaining further insight into the instructors' teaching practices in each of these areas.

Instructors who completed the quantitative survey were invited to participate in a follow-up interview designed to elicit specific practices that contributed to effective emergency remote online learning experiences in the courses that were nominated. The interview questions were adapted from Damm (2016), who developed 14 qualitative interview questions to complement the CoI Survey Instrument and used them in combination with the CoI Survey Instrument to explore student engagement in massive open online courses (MOOCs). The original interview questions are directed to student participants and comprise three "First Opening/Warming" questions, three "Instructor Presence" questions, four "Social Presence" questions, and four "Cognitive Presence" questions (Damm, 2016). Sample items include, "Do you feel like you can sense the different personalities of your classmates based on the discussion posts?" (social presence), "What did you think of the author's videos in each lesson? Did you find them insightful, engaging?" (cognitive presence), and "Do you think the instructor has contributed to the course discussion on a week-to-week basis?" (teaching presence). The Damm (2016) questionnaire has been cited by researchers who study CoI and MOOCs (Cornelius et al., 2019; Kovanovic et al., 2018; Poquet et al., 2018). For the current study, the questions in the Damm (2016) questionnaire were revised and directed towards instructors in regard to their online teaching practices, as well as to better fit the possible multimodal context of the courses in the current study. For example, "Do you think the instructor has contributed to the course discussion on a week-to-week basis? In what ways?" was revised to, "How did you (the instructor) contribute to course communications on a weekly basis? In what ways?" and, "Do you feel like you can sense the different personalities of your classmates based on the discussion posts?" was revised

to, “Do you feel like you were able to sense the different personalities of your students and that they were able to sense yours based on the mode(s) of communication (synchronous and/or asynchronous)?”. The interview questions were open-ended and designed to explore how the instructors incorporated elements of the CoI framework in their emergency remote online teaching practices during the Spring 2020 quarter. The versions of these questions that were used during the instructor interviews are included in the Appendix.

Quantitative Data Analysis

The quantitative data was analyzed using IBM SPSS Statistics 26 software. Different statistical analyses were required to answer the three quantitative research questions in this study: (a) descriptive statistics, (b) correlation analysis (Spearman’s correlation coefficient), and (c) analysis of differences between groups (independent-samples *t*-test). For all statistical tests, an alpha level of .05 was determined to be the measure of statistical significance previously published norms in the CoI literature.

Descriptive statistics were used to examine summaries of the student and instructor datasets. The descriptive summary of the student participant dataset included the following variables: overall CoI, teaching presence, social presence, cognitive presence, and student satisfaction and perception of learning. Additionally, the summary included the measures of central tendency and variability for each variable, specifically the means and standard deviations. The descriptive summary of the instructor participant dataset included the following variables: overall CoI, teaching presence, social presence, cognitive presence, the OTSEI, instructor satisfaction, and perception of (student)

learning. Additionally, the summary included the measures of central tendency and variability for each variable, specifically the means and standard deviations.

Correlation analyses were used to answer the first and second research questions regarding whether there was a relationship between the variables in both the student and instructor groups.

Before running Spearman's correlation coefficient for research questions one and two, the researcher checked whether necessary assumptions were met for this statistical test. These assumptions include: (a) the variables being investigated are continuous and/or ordinal variables, (b) the variables represent paired observations, and (c) there is a monotonic relationship between the variables (Laerd Statistics, 2018). Although there was concern with normality of the data, which will be addressed in Chapter 4: Results, Spearman's correlation does not rely on normality, so there was justification to continue with statistical analyses for research questions one and two.

Spearman's correlation coefficient was used to explore research question one, "Is there a relationship between students' perception of emergency remote learning (as measured with the CoI Survey) and students' satisfaction and perception of learning in emergency remote online learning experiences during the COVID-19 pandemic?". The data for this question comprises both continuous and ordinal data. To control for Type I/Type II error for this question, power analysis was performed in G*Power Version 3.1.9.6 (Faul et al., 2007; Faul et al., 2009). To achieve a medium effect size (d = .5) and 80% power, which is considered acceptable for social science research, a total sample size of 84 was required. The survey results in this study yielded a total sample size of 65 student participants, which does not meet this threshold. Therefore, Spearman's

correlation coefficient was used because (a) it allows for both continuous and ordinal variables and (b) it is the nonparametric equivalent to Pearson's correlation coefficient. Additionally, the bootstrap function in SPSS was used to further control for Type I/II errors.

Spearman's correlation coefficient was also used to explore research question two, "Is there a relationship between instructors' perception of emergency remote online teaching (as measured with the CoI Survey) and instructors' self-efficacy with online teaching (as measured with the OTSEI)?". The data for this question comprises continuous data. To control for Type I/Type II error for this question, power analysis was performed in G*Power Version 3.1.9.6 (Faul et al., 2007; Faul et al., 2009). To achieve a medium effect size (d = .5) and 80% power, a total sample size of 84 was required. The survey results in this study yielded a total sample size of 38 instructor participants, which does not meet this threshold. Therefore, Spearman's correlation coefficient was used to analyze the data for this research question, because it is the nonparametric equivalent to Pearson's correlation analysis. Additionally, the bootstrap function in SPSS was used to further control for Type I/II errors.

Before running the independent-samples t-test for research question three, the researcher checked whether necessary assumptions were met for this statistical test. These assumptions include: (a) a continuous dependent variable, (b) the independent variable is categorical with two groups, (c) there was independence of observations, (d) there are no significant outliers in the two groups of the independent variable in terms of the dependent variable, and (e) the dependent variable should be approximately normally distributed for each group of the independent variable (Laerd Statistics, 2015b). Although

there was concern with normality of the data based on unequal group sizes (students > instructors) and small sample size (total and for each group), which will be addressed in Chapter 4: Results, there was justification to continue with statistical analyses for research question three. CoI SurveyThe data for this question comprises continuous data. To control for Type I/Type II error for this question, power analysis was performed in G*Power Version 3.1.9.6 (Faul et al., 2007; Faul et al., 2009). To achieve a medium effect size (d = .5) and 80% power, at total sample size of 128 (N = 64, student participants; N = 64, instructor participants) was required, $t(126) = 1.98$. The survey results in this study yielded a total sample size of 103 (N = 65, student participants; N = 38, instructor participants), which does not meet this threshold. Despite the low sample sizes (overall and for the instructor group), the independent-samples t-test was still used because it is robust enough to deal with non-normality in the data. Additionally, the bootstrap function in SPSS was used to further control for Type I/II errors.

Qualitative Data Analysis

Qualitative methods were used to answer the fourth research question, "How does the qualitative interview data provide further insight about the instructors' emergency remote online teaching practices during the COVID-19 pandemic?". The data for this question comprised transcripts of the recorded follow-up interviews that were conducted with 20 instructor participants. The instructor interviews were recorded locally on the researcher's computer. Then, the recordings were transcribed using the Transcribe tool in Microsoft Word. The transcribed interview data were manually reviewed for accuracy and corrected, if necessary, in preparation for analysis. To protect the confidentiality of participants, the instructors were assigned a pseudonym during the interview, and course

and instructor information were removed from qualitative data before analysis. The Dedoose Qualitative Data Analysis software application was used to analyze the transcribed interview data. The researcher and an independent coder performed the data analysis. The independent coder was a doctoral candidate in the School of Education at the same institution as the researcher who was aware of the purpose of the study and the researcher's hypotheses, but was not familiar with the CoI framework. For the first round of coding, the researcher uploaded the transcribed interview data files as media in a project created for this study in the researcher's account in the Dedoose mixed-methods data analysis application. The researcher and independent coder used a deductive coding approach in which the CoI Coding Instrument (Garrison, 2017) was used to determine the *a priori* codes that were used to analyze the transcribed interview data. The CoI presences and their indicators were entered as codes in the study project on Dedoose. The researcher and the independent coder used the coding tools in Dedoose to independently code 10 each of the 20 transcribed interviews. They then switched files and independently coded the other 10 transcribed interviews. After this initial coding, the researcher and independent coder met to discuss and resolve any points of disagreement. For example, occasionally it would seem to only the researcher or the independent coder that an excerpt might represent one of the CoI presences and so the researcher and independent coder discussed these instances to determine whether a single code or perhaps multiple codes applied. For the second round of coding, the researcher exported the coded data from Dedoose to a spreadsheet in Microsoft Excel. The researcher and independent coder used the Custom Sort and Filter tool in Microsoft Excel to explore the interview excerpts that were coded for each of the three CoI presences. Then, the

researcher and independent coder used Miro, an online collaborative workspace, to build a visual table of codes, themes, and relevant excerpts. Finally, the results of this qualitative analysis were synthesized by the researcher into a composite narrative form, in which the instructors' shared lived experiences are reported as a single narrative, with direct quotes interjected to give examples and/or strengthen elements of the narrative (Willis, 2019). This narrative is presented in Chapter 4: Results.

The interview data in this study were limited by their self-report nature, the possible effect of the researcher during the interviews, and by the subjectivity of the analysis and interpretation by the researcher and independent coder (Creswell & Creswell, 2018). The researcher sought to increase the trustworthiness of the findings by triangulating with the quantitative results, providing a "rich, thick description" of the shared experience of the instructor participants, and including "negative or discrepant information" (e.g., when instructors shared frustrations, difficulties, and/or failures in their online teaching practice) (Creswell & Creswell, 2018, pp. 200-201).

Summary

The researcher used an explanatory mixed-methods research design, which involved the collection, analyzation, and synthesis of quantitative and qualitative data to answer the four research questions. These methods allowed the researcher to fulfill the purpose of this study, which was to use the CoI framework and self-efficacy theory to explore and analyze instructors' teaching practices in the emergency remote online teaching/learning environment during the COVID-19 pandemic. The results of the data analysis are presented in Chapter 4: Results.

Chapter 4: Results

The purpose of this chapter is to summarize the results of the quantitative and qualitative data analyses described in Chapter 3: Methods. The results are presented in the order of the research questions:

1. Is there a relationship between students' perception of emergency remote online learning (as measured with the CoI Survey) and students' satisfaction and perception of learning in the emergency remote online learning environment during the COVID-19 pandemic?

    H_0: There is no statistically significant correlation between students' perception of emergency remote online learning (as measured with the CoI Survey) and students' satisfaction and perception of learning in the emergency remote online learning environment during the COVID-19 pandemic.

    H_1: There is a statistically significant correlation between students' perception of emergency remote online learning (as measured with the CoI Survey) and students' satisfaction and perception of learning in the emergency remote online learning environment during the COVID-19 pandemic.

2. Is there a relationship between instructors' perception of emergency remote online teaching (as measured with the CoI Survey) and instructors' self-efficacy with online teaching (as measured with eight OTSEI items)?

    H_0: There is no statistically significant correlation between instructors' perception of emergency remote online teaching (as measured with the CoI Survey) and instructors' self-efficacy with online teaching (as measured with eight OTSEI items).

H_1: There is a statistically significant correlation between instructors' perception of emergency remote online teaching (as measured with the CoI Survey) and instructors' self-efficacy with online teaching (as measured with eight OTSEI items).

3. Is there a difference between students' and instructors' perception of emergency remote online learning/teaching (as measured by the CoI Survey) during the COVID-19 pandemic?

H_0: There is no statistically significant difference between students' and instructors' perception of emergency remote online learning/teaching (as measured with the CoI Survey) during the COVID-19 pandemic.

H_1: There is a statistically significant difference between students' and instructors' perception of emergency remote online learning/teaching (as measured with the CoI Survey) during the COVID-19 pandemic.

4. How does the qualitative interview data provide further insight about the instructors' emergency remote online teaching practices during the COVID-19 pandemic?

All statistical analyses were performed using IBM SPSS Statistics 26 software. Different statistical analyses were used to explore the data collected for the three quantitative research questions in this study, including descriptive statistics, correlation analysis, and means comparison analysis. Specifically, Spearman's correlation coefficient was used to explore research questions one and two and the independent-samples *t*-test was used to explore research question three.

Spearman's correlation calculates a coefficient, "which is a measure of the strength and direction of the association/relationship between two continuous or ordinal variables" (Laerd Statistics, 2018). A coefficient of zero means there is no relationship

between the variables, and the closer the value of the coefficient is to zero, the weaker the correlation is between the variables (Laerd Statistics, 2018). A coefficient of +1 indicates a perfect positive correlation and a coefficient of -1 indicates a perfect negative correlation between the variables and the closer the value of the coefficient is to +1 or -1, the stronger the correlation is between the variables (Laerd Statistics, 2018).

The independent-samples *t*-test calculates the difference in the mean scores on a dependent variable between two independent groups, and the associated alpha or significance level (*p* value), which indicates whether the difference is statistically significant (Laerd Statistics, 2018). A statistically significant difference ($p < .05$) means that the researcher can reject the null hypothesis, and that "it is unlikely that the group means are equal in the population" (Laerd Statistics, 2015b).

For all statistical tests, an alpha level of .05 was selected as the measure of statistical significance because that is what has been considered acceptable in the CoI literature.

Normality Tests

Before conducting statistical analyses, normality tests were run on the data, as a normal distribution of the data is a common assumption for many statistical tests (Laerd Statistics, 2015a & 2015b).

Student Data Normality Tests

For the student data, normality tests were run with the following variables entered: overall CoI, teaching presence, social presence, cognitive presence, student satisfaction, perception of learning, student academic year, and online courses taken. In SPSS Statistics, data points that are more than 1.5 box-lengths from the edge of their box

are classified as outliers (noted with circular dots) and data points that are more than 3 box-lengths away from the edge of their box are classified as extreme outliers (noted with asterisks; Laerd Statistics, 2015a & 2015b). Extreme outliers represent "genuinely unusual values" in the data (Laerd Statistics, 2015a & 2015b). There was one extreme outlier in the data for overall CoI, teaching presence, and cognitive presence, as assessed by inspection of the boxplots. There were five extreme outliers for student satisfaction and five extreme outliers for perception of learning, as assessed by inspection of the boxplots. One of the extreme outliers for both student satisfaction and perception of learning was the same case that was an extreme outlier for CoI scores, noted above.

Student academic year was normally distributed with skewness and kurtosis z-scores within an acceptable $\pm$ 2.58 boundary. Mean scores were not normally distributed for overall CoI, with a skewness of -9.22 (*SE* = 0.297) and kurtosis of 24.59 (*SE* = 0.586); teaching presence, with a skewness of -12.30 (*SE* = 0.297) and kurtosis of 34.48 (*SE* = 0.586); social presence, with a skewness of -2.47 (*SE* = 0.297) and kurtosis of 2.66 (*SE* = 0.586); cognitive presence, with a skewness of -7.82 (*SE* = 0.297) and kurtosis of 17.94 (*SE* = 0.586); student satisfaction, with a skewness of -19.18 (*SE* = 0.297) and kurtosis of 63.81 (*SE* = 0.586); perception of learning, with a skewness of -13.48 (*SE* = 0.297) and kurtosis of 36.60 (*SE* = 0.586), or online courses taken, with a skewness of 3.28 (*SE* = 0.297) and kurtosis of -1.19 (*SE* = 0.586). Scores were not normally distributed for any of the variables, as assessed by Shapiro-Wilk's test ($p < .05$). Scores were approximately normally distributed for student academic year and online courses taken, but were not normally distributed for overall CoI, teaching presence, social presence, cognitive presence, student satisfaction, or perception of learning as assessed

by visual inspection of Normal Q-Q plots. Overall CoI, teaching presence, social presence, cognitive presence, student satisfaction and perception of learning showed negative skewness, as assessed by visual inspection of the Normal Q-Q plot.

To address the extreme outlier for CoI scores, the values for CoI scores for this case were replaced with the mean aggregate for each score (overall CoI, teaching presence, social presence, cognitive presence). For both student satisfaction and perception of learning, four of the five extreme outliers, at the lower end of the scale, represented a score of 4 out of 5 on these Likert-type scale items (range of possible scores: 1-5). Because these scores were not abnormally far from the other values, these extreme outliers were not removed or transformed. However, one extreme outlier represented a score of 1 out of 5 on these Likert-scale items. This extreme outlier was the same case that was transformed for CoI variables and was similarly transformed to the mean score for both student satisfaction and perception of learning as well.

Normality tests were rerun with the outliers transformed. After transformation, there were no outliers in the data, as assessed by inspection of a boxplot for values greater than 1.5 box-lengths from the edge of the box. Furthermore, skewness and kurtosis for all CoI variables improved. Overall CoI, social presence, and cognitive presence z-scores were now within an acceptable $\pm$ 2.58 boundary. However, teaching presence was still slightly negatively skewed -2.99 (*SE* = 0.297), but the kurtosis z-score was within an acceptable $\pm$ 2.58 boundary. For both student satisfaction and perception of learning, skewness and kurtosis improved as a result of transforming the outlier. However, student satisfaction was still negatively skewed -12.03 (*SE* = 0.297) and had a kurtosis of 22.85 (*SE* = 0.586) and perception of learning was still negatively skewed -

6.51 (*SE* = 0.297) and had a kurtosis of 5.16 (*SE* = 0.586). The negative skew for both student satisfaction and student perception of learning was not surprising, as all of the scores for these items were in the upper range for these variables. Scores were normally distributed for social presence, but not for overall CoI, teaching presence, cognitive presence, student satisfaction, perception of learning, student academic year, or online courses taken, as assessed by Shapiro-Wilk's test ($p < .05$). However, as assessed by the K-S test, scores for overall CoI, $D(65) = 0.085$, $p = 0.200$, social presence, $D(65) = 0.073$, $p = 0.200$, and cognitive presence, $D(65) = 0.099$, $p = 0.183$, did not deviate significantly from normal, while scores for teaching presence, $D(65) = 0.138$, $p = 0.003$, remained significantly non-normal. Scores were normally distributed for social presence and approximately normally distributed for overall CoI, social presence, cognitive presence, student academic year, and online courses taken, but not for teaching presence, student satisfaction, or perception of learning, as assessed by visual inspection of Normal Q-Q plots. Teaching presence, student satisfaction, and perception of learning showed negative skewness, as assessed by visual inspection of the Normal Q-Q plot.

To prepare for secondary analysis of the student academic year demographic variable, normality tests specific to the independent-samples *t*-test were run with the following results. Scores for both student academic year groups (freshman/sophomore and junior/senior/graduate student) for overall CoI and all three presences were normally distributed with skewness and kurtosis z-scores within the acceptable ± 2.58 boundary. Scores for both student academic year groups for student satisfaction were not normally distributed with negative skew greater than the -2.58 boundary and kurtosis z-scores greater than the +2.58 boundary. Scores for student learning were normally distributed

for the freshman/sophomore group with skewness and kurtosis z-scores within the acceptable $\pm$ 2.58 boundary, but not for the junior/senior/graduate student group, which had a skewness of -7.4 (*SE* = 0.388) and kurtosis of 10.91 (*SE* = 0.759). Scores were normally distributed for the freshman/sophomore group for overall CoI and all three presences, as assessed by Shapiro-Wilk's test ($p > .05$). Scores for the junior/senior/graduate student group were normally distributed for overall CoI and social presence, but not for teaching presence or cognitive presence, as assessed by Shapiro-Wilk's test ($p < .05$). Scores were not normally distributed for any group for student satisfaction or perception of learning, as assessed by Shapiro-Wilk's test ($p < .05$). Scores were approximately normally distributed for all student academic year groups for overall CoI, social presence, and cognitive presence, but not for teaching presence, student satisfaction, or perception of learning, as assessed by visual inspection of Normal Q-Q plots. Both student academic year groups showed negative skewness for teaching presence, as assessed by visual inspection of the Normal Q-Q plots. Both student academic year groups showed negative skewness for student satisfaction and perception of learning, as assessed by visual inspection of the Normal Q-Q plots. There were outliers at the lower end of the scale for teaching presence in both the freshman/sophomore (n = 1) and junior/senior/graduate student (n = 1) groups and for social presence in the junior/senior/graduate student group (n = 3). There were extreme outliers at the lower end of the scale for student satisfaction for both the freshman/sophomore (n = 3) and junior/senior/graduate student groups (n = 3). There were extreme outliers at the lower end of the scale for perception of learning for the junior/senior/graduate student groups (n = 5). For the same reasons noted earlier in the Normality Tests section of this chapter,

these outliers were not removed or transformed, and the researcher decided to proceed with this statistical analysis.

To prepare for secondary analysis of the student online courses taken demographic variables, normality tests specific to one-way ANOVA and one-way MANOVA were run with the following results. Scores for the 0 courses group (n = 38) were normally distributed, with skewness and kurtosis z-scores within the acceptable $\pm$ 2.58 boundary, for overall CoI, social presence, and cognitive presence, but not for teaching presence, which had a negative skew of -2.80 (SE = 0.383) and kurtosis of 1.59 (SE = 0.750), student satisfaction, which had a negative skew of -8.50 (SE = 0.383) and kurtosis of 12.08 (SE = 0.750), or perception of learning, which had a negative skew of -5.11 (SE = 0.383) and kurtosis of 2.55 (SE = 0.750). Scores for the 1-2 courses group (n = 10) were normally distributed, with skewness and kurtosis z-scores within the acceptable $\pm$ 2.58 boundary, for overall CoI, all three presences, and perception of learning, but not for student satisfaction, which had a negative skew of -4.60 (SE = 0.687) and kurtosis of 7.49 (SE = 1.33). Scores for the 3-5 courses group (n = 5) were normally distributed, with skewness and kurtosis z-scores within the acceptable $\pm$ 2.58 boundary, for all of the dependent variables. Scores for the more than 5 courses group (n = 12) were normally distributed, with skewness and kurtosis z-scores within the acceptable $\pm$ 2.58 boundary, for overall CoI and all three presences but not for student satisfaction, which had a negative skew of -4.01 (SE = 0.637) and kurtosis of 5.07 (SE = 1.23), or perception of learning, which had a negative skew of -3.03 (SE = 0.637) and kurtosis of 2.57 (SE = 1.23). Scores were normally distributed for the 1-2 courses, 3-5 courses, and more than 5 courses groups for overall CoI and all three presences as assessed by Shapiro-Wilk's test

($p > .05$). Scores for the 0 courses group were normally distributed for overall CoI and social presence, but not for teaching presence or cognitive presence, as assessed by Shapiro-Wilk's test ($p < .05$). Scores were not normally distributed for any group for student satisfaction or perception of learning, as assessed by Shapiro-Wilk's test ($p < .05$). Scores were approximately normally distributed for all online courses taken groups for overall CoI, social presence, and cognitive presence, but not for teaching presence, student satisfaction, or perception of learning, as assessed by visual inspection of Normal Q-Q plots. The 0 courses group showed negative skewness for teaching presence, as assessed by visual inspection of the Normal Q-Q plots. All online courses taken group showed negative skewness for both student satisfaction and perception of learning, as assessed by visual inspection of the Normal Q-Q plots. There was one extreme outlier at the upper end of the scale for overall CoI in the 3-5 courses, two outliers at the lower end of the scale for teaching presence in the 0 courses group, one outlier at the upper end and one outlier at the lower end of the scale for social presence in the 3-5 courses group, six extreme outliers for student satisfaction in the 0 courses ($n = 3$), 1-2 courses ($n = 2$), and more than 5 courses ($n = 1$) groups, and seven extreme outliers for perception of learning in the 0 courses ($n = 4$), 1-2 courses ($n = 2$), and more than 5 courses ($n = 1$) groups. For the same reasons noted earlier in the Normality Tests section of this chapter, these outliers were not removed or transformed, and the researcher decided to proceed with this statistical analysis.

Spearman's correlation does not rely on normality of the data and the independent-samples *t*-test, one-way ANOVA, and one-way MANOVA are "fairly robust to deviations from normality" (Laerd Statistics, 2015a, 2018). To further control for the

non-normality of the data, the bootstrap function in SPSS will be applied during statistical analysis. No further transformations were performed, and it was decided to continue with the statistical analyses as planned for this student dataset.

Instructor Data Normality Tests

For the instructor data, normality tests were run with the following variables entered: overall CoI, teaching presence, social presence, cognitive presence, OTSEI, online teaching experience, higher education teaching experience, instructor satisfaction, and perception of student learning. There were no outliers in the data for teaching presence, social presence, cognitive presence, or perception of student learning, as assessed by inspection of a boxplot for values greater than 1.5 box-lengths from the edge of the box. There were eight extreme outliers identified for instructor satisfaction, as assessed by inspection of a boxplot. As stated earlier, extreme outliers represent "genuinely unusual points" in the data (Laerd Statistics, 2015a & 2015b). Four of the extreme outliers for instructor satisfaction were at the upper end of the scale and represented scores of 5 on this Likert-type scale item (range of possible scores: 1-5). The other four extreme outliers for instructor satisfaction were at the lower end of the scale and represented scores of 2 (n = 2) and 3 (n = 2) on these Likert-type items (range: 1-5). Because it was understandable that some instructors would report less satisfaction (i.e., score of 2) while others would report the highest level of satisfaction (i.e., score of 5) and because these scores were not abnormally far from the other values, which ranged from scores of 2-5, these outliers were not removed from the dataset or transformed.

Outliers were identified for online teaching experience, higher education teaching experience, overall CoI, and OTSEI, as assessed by visual inspection of their box plots.

The outliers for online teaching experience (n = 3) and higher education teaching experience (n = 1) were at the upper end of the scale and were not removed from the dataset or transformed because it was understandable that these variables would represent a wide range of values. The outlier for overall CoI mean score (n = 1) was at the lower end of the scale and was not removed from the dataset or transformed. The outlier for overall OTSEI mean score (n = 1) was at the higher end of the scale and was not removed from the dataset or transformed.

Mean scores for overall CoI, social presence, cognitive presence, overall OTSEI, online teaching experience, higher education teaching experience, and perception of student learning were normally distributed with skewness and kurtosis z-scores within the acceptable $\pm$ 2.58 boundary. Teaching presence mean scores were not normally distributed with a skewness of -2.61 (SE = 0.383) and kurtosis of 0.029 (SE = 0.750). Instructor satisfaction scores were not normally distributed with a skewness of -3.18 (SE = 0.383) and a kurtosis of 3.29 (SE = 0.750). Scores were normally distributed for overall CoI, social presence, cognitive presence, and overall OTSEI but not for teaching presence, online teaching experience, higher education teaching experience, instructor satisfaction, and perception of student learning, as assessed by Shapiro-Wilk's test (p < .05). Scores were normally distributed for overall CoI, social presence, cognitive presence, overall OTSEI, online teaching experience, higher education teaching experience, and perception of student learning, but not for teaching presence and instructor satisfaction, as assessed by visual inspection of Normal Q-Q plots. Teaching presence and instructor satisfaction showed negative skewness, as assessed by visual inspection of the Normal Q-Q plots. The skewness for teaching presence, -2.61 (SE =

0.383) was slightly above the $\pm$ 2.58 boundary. No further transformations were performed on this variable, but the researcher will take this into consideration when performing further statistical analyses. The non-normal distribution for online teaching experience and higher education teaching experience, as assessed by Shapiro-Wilk's ($p <$ .05), was expected because of frequencies noted in the descriptive statistics.

To prepare for secondary analysis of the online teaching experience variable, normality tests specific to the independent-samples *t*-test were run with the following results. Scores for overall CoI, all three CoI presences, and OTSEI were normally distributed for both online teaching experience groups (0-1 years and 2-12 years) with skewness and kurtosis z-scores within the acceptable $\pm$ 2.58 boundary. Scores for instructor satisfaction were normally distributed for the 2-12 years group with skewness and kurtosis z-scores within the acceptable $\pm$ 2.58 boundary, but not the 0-1 years group, which had negative skew greater than the -2.58 boundary but kurtosis z-scores within the +2.58 boundary. Scores for perception of student learning were normally distributed for both groups with skewness and kurtosis z-scores within the acceptable $\pm$ 2.58 boundary. Because skewness and kurtosis values for overall CoI and all three presences were equal to 0, SPSS did not compute Shapiro-Wilk's for these variables for either group. Scores were normally distributed for the freshman/sophomore group for overall CoI and all three presences, as assessed by Shapiro-Wilk's test ($p >$ .05). Scores for the OTSEI were normally distributed for both groups, as assessed by Shapiro-Wilk's test ($p >$ .05). Scores for instructor satisfaction or perception of student learning were not normally distributed for either group, as assessed by Shapiro-Wilk's test ($p <$ .05). Scores were approximately normally distributed for all online teaching experience groups for overall CoI, all three

presences, and the OTSEI, but not for instructor satisfaction or perception of student learning, as assessed by visual inspection of Normal Q-Q plots. Instructor satisfaction and perception of student learning had slight negative skewness for both groups, as assessed by visual inspection of the Normal Q-Q plots. There were extreme outliers for the 0-1 years group at the upper (n = 2) and lower (n = 4) end of the scale for instructor satisfaction and at the upper (n = 3) and lower (n = 2) end of the scale for student learning. For the same reasons noted earlier in the Normality Tests section of this chapter, these outliers were not removed or transformed, and the researcher decided to proceed with this statistical analysis.

To prepare for secondary analysis of the student online courses taken demographic variables, normality tests specific to the one-way ANOVA and one-way MANOVA were run with the following results. Scores for the 0-6 years higher education teaching experience group (n = 12) were normally distributed, with skewness and kurtosis z-scores within the acceptable $\pm$ 2.58 boundary, for overall CoI, teaching presence, social presence, and cognitive presence, but not for instructor satisfaction, which had a which had a positive skew of 5.44 (SE = 0.637) and kurtosis of 9.74 (SE = 1.23), or perception of student learning, which had a positive skew of 3.22 (SE = .637) and kurtosis of 2.14 (SE = 1.23). Scores for the 7-10 years group (n = 10) were normally distributed, with skewness and kurtosis z-scores within the acceptable $\pm$ 2.58 boundary, for all of the dependent variables. Scores for the 11-18 years group (n = 7) were normally distributed, with skewness and kurtosis z-scores within the acceptable $\pm$ 2.58 boundary, for overall CoI, all three presences, the OTSEI, and perception of student learning, but not for instructor satisfaction, which had a positive skew of 3.33 (SE = .794) and kurtosis

of 4.41 (*SE* = 1.59). Scores for the 19-40 years group (*n* = 9) were normally distributed, with skewness and kurtosis z-scores within the acceptable $\pm$ 2.58 boundary, for all of the dependent variables. Scores for the 0-6 years group were normally distributed for all three presences and the OTSEI, but not for overall CoI, as assessed by Shapiro-Wilk's test ($p < .05$). Scores for the 7-10 years group were normally distributed for social presence, cognitive presence, and the OTSEI, but not for overall CoI or teaching presence, as assessed by Shapiro-Wilk's test ($p < .05$). Scores for the 11-18 years group were normally distributed for all three presences and OTSEI, but not for overall CoI, as assessed by Shapiro-Wilk's test ($p < .05$). Scores for the 19-40 years group were normally distributed for all three presences and OTSEI, but not for overall CoI, as assessed by Shapiro-Wilk's test ($p < .05$). Scores were not normally distributed for any group for instructor satisfaction or perception of student learning, as assessed by Shapiro-Wilk's test ($p < .05$). Overall CoI scores were approximately normally distributed for all four higher education teaching experience groups, as assessed by visual inspection of the Normal Q-Q plots. Teaching presence scores were approximately normally distributed for the 0-6 years and 11-18 years groups but showed slight negative skew for the 7-10 years and 19-40 years groups, as assessed by visual inspection of the Normal Q-Q plots. Social presence scores were approximately normally distributed for the 0-6 years, 7-10 years, and 19-40 years groups but showed slight negative skew for the 11-18 years group, as assessed by visual inspection of the Normal Q-Q plots. Cognitive presence scores were approximately normally distributed for the 0-6 years and 7-10 years groups but showed slight negative skew for the 11-18 years group and slight positive skew for the 19-40 years group, as assessed by visual inspection of the Normal Q-Q plots. OTSEI scores

were approximately normally distributed for the 0-6 years and 7-10 years groups but showed slight positive skew for the 11-18 years and 19-40 years groups, as assessed by visual inspection of the Normal Q-Q plots. Instructor satisfaction scores were not normally distributed, with slight positive skew for the 0-6 years and 11-18 years groups and slight negative skew for the 7-10 years and 19-40 years groups, as assessed by visual inspection of the Normal Q-Q plots. Perception of student learning scores were not normally distributed, with positive skew for the 0-6 years, 7-10 years, and 11-18 years groups and slight negative skew for the 19-40 years group, as assessed by visual inspection of the Normal Q-Q plots. There was one outlier at the upper end of the scale and one extreme outlier at the lower end of the scale for teaching presence in 11-18 years group, one outlier at the upper end of the scale and one extreme outlier at the lower end of the scale for cognitive presence in 11-18 years group, two outliers at the upper end of the scale and one outlier at the lower end of the scale for OTSEI in the 0-6 years (n = 2) and 19-40 years (n = 1) groups, two extreme outliers at the upper end of the scale for satisfaction in the 0-6 years (n = 1) and 19-40 years (n = 1) groups, and three extreme outliers at the upper end of the scale and two extreme outliers at the lower end of the scale for perception of student learning for the 0-6 years (n = 2) and 7-10 years (n = 3). For the same reasons noted earlier in the Normality Tests section of this chapter, these outliers were not removed or transformed, and the researcher decided to proceed with this statistical analysis.

Spearman's correlation does not rely on normality of the data and the independent-samples t-test, one-way ANOVA, and one-way MANOVA are "fairly robust to deviations from normality" (Laerd Statistics, 2015a, 2017, & 2018). To further control

for the non-normality of the data, the bootstrap function in SPSS will be applied during statistical analysis. No further transformations were made, and a decision was made to continue with the planned statistical analysis for this dataset. Further tests of normality and assumptions, specific to the type of statistical analysis, will be reported below, with the results for each type of statistical analysis.

Research Question One

Research question one: Is there a relationship between students' perception of emergency remote learning (as measured with the CoI Survey) and students' satisfaction and perception of learning in the emergency remote online learning environment during the COVID-19 pandemic?

- H_0: There is no statistically significant correlation between student's perception of emergency remote learning (as measured with the CoI Survey) and students' satisfaction and perception of learning in the emergency remote online learning environment during the COVID-19 pandemic.
- H_1: There is a statistically significant correlation between students' perception of emergency remote online learning (as measured with the CoI Survey) and students' satisfaction and perception of learning in the emergency remote online learning environment during the COVID-19 pandemic.

To answer the first research question, Spearman's correlation was run on the student data to examine the relationship among the student CoI mean scores (overall and in all three presences), student satisfaction, and perception of learning. For this question, Spearman's correlation was used because it is the appropriate statistical test for correlation analysis when the data comprises both continuous and ordinal data and

because it does not rely on normality of the data. The acceptable alpha level for this statistical analysis was $p < .05$.

Before correlation analysis was performed, the responses of student participants ($N = 65$) were analyzed through descriptive statistics to determine the mean and standard deviation for overall CoI and each of the three CoI presences (teaching presence, social presence, and cognitive presence), as well as student satisfaction and perception of learning. The results of these descriptive analyses are presented in Table 2.

Before running Spearman's correlation, the researcher checked whether the assumptions were met for this statistical test. The first assumption is that the variables being investigated are continuous and/or ordinal variables. The variables being investigated comprised the continuous variables of overall CoI, teaching presence, social presence, and cognitive presence, and the ordinal variables of student satisfaction and perception of learning. The second assumption is that variables must represent paired observations. All the student data variables being investigated represent paired observations ($N = 65$). The third assumption is that there is a monotonic relationship between the variables, such that as the value of one variable increases or decreases, so does the value of the other variable (Laerd Statistics, 2018). Scatterplots were created for all the possible combinations of variables being investigated and it was determined that all of the variables had a positive monotonic relationship, in which as the value of one variable increased, so did the value of the other variable. All assumptions were met and as such the researcher proceeded with Spearman's correlation analyses. Table 2 presents the results of the correlation analyses, which will be discussed below.

Table 2

Student Data: Descriptive Statistics and Correlations for Tested Variables

Student Variable	Overall CoI	CoI TP	CoI SP	CoI CP	Satisfaction	Learning
Overall CoI	—	.825**	.814**	.897**	.410**	.466**
CoI TP		—	.486**	.708**	.384**	.361**
CoI SP			—	.587**	.316*	.314*
CoI CP				—	.346**	.436**
Satisfaction					—	.396**
Learning						—
M	4.32	4.60	3.82	4.37	4.89	4.78
SD	.40	.37	.66	.47	.36	.45
Range	1-5	1-5	1-5	1-5	1-5	1-5
α	.96	.92	.88	.92	.68	.68

Note: $N = 65$. CoI = Community of Inquiry; TP = teaching presence; SP = social presence; CP = cognitive presence; Satisfaction = student satisfaction; Learning = perception of learning.

* $p < .05$. ** $p < .01$.

Primary Findings for Research Question One

Student responses to the CoI Survey items indicated positive scores for overall CoI and each of the three presences (teaching presence, social presence, and cognitive presence), with no mean scores below the midpoint score of 3.0. The CoI presence with the highest mean score was teaching presence ($M = 4.60$, $SD = .37$). The CoI presence with the lowest mean score was social presence ($M = 3.82$, $SD = .66$) and this was also the presence with the lowest minimum score, which was 2.55. Student responses to the student satisfaction and perception of learning survey items indicated positive scores in both areas, with no mean scores below the midpoint score of 3.0.

There was a statistically significant, strong positive correlation between overall CoI and all three CoI presences: teaching presence, $r_s = .825$ ($p < .01$), social

presence, r_s = .814 (p < .01), and cognitive presence, r_s = .897 (p < .01). There was a positive correlation between teaching presence and social presence, r_s = .486 (p < .01) and a strong positive correlation between teaching presence and cognitive presence, r_s = .708 (p < .01). There was a moderate positive correlation between social presence and cognitive presence, r_s = .587 (p < .01). There was a positive correlation between student satisfaction and overall CoI, r_s = .410 (p < .01), teaching presence, r_s = .384 (p < .05), social presence, r_s = .384 (p < .05), and cognitive presence, r_s = .346 (p < .01). There was a positive correlation between perception of learning and overall CoI, r_s = .466 (p < .01), teaching presence, r_s = .361 (p < .05), social presence, r_s = .361 (p < .05), and cognitive presence, r_s = .436 (p < .01). There was a positive correlation between student satisfaction and perception of learning, r_s = .396 (p < .01).

The CoI presence with the lowest mean score was social presence (M = 3.82, SD = .66). The researcher went back into the student data and used descriptive statistics to examine the mean scores for each of the nine social presence survey items. Table 3 presents the nine social presence items and the means, standard deviations, variations, and minimum and maximum scores.

Student responses to the nine social presence survey items indicated overall positive scores for eight of the nine items. However, one item, which corresponded with the social presence sub-indicator “Affective Expression” (or personal/affective) and the statement, “Online or web-based communication is an excellent medium for social interaction,” had the lowest mean score (M = 2.88, SD = 1.19) and a low minimum score of 1.00.

Table 3

Student Data: Descriptive Statistics for the Nine CoI SP Survey Items

CoI SP Survey Item	*M*	*SD*	Var.	Range
Affective Expression				
Getting to know other course participants gave me a sense of belonging in the course.	3.88	1.02	1.05	1-5
I was able to form distinct impressions of some of the other course participants.	3.94	.98	.97	1-5
Online or web-based communication is an excellent medium for social interaction.	2.88	1.19	1.42	1-5
Open Communication				
I felt comfortable conversing through the online medium.	3.80	1.11	1.23	1-5
I felt comfortable participating in the course discussions.	4.08	1.01	1.01	1-5
I felt comfortable interacting with other course participants.	3.94	.93	.87	1-5
Group Cohesion				
I felt comfortable disagreeing with other course participants while still maintaining a sense of trust.	3.82	.95	.90	2-5
I felt that my point of view was acknowledged by other course participants.	4.15	.80	.63	1-5
Online discussions help me to develop a sense of collaboration.	3.72	1.15	1.33	1-5

Note: N = 65. CoI = Community of Inquiry; SP = social presence. The answer choices for the nine SP items were a 5-point Likert-type scale: *1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree*.

Secondary Findings for Research Question One

The researcher performed an independent-samples *t*-test to determine if there was a statistically significant difference between the two groups of the student academic year variable (freshman/sophomore and junior/senior/graduate student) for any of the

variables from the primary analysis (overall CoI, teaching presence, social presence, cognitive presence, student satisfaction, perception of learning).

Before running the independent-samples *t*-test, the researcher checked whether the assumptions were met for this statistical test. The first assumption is that the variables being investigated are continuous variables. The variables being investigated comprised the continuous variables of overall CoI, teaching presence, social presence, cognitive presence, student satisfaction, and perception of learning. The second assumption is that the independent variable is categorical, with two groups. The two groups that made up the categorical independent variable were (a) freshman/sophomore and (b) junior/senior graduate student. The third assumption is that there was independence of observations. Although the student participants in this study were reporting about their experiences in the courses taught by the instructor participants, it was determined that the study design allowed for sufficient independence of observations because the surveys were completed independently and anonymously by the student participants, as well as after the course experience (i.e., the researcher could be reasonably sure that the participants were not aware of each other's identities or participation and therefore it was not likely that they would be able to influence each other). The fourth assumption is that the dependent variable is approximately normally distributed for each group of the independent variable. As presented earlier in the Normality Tests section of this paper, overall CoI, teaching presence, social presence, and cognitive presence were approximately normally distributed for both the student academic year groups. However, student satisfaction and perception of learning were not normally distributed for either group. The fifth assumption is that there is homogeneity of variance. There was homogeneity of

variances, as assessed by Levene's test for equality of variances ($p > .05$). Because the independent-samples *t*-test is considered to be robust enough to deal with non-normality, all assumptions were considered met and so the researcher proceeded with the independent-samples *t*-test. Effect sizes (Cohen's *d*) were computed according to the method described in Field (2018, p.88), with the pooled *SD* used as the denominator. Tables 4 and 5 present the results of the independent-samples *t*-test, which will be discussed below.

Table 4

Student Data: Results of Comparison Analysis for Student Academic Year Groups

Variable	Freshman/ Sophomore		Junior/Senior/ Graduate Student		*t*(63)	*p*	Cohen's *d*
	M	*SD*	*M*	*SD*			
Overall CoI	4.17	.39	4.43	.37	-2.74	.008	-.68
CoI TP	4.51	.38	4.66	.35	-1.69	.096	-.41
CoI SP	3.63	.65	3.97	.64	-2.12	.038	-.52
CoI CP	4.21	.47	4.49	.43	-2.52	.014	-.62
Satisfaction	4.89	.31	4.89	.39	.011	.992	.003
Learning	4.71	.46	4.84	.44	-1.10	.277	-.27

Note: $N = 65$. CoI = Community of Inquiry; TP = teaching presence; SP = social presence; CP = cognitive presence; Satisfaction = student satisfaction; Learning = perception of learning. Mean difference values for each of the analyses are shown for the freshman/sophomore ($n = 28$) and junior/senior/graduate student ($n = 37$) groups, as well as the results of *t* tests (assuming equal variance) comparing the scores for CoI, satisfaction, and perception of learning between the two groups. The *p* values in this table are not bootstrap values.

Table 5

Student Data: Bootstrap Results of Comparison Analysis for Student Academic Year Groups

					Bootstrap 95% CI	
Variable	Mean Difference	Bias	*SE*	Bootstrap *p*	Lower	Upper
Overall CoI	-.26	.00427	.09	.006	-.43	-.06
CoI TP	-.15	.00428	.09	.098	-.35	.02
CoI SP	-.34	.00631	.16	.031	-.64	-.01
CoI CP	-.28	.00242	.11	.015	-.50	-.05
Satisfaction	.001	-.003 [b]	.09		-.17 [b]	.17 [b]
Learning	-.12	.007	.11		-.34	.12

Note: $N = 65$. Unless otherwise noted, bootstrap results are based on 1000 bootstrap samples. CoI = Community of Inquiry; TP = teaching presence; SP = social presence; CP = cognitive presence; Satisfaction = student satisfaction; Learning = perception of learning. Mean difference values for each of the analyses are shown for the freshman/sophomore and junior/senior/graduate student groups, as well as the results of *t* tests (assuming equal variance) comparing the scores for CoI, satisfaction, and perception of learning between the two groups.

[b] Based on 999 samples.

There were 28 student participants in the freshman/sophomore group and 37 student participants in the junior/senior/graduate student group. Overall CoI mean score was higher for the junior/senior/graduate student group ($M = 4.43$, $SD = .37$) than the freshman/sophomore group ($M = 4.17$, $SD = .39$). This difference, -0.26, 95% CI [-0.43 to -0.06], was statistically significant, $t(63) = -2.74$, $p = .006$, and represented a medium effect size of $d = -0.68$. The teaching presence mean score was higher for the junior/senior/graduate student group ($M = 4.66$, $SD = .35$) than the freshman/sophomore group ($M = 4.51$, $SD = .38$). This difference, -0.15, 95% CI [-0.35 to 0.02], was not

statistically significant, $t(63) = -1.69$, $p = .098$, and represented a small effect size of $d = -0.41$. The social presence mean score was higher for the junior/senior/graduate student group ($M = 3.97$, $SD = .64$) than the freshman/sophomore group ($M = 3.63$, $SD = .65$). This difference, -0.34, 95% CI [-0.64 to -0.01], was statistically significant, $t(63) = -2.12$, $p = .031$, and represented a medium effect size of $d = -0.52$. The cognitive presence mean score was higher for the junior/senior/graduate student group ($M = 4.49$, $SD = .43$) than the freshman/sophomore group ($M = 4.21$, $SD = .47$). This difference, -0.28, 95% CI [-0.50 to -0.05], was statistically significant, $t(63) = -2.52$, $p = .015$, and represented a medium effect size of $d = -0.62$. The student satisfaction mean score was the same for the junior/senior/graduate student ($M = 4.89$, $SD = .31$) and freshman/sophomore ($M = 4.89$, $SD = .39$) groups. The difference, 0.001, 95% CI [-0.17 to 0.17], was not statistically significant, $t(63) = .011$, $p = .992$, and represented a small effect size of $d = 0.003$. The perception of learning mean score was higher for the junior/senior/graduate student group ($M = 4.84$, $SD = .46$) than the freshman/sophomore group ($M = 4.71$, $SD = .44$). This difference, -0.12, 95% CI [-.34 to .12], was not statistically significant, $t(63) = -1.10$, $p = .277$, and represented a small effect size of $d = -0.27$.

The researcher performed a one-way ANOVA to determine if there was a statistically significant difference among the four groups of online courses taken for overall CoI, and a one-way MANOVA to determine if there was a statistically significant difference among the four groups of online courses taken for the three CoI presences (teaching presence, social presence, and cognitive presence).

Before running the one-way ANOVA, the researcher checked whether the assumptions were met for this statistical test. The first assumption is that the variables

being investigated are continuous variables. The variable being investigated was the continuous variable of overall CoI. The second assumption is that the independent variable is categorical, with two or more independent groups. The four groups that made up the categorical independent variable were (a) 0 courses, (b) 1-2 courses, (c) 3-5 courses, and (d) more than 5 courses. The third assumption is that there was independence of observations. Although the student participants in this study were reporting about their experiences in the courses taught by the instructor participants, it was determined that the study design allowed for sufficient independence of observations because the surveys were completed independently and anonymously by the student participants, as well as after the course experience (i.e., the researcher could be reasonably sure that the participants were not aware of each other's identities or participation and therefore it was not likely that they would be able to influence each other). The fourth assumption is that there are no significant outliers for the dependent variable in any of the independent variable groups. As presented earlier in the Normality Tests section of this paper, there were outliers for some of the dependent variables for each group. The fifth assumption is that the dependent variable is approximately normally distributed for each of the independent variable groups. As presented in the Normality Tests section of this paper, overall CoI, social presence, and cognitive presence were approximately normally distributed for all four of the online courses taken groups; however, teaching presence was not normally distributed for the 0 courses group, and student satisfaction and perception of learning were not normally distributed for any group. The sixth assumption is that there is homogeneity of variance. There was homogeneity of variances, as assessed by Levene's test for equality of variances ($p > .05$).

Because a one-way ANOVA is considered to be robust enough to deal with non-normality, no outliers were removed and no transformations were made, and the researcher proceeded with the statistical analysis. The results of the one-way ANOVA were not statistically significant and are presented below.

There were 38 students in the 0 courses online courses taken group, 10 students in the 1-2 courses group, five students in the 3-5 courses group, and 12 students in the more than 5 courses group. The overall CoI mean score was highest for the 3-5 courses online courses taken group ($n = 5$, $M = 4.45$, $SD = 0.32$), followed by the more than 5 courses group ($n = 12$, $M = 4.32$, $SD = .49$), the 0 courses group ($n = 38$, $M = 4.31$, $SD = .37$), and the 1-2 courses group ($n = 10$, $M = 4.21$, $SD = .45$), in that order. There were no statistically significant differences in overall CoI mean scores between the different online courses taken groups, $F(3, 61) = .41$, $p = .748$, $\omega^2 = -0.03$.

Before running the MANOVA, the researcher checked whether the assumptions were met for this statistical test. The first assumption is that the variables being investigated are continuous variables. The variables being investigated comprised the continuous variables of overall CoI, teaching presence, social presence, cognitive presence, satisfaction, and perception of learning. The second assumption is that the independent variable is categorical, with two or more independent groups. The four groups that made up the categorical independent variable were (a) 0 courses, (b) 1-2 courses, (c) 3-5 courses, and (d) more than 5 courses. The third assumption is that there was independence of observations. Although the student participants in this study were reporting about their experiences in the courses taught by the instructor participants, it was determined that the study design allowed for sufficient independence of observations

because the surveys were completed independently and anonymously by the student participants, as well as after the course experience (i.e., the researcher could be reasonably sure that the participants were not aware of each other's identities or participation and therefore it was not likely that they would be able to influence each other). The fourth assumption is that there are no significant univariate or multivariate outliers for the dependent variable in the independent variable groups. As presented earlier in the Normality Tests section of this paper, there were univariate outliers for some of the dependent variables for each group. There were no multivariate outliers in the data, as assessed by Mahalanobis distance ($p > .001$). The fifth assumption is that there is multivariate normality. Social presence scores were normally distributed for each group, as assessed by Shapiro-Wilk's test ($p > .05$). Teaching presence and cognitive presence scores were normally distributed for the 1-2 courses, 3-5 courses, and more than 5 courses online teaching groups, but not for the 0 courses group, as assessed by Shapiro-Wilk's test ($p < .05$). The sixth assumption is that there is no multicollinearity. There was no multicollinearity, as assessed by the Pearson correlations between teaching presence and social presence ($r = .445$, $p = .001$), teaching presence and cognitive presence ($r = .717$, $p = .001$), and social presence and cognitive presence ($r = .580$, $p = .001$). The seventh assumption is that there is a linear relationship between the dependent variables for each group. There was a linear relationship between the scores for all three presences in each group, as assessed by a scatterplot. The eighth assumption is that there are at least as many cases in each group as there are dependent variables. The smallest online courses taken group had five cases and there were three dependent variables. The ninth assumption is that there is homogeneity of variance-covariance matrices. There was

homogeneity of variance-covariances matrices, as assessed by Box's test of equality of covariance matrices (p = .511). The tenth assumption is that there is homogeneity of variances. There was homogeneity of variances, as assessed by Levene's Test of Homogeneity of Variance (p > .05). Because a one-way MANOVA is considered to be robust enough to deal with non-normality, no outliers were removed and no transformations were made, and the researcher proceeded with the statistical analysis. The results of the one-way MANOVA were not statistically significant and are discussed below.

There were 38 students in the 0 courses group, 10 students in the 1-2 courses group, five students in the 3-5 courses group, and 12 students in the more than 5 courses group. Students in all online courses taken groups scored higher for teaching presence (M = 4.62, SD = .35; M = 4.55, SD = .38, M = 4.69, SD = .31, and M = 4.53, SD = .47, respectively), followed by cognitive presence (M = 4.39, SD = .58; M = 4.20, SD = .53, M = 4.47, SD = .43, and M = 4.42, SD = .51, respectively), and social presence (M = 3.80, SD = .58; M = 3.76, SD = .82, M = 4.09, SD = .61, and M = 3.85, SD = .83, respectively). The differences between the online courses taken groups on the combined dependent variables were not statistically significant, $F(9, 143) = .521$, p = .858; Wilks' Λ = .925; partial η^2 = .026.

Summary of Findings for Research Question One

The researcher hypothesized that there would be a statistically significant correlation between students' perception of emergency remote online teaching (as measured with the CoI Survey) and students' satisfaction and perception of learning in the emergency remote online learning environment during the COVID-19 pandemic.

Statistically significant positive correlations were found between the variables student satisfaction and CoI (overall and all three presences) and between the variables perception of learning and CoI (overall and all three presences) ($p < .05$). The possible implications of these findings as well as the secondary findings will be discussed in Chapter 5: Discussion.

Research Question Two

Research question two: Is there a relationship between instructors' perception of emergency remote online teaching (as measured with the CoI Survey) and instructors' self-efficacy with online teaching (as measured with eight OTSEI items)?

- H_0: There is no statistically significant correlation between instructors' perception of emergency remote online teaching (as measured with the CoI Survey) and instructors' self-efficacy with online teaching (as measured with eight OTSEI items).
- H_1: There is a statistically significant correlation between instructors' perception of emergency remote online teaching (as measured with the CoI Survey) and instructors' self-efficacy with online teaching (as measured with eight OTSEI items).

To answer the second research question, Spearman's correlation was run on the instructor data to examine the relationship between instructor CoI mean scores (overall and in all three presences) and instructor OTSEI mean score. Spearman's correlation was used because it is the appropriate statistical test for correlation analysis when the data comprises both continuous and ordinal data and because it does not rely on normality of the data. The acceptable alpha level for this statistical analysis was $p < .05$.

The responses of instructor participants ($N = 38$) were analyzed through descriptive statistics to determine the means and standard deviations for overall CoI, teaching presence, social presence, cognitive presence, and OTSEI. The variables of instructor satisfaction, perception of student learning, online teaching experience, and higher education teaching experience were also entered, as they were of interest for secondary analysis. The results of the descriptive analyses are presented in Table 6.

Before running Spearman's correlation, the researcher checked whether the assumptions were met for this statistical test. The first assumption is that the variables being investigated are continuous and/or ordinal variables. The variables being investigated comprised the continuous variables of overall CoI, teaching presence, social presence, cognitive presence, and OTSEI, and because they were of interest for secondary analysis, the ordinal variables of instructor satisfaction and perception of student learning. The second assumption is that variables must represent paired observations. All the instructor data variables being investigated represent paired observations ($N = 38$). The third assumption is that there is a monotonic relationship between the variables, such that as the value of one variable increases or decreases, so does the value of the other variable (Laerd Statistics, 2018). Scatterplots were created for all the possible combinations of variables being investigated, and it was determined that all of the variables had a positive monotonic relationship, in such that as the value of one variable increased, so did the value of the other variable. All assumptions were met and so the researcher proceeded with Spearman's correlation analyses. Table 6 presents the results of the correlation analyses, which will be discussed below.

Table 6

Instructor Data: Descriptive Statistics and Correlations for Tested Variables

Instructor Variable	Overall CoI	CoI TP	CoI SP	CoI CP	OTSEI	Satisfaction	Learning
Overall CoI	—	.729**	.869**	.778**	.141	.622**	.493**
CoI TP		—	.454**	.594**	.073	.579**	.542**
CoI SP			—	.472**	-.032	.463**	.270
CoI CP				—	.374*	.409*	.475**
OTSEI					—	.048	.166
Satisfaction						—	.711**
Learning							—
M	3.97	4.26	3.53	3.99	2.07	3.95	4.24
SD	.40	.35	.75	.43	.65	.73	.54
Range	1-5	1-5	1-5	1-5	1-4	1-5	1-5
α	.91	.73	.92	.81	.91	.81	.81

Note: N = 38. CoI = Community of Inquiry; TP = teaching presence; SP = social presence; CP = cognitive presence; Satisfaction = instructor satisfaction; Learning = perception of student learning.

* $p < .05$. ** $p < .01$.

Primary Findings for Research Question Two

Instructor responses to the CoI Survey items indicated positive scores for overall CoI and each of the three presences (teaching presence, social presence, and cognitive presence), with no mean scores below the midpoint score of 3.00. The CoI presence with the highest mean score was teaching presence (*M* = 4.26, *SD* = .35). The CoI presence with the lowest mean score was social presence (*M* = 3.53, *SD* = .75) and this was also the presence with the lowest minimum score, which was 1.67. Instructor responses to the OTSEI survey items indicated a relatively low mean score (*M* = 2.07, *SD* = .65) and a low minimum score of 1.00. Instructor responses to the instructor satisfaction and perception of student learning survey items indicated positive scores in both areas, with

no mean scores below 3.00. However, instructor satisfaction had a low minimum score of 2.00.

There was a strong positive correlation between overall CoI and all three CoI presences: teaching presence, $r_s = .729$ ($p < .01$), social presence, $r_s = .869$ ($p < .01$), and cognitive presence, $r_s = .778$ ($p < .01$). There was a positive correlation between teaching presence and social presence, $r_s = .454$ ($p < .01$) and between teaching presence and cognitive presence, $r_s = .594$ ($p < .01$). There was a positive correlation between social presence and cognitive presence, $r_s = .472$ ($p < .01$). Additionally, there was a positive correlation between the OTSEI and cognitive presence, $r_s = .374$ ($p < .05$).

Similar to the student data, the CoI presence with the lowest mean score was social presence ($M = 3.52$, $SD = .74$). Although this mean score could be considered positive, the researcher was interested in why social presence received the lowest rating among the three CoI presences from the instructor participants in this study. So, the researcher went back into the data to examine the mean scores for each of the nine social presence survey items. The nine social presence items and the means, standard deviations, variations, and minimum and maximum scores are presented in Table 7 and will be discussed below.

Table 7

Instructor Data: Descriptive Statistics for the Nine CoI SP Survey Items

CoI SP Survey Item	*M*	*SD*	Var.	Range
Affective Expression				
Getting to know other course participants gave students a sense of belonging in the course.	3.92	.96	.94	2-5
Students were able to form distinct impressions of some of the other course participants.	3.76	.99	.99	2-5
Online or web-based communication is an excellent medium for social interaction.	2.74	1.13	1.28	1-5
Open Communication				
Students were comfortable conversing through the online medium.	3.63	1.02	1.05	2-5
Students were comfortable participating in the course discussions.	3.68	.98	.97	2-5
Students were comfortable interacting with other course participants.	3.76	.85	.72	2-5
Group Cohesion				
Students were comfortable disagreeing with other course participants while still maintaining a sense of trust.	3.39	.91	.84	1-5
Students' different points of view were acknowledged by other course participants.	3.50	.83	.68	1-5
Online discussions help students to develop a sense of collaboration.	3.37	.97	.94	1-5

Note: N = 38. CoI = Community of Inquiry; SP = social presence. The answer choices for the nine SP items were rated using a 5-point Likert-type scale: 1 = *strongly disagree,* 2 = *disagree,* 3 = *neutral,* 4 = *agree,* 5 = *strongly agree*.

Instructor responses to the nine social presence survey items indicated overall positive scores for seven of the eight items. However, one item, which corresponded with the social presence sub-indicator "Affective Expression" (or personal/affective) and the statement, "Online or web-based communication is an excellent medium for social interaction," had the lowest mean score (*M* = 2.74, *SD* = 1.13) and a low minimum score

of 1.00. Furthermore, three items, which all corresponded with the social presence sub-indicator "Group Cohesion," had mean scores above the midpoint score of 3.00 but low minimum scores of 1.00.

There was a relatively low mean score for overall OTSEI (M = 2.07, SD = .65) and a low minimum score of 1.00. The researcher went back into the data to examine the mean scores for each of the eight OTSEI survey items. The eight OTSEI items and the means, standard deviations, variations, and minimum and maximum scores are presented in Table 8 and will be discussed below.

Instructor responses to the eight OTSEI survey items indicated overall low scores for all eight items. The lowest mean score corresponded with the statements, "[I can] obtain the appropriate copyright permissions [for sharing digital resources with my students]" (M = 1.66, SD = .78) and "[I can] select the [online] technology that is compatible with students' networks and platforms (i.e., compatible versions of software and networks that are capable of "talking to each other")" (M = 1.74, SD = .76). Additionally, the researcher chose to run frequency statistics to further parse the data for each item. For the first of the two items with the lowest mean scores (item two in Table 8), half (50%) of the instructor respondents rated themselves as "beginner" with only 10.5% rating themselves as "advanced" and 2.6% rating themselves as "expert". For the second item (item seven in Table 8), almost half (44.7%) rated themselves as "beginner" with only 18.4% rating themselves as "advanced" and none rating themselves as "expert." The highest mean scores corresponded with the statements, "[I can] select the appropriate software applications to use for my [courses]" (M = 2.58, SD = .75) and "[I can] learn how to use new technologies used in my [course] without support from my

institution" (M = 2.26, SD = .95). For the first of these two highest mean scores items (item one in Table 8), half (50%) of the instructor respondents rated themselves as "intermediate" with only 2.6% rating themselves as "beginner" and the remaining rating themselves as either "advanced" (34.2%) or "expert" (5%). For the second item (item six in Table 8), almost half (44.7%) rated themselves as "intermediate" with 22.1% rating themselves as "beginner" and the remaining rating themselves as either "advanced" (21.1%) or "expert" (13.2%).

Table 8

Instructor Data: Descriptive Statistics for the Eight OTSEI Survey Items

OTSEI Survey Item	*M*	*SD*	Var.	Range
[I can] select the appropriate software applications to use for my [courses].	2.58	.75	.57	1-4
[I can] obtain the appropriate copyright permissions [for sharing digital resources with my students].	1.66	.78	.61	1-4
[I can] discern between technological applications that require differing levels of bandwidth.	1.97	.85	.72	1-4
[I can] determine how difficult various types of technology will be for my students to use.	2.05	.80	.64	1-4
[I can] select the [online technology] that is most efficient for delivery of materials to students.	2.24	.82	.67	1-4
[I can] learn how to use new technologies used in my [course] without support from my institution.	2.26	.95	.90	1-4
[I can] select the [online] technology that is compatible with students' networks and platforms (i.e., compatible versions of software and networks that are capable of "talking to each other").	1.74	.76	.57	1-3
[I can] manage the time requirements needed for learning [online] technology.	2.08	.91	.83	1-4

Note: N = 38. OTSEI = Online Teaching Self-Efficacy Inventory. The answer choices for the eight OTSEI items were rated using a 4-point Likert-type scale: 4-point scale: 1 = *Beginner,* 2 = *Intermediate,* 3 = *Advanced,* 4 = *Expert*.

Secondary Findings for Research Question Two

Statistical analyses were conducted to explore whether there was a relationship between the instructor satisfaction and perception of student learning variables and the variables included in the primary analysis. There was a statistically significant strong positive correlation between instructor satisfaction and perception of student learning, $r_s = .711$ ($p < .01$) and a statistically significant positive correlation between instructor satisfaction and all CoI measurements: overall CoI, $r_s = .622$ ($p < .01$), teaching presence, $r_s = .579$ ($p < .01$), social presence, $r_s = .463$ ($p < .01$), and cognitive presence, $r_s = .409$ ($p < .05$). There was a statistically significant positive correlation between instructor perception of student learning and overall CoI, $r_s = .493$ ($p < .01$), teaching presence, $r_s = .542$ ($p < .01$), and cognitive presence, $r_s = .475$ ($p < .01$), but no significant correlation between instructor perception of student learning and social presence.

The researcher also performed secondary analyses involving the online teaching experience and higher education teaching experience variables and the variables included in the primary analysis, as well as instructor satisfaction and perception of student learning.

An independent-samples *t*-test was conducted to determine if there was a statistically significant difference between the two groups of online teaching experience for any of the variables from the primary analysis (CoI, CoI TP, CoI SP, CoI CP, OTSEI).

Before running the independent-samples *t*-test, the researcher checked whether the assumptions were met for this statistical test. The first assumption is that the variables being investigated are continuous variables. The variables being investigated comprised

the continuous variables of overall CoI, teaching presence, social presence, cognitive presence, OTSEI, satisfaction, and student learning. The second assumption is that the independent variable is categorical, with two groups. The two groups that make up the categorical independent variable are (a) 0-1 years and (b) 2-12 years online teaching experience. The third assumption is that there was independence of observations. The instructor participants in this study were reporting about their experiences in the courses they taught and so it was determined that the researcher could be reasonably sure that the instructors were not aware of each other's identities or participation and therefore it was not likely that they would be able to influence each other. The fourth assumption is that the dependent variable is approximately normally distributed for each group of the independent variable. As presented earlier in the Normality Tests section of this paper, overall CoI, teaching presence, social presence, cognitive presence, and the OTSEI were approximately normally distributed for both online teaching experience groups; however, instructor satisfaction and perception of student learning were not normally distributed for either group. The fifth assumption is that there is homogeneity of variance. There was homogeneity of variances, as assessed by Levene's test for equality of variances ($p > .05$). Because the independent-samples *t*-test is considered to be robust enough to deal with non-normality, all assumptions were considered met and so the researcher proceeded with the statistical analysis. Effect sizes (Cohen's *d*) were computed according to the method described in Field (2018, p.88), with the pooled *SD* used as the denominator. Tables 9 and 10 present the results of the independent-samples *t*-test, which will be discussed below.

Table 9

Instructor Data: Results of Comparison Analysis for Online Teaching Experience Groups

Variable	Online Teaching Experience				*t*(36)	*p*	Cohen's *d*
	0-1 years		2-12 years				
	M	*SD*	*M*	*SD*			
Overall CoI	3.92	.39	4.06	.43	-1.03	.309	-.35
CoI TP	4.25	.36	4.27	.33	-.242	.811	-.09
CoI SP	3.45	.74	3.67	.78	-.862	.394	-.39
CoI CP	3.92	.38	4.12	.51	-1.38	.177	-.47
OTSEI	2.02	.58	2.18	.79	-.746	.461	-.27
Satisfaction	3.76	.78	4.31	.48	-2.31	.027	-.60
Learning	4.12	.53	4.46	.52	-1.91	.064	-.64

Note: $N = 38$. CoI = Community of Inquiry; TP = teaching presence; SP = social presence; CP = cognitive presence; Satisfaction = instructor satisfaction; Learning = perception of student learning. Mean difference values for each of the analyses are shown for the 0-1 years ($n = 25$) and 2-12 years ($n = 13$) online teaching experience groups, as well as the results of *t* tests (assuming equal variance) comparing the scores for CoI, OTSEI, satisfaction, and perception of student learning between the two groups. The *p* values in this table are not bootstrap values.

Table 10

Instructor Data: Bootstrap Results of Comparison Analysis for Online Teaching Experience Groups

Variable	Mean Difference	Bias	*SE*	Bootstrap *p*	Bootstrap 95% CI	
					Lower	Upper
Overall CoI	-.14	-.00080	.14	.328	-.42	.15
CoI TP	-.03	-.00231	.11	—	-.27	.18
CoI SP	-.22	-.00077	.26	—	-.75	.35
CoI CP	-.20	.00082	.17	—	-.52	.14
OTSEI	-.17	.00225	.25	—	-.67	.29
Satisfaction	-.55	-.006	.20	—	-.96	-.17
Learning	-.34	.001	.18	.062	-.68	.03

Note: $N = 38$. Unless otherwise noted, bootstrap results are based on 1000 bootstrap samples. CoI = Community of Inquiry; TP = teaching presence; SP = social presence; CP = cognitive presence; Satisfaction = instructor satisfaction; Learning = perception of student learning. Mean difference values for each of the analyses are shown for the 0-1 years ($n = 25$) and 2-12 years ($n = 13$) online teaching experience groups, as well as the results of *t* tests (assuming equal variance) comparing the scores for CoI, OTSEI, satisfaction, and perception of student learning between the two groups.

There were 25 instructor participants in the 0-1 years online teaching experience group and 13 instructor participants in the 2-12 years group. Overall CoI score was higher for the 2-12 years group ($M = 4.06$, $SD = .43$) than the 0-1 years group ($M = 3.92$, $SD = .39$). This difference, -0.14, 95% CI [-0.42 to 0.15], was not statistically significant, $t(36) = -1.03$, $p = .309$, and represented a small effect size of $d = 0.42$. Teaching presence score was higher for the 2-12 years group ($M = 4.28$, $SD = .33$) than the 0-1 years group ($M = 4.25$, $SD = .36$). This difference, -0.03, 95% CI [-0.27 to 0.18], was not statistically significant, $t(36) = -.242$, $p = .811$, and represented a small effect size of $d = 0.34$. Social presence score was higher for the 2-12 years group ($M = 3.68$, $SD = .78$) than the 0-1 years group ($M = 3.45$, $SD = .74$). This difference, -0.22, 95% CI [-0.75 to 0.35], was not statistically significant, $t(36) = -.862$, $p = .394$, and represented a medium effect size of $d = 0.77$. Cognitive presence score was higher for the 2-12 years group ($M = 4.12$, $SD = .51$) than the 0-1 years group ($M = 3.92$, $SD = .38$). This difference, -0.20, 95% CI [-0.52 to 0.14], was not statistically significant, $t(36) = -1.38$, $p = .177$, and represented a small effect size of $d = 0.47$. OTSEI score was higher for the 2-12 years group ($M = 2.18$, $SD = .79$) than the 0-1 years group ($M = 2.02$, $SD =$

.58). This difference, -0.17, 95% CI [-0.67 to 0.29], was not statistically significant, $t(36) = -.746$, $p = .461$, and represented a medium effect size of $d = 0.73$. Instructor satisfaction score was higher for the 2-12 years group ($M = 4.31$, $SD = .48$) than the 0-1 years group ($M = 3.76$, $SD = .78$). This difference, -0.55, 95% CI [-0.96 to -0.17], was statistically significant, $t(36) = -2.31$, $p = .027$, and represented a medium effect size of $d = 0.60$. Student learning score was higher for the 2-12 years group ($M = 4.46$, $SD = .52$) than the 0-1 years group ($M = 4.12$, $SD = .53$). This difference, -0.34, 95% CI [-0.68 to 0.03], was not statistically significant, $t(36) = -1.91$, $p = .064$, and represented a medium effect size of $d = 0.52$.

Finally, the researcher performed a one-way ANOVA to determine if there was a statistically significant difference among the four groups of higher education teaching experience for overall CoI and a one-way MANOVA to determine if there was a statistically significant difference among the four groups of higher education teaching experience for the three CoI presences (teaching presence, social presence, and cognitive presence) and OTSEI.

Before running the one-way ANOVA, the researcher checked whether the assumptions were met for this statistical test. The first assumption is that the variables being investigated are continuous variables. The variable being investigated is the continuous variable of overall CoI. The second assumption is that the independent variable is categorical, with two or more independent groups. The four groups that make up the categorical independent variable are (a) 0-6 years, (b) 7-10 years, (c) 11-18 years, and (d) 19-40 years. The third assumption is that there was independence of observations. The instructors in this study were reporting about their experiences in the courses they

taught and so it was determined that the researcher could be reasonably sure that the instructors were not aware of each other's identities or participation and therefore it was not likely that they would be able to influence each other. The fourth assumption is that there are no significant outliers for the dependent variable in any of the independent variable groups. As presented earlier in the Normality Tests section of this paper, there were outliers for social presence and cognitive presence in the 11-18 years group, for the OTSEI in the 0-6 years and 19-40 years groups, for satisfaction in the 0-6 years and 11-18 years groups, and for perception of student learning in the 0-6 years and 7-10 years groups. The fifth assumption is that the dependent variable is approximately normally distributed for each of the independent variable groups. As presented in the Normality Tests section of this paper, social presence, cognitive presence, and the OTSEI were normally distributed for all higher education teaching experience groups. Teaching presence was not normally distributed for the 7-10 years group and overall CoI, instructor satisfaction, and perception of student learning were not normally distributed for any group, as assessed by Shapiro-Wilk's ($p < .05$). The sixth assumption is that there is homogeneity of variance. There was homogeneity of variances, as assessed by Levene's test for equality of variances ($p > .05$). Because a one-way ANOVA is considered to be robust enough to deal with non-normality, no outliers were removed and no transformations were made, and the researcher proceeded with the statistical analyses. The results of the one-way ANOVA were not statistically significant and are presented below.

There were 12 instructors in the 0-6 years higher education teaching experience group, 10 instructors in the 7-10 years group, seven instructors in the 11-18 years group,

and nine instructors in the 19-40 years group. The overall CoI mean score was highest for the 0-6 years group (n = 12, M = 4.13, SD = 0.38), followed by the 19-40 years (n = 9, M = 3.96, SD = .3.97), 11-18 years (n = 7, M = 3.93, SD = .44), and 7-10 years (n = 10, M = 3.81, SD = .32) groups, in that order. There were no statistically significant differences in overall CoI score between the different higher education teaching experience groups, $F(3, 34) = 1.17$, $p = .337$, $\omega^2 = 0.01$.

Before running the MANOVA, the researcher checked whether the assumptions were met for this statistical test. The first assumption is that the variables being investigated are continuous variables. The variables being investigated comprised the continuous variables of teaching presence, social presence, cognitive presence, and the OTSEI. The second assumption is that the independent variable is categorical, with two or more independent groups. The four groups that make up the categorical independent variable are (a) 0-6 years, (b) 7-10 years, (c) 11-18 years, and (d) 19-40 years. The third assumption is that there was independence of observations. The instructors in this study were reporting about their experiences in the courses they taught and so it was determined that the researcher could be reasonably sure that the participants were not aware of each other's identities or participation and therefore it was not likely that they would be able to influence each other. The fourth assumption is that there are no significant univariate or multivariate outliers for the dependent variable in the independent variable groups. As presented earlier in the Normality Tests section of this paper, there were univariate outliers for social presence and cognitive presence in the 11-18 years group and for the OTSEI in the 0-6 years and 19-40 years groups. There were no multivariate outliers in the data, as assessed by Mahalanobis distance ($p > .001$). The fifth

assumption is that there is multivariate normality. Social presence scores were normally distributed for each group, as assessed by Shapiro-Wilk's test ($p > .05$). Teaching presence scores were normally distributed for the 0-6 years, 11-18 years, and 19-40 years groups, but not for the 7-10 years group, as assessed by Shapiro-Wilk's test ($p < .05$). Social presence, cognitive presence, and the OTSEI were normally distributed for all groups, as assessed by Shapiro-Wilk's test ($p < .05$). The sixth assumption is that there is no multicollinearity. There was no multicollinearity, as assessed by Pearson correlations between teaching presence and social presence ($r = .473$, $p = .003$), teaching presence and cognitive presence ($r = .607$, $p = .001$), teaching presence and the OTSEI ($r = .102$, $p = .541$), social presence and cognitive presence ($r = .495$, $p = .002$), social presence and the OTSEI ($r = -.070$, $p = .678$), or cognitive presence and the OTSEI ($r = .327$, $p = .045$) . The seventh assumption is that there is a linear relationship between the dependent variables for each group. There was a linear relationship between the scores for all three presences in each group, as assessed by a scatterplot. The eighth assumption is that there are at least as many cases in each group as there are dependent variables. The smallest higher education teaching experience group has seven cases and there are four dependent variables. The ninth assumption is that there is homogeneity of variance-covariance matrices. There was homogeneity of variance-covariances matrices, as assessed by Box's test of equality of covariance matrices ($p = .096$). The tenth assumption is that there is homogeneity of variances. There was homogeneity of variances, as assessed by Levene's test of homogeneity of variance ($p > .05$). Because a one-way MANOVA is considered to be robust enough to deal with non-normality, the researcher

proceeded with the statistical analyses. The results of the one-way MANOVA were not statistically significant and are discussed below.

There were 12 instructors in the 0-6 years higher education teaching experience group, 10 instructors in the 7-10 years group, seven instructors in the 11-18 years group, and nine instructors in the 19-40 years group. Instructors in all groups scored higher for teaching presence (M = 4.34, SD = .26; M = 4.13, SD = .40, M = 4.22, SD = .26, and M = 4.32, SD = .44, respectively), followed by cognitive presence (M = 4.19, SD = .46; M = 3.86, SD = .34, M = 3.86, SD = .42, and M = 3.96, SD = .46, respectively), social presence (M = 3.72, SD = .68; M = 3.30, SD = .51, M = 3.60, SD = .99, and M = 3.47, SD = .89, respectively), and the OTSEI (M = 2.13, SD = .69; M = 2.13, SD = .65, M = 1.89, SD = .36, and M = 2.08, SD = .84, respectively). The differences between the higher education teaching experience groups on the combined dependent variables were not statistically significant, $F(12, 82) = .509$, $p = .903$; Wilks' $\Lambda = .827$; partial $\eta^2 = .061$.

Summary of Findings for Research Question Two

The researcher hypothesized that there would be a statistically significant correlation between instructors' perception of emergency remote online teaching (as measured with the CoI Survey) and instructors' self-efficacy with online teaching (as measured with eight OTSEI items). Although no statistically significant relationship was found between the OTSEI and overall CoI, teaching presence, or social presence, a statistically significant positive correlation was found between the OTSEI and cognitive presence ($p < .05$). The possible implications of this finding, as well as possible implications of the secondary findings, will be discussed in Chapter 5: Discussion.

Research Question Three

Research question three: Is there a difference between students' and instructors' perception of emergency remote learning/teaching during the COVID-19 pandemic?

- H_0: There is no statistically significant difference between students' and instructors' perception of emergency remote learning/teaching (as measured with the CoI Survey) during the COVID-19 pandemic.
- H_1: There is a statistically significant difference between students' and instructors' perception of emergency remote learning/teaching (as measured with the CoI Surveysurvey) during the COVID-19 pandemic.

To answer the third research question, an independent-samples *t*-test was run on the combined student and instructor data to determine if there was a difference between student and instructor CoI scores (overall and in all three presences). An independent-samples *t*-test was used because it is the appropriate statistical analysis for determining whether a statistically significant difference exists between the means of two independent groups on a continuous dependent variable and is considered robust enough to deal with non-normality in the data. The independent-samples *t*-test calculates a significance level (*p*-value), which is the probability that the sample group's mean is at least as different as was found in the study, "given that the null hypothesis is indeed true" (Laerd Statistics, 2015a). Furthermore, if the researcher sets a small significance level (e.g., $p < .05$), the researcher may "conclude that it is unlikely that the two group means are equal in the population" and therefore accept the alternative hypothesis and reject the null hypothesis (Laerd Statistics, 2015a). Because the sample sizes are unequal, this independent-samples

t-test has an unbalanced design. The acceptable alpha level for this statistical analysis was $p < .05$.

Before a means comparison analysis was performed, the responses of student participants ($n = 65$) and instructor participants ($n = 38$) were analyzed through descriptive statistics to determine the means and standard deviations for overall CoI and each of the three CoI presences (teaching presence, social presence, and cognitive presence). The results of these descriptive analyses were reported earlier in Tables 2 and 6. Student responses to the CoI Survey items indicated positive scores for overall CoI and each of the three presences (teaching presence, social presence, and cognitive presence), with no mean scores below the midpoint score of 3.00. The CoI presence with the highest mean score was teaching presence ($M = 4.60$, $SD = .37$). The CoI presence with the lowest mean score was social presence ($M = 3.82$, $SD = .66$), and this was also the presence with the lowest minimum score, which was 2.55. Instructor responses to the CoI Survey items indicated positive scores for overall CoI and each of the three presences, with no mean scores below the midpoint score of 3.00. The CoI presence with the highest mean score was teaching presence ($M = 4.26$, $SD = .35$). The CoI presence with the lowest mean score was social presence ($M = 3.53$, $SD = .75$), and this was also the presence with the lowest minimum score, which was 1.67.

Before running the independent-samples *t*-test, the researcher checked whether the assumptions were met for this statistical test. The first assumption is that the variables being investigated are continuous variables. The variables being investigated comprised the continuous variables of overall CoI, teaching presence, social presence, and cognitive presence. The second assumption is that the independent variable is categorical, with two

groups. The two groups that make up the categorical independent variable are (a) student and (b) instructor. The third assumption is that there was independence of observations. Although the student participants in this study were reporting about their experiences in the courses taught by the instructor participants, it was determined that the study design allowed for sufficient independence of observations because the surveys were completed independently and anonymously by the student and instructor participants, as well as after the course experience (i.e., the participants were not aware of each other's identities or participation and therefore it was not likely that they would be able to influence each other). The fourth assumption is that the dependent variable is approximately normally distributed for each group of the independent variable. As presented earlier in the Normality Tests section of this paper, the dependent variables that will be tested (overall CoI, teaching presence, social presence, cognitive presence) are approximately normally distributed for both the student and instructor groups. The fifth assumption is that there is homogeneity of variance. There was homogeneity of variances, as assessed by Levene's test for equality of variances ($p > .05$). All assumptions were met and so the researcher proceeded with the independent-samples *t*-test. Effect sizes (Cohen's *d*) were computed according to the method described in Field (2018, p.88), with the pooled *SD* used as the denominator. Tables 11 and 12 present the results of the independent-samples *t*-test, which will be discussed below.

Table 11

Student and Instructor Data: Results of Comparison Analysis

Variable	Students		Instructors		*t*(101)	*p*	Cohen's *d*
	M	*SD*	*M*	*SD*			
Overall CoI	4.32	.40	3.97	.40	4.26	.000	.85
CoI TP	4.60	.37	4.26	.35	4.56	.000	.92
CoI SP	3.82	.66	3.53	.75	2.06	.042	.42
CoI CP	4.37	.47	3.99	.43	4.09	.000	.83

Note: *N* = 103. CoI = Community of Inquiry; TP = teaching presence; SP = social presence; CP = cognitive presence. Mean difference values for each of the analyses are shown for the students (*n* = 65) and instructors (*n* = 38), as well as the results of *t* tests (assuming equal variance) comparing the CoI scores between the two groups. The *p* values in this table are not bootstrap values.

Table 12

Student and Instructor Data: Bootstrap Results of Comparison Analysis

					Bootstrap 95% CI	
Variable	Mean Difference	Bias	*SE*	Bootstrap *p*	Lower	Upper
Overall CoI	.34	-.00390	.08	.001	.18	.49
CoI TP	.33	-.00455	.07	.001	.19	.46
CoI SP	.29	-.00447	.14	.049	.004	.57
CoI CP	.38	-.00254	.09	.001	.20	.56

Note: *N* = 103. CoI = Community of Inquiry; TP = teaching presence; SP = social presence; CP = cognitive presence. Bootstrap results are based on 1000 bootstrap samples. Mean difference values for each of the analyses are shown for the students (*n* = 65) and instructors (*n* = 38), as well as the results of *t* tests (assuming equal variance) comparing the CoI scores between the two groups.

There were 65 student and 38 instructor participants. Student overall CoI score (*M* = 4.32, *SD* = .40) was higher than instructor overall CoI score (*M* = 3.97, *SD* = .40).

This difference, 0.34, 95% CI [0.18 to 0.49], was statistically significant, $t(101) = 4.26$, $p = .001$, and represented a large effect size of $d = .87$. Student teaching presence score ($M = 4.60$, $SD = .37$) was higher than instructor teaching presence score ($M = 4.26$, $SD = .35$). This difference, 0.33, 95% CI [0.19 to 0.46], was statistically significant, $t(101) = 4.56$, $p = .001$, and represented a large effect size of $d = .91$. Student social presence score ($M = 3.82$, $SD = .66$) was higher than instructor social presence score ($M = 3.53$, $SD = .75$). This difference, 0.29, 95% CI [0.004 to 0.57], was statistically significant, $t(101) = 2.06$, $p = .049$, and represented a moderate effect size of $d = .45$. Student cognitive presence score ($M = 4.37$, $SD = .47$) was higher than instructor cognitive presence score ($M = 3.99$, $SD = .43$). This difference, 0.38, 95% CI [0.20 to 0.56], was statistically significant, $t(101) = 4.09$, $p = .001$, and represented a large effect size of $d = .85$.

Although the mean scores for overall CoI and all three CoI presences can be considered positive, one presence, social presence, had a noticeably lower mean score for both students ($M = 3.82$) and instructors ($M = 3.53$) than the other presences. This finding was also reported earlier, in the results for the separate student and instructor data analyses for research questions one and two.

Summary of Findings for Research Question Three

The researcher hypothesized that there would be a statistically significant difference between students' and instructors' perception of emergency remote learning/teaching (as measured with the CoI Survey) during the COVID-19 pandemic. A statistically significant difference was found between means for overall CoI, teaching presence, social presence, and cognitive presence ($p < .05$), and therefore, the researcher

can reject the null hypothesis and retain the alternative hypothesis for this research question. That said, social presence had the lowest mean score for both students and instructors and only just met the acceptable threshold for statistical significance (p = .049). The possible implications of these findings will be discussed in Chapter 5: Discussion.

Research Question Four

Research question four: How does the qualitative interview data provide further insight about the instructors' emergency remote online teaching practices during the COVID-19 pandemic?

To answer the fourth research question, the researcher used a phenomenological approach in order to gain deeper insight about the instructors' emergency remote online teaching practices, as they related to the CoI framework. The researcher interviewed 20 instructors for this study, using a semi-structured interview design with 14 questions aligned to the CoI framework (adapted from Damm, 2016). Most of the instructors interviewed for this study reported that the courses they were describing took place in-person and on-campus before the COVID-19 pandemic necessitated the switch to emergency remote online learning. Although seven (35%) of the instructors interviewed for this study reported that they had experience with online teaching, only one reported that the course they were describing for this study was regularly taught by them in an online format. The results of the qualitative analysis of the instructor interview data are presented below in a composite narrative form, in which the instructors' lived experiences are reported as a single narrative, with direct quotes interjected to give examples and/or strengthen elements of the narrative (Willis, 2018).

General Response to Online Teaching

Before asking the qualitative interview questions that were aligned with the CoI framework, the researcher asked three opening questions. The first question simply asked the instructors whether or not they had taught an online course prior to Spring 2020. Seven (35%) of the 20 instructors interviewed responded that they had taught an online course before, while the remaining 13 (65%) instructors responded that this was their first experience with online teaching. The second question asked the instructors how they felt about the move to emergency remote online teaching in Spring 2020. The instructors' responses ranged from "devastated" to "okay" to "good." A few instructors remarked that while they had understood that it was necessary (e.g., for public health and safety), they had not been excited about online teaching. The third question asked if they felt there was anything they could not do in their course as a result of the move to emergency remote online learning. One instructor described the difficulty students encountered practicing physiological manipulations that were designed to be practiced on a partner, while a few other instructors described not having access to specialized tools and resources that were only available on campus (e.g., lab equipment). Another instructor reported that their entire course needed to be reimagined due to not being able to engage in the fieldwork that is normally the primary activity of the course. A few instructors mentioned not being able to facilitate the same kinds of group learning activities that they normally would do in an in-person on-campus class. While answering these opening questions, many of the instructors shared that they were surprised that their course had been nominated as an effective online course by their students. A few instructors added that they had not yet looked at the student feedback from their Spring 2020 courses because they were worried

about finding negative feedback. After these opening questions, the researcher reminded the instructors to focus on their experiences teaching the course that was selected for inclusion for this study, and then asked the semi-structured interview questions that were aligned with the CoI framework.

Reflection on Teaching Presence

Regarding teaching presence, the instructors who were interviewed were asked to describe elements of their practice that corresponded with the indicators for teaching presence: design and organization, facilitating discourse, and direct instruction.

Almost all the instructors reported using the Canvas LMS as the hub for their courses, including instructional content, access to online learning tools, assignment information and submissions, course communications, and grades. Many instructors described their use of modules within Canvas to organize course content and several noted that they used the same basic structure for each module in order to create a sense of routine for their students. Other organizational design choices described by the instructors included using the Announcements feature in Canvas to send weekly agendas, checklists, and due date reminders (sometimes multiple times each week). All the instructors reported using Zoom for synchronous online sessions.

Regarding scheduling, some of the instructors reported that they adhered to what would have been the in-person (on campus) schedule for class meetings and assignment due dates; however, most of the instructors reported some modification to the course schedule. One instructor reported that their formerly in-person on-campus course became completely asynchronous online, while another instructor reported few changes because their course had already been a completely online course. Most of the instructors reported

that attendance for synchronous online sessions was optional. An instructor remarked that one of their realizations from this experience was that “we meet too much in person” and that they reduced the number of synchronous online sessions from what would have been the in-person (on campus) requirement, while another instructor reported that they added additional synchronous “help sessions.” A few instructors mentioned that they kept the number of synchronous online sessions but reduced the amount of time spent in each session. Although one instructor mentioned polling students to find the best time to meet for synchronous online sessions, most instructors reported that they made recordings of synchronous online sessions available for students who were unable to attend the scheduled live sessions. However, one instructor noted that they did not make synchronous sessions available for asynchronous engagement due to the sensitive nature of the course topics and their perceived need to create a confidential environment for their students. A few instructors noted that attendance and participation during synchronous online sessions was mandatory and was factored into students’ grades.

All but one of the instructors reported using both synchronous and asynchronous methods for delivering content, engaging with students, and facilitating discourse (both student to instructor and student to student). Some delivered lectures during synchronous online sessions, while others reported that they created prerecorded lectures that students were expected to watch before attending synchronous sessions or at some other point in the learning experience. Many of the instructors reported that they chunked their lectures into smaller segments, regardless of whether they used synchronous or asynchronous delivery methods.

The instructors' reported practices used during synchronous online sessions varied widely, with some using the time to deliver lectures and other course content (videos, readings) and take questions from students, while others (usually those who had created prerecorded lectures) used the time to engage student groups in structured Zoom Breakout Room activities, including discussions, peer coaching, group problem solving, and group lab activities. Some professors described using the Chat feature in Zoom to facilitate discourse between students and to take questions while they lectured in synchronous online sessions. A few instructors claimed that it was difficult to monitor the chat while also presenting in Zoom—this was one of the most noted claims of difficulty among instructors regarding their ability to facilitate discourse. Many instructors also noted that not being able to see their students, either because students had their videos turned off or because there were too many students to be able to view them all on one screen, made it difficult to facilitate discourse (both student to instructor and student to student).

The instructors' reported decisions and practices related to asynchronous course elements also varied widely, with some choosing to use basic features in Canvas for Assignments, Discussions, and Assessments, and simplifying their expectations (i.e., mostly student-to-teacher interactions), while others used advanced features in Canvas to create learning experiences similar to what they would have designed for in-person learning, including using advanced student grouping to facilitate structured asynchronous peer and group learning activities. A few instructors integrated innovative third-party tools within Canvas (e.g., Flipgrid, PollEverywhere, Khan Academy) that are designed to boost participant engagement in online learning environments, and a few described using

technologies that allowed them to embed accountability measures, such as quizzes, into asynchronous lecture/content videos. A few instructors mentioned that they used the data analytics features in Panopto to monitor student engagement with asynchronous lectures.

The instructors described multiple methods for providing extra support to students, including inviting students to book online office hours (held on Zoom), staying online after synchronous online sessions, and being constantly vigilant so that they could respond quickly to student emails. One instructor described a novel use of the Marco Polo app, which is mostly used by families and friends to send short video messages to each other, as a way to provide video support to their students. The instructor described how students would use Marco Polo to send a video to them about a problem they were trying to solve, along with a brief explanation of why they were stuck, and the instructor would respond with a brief video that addressed any student misconceptions and how the student could move forward with solving the problem. The instructor noted that this allowed for flexibility in both their and the students' schedules, while enabling targeted support for struggling students. A few instructors described behaviors that could be considered sharing teaching presence with students, such as having students act as peer coaches and having students share learning artifacts with each other.

Reflection on Social Presence

Regarding social presence, the instructors who were interviewed were asked to describe elements of their practice that corresponded with the indicators for social presence: personal/affective, open communication, and group cohesion.

Many instructors reported starting synchronous online sessions with some form of socialization, ranging from checking in with students about their daily lives, including

student mental health issues, to discussing current events, which in Spring 2020 included the Black Lives Matter protests brought about by the murders of scores of Black people at the hands of law enforcement in the United States and abroad. Many instructors reported taking steps to make the course material "relatable to [students'] current situation and lives" and that they felt that "built more community with me [and] the students." One instructor remarked that they felt that the circumstances required them to fill a "pastoral care" role, and another instructor mentioned that they often reminded their students that they "prayed for them." A few instructors noted that they felt sadness for their students' loss of the community they would have enjoyed on campus and that they wanted to do what they could to mitigate that loss. Two instructors described their habit of welcoming each student by name as they joined synchronous online sessions, while others reported using a survey or introductory writing assignment so that they could get to know their students. One professor noted that some students had no choice but to be completely asynchronous and that it was difficult to get to know those students, both for the instructor and the other students. A few instructors remarked that students who were able to attend live online sessions "got so much out of the class" and that students who could not or did not seemed "less engaged."

Some elements that contributed to positive personal/affective experiences were related to conditions outside of the specific course being discussed or mode of delivery, and included the students knowing each other from prior coursework, the students being part of a cohort, the students knowing the instructor (and vice versa) from prior coursework, and/or the students being members of another university-based social network. One instructor noted that their students also participated in Wesleyan small

groups that were facilitated by a different instructor and that they felt that this outside influence contributed to positive social elements in their course. Another instructor noted that being a member of the core faculty gave them access to valuable information about students that was not readily available to adjunct instructors because it was shared in departmental meetings that were attended only by core faculty. One instructor mentioned that they were aware that other departments (but not theirs) used cohort models and that they thought that might contribute to stronger social connections among the students.

A few instructors commented that class size was a key factor for social presence (all areas), with a smaller class size contributing to better overall social presence. Another key factor for social presence (all areas) in synchronous online sessions was the ability of the instructor to see the students and for the students to see each other. Two instructors reported that they required students to have "cameras on," while others noted that they understood this was not always possible for a variety of reasons, ranging from student home environment to technology access. Most instructors reported that their students had the technology they needed (and knowledge of how to use it) to fully participate in their courses; however, some instructors noted that technology access issues (e.g., camera or microphone not working) affected students' ability to fully participate in synchronous online sessions. One instructor mentioned that their own technology access issues (internet connection) sometimes interfered with their ability to conduct synchronous online sessions. At the intersection of class size and synchronous class sessions, some instructors reported that large class sizes made it difficult for them (and the other students) to see all students on screen at the same time, and one instructor mentioned that they missed being able to read students' body language.

The most reported tool used to foster open communication in synchronous online sessions was Zoom Breakout Rooms. Some instructors reported randomizing Zoom Breakout Room groups, so that students would benefit from a variety of ideas and points of view, while others reported keeping Zoom Breakout Room groups stable for the entire course, to foster a sense of group cohesion (e.g., lab partners/groups). Most of the instructors who used Zoom Breakout Rooms described highly structured Zoom Breakout Room activities, designed to foster group cohesion, in which group members had assigned roles or a group leader. One instructor remarked about the climate of the Zoom Breakout Rooms they visited, "…as I jumped from room to room to check on them, they were actually socializing and working together. So that was good to see that they were not just all being shy and working on stuff by themselves." However, one instructor reported that a student shared with them that they found it difficult to participate in Zoom Breakout Room discussions because they were uncomfortable sharing in that environment. Some instructors reported participating in Zoom Breakout Room discussions, while others visited rooms but did not participate (e.g., "tried to be a fly on the wall"), and still others did not visit rooms at all. Regarding the choice to not visit Zoom Breakout Rooms, one instructor remarked, "I felt like they needed space without me overseeing them." At least one of the instructors who reported each of these break out room visitation practices also reported that they used some form of accountability for Zoom Breakout Room work (e.g., reporting out, creating a learning artifact, etc.).

The second most reported tool used to foster open communication in synchronous online sessions was the Zoom Chat feature. As mentioned earlier in the qualitative results for teaching practice, some instructors found it personally difficult to use the chat feature

to engage with students if they were also presenting, which some attributed to not being able to view the chat window while simultaneously sharing content and others attributed to not being able to pay attention to the stream of comments in the chat while lecturing. However, a few instructors mentioned asking students to use the chat feature to post questions for them to answer during or after a lecture, while others reported that they instructed students to engage with each other and even answer each other's questions in the chat.

The most reported tool used to foster open communication in asynchronous online activities was the Discussion feature in Canvas; however, whether and how this practice intersected with the personal/affective or group cohesion indicators varied widely. Some instructors reported creating stable asynchronous Canvas Discussion groups in which students were aware of each other's identities and seemed to grow as co-learners. One instructor mentioned that they noticed students socializing with each other in Canvas Discussion board posts and another instructor reported being delighted by "lively" Canvas Discussion boards. One instructor indicated that they noticed that the students' writing in Canvas Discussion posts was of a high quality and they believed this was because the students knew that other students would be reading their responses. Another instructor reported that they had selected the option in Canvas that makes all Discussion posts anonymous and that they believed this made students less aware of each other. Finally, one instructor reported that they intentionally did not use the Discussion feature in Canvas because they did not believe it was a meaningful learning activity, and they reported that their students thanked them and shared that they (the students) did not like the use of discussion boards in their coursework.

Some instructors who assigned asynchronous group projects reported allowing students to choose their own methods for asynchronous collaboration. They reported that students chose to use a variety of collaborative technologies, including shared documents and presentations. Furthermore, they reported that some student groups planned synchronous group work sessions while others completed group projects completely asynchronously.

Reflection on Cognitive Presence

Regarding cognitive presence, the instructors who were interviewed were asked to describe elements of their practice that corresponded with the indicators for cognitive presence: triggering event, exploration, integration, and resolution.

Instructors reported two main types of triggering events: lectures (synchronous or asynchronous) and readings (textbook or other reading materials). As mentioned previously, some instructors used technology tools that were designed to integrate with video tools in order to create interactive asynchronous videos (lecture and otherwise). Instructors reported a variety of activities designed to encourage exploration with instructor-curated resources, including reading topical texts, listening to podcasts, and watching videos or films. One instructor reported using Khan Academy as a tool to engage students in exploration about course topics. A few instructors reported using activities that promoted student inquiry as the means of exploration. For example, one instructor reported that students were required to engage with a university librarian to explore learning materials related to a topic. Another instructor reported that students were required to find and interview an expert in their area of interest. One instructor described sending students on an electrical engineering quest to “go for a walk and look

for transformers… go take a picture of one and tell me what the incoming voltage is," and reported a high level of student engagement with this activity.

Many instructors reported exploration activities that took place in synchronous online session Zoom Breakout Room discussions and/or in asynchronous Canvas Discussion board threads. Zoom Breakout Rooms were also used by some instructors for activities that facilitated integration, including having students solve problems together, do lab work together, or create a shared learning artifact based on group discussion about a topic. A few instructors described individual or group learning activities that combined the exploration and integration indicators, including projects that involved creating a presentation that was then presented to the class. Instructors who designed activities, both synchronous and asynchronous, that fostered student collaboration noted that they believed students learned from each other during these experiences. One instructor remarked that they felt the need to have tight control over student learning because of "compliance" issues related to their field and felt that they needed to carefully monitor what students shared with each other.

Many instructors described writing assignments as a main form of integration/resolution activity. A few instructors (from the hard sciences) noted lab reports as culminating learning artifacts. Some instructors also reported using quizzes or tests to gauge student learning; however, a few who normally administered a final exam also noted that they (or their department) decided not to give a final exam for the Spring 2020 quarter. A few instructors reported that they used multiple feedback loops to provide students with numerous opportunities to demonstrate mastery of the learning and

one instructor specifically mentioned using a “mastery learning” approach, in which students need to demonstrate mastery of a standard before moving on to new material.

Summary of Findings

The researcher used correlation and means comparison analyses to analyze quantitative data that was collected for three of the four research questions and a deductive coding approach to analyze the qualitative data that was collected for the fourth research question. The results of these analyses yielded findings that provided answers for all four of the research questions. The implications of these findings are further discussed in Chapter 5: Discussion.

Chapter 5: Discussion

The purpose of this explanatory sequential mixed methods study was to use the CoI framework and self-efficacy theory to explore and analyze instructor strategies for emergency remote online teaching during the COVID-19 pandemic. In this chapter, the researcher will present the conclusions as well as the limitations of this study and discuss the implications for future practice and make recommendations for future research.

Students' Perceptions of Emergency Remote Online Learning

The findings for research question one support the researcher's hypothesis that there would be a statistically significant correlation between students' perception of emergency remote online teaching (as measured with the CoI Survey) and students' satisfaction and perception of learning during the COVID-19 pandemic. The findings indicated a statistically significant positive correlation between overall CoI and all three presences, as well as statistically significant positive correlations among all three presences, and between all CoI measurements and student satisfaction and perception of learning. Overall, these findings aligned with other studies that have examined the relationship between the CoI framework and student satisfaction and perception of learning (Arbaugh, 2014; Lee et al., 2020; Shea & Bidjerano, 2013). The connection between CoI and student satisfaction and perception of learning has been found to be connected to the interplay of teaching presence and social presence (Arbaugh, 2014), and of social presence and cognitive presence (Lee et al., 2020). Shea and Bidjerano (2013) noted that social presence was an important mediator of teaching presence and cognitive presence, and as such, contributes to students' perceptions of learning. Additionally, Richardson et al. (2017) found a "moderately large correlation" between social presence

and both satisfaction and perception of learning. Of particular interest in this study was the finding of the lowest mean score being for social presence, which prompted further statistical analyses of the nine indicators for social presence in the student data. These findings will be discussed later in this chapter, along with similar findings from the results of statistical analyses of the instructor data.

Secondary analyses of the student data revealed statistically significantly higher mean scores in the junior/senior/graduate student group for overall CoI, social presence, and cognitive presence, but not for teaching presence. This finding disagrees with Shea and Bidjerano (2009), who reported that student age and academic level were predictors of students' perceptions of teaching presence. However, the results for social presence and cognitive presence point to a possible connection between student age and/or academic level and perception of these presences. Although it might seem as though more experience with online learning (i.e., more courses taken) might lead to a more nuanced perception of CoI, there were no statistically significant differences between the four groups of online courses taken for overall CoI or the combined three-presence variable. These findings leave us with more questions than answers about the connection between the number of online courses taken and CoI. Perhaps the answer lies in the type of prior online learning experienced by the students in this study and how it affected their engagement with and perception of online learning in the courses evaluated for this study.

Although the correlational analyses conducted in the current study cannot be used to establish causation, the statistically significant correlations in the student data reveal variables that could be considered potential predictors, given a larger sample size and

further statistical analysis. This will be further discussed in the Implications for Research and Practice section of this chapter.

Instructors' Perceptions of Emergency Remote Online Teaching

The findings for research question two, which involved instructor data analysis, represent a novel contribution to CoI research because past studies have primarily focused on students' perception of COI presences. The researcher of this dissertation could find no published studies on instructors' perception of CoI, only an uncited mention of this being done in a meta-analysis by Stenbom (2018). Findings from the present study partially support the researcher's hypothesis that there would be a statistically significant correlation between instructors' perceived effectiveness of emergency remote online teaching (as measured with the CoI Survey) and instructors' self-efficacy with online teaching (as measured with eight OTSEI items). Although no statistically significant relationship was found between the OTSEI and overall CoI, teaching presence, or social presence, a statistically significant positive correlation was found between the OTSEI and cognitive presence ($p < .05$). A possible explanation of this finding is that the eight items from the OTSEI represent technical skills that are important indicators of an instructors' ability to design learning experiences that create the conditions necessary for a successful cognitive presence arc (triggering event, exploration, integration, resolution). This agrees with findings in the literature that present online teaching self-efficacy as a strong predictor of instructors' ability to master online teaching skills (Horvitz et al., 2015) and suggests the importance of professional learning for novice online teachers (Gosselin et al., 2016; Northcote et al., 2011; Northcote et al., 2015). Although some of the instructors who were interviewed for this

study reported innovative approaches to elements of the cognitive presence arc (e.g., student inquiry, introducing a problem of practice) and/or learning activities that involved all elements of the arc, others reported more basic methods of content delivery (e.g., lecture, readings) followed by a standard assessment (e.g., quiz, test, paper). A search of published literature yielded no studies that have measured CoI alongside a separate measure of instructor self-efficacy. Therefore, the current study contributes new knowledge to the field of COI research.

Despite the significant correlation between instructors mean scores in overall OTSEI and cognitive presence, the researcher noticed that there was a relatively low mean score for overall OTSEI and decided to perform further statistical analyses to examine the mean scores for each of the eight OTSEI survey items and found overall low scores for all eight items. This finding may suggest that instructors, although feeling confident about the indicators for cognitive presence, could benefit from receiving training in the specific technical domains assessed by the OTSEI items, especially in the areas that instructor participants identified as professional learning needs: (a) obtaining copyright/permissions for sharing digital resources with students and (b) selecting online technologies that are compatible with students' networks and platforms. This finding may be of particular interest to the ETM department of the university where this study took place, so that they can address this in future PD offerings, as well as to anyone involved with planning online teaching PD for instructors.

Additionally, secondary analyses of the other variables collected in the instructor data revealed a strong positive correlation between overall CoI and all three CoI presences, as well as positive correlations among all three presences. As with the student

data analysis, and of particular interest in this study, was the finding of the lowest mean score being for social presence. This prompted further statistical analyses to examine the mean scores for each of the nine social presence instructor survey items in the instructor data. These findings will be discussed later in this chapter, along with similar findings from the results of statistical analysis of the student data.

Secondary data analyses also revealed a statistically significant positive correlation between instructor satisfaction and instructor perception of student learning ($p < .01$). This finding agrees with the suggestion by Horvitz et al. (2015) that instructors who believe their students are learning will report satisfaction with their online teaching experience. In other words, if students appear to be mastering the content and/or are doing well on assessments, the instructor will believe that they themselves are doing a good job teaching, and therefore they will feel satisfaction in their work. The findings of statistically significant positive correlations between instructor satisfaction and all CoI measurements ($p < .05$) and between instructor perception of student learning and overall CoI, teaching presence, and cognitive presence ($p < .01$) add to the research on CoI by examining these variables through the lens of instructor participants. These findings also agree with findings in the literature of connections between instructors' satisfaction with teaching and perception of student learning, and the suggested importance of providing the support necessary to ensure that instructors succeed in their first attempts at online teaching (Horvitz et al., 2015). There was no significant correlation between instructor perception of student learning and instructor social presence. This may be because instructors were not able to connect the behaviors that make up the social presence indicators as necessary for student learning. There was no significant correlation between

either instructor satisfaction or instructor perception of student learning and the OTSEI. However, as the OTSEI was found to be significantly positively correlated with cognitive presence, it could be that the operationalization of the skills represented by the OTSEI indicators through the cognitive presence indicators creates a connection between the OTSEI and instructor satisfaction and/or instructor perception of student learning. An example of this would be an instructor who is self-directed in their technology professional learning and is able to choose appropriate technologies to optimize learning activities at each stage of the cognitive presence arc.

Although correlational analyses cannot be used to establish causation, the statistically significant correlations in the instructor data reveal variables that could be considered potential predictors, given a larger sample size and further statistical analysis. This will be further discussed in the Implications for Research and Practice section of this chapter.

Comparison of Students' and Instructors' Perceptions of Emergency Remote Online Learning

The findings for research question three support the researcher's hypothesis that there would be a statistically significant difference between students' and instructors' perception of emergency remote learning/teaching (as measured with the CoI Survey) during the COVID-19 pandemic. There were statistically significant differences for overall CoI and all three presences, with students giving higher scores than instructors in all areas. Because a statistically significant difference was found between means for overall CoI, teaching presence, social presence, and cognitive presence ($p < .05$), the researcher can reject the null hypothesis and accept the alternative hypothesis for this

research question. This finding suggests that the student and instructor participants in this study were not in agreement in their perceptions of the items on the CoI Survey, which supports the suggestion by Diaz et al. (2010) that a gap analysis should be performed to compare student and instructor ratings of the items on the CoI Survey. Qualitative data analysis revealed that most of the instructor participants were surprised that their courses had been nominated by their students, which perhaps contributed to a more realistic appraisal of their online teaching practices. Many of the instructors who were interviewed for this study also shared that they believed in-person learning to be better for a variety of reasons, which may have contributed to their surprise that students nominated the online version of their course as effective. Furthermore, the higher student mean scores could be a result of the students being influenced by having nominated the course (and therefore the instructor) they were evaluating. The student participants who took the survey knew that they were evaluating the course they had nominated in the HEDS survey they completed in spring 2020. This will be further discussed in the Limitations section of this chapter.

The analysis of the combined student and instructor data revealed that the CoI the presence with the lowest mean score was social presence. This finding will be discussed later in this chapter, along with similar findings from the results of statistical analysis of the separate student and instructor datasets.

Regarding Social Presence in Online Teaching/Learning

As stated earlier, the CoI framework is based on collaborative constructionist beliefs (Dewey, 1910; Vygotsky, 1978) that connect to a central element of the CoI framework—the importance of social interaction and cohesion between the teacher and

learners and among learners, which is represented in the CoI framework as social presence (Garrison, 2017).

Social presence has three elements, which are defined as (a) personal/affective: the ability of participants to "develop personal and affective relationships progressively by way of projecting their individual personalities," (b) open communication: the ability of participants to "communicate purposefully in a trusting environment," and (c) group cohesion: "the ability of participants to identify with the group or course of study" (Garrison, 2017). The nine social presence items on the CoI Survey assess instructors' skills in designing the social elements of an online course.

The findings in this study revealed that social presence was the presence with the lowest mean score in both the student and instructor data. An examination of the mean scores for each of the nine social presence survey items revealed overall positive scores for eight of the nine items. However, one item, which corresponded with the social presence element "Affective Expression" (or personal/affective) and the statement, "Online or web-based communication is an excellent medium for social interaction," had the lowest mean score of the nine social presence items in both the student and instructor data. This finding indicates that, although the students and instructors who participated in this study reported overall positive experiences with online learning (as measured by the CoI Survey), they felt the least positive about the methods of online communication that were available or that were used for the courses evaluated in this study. Additionally, in the instructor data, three items, which all corresponded with the social presence element "group cohesion," while having mean scores above the midpoint score of 3.00, also had low minimum scores of 1.00. These "group cohesion" items corresponded with the

statements: (a) “Students were comfortable disagreeing with other course participants while still maintaining a sense of trust,” (b) “Students’ different points of view were acknowledged by other course participants,” and (c) “Online discussions helped students to develop a sense of collaboration.” This finding indicates that some instructors may have a difficult time judging how well group cohesion is occurring in their online courses, or it may indicate that these items do not translate well to being answered by instructors. Because the researcher could not find evidence of published research involving instructor participants taking the CoI Survey, it was not possible to compare this finding in the instructor data with results from prior studies.

Understanding the factors that contribute to social presence is important, as social presence has been found to be an important mediator between teaching presence and cognitive presence and contributes to student satisfaction and perception of learning (Garrison et al., 2010; Shea & Bidjerano, 2009). However, researchers have found that social presence is often not ranked as an important consideration for online teaching, with pedagogy and assessment being seen as more important (Bawane & Spector, 2009; Tamim, 2020). Although the researchers in these studies maintained that social presence was an important factor in effective online learning, their findings indicated that instructors may not fully understand its importance or how it contributes to learning. Diaz et al. (2010) found that students gave social presence items lower ratings when asked to evaluate the importance of CoI Survey items but posited that students may not understand how social presence plays a role in learning. Furthermore, research has suggested that instructors may struggle with social presence and/or neglect the importance of social presence in the online learning environment (Sanga, 2018; Shearer et al., 2020; Tamim,

2020) and researchers have conducted studies that focused specifically on the development of social presence in an online course (d'Alessio et al., 2019; Flener-Lovitt et al., 2020). In a situation that necessitates a move to emergency remote online learning, it is easy to understand how instructor PD may be focused on items related to teaching presence and cognitive presence because they may represent the basic elements that are necessary for learning to take place. However, because social presence is the glue that binds the other presences in the CoI framework, it is important to build instructors' skills in developing social presence in their online courses (Shea & Bidjerano, 2009 & 2013). The implications of the findings in the current study regarding social presence are that instructors may need more PD about course design elements that foster the conditions described in all nine of the social presence items, and especially those that were discussed above, having to do with personal/affective social interaction and group cohesion in the online learning environment, which is also supported in the literature (e.g., Garrison et al., 2010).

Further Insights from the Qualitative Findings

The qualitative findings in this study fulfilled the purpose of research question four by providing further insight to the quantitative results and connections to the literature. Seven (35%) of the 20 instructors interviewed for this study had experience with online teaching prior to Spring 2020. At the same time, for 13 (65%) of the instructors interviewed, along with scores of instructors the world over, the COVID-19 pandemic necessitated a move to emergency remote online teaching that was also their first experience with online teaching. This change from in person to online teaching required changes in ideologies, beliefs, attitudes, and practices (Ertmer & Ottenbreit-

Leftwich, 2010). Being able to observe a social model struggle with and succeed at mastering a new practice helps less experienced teachers to believe themselves capable of succeeding as well (Bandura, 1995; Ertmer, 2005). The instructors interviewed for this study, whether experienced or inexperienced with online teaching, were willing to become social models by sharing their struggles and perceived successes, as well as their lingering concerns. Furthermore, the instructors represented a wide range of disciplines and practices, thereby increasing the chances that this study may provide a social model who instructors may believe they can emulate in order to succeed (Ertmer, 2005).

The findings from the opening interview questions revealed that instructors' feelings about the move to emergency remote online learning varied, but with most instructors feeling like they had done as much as they could do to prepare, and yet a few still felt that there was very little they could have done to successfully recreate their course in the online environment. Most of the instructors who felt that it was difficult or impossible to recreate their course in an online environment were those whose courses depended heavily on expensive equipment and resources that were available only on campus, on being able to practice professional skills on another person (i.e., physical health skills), or in a specialized field-work environment. These findings are important because they call attention to the experiences of instructors and students who study in fields that are highly dependent on human physical interaction and/or on specialized equipment and environments (e.g., labs) that are not currently and may never be feasible in remote online learning. Researchers have found that some instructors believe the quality of online learning is inferior to face-to-face (Tamim, 2020; McVey, 2019). In the case of courses or programs that rely on hands-on experiences and access to campus- or

field-based labs, this very well may be true. A necessary consideration for future planning for HEIs is how to mitigate the loss of hands-on experiential learning for students in these fields.

Teaching Presence

As noted earlier, the indicators for teaching presence (design and organization, facilitating discourse, direct instruction) represent how the instructor uses course platforms and other tools to facilitate the learning process, as well as how the instructor behaves when interacting with students in the learning environment. The findings from interview questions about teaching presence revealed that the strategies instructors used to design their courses, engage students with course materials, and facilitate discourse within their course were fairly standardized in the types of technologies used, but also featured some customization and innovation by the instructors, both in the technologies and how they were used. For example, for all the instructors interviewed for this study, the Canvas LMS served as the course content and communications hub for the emergency remote online learning environment. Within the Canvas LMS, a best practice reported by the instructors was the use of the Module feature and, moreover, the use of the same basic structure for each module. The use of the same LMS is an important consideration at both the institutional and departmental levels, as it allowed for a common teaching and learning environments for all instructors and students and included features that instructors used for course design and organization, to facilitate discourse, and to provide access to direct instruction. Another common best practice reported by the instructors was the use of the Announcements feature in Canvas to share information about course design and organization with students, including scheduled announcements

(e.g., weekly agendas, checklists, and/or due date reminders). Researchers have found that students "appreciate regular announcements and emails from instructors" (Tamim, 2020) and have called for further research regarding how specific teacher behaviors, such as "providing students with clear course goals, topics, due dates," contribute to the development of CoI within a course (e.g., Shea & Bidjerano, 2013). The attention paid by instructors to these kinds of communications may not be usual for in-person learning but can be considered critical in keeping students engaged and on-track in the online learning environment.

Regarding modifications to the weekly course schedules, the findings revealed that most of the instructors made some sort of modification, with the most reported modification being that students were not required to attend synchronous online sessions (i.e., session recordings were made available for asynchronous engagement), and the next reported modification being a reduction in the number of hours spent in synchronous sessions (i.e., either reduction in number of sessions or in length of sessions). These findings point to the importance of the intersection of time and activity type as a factor when redesigning a course for the online environment, especially as the term "Zoom fatigue" is now ubiquitous as a result of (over)use of synchronous video technologies during the pandemic. An important element of course design is whether learning will take place synchronously and/or asynchronously and how much time will be spent in each learning environment. The instructors in this study made decisions about the amount of synchronous class time needed based on their professional expertise and found that their choices led to a better allocation of time for both themselves and their students. It is important to note that time allocations may vary widely based on discipline, and so it is

important for these decisions to be made at that level. In fact, a few instructors in this study noted that they expanded the time spent in synchronous sessions to allow for the extra help students needed. A practice that came up in the instructor interviews that may need to be examined from an institutional perspective is whether attendance in synchronous online sessions should be required and/or factored into students' grades.

Regarding synchronous and/or asynchronous modes of online learning, the findings revealed that most instructors used both and that there were elements that were the same for all instructors and others for which instructors' practices varied widely. Although the instructors and students at the university in this study have access to the Microsoft suite of tools, including the Teams application, which can be used for videoconferencing, Zoom was the tool that the instructors interviewed for this study reported using to facilitate synchronous online sessions, and in combination with Panopto for asynchronous sharing of lectures. A best practice reported by most of the instructors was recording lectures to make them available for some form of asynchronous student engagement, including watching a pre-recorded lecture prior to a scheduled synchronous session and/or watching a recorded synchronous session that a student was unable to attend. Pre-recording lectures is not a new practice in online learning and is often used as a flipped learning strategy for in-person, online, and blended learning; however, for many of the instructors in this study, this was the first time they were engaging in this practice. An important consideration for pre-recorded lectures is how to make the video content engaging for students. Students appreciate instructor-created videos, but instructors must ensure the videos are engaging and do not simply mimic face-to-face lectures (Dinmore, 2019; Wilson et al., 2018). Two relatively innovative practices, in terms of widespread

use, that were mentioned by a few instructors was the chunking of lectures into smaller units and the use of online tools to embed quizzes into recordings. This finding will be further discussed later, along with cognitive presence considerations. It is important to note that certain considerations may prevent synchronous sessions from being able to be shared asynchronously, including data privacy and confidentiality considerations (e.g., FERPA or other field-specific or ethical considerations) or even the nature of course content (e.g., sensitive topics), as was reported by one instructor interviewee.

An innovative practice that was reported as being used in synchronous online sessions was engaging the students in collaborative learning activities in Zoom Breakout Rooms (e.g., discussions, peer coaching, group problem solving, and group lab activities). Additionally, the Chat feature in Zoom came up as a useful tool for facilitating discourse between the instructor and students (e.g., fielding questions during lectures) or student to student (asking students to use it as a backchannel during lectures and/or to answer each other's questions) in synchronous online sessions. Allowing students to chat/backchannel during a lecture is still somewhat controversial among teachers, with some believing it to be a distraction from the instructor's curated content, while others have realized the now-documented benefits for students, especially those who are less inclined to verbalize questions, and in large class-size environments (Baron et al., 2016; Seglem & Haling, 2018). It is important to note that a few instructors felt that monitoring the Zoom Chat was too difficult for them to manage, as this represents an area where more PD may be needed in how to share teaching presence with students (e.g., ask students to facilitate the chat). Class size came up as an issue for all three presences and, related to teaching presence, many instructors reported that not being able to see their

students (e.g., student camera turned off or student videos did not all fit on the instructor's screen), made it difficult to facilitate discourse (both student to instructor and student to student) during synchronous online sessions. This is an important consideration for future planning and PD to determine how to plan appropriate learning activities in synchronous online sessions for large class sizes that do not necessitate the instructor or students to see all participants on a single screen.

Instructors' asynchronous teaching practices varied widely, with the baseline being the use of basic features in Canvas for Assignments, Discussions, and Assessments, with interactions being mainly student-to-teacher. For many of the instructors, especially those who were new to online teaching, these baseline practices represented what they were comfortable managing, but also what they believed their students would be able to manage. This is an important finding, as it represents both the condition of instructors who needed to balance what was possible from a technological perspective, with what was possible from a personal skills and work/life balance perspective, as well as instructors' beliefs about what they could reasonably expect from their students. That said, a few instructors used advanced features in Canvas to facilitate peer and group learning activities (student-to-student interactions) in an effort to recreate the types of group learning activities that would have occurred in an in-person setting. Additionally, instructors also reported trying out tools like Flipgrid, PollEverywhere, and Khan Academy to boost student engagement and learning. Tamim (2020) found that students "prefer structured and guided discussion" activities. The instructors in this study who designed activities that fostered student collaboration reported that they believed students learned from each other during these experiences, whether synchronous or asynchronous,

which supports the finding reported by Akyol et al. (2009) that students valued the opportunity to take part in teaching presence elements and that this also improved discourse among students and positively contributed to student learning.

Instructors reported using both synchronous (e.g., online office hours) and asynchronous tools (e.g., email, Marco Polo app) to provide extra support to students. An important consideration in planning for student supports, academic and otherwise, is how to help students to be aware of institutional supports that are available outside of their course instructors (e.g., institutionally supported tutoring, library services, academic and mental health counseling, etc.). The instructor who used the Marco Polo app displayed an innovative crossover use of a tool that was not originally designed for use in education. This example serves to encourage educators to explore tools beyond those specifically designed for education in order to find new crossover tools that can enhance student learning. However, instructors should be mindful about accessibility, as well as the appropriateness of requiring students to use third-party digital tools for course communications.

These qualitative findings for teaching presence answered the call by Shea and Bidjerano (2013) to explore how specific teacher behaviors (teaching presence) contribute to the development of CoI within a course and affect student learning outcomes.

Social Presence

As noted earlier, the indicators for social presence (open communication, group cohesion, personal/affective) represent the way the instructor has designed elements of the course so that students get to know each other and build trust in their peers so that

they feel comfortable participating in collaborative learning activities (Akyol & Garrison, 2008). Although social presence is often an afterthought in online course planning (Bawane & Spector, 2009; Tamim, 2020), research has found that it actually plays a critical role in connecting teaching presence with cognitive presence in the CoI framework (Gutierrez-Santuiste et al., 2015). In the current study, findings from interview questions about social presence revealed that the instructors were deeply concerned about how social elements that are often taken for granted in in-person learning were impacted by the move to emergency remote online learning. One reason for this might be that the majority of the disciplines represented in this study were undergraduate courses, and the move to emergency remote online learning more heavily impacted these students who likely were used to the day-to-day social elements that are part of the undergraduate on-campus experience. In fact, 16 of the 20 instructors (80%) interviewed for this study taught undergraduate courses. This concern aligns with results from the HEDS (2020a) spring 2020 faculty survey, in which 74% of faculty (N = 3,856) reported that they often or very often were worried about the health and well-being of their students. Moreover, results from the HEDS (2020b) spring 2020 student survey showed that 43% of students (N = 39,948) reported that they often or very often were worried about their loss of friendships or social interaction as a result of the move to remote online learning (another 28% reported that they sometimes worried about this). Instructors sought to mitigate the loss of campus life by incorporating socialization into synchronous online sessions (e.g., pre-or-post class session check-ins and unstructured conversation) in order to create opportunities for personal/affective expression. Research shows that students value this practice in the online learning environment (Martin &

Bollinger, 2018). It is important to note that instructors also shared concerns about student mental health issues, both because of the pandemic and because of current events including the murders of Black people at the hands of law enforcement and the resulting protests in the United States and abroad. Instructors who addressed these issues with their students and who connected them to the coursework, when possible, found it to be a successful community-building teaching practice. Other best practices, which may have helped to build a trusting environment and to facilitate personal/affective interactions, included welcoming students by name as they entered the synchronous online session, and taking time to communicate concern and care, such as one instructor who reported telling students that they "prayed for them." Instructors reported that it was more difficult to get to know students who were able to participate only asynchronously. This finding indicates that more PD may be needed about asynchronous activities (e.g., using Flipgrid or other two-way video tools) that boost social presence.

An important finding in this study was that certain conditions that contributed to positive personal/affective experiences were unrelated to the specific course, but might be able to be intentionally reproduced, and had to do with students being a part of a cohort within their discipline or being members of a university-based social network (e.g., Wesleyan small groups). How can HEIs capitalize on faculty- or student-led university-based social networks in order to increase social presence opportunities for students who are in online learning environments (emergency or otherwise)? The finding of a perceived greater access to informal student data for "core faculty" versus adjunct instructors may be difficult to mitigate but is one that HEIs that rely on a large number of adjunct instructors need to consider. Is the kind of informal information that may be

shared among “core faculty” who interact with each other more often critical to supporting students and, if so, how can this information also be shared with adjunct faculty? As with teaching presence, both class size and the ability to see students in synchronous online sessions was brought up by instructors as factors that negatively influenced social presence in their courses. Regarding class size, this finding adds an instructor perspective to research done by Akyol et al. (2009), who found that some of the students in their study “suggested a relationship between class size and social presence” and that “social presence was better in small groups." An important consideration that extended beyond higher education during the pandemic was whether to require students to have their cameras turned on during synchronous online sessions. The controversy brought up issues of student dignity and agency regarding privacy about their home lives, but also equity in access to the technologies, both tools and internet bandwidth, necessary for camera/video-based applications. Some instructors even struggled with acquiring and maintaining the hardware, software, and network access necessary for optimal online teaching. These concerns align with findings from the HEDS (2020b) spring 2020 student survey, in which 32% of students (N = 39,928) reported that they often or very often were worried about being able to access and use the technology needed for their online coursework (another 28% reported that they sometimes worried about this). The implications of these findings are that HEIs need to consider not only how to guide instructors in their approach for social presence issues such as “cameras on” during synchronous online sessions, but also how to define their role in assisting students and instructors with having the tools necessary for optimal online learning.

A best practice for fostering open communication was the use of Zoom Breakout Rooms, regardless of whether groups remained stable over the quarter (maximized group cohesion) or were randomized after various amounts of time (maximized exposure to many different points of view). The use of Zoom Breakout Rooms allows students to spend time with a small group of peers to solve problems together and/or engage in discussions about course topics. However, an important consideration is that not all students will feel comfortable verbally participating in synchronous online spaces, perhaps for the same reasons they might be reticent to do so during in-person learning. Furthermore, an important consideration for instructors is how they will involve themselves in Zoom Breakout Room activities. The instructors in this study reported a wide range of practices, with some fully participating and others simply visiting rooms to monitor progress and offer help when needed. A second practice reported by instructors as encouraging open communication involved the use of the Zoom Chat feature. Best practices included asking students to use the Zoom Chat feature to post questions for the instructor (teacher-to-student interaction) or to use the Zoom Chat feature as a backchannel during lectures (student-to-student interaction), which is supported in the literature (Baron et al., 2016; Seglem & Haling, 2018). However, an important consideration is that not all instructors felt comfortable using the Zoom Chat feature, mostly because they felt it was their responsibility to facilitate and/or monitor the chat and they felt unable to do so, which suggests that more PD is needed about how to share teaching presence with students (e.g., allow students to facilitate the chat during synchronous online sessions). A third practice reported by instructors as facilitating open communication was the Discussion feature in Canvas and included the use of the Student

Groups feature in Canvas to build group cohesion. Even so, one instructor expressed an extreme dislike of asynchronous online discussions, which according to this instructor was also shared by students. This suggests that more PD is needed on how to successfully facilitate this mode of learning or a better understanding about how this mode of learning may not be ideal for all courses or for all teachers and/or learners. Fortunately, researchers continue to investigate best practices in designing optimal asynchronous discussion learning activities (Gao et al., 2013; Kim et al., 2020).

Finally, instructors' use of structured group projects allowed students to independently build social presence as they navigated the use of collaborative technologies to share learning materials (e.g., shared folders) and create learning artifacts (e.g., shared presentations), as well as communicate synchronously (e.g., online group work sessions) and asynchronously with group members. The literature supports the use of synchronous technologies for group work to boost all three CoI presences (Rockinson-Szapkiw & Wendt, 2015); however, an important consideration in an emergency remote online learning environment is the degree to which students can independently align their schedules to facilitate synchronous group work sessions outside of scheduled synchronous class time. This suggests that instructors should investigate the use of scheduled synchronous class time to facilitate group work sessions or to take into consideration that synchronous group work may not be possible in the emergency remote online learning context.

Cognitive Presence

As noted earlier, the indicators for cognitive presence (triggering event, exploration, integration, resolution) represent the arc of phases the instructor uses to

guide the students through the learning process, beginning with a triggering event that spurs students to consider the purpose of the learning activity and is followed by activities through which students explore resources, synthesize their learning, and reflect on their learning. The findings from interview questions about cognitive presence revealed that the instructors used mostly traditional methods for the triggering event and resolution stages of the cognitive presence arc, but also employed some innovative practices in the exploration and integration stages. The implications of these findings may be that instructors felt less comfortable exploring different ways to share what is considered essential content for their courses, as well as what are considered traditional methods of assessment, but were more comfortable exploring different ways for students to engage with content and document their learning in the middle stages, which were made necessary or possible by the emergency remote online learning context.

The most widely reported practices related to the triggering event element of CoI cognitive presence was initially engaging students with course topics/content through synchronous or asynchronous lecture and/or readings. As mentioned earlier, the relatively innovative practices that some instructors engaged in were chunking asynchronous lectures into smaller segments and/or embedding polls or quizzes into lectures.

Innovative practices that instructors reported using to encourage exploration of course topics (the second stage in the cognitive presence arc) included listening to podcasts, watching videos or films, engaging in learning activities on third party applications (e.g., Khan Academy), going on an asynchronous field-work-style quest to find examples of a course topic, or engaging with university librarians or experts in the field about a student-choice course-related topic. By removing themselves from the

traditional instructor role as a central source of information about a topic, these instructors created conditions for students to independently explore learning about course topics both in the current and in future contexts (i.e., lifelong learning). The previously mentioned Zoom Breakout Room activities of having students solve problems together or engage in course topic-related discussions also promoted the cognitive presence elements of exploration and integration, as did carefully designed asynchronous Canvas Discussion board activities. However, an important consideration that was brought up by one instructor is the need in some fields for the instructor to closely monitor individual student learning due to highly-context-related compliance issues (e.g., different expectations, procedures, and even legal requirements in different contexts, even within the same profession) and that this can hamper student-to-student learning.

The findings in this study did not reveal any innovative practices or non-traditional formative or summative assessments (final, resolution stage of the cognitive presence arc), but rather that instructors attempted, as best as possible, to employ what would be considered traditional assessment methods, such as writing assignments, presentations, lab reports, and/or quizzes and tests. One instructor mentioned using multiple feedback loops about learning artifacts and another mentioned using a mastery learning approach, which are both considered to be best and/or innovative practices in any learning environment (i.e., in person or online). An important consideration for future planning for emergency remote learning that was widespread at all levels of education, and was mentioned by instructors in this study, was the modification or elimination of comprehensive exams. This presents an opportunity for instructors to explore alternative models, such as the practical inquiry model, as developed by Garrison et al. (2001) to

support cognitive presence, in which students independently and collectively construct knowledge through identifying problems, collaborating on possible solutions, and creating learning artifacts that demonstrate their mastery of concepts and reflection about their learning. In HEIs during the pandemic, decisions about testing were made at the institutional level in some cases but were also made at the departmental level or even by individual instructors, and researchers have suggested that the pandemic hastened a "there is no alternative (TINA)" moment that prompted a rethinking of the "who and the why" of testing (Fuller et al., 2020) and an imperative to explore different methods of non-traditional formative and summative assessments (Khan & Jawaid, 2020).

Study Strengths and Implications for Research and Practice

The current study presents a wide range of perspectives on CoI from undergraduate and graduate students and instructors from a wide variety of disciplines. A novel aspect of this study was that instructor participants also took the CoI Survey (in addition to student participants) and comparison analyses was performed on the student and instructor data. The overall positive mean scores for overall CoI and all three presences in both the student and instructor data suggest that students and instructors believed that their experiences in the emergency remote online teaching/learning environment met the standards for effective online teaching/learning set by the CoI framework. This aligns with results from the HEDS (2020b) spring 2020 student survey, in which 75% of students surveyed ($N = 41,084$) agreed or strongly agreed that their instructors showed care and concern for them as they modified courses for online learning. Additionally, qualitative results from interviews with 20 of the instructor participants provided a richer description of instructors' emergency remote online

teaching practices in all three CoI presences. Taken as a whole, this study yielded several important implications for research and practice.

As stated earlier in this chapter, all of the statistically significant correlations in the results for both the student and instructor data analyses represent important variables which could be potential predictors, both among CoI presences and for any of the other variables, given larger sample sizes, and including all courses at a HEI or multiple HEIs (not just nominated courses). Additionally, further studies could explore and analyze instructor PD for online learning, to determine what types of PD contribute to higher CoI, especially social presence, as well as instructors' specific technological skills (as measured by the OTSEI). Interviews or focus groups with students could be done alongside interviews with instructors to gain further insight on student perspectives on the elements of CoI in online courses. Also, regarding students, future research could include a reflective measurement of their prior online learning experiences or a measurement of comparison of prior experiences to those being studied. Further research could also explore the element of class size as it relates to social presence in both synchronous and asynchronous online learning. Finally, considering that the context of this study was a global pandemic, and that instructors reported both minor and major modifications were made to student grades, from adjustments to individual assignments to not administering the usual final exams in the Spring 2020 iteration of courses, this study did not look at a connection to assessment-based student learning outcomes or GPA. However, the instructors who were interviewed for this study did mention making changes to their grading practices and therefore further research could explore and analyze different types of grading practices, including alternative assessments, mastery learning, or a practical

inquiry approach, and how they affect students' and/or instructors' perceptions of overall CoI and all three presences.

Although the findings in this study suggest an overall best possible emergency online teaching/learning experience for the student and instructor participants, the findings regarding social presence as well as instructors' specific technological skills suggest that more instructor PD is needed in these areas. Regarding social presence, instructors first need to see the online learning environment as different or parallel rather than inferior to in-person learning. They need to recognize that different strategies are needed to build social presence in online learning environments and that their successful in-person strategies may not translate to the online environment. Once this is understood, social presence needs to receive the same amount of PD attention as other presences and/or skills, by both the instructors and those who develop PD for instructors. Regarding specific technological skills (e.g., those assessed by the OTSEI items in this study), instructors need to see these as useful skills regardless of whether they teach entirely in-person, hybrid, or entirely online. Once this is understood, those who develop PD for instructors need to not only create PD that teaches instructors how to use a tool, but also helps instructors to choose the appropriate technology for a learning stage in the cognitive presence arc. For all skills specific to online teaching, HEIs should encourage the formation of department-level PLCs so that novice online instructors may benefit from mentoring by social models who help them to see themselves as capable of success (Ertmer, 2005). Seasoned online instructors may also benefit from being part of a PLC that builds both independent and collective strength in a department's online teaching practices.

This study was conducted in the context of the COVID-19 global pandemic. In capturing the experiences of these students and instructors, this study adds to the existing and continuing narrative, brought about by the pandemic, about best practices in (emergency remote) online teaching. Whether faced with a pandemic, natural disaster, or other variable that requires a shift in educational context, HEIs (and instructors and students) will need to be resilient. In order to be resilient, HEIs will need to ensure that instructors (and students) are prepared, well before emergently necessary, to conduct courses in any learning environment, including online and hybrid. Hodges et al. (2020) noted that "well-planned online learning experiences are meaningfully different from courses offered online in response to a crisis or disaster." Spring 2020 should be the last time students and instructors pivoted to (emergency remote) online learning with no prior preparation, experience, or well-designed plan. Garrison (2017) wrote, "We never learn in isolation," and so it should be for both instructors, who would benefit from PLC work, and students, who would benefit from an increased focus on optimizing social presence in the online learning environment.

Addressing Study Limitations through Future Research

A potential limitation of this study involved sampling. The sample of student and instructor participants was drawn from a previous study that asked the student participants to nominate an effective online course. Although the previous study was sent out to all students enrolled in the university thereby ensuring sample representativeness, the present sample was a self-nominated rather than randomly drawn sample. A related potential limitation was that survey and interview data in this study were self-report data from participants who chose to participate in the study. However, the CoI Survey is a

self-report tool geared toward self-perceptions and lived experiences. Furthermore, the researcher used a purposive extreme (or deviant) sampling technique to determine the potential instructor participants for the current study, which may have introduced researcher bias. However, the researcher sought to mitigate this researcher bias by using a structured sorting process, as described in Chapter 3: Methods, to select the instructor participants for inclusion in this study. Although the non-random sampling limits the generalizability of the results, it is possible that an HEI or an instructor may see themselves in the results of this study, and therefore may benefit from the experiences revealed and shared in this study. Future research could potentially improve generalizability by including all students and instructors at an HEI as prospective participants.

A second potential limitation, regarding the quantitative results, was the low sample sizes for both student and instructor participants. This limitation affected the researcher's choice of statistical analyses in this study (e.g., correlation analysis instead of regression analysis for research questions one and two). The low sample sizes may have resulted from the data collection being constrained by the timeframe for the study, for which quantitative data was collected over a two-month period (August-September 2020). Prospective student participants may have graduated the previous spring, and both student and instructor participants may have been too busy preparing for the start of the fall quarter to participate. Future research could extend the timeframe for data collection and/or collect data at multiple points during an academic year.

A third potential limitation was that the qualitative results in this study reflect the perspectives of the 20 instructors interviewed by the researcher and did not include the

perspectives of any of the student participants. The inclusion of student perspectives would have made for richer qualitative findings, and allowed for another form of data triangulation, thereby lending more credibility to the qualitative results. Furthermore, the analysis of the interview data was affected by the interpretation of the researcher, as well as the independent coder, and could be subject to other interpretations. As stated earlier, the instructor interviews were designed to gather information about the instructors' lived experiences. Although this limits the generalizability of the results, it is possible that an HEI or an instructor may see themselves in the qualitative results of this study, and therefore may benefit from the experiences revealed and shared in this study. Furthermore, the researcher shared the qualitative results as a composite narrative, not only to protect the identities of the instructor participants in this study but also to make the results more accessible as broad examples for other HEIs and instructors.

A fourth potential limitation was that students' prior experiences with online learning may have affected their perception of the online learning environment investigated in this study. It was not within the scope of this study to investigate the nature and quality of the prior online course experiences of the student participants. Future research could include a reflective measurement of prior online learning experiences or a measurement of comparison of prior experiences with the experience being studied.

Finally, all participants were students and instructors at a private, urban, predominantly white, faith-based HEI, which limits the generalizability of the results to HEI in other settings. This dissertation was undertaken as part of a university-wide effort to study the institutional response to the COVID-19 pandemic, and so it made sense to

limit the participants to students and instructors who were studying and teaching at the university. It is possible that a HEI with a similar context may benefit from the findings in this study, or that the research design will provide guidance for undertaking a similar study in a different context. Future research could include students and instructors from multiple diverse HEIs as prospective participants.

Conclusion

Early experiences with online learning will have implications across remote, blended, and online learning in the future (Hodges et al., 2020). Some of the instructor participants in this study had prior experience with online learning and intentionally took steps to create an effective online learning environment, while others had no prior online teaching experience but intuitively did something right to help their students to succeed in the emergency remote online learning environment. Future practice should not leave this up to chance. Whether in response to an emergency or because of a demand for more online programs of study, HEIs will need to plan for multiple iterations of courses and/or entire degree programs. Successful HEIs will make use of lessons learned from the COVID-19 pandemic and will develop flexible plans for pivots from in-person, to hybrid, to completely online learning.

The researcher in the current study used the CoI framework to collect information about the experiences of both students and instructors in multiple disciplines in order to gather a wide range of perspectives about emergency remote online learning during the COVID-19 pandemic. This study adds not only to the compendium of CoI research, but also to the ongoing narrative about this global experience by sharing both quantitative and qualitative findings, as well as implications for future research and practice. The

usefulness of this research will be evident in how HEIs employ it when planning for future online learning experiences (emergency and otherwise).

References

Akyol, Z., & Garrison, D. R. (2008). The development of Community of Inquiry over time in an online course: understanding the progression and integration of social, cognitive, and teaching presence. *Journal of Asynchronous Learning Network, 12(3-4)*.

Akyol, Z., Garrison, D. R., & Ozden, M. Y. (2009). Online and blended communities of inquiry: Exploring the developmental and perceptional differences. *The International Review of Research in Open and Distributed Learning*, *10*(6), 65-83.

Akyol, Z., Vaughan, N., & Garrison, D. R. (2011). The impact of course duration on the development of a community of inquiry. *Interactive Learning Environments*, *19*(3), 231-246.

Anderson, T., Liam, R., Garrison, D. R., & Archer, W. (2001). Assessing teaching presence in a computer conferencing context. *Online Learning, 5*(2). http://dx.doi.org/10.24059/olj.v5i2.1875

Arbaugh, J. B. (2013). Does academic discipline moderate CoI-course outcomes relationships in online MBA courses? *Internet and Higher Education, 17(1).*

Arbaugh, J. B. (2014). System, scholar or students? Which most influences online MBA course effectiveness?. *Journal of Computer Assisted Learning*, *30*(4), 349-362.

Arbaugh, J. B., Bangert, A., & Cleveland-Innes, M. (2010). Subject matter effects and the Community of Inquiry (CoI) framework: An exploratory study. *Internet and Higher Education, 13(1-2).*

Arbaugh, J. B., Cleveland-Innes, M., Diaz, S. R., Garrison, D. R., Ice, P., Richardson, J. C., & Swan, K (2008). Developing a community of inquiry instrument: Testing a

measure of the Community of Inquiry framework using a multi-institutional sample. *Internet and Higher Education*, *11(3–4)*.

Bangert, A. W. (2009). Building a validity argument for the community of inquiry survey instrument. *The Internet and Higher Education*, *12(2).*

Baran, E., & AlZoubi, D. (2020). Human-centered design as a frame for transition to remote teaching during the COVID-19 pandemic. *Journal of Technology and Teacher Education*, *28*(2).

Baron, D., Bestbier, A., Case, J. M., & Collier-Reed, B. I. (2016). Investigating the effects of a backchannel on university classroom interactions: A mixed-method case study. *Computers & Education*, *94*, 61-76.

Bandura, A. (1977). *Social learning theory*. Prentice-Hall.

Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory*. Prentice-Hall.

Bandura, A. (1995). *Self-efficacy in changing societies*. Cambridge University Press.

Bawane, J., & Spector, J. M. (2009). Prioritization of online instructor roles: implications for competency-based teacher education programs. *Distance Education, 30*(3), 383–397. https://doi.org/10.1080/01587910903236536.

Befus, M. (2016). Conducting a multivocal thematic synthesis on an extensive body of literature. *Canadian Journal of Learning and Technology*, *42*(2).

Bigatel, P. M., Ragan, L. C., Kennan, S., May, J., & Redmond, B. F. (2012). The identification of competencies for online teaching success. *Journal of Asynchronous Learning Networks*, *16*(1), 59-77.

Bigatel, P. M., & Edel-Malizia, S. (2018). Using the “indicators of engaged learning

online" framework to evaluate online course quality. *TechTrends, 62*, 58–70. https://doi.org/10.1007/s11528-017-0239-4.

Brown, B., & Eaton, S. E. (2020). Using a Community of Inquiry Lens to Examine Synchronous Online Discussions in Graduate Courses. In *Handbook of Research on Online Discussion-Based Teaching Methods* (pp. 229-262). IGI Global.

Carlon, S., Bennett-Woods, D., Berg, B., Claywell, L., LeDuc, K., Marcisz, N., ... & Zenoni, L. (2012). The community of inquiry instrument: Validation and results in online health care disciplines. *Computers & Education*, *59*(2), 215-221.

Caskurlu, S. (2018). Confirming the subdimensions of teaching, social, and cognitive presences: A construct validity study. *The Internet and Higher Education*, *39*, 1-12.

Castellanos-Reyes, D. (2020). 20 years of the Community of Inquiry framework. TechTrends.

Cho, M. H., Kim, Y., & Choi, D. (2017). The effect of self-regulated learning on college students' perceptions of community of inquiry and affective outcomes in online learning. *The Internet and Higher Education*, *34*, 10-17.

Cornelius, S., Calder, C., & Mtika, P. (2019). Understanding learner engagement on a blended course including a MOOC. *Research in learning technology*.

Corry, M., & Stella, J. (2018). Teacher self-efficacy in online education: a review of the literature.

Creswell, J.W. & Creswell, J.D. (2018). *Research design: Qualitative, quantitative, and mixed methods approaches* (5th ed.). Sage.

d'Alessio, M. A., Lundquist, L. L., Schwartz, J. J., Pedone, V., Pavia, J., & Fleck, J. (2019). Social presence enhances student performance in an online geology course

but depends on instructor facilitation. *Journal of Geoscience Education*, *67*(3), 222-236.

Damm, C.A.V. (2016). Applying a Community of Inquiry instrument to measure student engagement in large online courses. *Current Issues in Emerging eLearning, 3*(1).

Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS quarterly*, 319-340.

Dewey, J. (1910). *How we think.* D.C. Heath & Co., Publishers. https://www.gutenberg.org/files/37423/37423-h/37423-h.htm

Díaz, S. R., Swan, K., Ice, P., & Kupczynski, L. (2010). Student ratings of the importance of survey items, multiplicative factor analysis, and the validity of the community of inquiry survey. *The Internet and Higher Education*, *13(1-2)*.

Dinmore, S. (2019). Beyond lecture capture: creating digital video content for online learning – A case study. *Journal of University Teaching and Learning Practice, 16*(1). https://ro.uow.edu.au/jutlp/vol16/iss1/7

Eneau, J., & Develotte, C. (2012). Working together online to enhance learner autonomy: analysis of learners' perceptions of their online learning experience. *ReCALL, 24*(1), 3-19. https://doi.org/10.1017/S0958344011000267

Ertmer, P. A. (2005). Teacher pedagogical beliefs: The final frontier in our quest for technology integration?. *Educational technology research and development*, *53*(4), 25-39.

Ertmer, P. A., & Ottenbreit-Leftwich, A. T. (2010). Teacher technology change. *Journal of Research on Technology in Education, 42*(3), 255-284. https://doi.org/10.1080/15391523.2010.10782551

Evmenova, A. S., Borup, J., & Dabbagh, N. (2021). Re-Designing Professional Development to Assist Instructors' Rapid Transition to Remote Teaching During the Covid-19 Pandemic. *The Teacher Educators' Journal*, 22.

Faul, F., Erdfelder, E., Lang, A.-G., & Buchner, A. (2007). G*Power 3: A flexible statistical power analysis for the social, behavioral, and biomedical sciences. *Behavior Research Methods, 39,* 175-191.

Faul, F., Erdfelder, E., Buchner, A. & Lang, A.-G. (2009). Statistical power analyses using G*Power 3.1: Tests for correlation and regression analyses. *Behavior Research Methods, 41,* 1149-1160. doi:10.3758/BRM.41.4.1149.

Field, A. (2018). *Discovering statistics using IBM SPSS statistics: North American edition* (5th ed.). Sage.

Fiock, H. (2020). Designing a Community of Inquiry in Online Courses. *The International Review of Research in Open and Distributed Learning*, *21(1).* https://doi.org/10.19173/irrodl.v20i5.3985

Flener-Lovitt, C., Bailey, K., & Han, R. (2020). Using Structured Teams to Develop Social Presence in Asynchronous Chemistry Courses. *Journal of Chemical Education*, *97*(9), 2519-2525.

Fuller, R., Joynes, V., Cooper, J., Boursicot, K., & Roberts, T. (2020). Could COVID-19 be our 'There is no alternative'(TINA) opportunity to enhance assessment?. *Medical teacher*, *42*(7), 781-786.

Gao, F., Zhang, T., & Franklin, T. (2013). Designing asynchronous online discussion environments: Recent progress and possible future directions. *British Journal of Educational Technology*, *44*(3), 469-483.

Garrison, R. D. (2017). *E-learning in the 21st century: A Community of Inquiry Framework for research and practice* (3rd ed.), Routledge.

Garrison, D. R., & Akyol, Z. (2015). Toward the development of a metacognition construct for communities of inquiry. *The Internet and Higher Education*, *24*, 66-71.

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., Anderson, T., & Archer, W. (2000). Critical inquiry in a text-based environment: Computer conferencing in higher education. *Internet and Higher Education, 2 (2–3).*

Garrison, R. D. & Arbaugh, J. B. (2007). Researching the community of inquiry framework: Review, issues, and future directions. *Internet and Higher Education, 10.*

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.

Gosselin, K. P. (2009). *Development and psychometric exploration of the online teaching self-efficacy scale* (Doctoral dissertation, Texas Tech University).

Gosselin, K.P., Northcote, M., Reynaud, D., Kilgour, P., Anderson, M., & Boddey, C. (2016). Development of an evidence-based professional learning program informed by online teachers' self-efficacy and threshold concepts. *Online Learning Journal, 20 (3).*

Gregg, A., Chang, H. K., Wang, Y., Ward, P., & Clariana, R. B. (2020). Using Student

Facilitation and Interactive Tools Within and Beyond the LMS: Towards Creating an Authentic Community of Inquiry. In *Handbook of Research on Online Discussion-Based Teaching Methods* (pp. 174-201). IGI Global.

Gutiérrez-Santiuste, E., Rodríguez-Sabiote, C., & Gallego-Arrufat, M. J. (2015). Cognitive presence through social and teaching presence in communities of inquiry: A correlational–predictive study. *Australasian Journal of Educational Technology*, *31*(3).

Hampton, D., Culp-Roche, A., Hensley, A., Wilson, J., Otts, J. A., Thaxton-Wiggins, A., ... & Moser, D. K. (2020). Self-efficacy and satisfaction with teaching in online courses. *Nurse educator*, *45*(6), 302-306.

Hayes, S., Smith, S. U., & Shea, P. (2015). Expanding learning presence to account for the direction of regulative intent: Self-, co- and shared regulation in online learning. *Online Learning*, *19(3)*. https://doi-org.ezproxy.spu.edu/10.24059/olj.v19i3.530

Heilporn, G. & Lakhal, S. (2019). Investigating the reliability and validity of the community of inquiry framework: An analysis of categories within each presence. *Computers & Education, 145.*

Higgs, M. A. S., Cobb, C. M., & Morris, P. D. (2020). Pre-Covid-19 on-ground and distance learners' characteristics: A road map for distance and remote learning during a pandemic. *Journal of Student Success and Retention Vol*, *6*(1).

Higher Education Data Sharing Consortium (HEDS) (2020a). *HEDS COVID-19 institutional response faculty survey overall data from April to June 2020 for public use* [Data set]. HEDS. https://www.hedsconsortium.org/heds-covid-19-response-

information/#Summary

Higher Education Data Sharing Consortium (HEDS) (2020b). *HEDS COVID-19 institutional response student survey overall data from April to June 2020 for public use* [Data set]. HEDS. https://www.hedsconsortium.org/heds-covid-19-response-information/#Summary

Hodges, C., Moore, S., Lockee, B., Trust, T., & Bond, A. (2020). The difference between emergency remote teaching and online learning. *Educause Review.* https://er.educause.edu/articles/2020/3/the-difference-between-emergency-remote-teaching-and-online-learning

Horvitz, B. S., Beach, A. L., Anderson, M. L., & Xia, J. (2015). Examination of faculty self-efficacy related to online teaching. *Innovative Higher Education*, *40*(4), 305-316.

learning. *Procedia-Social and Behavioral Sciences*, *47*, 369-375.

Horzum, M. B., & Uyanik, G. K. (2015). An item response theory analysis of the Community of Inquiry Scale. *International Review of Research in Open and Distributed Learning*, *16*(2), 206-226.

Inside Higher Ed (2019) 2019 survey of faculty attitudes on technology. https://www.insidehighered.com/booklet/2019-survey-faculty-attitudes-technology

Jaber, R., & Kennedy, E. (2017). 'Not the same person anymore': groupwork, identity and social learning online. *Distance Education, 38*(2), 216-229. https://doi.org/10.1080/01587919.2017.1324732.

Kaur, R., & Sidhu, G. K. (2010). Learner autonomy via asynchronous online interactions: a Malaysian perspective. *International Journal of Education and Development using Information and Communication Technology, 6*(3), 88–100.

Kebritchi, M., Lipschuetz, A., & Santiague, L. (2017). Issues and challenges for teaching successful online courses in higher education: A literature review. *Journal of Educational Technology Systems*, *46*(1), 4-29.

Khan, R. A., & Jawaid, M. (2020). Technology enhanced assessment (TEA) in COVID 19 pandemic. *Pakistan journal of medical sciences*, *36*(COVID19-S4), S108.

Kim, M. K., Lee, I. H., & Wang, Y. (2020). How students emerge as learning leaders in small group online discussions. *Journal of Computer Assisted Learning*, *36*(5), 610-624.

Kovanović, V., Joksimović, S., Poquet, O., Hennis, T., Čukić, I., De Vries, P., ... & Gašević, D. (2018). Exploring communities of inquiry in massive open online courses. *Computers & Education*, *119*, 44-58.

Kozan, K., & Caskurlu, S. (2018). On the Nth presence for the Community of Inquiry framework. *Computers & Education*, *122*, 104-118.

Kozan, K., & Richardson, J. C. (2014). New exploratory and confirmatory factor analysis insights into the community of inquiry survey. *The Internet and Higher Education*, *23*, 39-47.

Laerd Dissertation (2012). Sampling techniques: Purposive sampling. *Laerd Dissertation*. https://dissertation.laerd.com/purposive-sampling.php

Laerd Statistics (2015a). Cronbach's alpha using SPSS Statistics. *Statistical tutorials and software guides*. Retrieved from https://statistics.laerd.com/

Laerd Statistics (2015b). Independent-samples t-test using SPSS Statistics. *Statistical tutorials and software guides*. Retrieved from https://statistics.laerd.com/

Laerd Statistics (2018). Spearman's correlation using SPSS Statistics. *Statistical tutorials*

and software guides. Retrieved from https://statistics.laerd.com/

Lee, R., Hoe Looi, K., Faulkner, M., & Neale, L. (2020). The moderating influence of environment factors in an extended community of inquiry model of e-learning. *Asia Pacific Journal of Education*, 1-15.

Lichtman, M. (2013). *Qualitative research in education: A user's guide* (3rd ed.). Sage.

Lin, X., & Gao, L. (2020). Students' sense of community and perspectives of taking synchronous and asynchronous online courses. *Asian Journal of Distance Education, 15(1)*.

Martin, F., & Bolliger, D. U. (2018). Engagement matters: student perceptions on the importance of engagement strategies in the online learning environment.

Martin, F., Wang, C., Jokiaho, A., May, B., & Grübmeyer, S. (2019). Examining Faculty Readiness to Teach Online: A Comparison of US and German Educators. *European Journal of Open, Distance and E-learning*, *22*(1), 53-69.

Mayes, R., Ku, H.-Y., Akarasriworn, C., Luebeck, J., & Korkmaz, Ö. (2011). Themes and strategies for transformative online instruction: a review of literature and practice. *Quarterly Review of Distance Education, 12*(3), 151–166.

McVey, M. G. (2019). Transformational Journey of Educators in Technology: A Study of Tenured Business Faculty. *American Journal of Distance Education*, *33*(4), 230-244.

Miller, M. G., Hahs-Vaughn, D. L., & Zygouris-Coe, V. (2014). A confirmatory factor analysis of teaching presence within online professional development. *Journal of Asynchronous Learning Networks*, *18*(1), n1.

Mishra, P., & Koehler, M. J. (2006). Technological pedagogical content knowledge: A framework for teacher knowledge. *Teachers college record*, *108*(6), 1017-1054.

Montelongo, R. (2019). Less than/more than: Issues associated with high-impact online teaching and learning. *Administrative Issues Journal: Connecting Education, Practice, and Research*, *9*(1), 68-79.

Moore, J. L., Dickson-Deane, C., & Galyen, K. (2011). e-Learning, online learning, and distance learning environments: Are they the same? *The Internet and Higher Education*, *14*(2).

Moreira, J., Ferreira, A., & Almeida, A. (2013). Comparing communities of inquiry of Portuguese higher education students: One for all or one for each?. *Open Praxis*, *5*(2), 165-178.

Northcote, M., Reynaud, D., Beamish, P., Martin, T., & Gosselin, K. P. (2011). Bumpy moments and joyful breakthroughs: The place of threshold concepts in academic staff development programs about online learning and teaching. *ACCESS: Critical Perspectives on Communication, Cultural & Policy Studies*, *30*(2), 75-89.

Northcote, M., Gosselin, K. P., Reynaud, D., Kilgour, P., & Anderson, M. (2015). Navigating learning journeys of online teachers: Threshold concepts and self-efficacy. *Issues in Educational Research*, *25*(3), 319-344.

Northcote, M., Gosselin, K.P., Kilgour, P., Reynaud, D., & McLoughlin, C. (2019). A professional learning program for novice online teachers using threshold concepts. *Online Learning, 23(4)*, 336-353. doi:10.24059/olj.v23i4.1573

Oyarzun, B., Hancock, C., Salas, S., & Martin, F. (2021). Synchronous meetings, Community of Inquiry, COVID-19, and online graduate teacher education. *Journal of Digital Learning in Teacher Education*, 1-17.

Poluekhtova, I. A., Vikhrova, O. Y., & Vartanova, E. L. (2020). Effectiveness of online

education for the professional training of journalists: Students' distance learning during the COVID-19 pandemic. *Psychology in Russia: State of the Art*, *13*(4).

Poquet, O., Kovanović, V., de Vries, P., Hennis, T., Joksimović, S., Gašević, D., & Dawson, S. (2018). Social presence in massive open online courses. *International Review of Research in Open and Distributed Learning*, *19*(3).

Richardson, J. C., Maeda, Y., Lv, J., & Caskurlu, S. (2017). Social presence in relation to students' satisfaction and learning in the online environment: A meta-analysis. *Computers in Human Behavior, 71,* 402-417.

Richmond, V. P., Gorham, J. S., & McCroskey, J. C. (1987). The relationship between selected immediacy behaviors and cognitive learning. *Annals of the International Communication Association*, *10*(1), 574-590.

Robinia, K. A., & Anderson, M. L. (2010). Online teaching efficacy of nurse faculty. *Journal of Professional Nursing*, *26*(3), 168-175.

Rockinson-Szapkiw, A. J., Baker, J. D., Neukrug, E., & Hanes, J. (2010). The efficacy of computer mediated communication technologies to augment and support effective online helping profession education. *Journal of Technology in Human Services*, *28*(3), 161-177.

Rockinson-Szapkiw, A. J., & Wendt, J. (2015). Technologies that assist in online group work: A comparison of synchronous and asynchronous computer mediated communication technologies on students' learning and community. *Journal of Educational Multimedia and Hypermedia*, *24*(3), 263-279.

Sanga, M. W. (2018). Getting to master online teaching: Insights from purposefully organized course development training. *Quarterly Review of Distance*

Education, *19*(2), 15-54.

Seglem, R., & Haling, L. (2018). "I Got Confused Reading It": Using Backchannels to Collaboratively Build Meaning with Texts. *Journal of Teaching and Learning with Technology*, *7*(1), 43.

Senner, J. (2015). Updated e-learning definitions. *Online Learning Consortium.* https://onlinelearningconsortium.org/updated-e-learning-definitions-2/

Shea, P. (2011). Learning presence in the Community of Inquiry Model: Towards a theory of online learner self-and co-regulation. In *EdMedia+ Innovate Learning* (pp. 2556-2565). Association for the Advancement of Computing in Education (AACE).

Shea, P., & Bidjerano, T. (2009). Community of inquiry as a theoretical framework to foster "epistemic engagement" and "cognitive presence" in online education. *Computers & Education*, *52*(3), 543-553.

Shea, P., & Bidjerano, T. (2010). Learning presence: Towards a theory of self-efficacy, self-regulation, and the development of a communities of inquiry in online and blended learning environments. *Computers and Education, 55(4).*

Shea, P., & Bidjerano, T. (2012). Learning presence as a moderator in the community of inquiry model. *Computers and Education, 59(2).*

Shea, P., & Bidjerano, T. (2013). Understanding distinctions in learning in hybrid, and online environments: An empirical investigation of the community of inquiry framework. *Interactive Learning Environments*, *21*(4), 355-370.

Shea, P., Hayes, S., Smith, S. U., Vickers, J., Bidjerano, T., Pickett, A., Gozza-Cohen, M., Wilde, J., & Jian, S. (2012). Learning presence: Additional research on a new conceptual element within the Community of Inquiry (CoI) framework. *The Internet*

and Higher Education, *15*(2), 89-95.

Shearer, R. L., Aldemir, T., Hitchcock, J., Resig, J., Driver, J., & Kohler, M. (2020). What students want: A vision of a future online learning experience grounded in distance education theory. *American Journal of Distance Education*, *34*(1), 36-52.

Sorensen, C. K., & Baylen, D. M. (2009). Learning online: Adapting the seven principles of good practice to a Web-based instructional environment. In A. Orellana, T. L. Hudgins, & M. Samonson (Eds.), *The perfect online course: Best practices for designing and teaching* (pp. 69-86). Information Age Publishing.

Stenbom, S. (2018). A systematic review of the Community of Inquiry survey. *Internet and Higher Education, 39*.

Swan, K., Day, S. L., Bogle, L. R., & Matthews, D. B. (2014). A collaborative, design-based approach to improving an online program. *Internet and Higher Education, 21.*

Swan, K., Shea, P., Richardson, J., Ice, P., Garrison, D. R., Cleveland-Innes, M., & Arbaugh, J. B. (2008). Validating a measurement tool of presence in online communities of inquiry. *E-mentor*, *2(24).*

Tamim, S. R. (2020). Analyzing the complexities of online education systems: a systems thinking perspective. *TechTrends*, *64*(5), 740-750.

Tamir, E. (2020). The effects of teacher preparation on student teachers' ideas about good teaching. *Australian Journal of Teacher Education (Online), 45*(4), 1-17.

Tucker, C. (2017). The techy teacher: When students drive the pace, space, and path. *Educational Leadership 74(7).*

National Center for Education Statistics, United States. Office of Educational Research, Improvement. Center for Education Statistics, & Institute of Education Sciences

(US). (2019). *Digest of education statistics* (Table 311.15). US Department of Health, Education, and Welfare, Education Division, National Center for Education Statistics.

Velázquez, B. B., Gil-Jaurena, I., Encina, J. M. (2019). Validation of the Spanish version of the 'Community of Inquiry' survey. *Revista de Educación a Distancia, 59(*4), 1-26.

Vygotsky, L. (1978). *Mind in society: The development of higher psychological processes.* Harvard University Press.

Waddington, A., & Porter, S. (2021). Developing social presence in online learning among nurses: exploration of the Community of Inquiry Models domain of social using a qualitative descriptive design. *Nurse Education in Practice*, 103000.

Wicks, D. A., Craft, B. B., Mason, G. N., Gritter, K., & Bolding, K. (2015). An investigation into the community of inquiry of blended classrooms by a Faculty Learning Community. *Internet and Higher Education, 25.*

Williams, K. M., & Corwith, A. (2021). Beyond Bricks and Mortar: The efficacy of online learning and community-building at College Park Academy during the COVID-19 pandemic. *Education and Information Technologies*, 1-22.

Willis, R. (2019). The use of composite narratives to present interview findings. *Qualitative Research, 19*(4), 471–480. https://doi.org/10.1177/1468794118787711

Wilson, K. E., Martinez, M., Mills, C., D'Mello, S., Smilek, D., & Risko, E. F. (2018). Instructor presence effect: liking does not always lead to learning. *Computers and Education, 122*, 205–220. https://doi.org/10.1016/j.compedu.2018.03.011

Yu, T., & Richardson, J. C. (2015). Examining reliability and validity of a Korean version of the community of inquiry instrument using exploratory and confirmatory factor analysis. *The Internet and Higher Education, 25.*

Zawacki-Richter, O. (2021). The current state and impact of Covid-19 on digital higher education in Germany. *Human Behavior and Emerging Technologies*, *3*(1), 218-226.

Zee, M., & Koomen, H. M. (2016). Teacher self-efficacy and its effects on classroom processes, student academic adjustment, and teacher well-being: A synthesis of 40 years of research. *Review of Educational research*, *86*(4), 981-1015.

Appendix: Instruments and Measures

Community of Inquiry Survey Instrument (Arbaugh, 2008): Student Survey

5-point Likert-type scale
1 = *strongly disagree,* 2 = *disagree,* 3 = *neutral,* 4 = *agree,* 5 = *strongly agree*

Directions (modified for the current study): When answering the following questions, please reflect and respond based on your personal experience in the course that you nominated.

Teaching Presence
Design & Organization

1. The instructor clearly communicated important course topics.

2. The instructor clearly communicated important course goals.

3. The instructor provided clear instructions on how to participate in course learning activities.

4. The instructor clearly communicated important due dates/time frames for learning activities.

Facilitation

5. The instructor was helpful in identifying areas of agreement and disagreement on course topics that helped me to learn.

6. The instructor was helpful in guiding the class towards understanding course topics in a way that helped me clarify my thinking.

7. The instructor helped to keep course participants engaged and participating in productive dialogue.

8. The instructor helped keep the course participants on task in a way that helped me to learn.

9. The instructor encouraged course participants to explore new concepts in this course.

10. Instructor actions reinforced the development of a sense of community among course participants.

Direct Instruction

11. The instructor helped to focus discussion on relevant issues in a way that helped me to learn.

12. The instructor provided feedback that helped me understand my strengths and weaknesses relative to the course's goals and objectives.

13. The instructor provided feedback in a timely fashion.

Social Presence
Affective expression

14. Getting to know other course participants gave me a sense of belonging in the course.

15. I was able to form distinct impressions of some course participants.

16. Online or web-based communication is an excellent medium for social interaction.

Open communication

17. I felt comfortable conversing through the online medium.

18. I felt comfortable participating in the course discussions.

19. I felt comfortable interacting with other course participants.

Group cohesion

20. I felt comfortable disagreeing with other course participants while still maintaining a sense of trust.

21. I felt that my point of view was acknowledged by other course participants.

22. Online discussions help me to develop a sense of collaboration.

Cognitive Presence
Triggering event

23. Problems posed increased my interest in course issues.

24. Course activities piqued my curiosity.

25. I felt motivated to explore content related questions.

Exploration

26. I utilized a variety of information sources to explore problems posed in this course.

27. Brainstorming and finding relevant information helped me resolve content related questions.

28. Online discussions were valuable in helping me appreciate different perspectives.

Integration

29. Combining new information helped me answer questions raised in course activities.

30. Learning activities helped me construct explanations/solutions.

31. Reflection on course content and discussions helped me understand fundamental concepts in this class.

Resolution

32. I can describe ways to test and apply the knowledge created in this course.

33. I have developed solutions to course problems that can be applied in practice.

34. I can apply the knowledge created in this course to my work or other non-class related activities.

Community of Inquiry Survey Instrument: Instructor Survey

(Adapted from the CoI Survey; Arbaugh et al., 2008)

Note: For the Faculty Survey in the current study, the CoI Survey items were revised so that faculty participants were able to report their teaching practices and experiences and their perception of their students' practices and experiences.

5-point Likert-type scale
1 = *strongly disagree,* 2 = *disagree,* 3 = *neutral,* 4 = *agree,* 5 = *strongly agree*

Directions (modified for the current study): When answering the following questions, please reflect and respond based on your professional practice, and what was true as a result of your course design and facilitation of the course that was nominated.

Teaching Presence
Design & Organization

1. I clearly communicated important course topics.

2. I clearly communicated important course goals.

3. I provided clear instructions on how to participate in course learning activities.

4. I clearly communicated important due dates/time frames for learning activities.

Facilitation

5. I was helpful in identifying areas of agreement and disagreement on course topics that helped students to learn.

6. I was helpful in guiding the class towards understanding course topics in a way that helped students to clarify their thinking.

7. I helped to keep course participants engaged and participating in productive dialogue.

8. I helped keep the course participants on task in a way that helped students to learn.

9. I encouraged course participants to explore new concepts in this course.

10. My actions reinforced the development of a sense of community among course participants.

Direct Instruction

11. I helped to focus discussion on relevant issues in a way that helped students to learn.

12. I provided feedback that helped students understand their strengths and weaknesses relative to the course's goals and objectives.

13. I provided feedback in a timely fashion.

Social Presence
Affective expression

14. Getting to know other course participants gave students a sense of belonging in the course.

15. Students were able to form distinct impressions of some of the other course participants.

16. Online or web-based communication is an excellent medium for social interaction.

Open communication

17. Students were comfortable conversing through the online medium.

18. Students were comfortable participating in the course discussions.

19. Students were comfortable interacting with other course participants.

Group cohesion

20. Students were comfortable disagreeing with other course participants while still maintaining a sense of trust.

21. Students' different points of view were acknowledged by other course participants.

22. Online discussions help students to develop a sense of collaboration.

Cognitive Presence
Triggering event

23. Problems posed increased students' interest in course issues.

24. Course activities piqued students' curiosity.

25. Students were motivated to explore content related questions.

Exploration

26. Students utilized a variety of information sources to explore problems posed in this course.

27. Brainstorming and finding relevant information helped students resolve content related questions.

28. Online discussions were valuable in helping students appreciate different perspectives.

Integration

29. Combining new information helped students answer questions raised in course activities.

30. Learning activities helped students construct explanations/solutions.

31. Reflection on course content and discussions helped students understand fundamental concepts in this class.

Resolution

32. Students can describe ways to test and apply the knowledge created in this course.

33. Students developed solutions to course problems that can be applied in practice.

34. Students can apply the knowledge created in this course to their work or other non-class related activities.

Online Teaching Self-Efficacy Survey: Instructor Survey

(Adapted from the Online Teaching Self-Efficacy Inventory [OTSEI]; Gosselin, 2009)

Note: The OTSEI (Gosselin, 2009) comprises 47 questions on five scales rated on a continuum from "0 = *No confidence at all*" to "10 = *Complete confidence*." The following eight items from the OTSEI were included in the instructor survey in the current study. Revisions to the original wording of the items are identified below with brackets. The rating scale was also revised from a 10-point continuum to a 4-point Likert-type scale, which necessitated a revision of the directions, as described below.

4-point Likert-type scale

1 = *Beginner,* 2 = *Intermediate,* 3 = *Advanced,* 4 = *Expert*.

Directions (modified for this study): Please indicate how confident you are in your ability to accomplish the stated activities in the context of teaching online courses. For this question: Beginner = still learning; Intermediate = somewhat self-sufficient; Advanced = completely self-sufficient; Expert = innovative.

1. [I can] select the select the appropriate software applications to use for my [courses].
2. [I can] obtain the appropriate copyright permissions [for sharing digital resources with my students].
3. [I can] discern between technological applications that require differing levels of bandwidth.
4. [I can] determine how difficult various types of technology will be for my students to use.
5. [I can] select the [online technology] that is most efficient for delivery of

materials to students.

6. [I can] learn how to use new technologies used in my [course] without support from my institution.
7. [I can] select the [online] technology that is compatible with students' networks and platforms (i.e., compatible versions of software and networks that are capable of "talking to each other").
8. [I can] manage the time requirements needed for learning [online] technology.

Student Satisfaction and Perception of Learning Questions: Student Survey

5-point Likert-type scale
1 = *strongly disagree,* 2 = *disagree,* 3 = *neutral,* 4 = *agree,* 5 = *strongly agree*

Directions (given for the current study): When answering the following questions, please reflect and respond based on your personal experience in the course that you nominated.

1. Overall, I was satisfied with this course.
2. I learned a lot in this course.

Instructor Satisfaction and Perception of Student Learning Questions: Instructor Survey

5-point Likert-type scale
1 = *strongly disagree,* 2 = *disagree,* 3 = *neutral,* 4 = *agree,* 5 = *strongly agree*

Directions (given for the current study): When answering the following questions, please reflect and respond based on your personal experience in the course that was nominated.

1. Overall, I was satisfied with this course.
2. My students learned a lot in this course.

Demographic Questions: Student Survey

1. Please identify the Spring 2020 course that you nominated for this study (e.g., EDU 9000). If you do not remember the course, it was listed in the email that contained the link for this survey. (open-ended)
2. What was your academic year in Spring 2020? (Freshman, Sophomore, Junior, Senior, Graduate Student)
3. How many online courses had you taken prior to Spring 2020? (0, 1-2, 3-5, more than 5)

Demographic Questions: Instructor Survey

1. Please identify the Spring 2020 course that was nominated for this study (e.g., EDU 9000). If you do not remember the course, it was listed in the email that contained the link for this survey. (open-ended)
2. Please identify your current academic appointment type: (Instructor, Assistant Professor, Associate Professor, Professor, Other)
3. How many years of experience do you have teaching online courses? (open-ended)
4. How many years of experience do you have teaching courses at the college/university level? (open-ended)
5. What type of professional learning or support for online teaching did you engage in? (Select all that apply: Faculty Mentor/Support (received); Faculty Mentor/Support (provided); [University] ETM Coaching/Support; [University] Workshop; Other)
6. When did you engage in professional learning or receive support for online teaching? (Select all that apply: Prior to COVID19 pandemic emergency

remote online teaching; During or as a result of COVID19 pandemic emergency remote online teaching)

7. Do you feel that your professional learning helped you to be successful in emergency remote online teaching? (Yes, No)

Follow-Up Interview Questions

CoI Interview Questions: Instructor Participant (Adapted from Damm, 2016)

First Opening/Warming

1. Have you taught an online course before?
2. How did you feel about the move to completely remote online learning?
    a. Did you feel good about your ability to teach your course in the completely online environment?
3. Was there anything you weren't able to do because of the completely online environment?

Social Presence

Note for interviewer: Social Presence is defined as "the ability of participant to identify with the group or course of study, communicate purposefully in a trusting environment, and develop personal and affective relationships progressively by way of projecting their individual personalities" (Garrison, 2009).

4. First, we are going to talk about the social aspects of the course.
5. Did this course have synchronous (face-to-face) class sessions, asynchronous class sessions, or a mixture of both?
    a. If there were synchronous online class sessions:
        i. What kinds of communication happened during online class

sessions (teacher to student, student to student)?

ii. What supported the flow of communication in online class sessions?

iii. Did anything inhibit the flow of communication, such as the structure of the online class session, a discomfort with the tools, or discomfort with sharing in an online format (e.g., because the class sessions were being recorded).

b. If there were asynchronous class sessions or activities.

i. What kinds of communication happened through online forums (teacher to student, student to student)?

ii. Was participation required? How often did you post something? Did you read the other posts? Did you respond to posts, whether a follow-up to a response on your post or to someone else's post?

iii. What supported the flow of communication about asynchronous learning activities?

iv. Did anything inhibit the flow of communication, such as the structure of asynchronous activities (or a lack thereof), a delayed response from a classmate or the instructor, not enough time in the week, a discomfort with posting in an online forum?

6. Do you feel like you were able to sense the different personalities of your students and that they were able to sense yours based on the mode(s) of communication (synchronous and/or asynchronous)?

7. Did you feel that your students developed into a community of learners? (Ask for more explanation)

Cognitive Presence

Note for interviewer: Cognitive presence is defined as "the extent to which learners are able to construct and confirm meaning through sustained reflection and discourse in a critical community of inquiry (Garrison et al., 2001).

Now we are going to talk about the learning aspects of the course.

8. What kinds of learning activities were students asked to do in this course, such as weekly readings, assignments, posts, a final project (attending synchronous class sessions or watching class sessions asynchronously)?
9. Were the assigned readings and assignments relevant to each week's lesson?
10. Did your students' contributions, in class discussions and/or postings in online forums further advance their classmates' knowledge of the topic in the lesson? Did students in your class gain a different perspective from reading or listening to their classmates' contributions?
11. Are students able to apply what they learned in their daily life?

Teaching Presence

Note for interviewer: Teaching presence is defined as "the design, facilitation, and direction of cognitive and social processes for the purpose of realizing personally meaningful and educationally worthwhile learning outcomes (Anderson et al., 2001).

Now we are going to talk about the teaching aspects of the course.

12. How did you (the instructor) contribute to course communications on a weekly basis? In what way?

13. When you asked a question of a student, or the class, were you satisfied with the response and the timeliness of the response?
14. Would you have liked more interaction with the students? If yes, what would you suggest?
15. Did students have an opportunity to take on any teaching roles? (If yes, ask for explanation.)

CoI Coding Template

Community of Inquiry Coding Template

Elements	Categories	Indicators (examples only)
Cognitive Presence	Triggering Event	Sense of puzzlement
	Exploration	Information exchange
	Integration	Connecting ideas
	Resolution	Apply new ideas
Social Presence	Emotional Expression	Emoticons
	Open Communication	Risk-free expression
	Group Cohesion	Encouraging collaboration
Teaching Presence	Instructional Management	Defining & initiating discussion topics
	Building Understanding	Sharing personal meaning
	Direct Instruction	Focusing discussion

(Garrison, Anderson, & Archer, 2000, p. 4)