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LOYOLA UNIVERSITY CHICAGO AND ERIKSON INSTITUTE

TEACHING PRESENCE IN ONLINE DISCUSSIONS:

RELATIONSHIP-BASED LEARNING BY DESIGN

A DISSERTATION SUBMITTED TO

THE FACULTY OF THE GRADUATE SCHOOL

IN CANDIDACY FOR THE DEGREE OF

DOCTOR OF PHILOSOPHY

PROGRAM IN CHILD DEVELOPMENT

BY

MARY QUEST

CHICAGO, IL

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ABSTRACT

Online learning is increasingly prevalent in higher education. The current study explores how learning takes place in online discussions; an activity often found in online courses. Activity Theory is used to understand the contributions of individuals to the process of socially constructing knowledge within small groups. The Community of Inquiry (CoI) model and the Interaction Analysis Model (IAM), support the identification and analysis of individual contributions to discussions along with group level dynamics. The CoI integrates the social, cognitive, and teaching aspects of the online discussion through the concept of presence. While it is largely recognized that each participant can contribute to the learning of others in the group, teaching presence on the part of students is rarely examined. How does teaching presence on the part of individuals contribute to social construction of knowledge within groups in online discussions? This study examines online discussions within a graduate level human development course. A total of 334 messages from 27 participants are coded for evidence of social, cognitive, and teaching presence at the individual level, and phases of construction of knowledge at the group level. This allows for multi-level comparative analyses of the contributions of individuals to interactive processes within groups. Data reveal that students do in fact engage in teaching presence within online discussions, and that this is beneficial for the social construction of knowledge within small groups. Instructor modeling contributes to establishing community and supports teaching presence on the part of individual students and the social construction process in groups. The findings have implications for the design of online discussions, the instructor's

presence and role in supporting learning, the design of and future research on teaching and learning, and the practice of child development professionals.

CHAPTER ONE

INTRODUCTION

Institutions of higher education are increasingly incorporating online learning into degree programs in a variety of ways, from fully online programs to hybrid options, to stand alone courses offered in an online format. Online and remote learning has entered classrooms at all levels given the global COVID-19 pandemic, resulting in quarantine and students learning virtually from home. This historic event has forever changed the world of education by accelerating educators into the world of virtual teaching and learning and has prompted a new educational reality that will undoubtedly have lasting impacts on educators' knowledge, beliefs, and professional teaching practices. This shift toward virtual contexts requires a shift in thinking about the design of curriculum and instruction on the part of higher education faculty. There is an opportunity to design online educational spaces that embrace relationship-based learning and that place value on multiple perspectives when reading, analyzing, interpreting, and applying theories and research to professional practices. These types of educational experiences are essential for developing dispositions and values that are necessary for the work of professionals in the field of early care and education.

Whether in a face-to-face context or an online context, instruction begins with goals for learning. The pathway to reaching learning goals is captured in instructional approaches; that is, the design of activities and experiences students engage in over time. Instructional activities are designed and implemented in alignment with an instructor's beliefs about teaching and learning.

Viewing students as having power, rights, and knowledge to bring to their own learning experiences is a belief that can inform the goals for learning and the design of the discussion activity. Incorporating this view of students as contributors to their own and one another's learning within programs and courses aimed at preparing professionals for the field of early care and education affords students opportunities to experience relationship-based learning as they engage in the process of co-constructing knowledge. How does this belief inform the design of instructional activities? Is the delivery or presentation of content enough for learning to take place, or does something else need to be involved for lasting learning to occur? What is the pattern of teaching and learning activities we are aiming for in virtual classrooms? What are different instructional approaches for online learning, and how do they guide educators in the design and facilitation of student learning experiences?

Instructor designed discussion activities and student postings and responses to one another in online learning environments have the potential to support students in furthering their own learning and learning within the group. The extent to which this is accomplished, however, varies to a greater or lesser degree as the following examples of students responding to peers in an online discussion illustrate. In the first example, John and Anna's instructor posed the prompt "What is something that is listed as a practitioner 'take-away' in the reading on cultural influences on caregiving practices? What do we need to recognize about caregiver and child relationships? Post your own response and then respond to two peers' postings."

> John-
> I enjoyed your post. I agree with your statement "We need to recognize that families are all different". I also included that in my response to the question in the prompt about caregiver and child relationships.
> -Anna

In the next example, Jenny and Laura's instructor posed the prompt:

> Read the case study and make connections to the reading on cultural influences on caregiving practices. Include experiences you have had in your own life and work that are examples that help illustrate points that are made in the reading or the case. Post your own response and then respond to two peers' postings.
>
> Jenny-
> I just read Mark's post and I think it relates to what you and I posted. He shared his initial reaction to the case study about the family who asked the teacher to spoon feed their three-year-old, and how at first he reacted with feeling like they were really overstepping, but then reading the section about how "culture shapes every aspect of human development" he started to think about that differently.
>
> Your reaction to the family in the case study was similar to mine at first, that doing this will make the child helpless and he needs to learn to do this independently, but now I am wondering how the family's request might relate to their cultural beliefs? But I'm still not sure how I would feel about spoon feeding a child in my preschool classroom, or if it is even possible. (You and I have discussed all of the regulations around food in both our centers previously, so you know where I would go with this). You said in your post "My sister sometimes will feed her three-year-old because she isn't sure how much she has eaten during the day while she has been at work and she is worried about her gaining weight since she was born prematurely and always been small" and I started thinking about how the case doesn't really say why the family wants the teacher to do this. Can you think of other reasons why a family would want that?
> -Laura

These two discussion responses are different beyond just their length; there is a marked difference in the substantive quality of thinking invested in responding. The first represents exactly the type of response that an online instructor does not want to see in online discussions if the goal is to invite analysis, debate, and different perspectives. Essentially, it is peer feedback that does not seem to support, extend, or challenge thinking around a concept. The second example suggests that the student is thinking in much greater depth by connecting theory and practice, applying, and questioning. This response indicates the student's comfort with challenging her own and other students' thinking, her emerging understanding of the concept

being discussed and refined through the discussion, and her ability to extend the group's thinking by posing a question.

The terms discourse, dialogue, and discussion are at times used interchangeably within educational contexts and research literature. While all three terms are about using language to communicate with a particular audience in mind, there are differences associated with each. Brennan and colleagues (2018) distinguish between discourse and dialogue, indicating that "Discourse is language used in a social context" giving the example of a monologue or a written text (p. 149). They differentiate discourse from dialogue indicating that "dialogue is discourse that unfolds in a coordinated fashion between two or more people as they interact" (p. 149). Interactive communication tools used within Learning Management Systems (LMS) typically are called discussion forums (de Lima et al., 2019). Garrison and Arbaugh (2007) conceptualize online discussion within forums as discourse which supports collaboration and high-level thinking. For the purposes of clarity and consistency throughout this text, the term "discussion" will be used to refer to collaborative dialogue taking place in forums within asynchronous online courses.

There are many aspects of online discussions that could contribute to the varying depth of responses students might post. A discussion is inherently a social activity as it involves more than one person. Therefore, interpersonal aspects, such as the involvement of the instructor in the discussion, could contribute to the depth of responses (Lai, 2015). If the instructor responds to affirm, challenge, or question what students post, this offers both a means of furthering the discussion and models for students the ways that they might respond to one another. The length of time the group has been working together in this way is another factor (Barab et al., 2004),

both for students to make use of instructor modeling and to become comfortable with questioning and challenging one another. In the first few weeks of the term the depth of responses might be quite different compared to the last few weeks. The group of students within the course, both in terms of the experience and prior knowledge they bring, might also influence the depth of responses.

There are course design features that could influence the depth involved in student responses within discussions, such as the structure of the discussion activity itself. Deadlines for posting, the number of responses to peers that are expected, requirements on the length of a post, or how much the discussions count toward the final grade are some aspects of the structure of the discussion that are determined in the curriculum and course design (Penny & Murphy, 2009; Gilbert & Dabbagh, 2005).

Another design aspect involves the type of discussion prompt used. Closed-ended questions, which the first example included, tend to result in all students in the group posting mostly the same information taken from the reading and module content. Closed-ended prompts are ones that have a discrete response that is short or factual. Closed-ended prompts are convergent (Andrews, 1980) in that there is a single or limited number of "correct" answers, and they tend to serve the purpose of monitoring whether students have done the reading or can convey basic understanding of material. Closed-ended prompts can be important in establishing that students have a shared knowledge of concepts as a foundation for higher-level thinking, but primarily serve to check for understanding.

In contrast, open-ended types of prompts are characterized by having unlimited responses and are structured to elicit connections, opinions, or feelings. These are designed to promote

higher level thinking such as applying, analyzing, or creating new ideas. Open-ended prompts are divergent (Andrews, 1980) in that they don't ask for or assume a single "correct" answer. There could be multiple ways in which students might respond that can contribute to the discussion and the thinking that is going on within the group through the discussion. Examples of open-ended prompts include a case study (as in the second example), asking students to apply or connect reading and content to a given example, asking students to generate examples or share experiences, or a provocative statement or question that invites students to critically analyze content in their response. Open-ended prompts take into account the interpersonal or social dimension of the online discussion by inviting multiple ideas or perspectives, while also grounding the discussion in the cognitive dimension, through exploring or learning about the content. Incorporating an open-ended prompt into the design of an online discussion implies that there is value in viewing ideas and concepts in multiple ways.

It is likely that a combination of these design features and even others that haven't been considered influences the quality of peer responses, including the depth of the second example. In both examples, the response from the student is an indication that they were "present" in class to varying degrees. Within online courses one of the main means of showing others that you are present (for both students and the instructor) is to post to the discussion. Different from face-to-face courses, where physically showing up means you were present regardless of whether you say anything, in online courses you need to leave some indication that you have been there (i.e., online) engaging with the content and others by posting something. Clearly in the examples shared, just as in face-to-face courses, there are levels of participation within course activities designed for socially constructing learning, such as discussions, that go beyond showing

evidence of simply being there. The level of participation from Anna in her response is similar to the student in a face-to-face class who is physically present but doesn't say anything. Whereas the participation from Laura through her response contributes to the learning of the group.

How can the design of the online discussion activity invite students to be present in ways that contribute to the learning of the group? One theoretical perspective that offers a framework for thinking about this question is Activity Theory. Activity Theory has its roots in social constructivist learning theory (Vygotsky, 1978) which emphasizes that learning for individuals and groups happens within a social and cultural community. The central premise of social constructivism is that learning begins with and builds on people making meaning while engaging in collaborative processes as they work through accomplishing a task. Learning begins in a social context before learning and meaning is organized and internalized by the individual (Vygotsky, 1978). This means that multiple perspectives and differing experiences of individuals as part of the learning community contribute to the knowledge any of the learners in the community will construct. A social constructivist philosophy recognizes a generative kind of learning that involves interaction among participants in order to construct new knowledge, skills, and channels of connection between prior knowledge and new knowledge for each individual in the group. Thus, learning is not only an accumulation of information or content but includes interactions whereby learners connect, apply, and use this knowledge now and in the future.

Activity Theory is a theoretical framework that could allow for an examination of the design of the online discussion activity as it invites participation and interaction on the part of students. Activity Theory was proposed by Leont'ev (1979) and Luria (Wertsch, 1979), students of Vygotsky, who first proposed social constructivist learning theory. Activity Theory builds on

social constructivism to examine three interrelated components of a person's performance in a setting:

1. The specific task (e.g., the online discussion)
2. The purpose and goals of the task and how these are addressed in the design of the task (e.g., the discussion prompt; guidelines for posting)
3. The role of participants in the task (e.g., the instructor is responsible for design and facilitation in the online discussion; the students engage in posting responses to one another in the online discussion)

Activity Theory offers the opportunity to examine closely various components of the online discussion and the participation of students, individually and as they interact in groups, as they engage in the discussion activity. Analyzing aspects of activity up close can inform our understanding of the behavior and learning of the participants in the activity, and how participants influence the learning of each other. Studying instructors' and students' actions related to the online discussion task can help us to understand how different aspects of the task, including design elements, influence student learning.

There is a second theoretical construct deriving from social constructivist thinking, the Community of Inquiry, that has the potential to add a more nuanced understanding of the teaching-learning dynamic in online discussions. Student and instructor participation in online education settings has been conceptualized by Garrison and colleagues (2003) as "presence." In their book, *Creating a Sense of Presence in Online Teaching,* Lehman and Conceição (2010) describe presence as a sense of "being there and being together with online learners through the learning experience" (p. 3). They draw on the Community of Inquiry Model (Garrison et al.,

2003), which is rooted in social constructivist philosophy, to describe three essential elements for online education – cognitive presence, social presence, and teaching presence (Lehman & Conceição, 2010). Cognitive presence refers to the engagement of learners in the inquiry process and construction of meaning through discussion. Social presence involves the social and emotional aspects of communication in online activities. Teaching presence includes facilitation and instruction within online group discussions as well as the design and organization of online activities. The Community of Inquiry Model (CoI) has gained increasing attention over the past 20 years as a tool for designing and analyzing the online learning process at the intersection of social, cognitive, and teaching presence (Garrison & Arbaugh, 2007).

There are many interpersonal factors and design elements that influence student presence. Within the activity of the discussion forum, one design aspect that may influence the social, cognitive, and teaching presence of students is the design of the discussion prompt (Darabi et al., 2011; Kanuka et al., 2007; Kilis & Yildirim, 2019; Koh et al., 2010; Lohr & Haley, 2018). The discussion prompt includes questions or statements that participants respond to within the discussion. The use of rubrics (i.e., scoring guides that give criteria for discussions) is another aspect of the design of the discussion task that potentially influences the presence of students in all three ways (Gilbert & Dabbagh, 2005; Penny & Murphy, 2009). Guidelines for the online discussion task in terms of whether and how facilitation is structured (Wang & Chen, 2010) and the roles for students and the instructor that are implied through the directions for the task (Lai, 2015) are additional ways in which design may influence student presence. An unexplored area of the Community in Inquiry model is the possibility for students to engage in teaching presence

through facilitation and instruction within the online discussion forum, though this type of interaction on the part of students fits well with the goal of social learning.

Activity Theory allows for identification and analysis of factors that influence the behaviors of instructors and students in the online discussion task, while Community of Inquiry is a model that tries to identify and integrate the social, cognitive, and teaching aspects of the online discussion through the concept of presence. Examining the types of presence from the CoI model within online discussion postings may offer insights into the social construction of knowledge in the online context. Focusing specifically on teaching presence for instructors and students related to social learning could inform the design of the discussion activity. Within relationship-based teaching and learning contexts, each participant is known to be capable of contributing to the knowledge of the group and collective learning is highly valued. Yet, teaching presence on the part of students has rarely been examined. Exploring the connection between teaching presence on the part of students and group learning within online discussions offers an opportunity to better understand socially constructed knowledge.

CHAPTER TWO

THEORETICAL FRAMEWORK AND REVIEW OF LITERATURE

Social Constructivism: Activity Theory

Activity Theory is a promising framework for designing and analyzing the online discussion task because the central premise is that knowledge is constructed socially. Learning happens within interactions in groups engaged in tasks with specific goals. Activity Theory shifts the focus from the learning of the individual toward the various aspects of a task including social and cultural aspects, which influence the behavior of individuals and groups participating in the task. Vygotsky's Sociocultural Theory (1978), which is the basis for Activity Theory (Leont'ev, 1979), grew out of the Russian cultural-historical perspective on psychology and was a departure from the sole focus on the individual in the study of psychology and cognition prevalent at the time and even today.

One of the most widely known psychological theories at the time Leont'ev proposed Activity Theory was Piaget's theory of cognitive development. Piaget proposed a stage-bound progression of cognitive development in which learning is constructed by the individual through experiences. Learners assimilate new information by creating a new mental space for considering possibilities or accommodate new information within existing mental schema. In Piaget's view, how we think, and reason is bound by developmental maturation (Lourenço, 2012). This means that regardless of the social and cultural context, if individuals are presented with learning experiences, cognitive development is thought to progress in universal ways.

The 1960s and 1970s were viewed as a “cognitive revolution” within cross-cultural psychology (Cole, 1998) as theories incorporating the complex relationship between both external experiences and internal mental processes emerged. Neo-Piagetian conceptualizations of cognitive development at this time challenged some of Piaget’s notions about the process of cognitive development. However, these neo-Piagetian versions of cognitive development retained the notion of individuals as the focus of learning and development. This means that what is learned or changing can be measured and considered accomplishments of the individual as indicated by tangible, observable behaviors of the individual and what they can demonstrate. The focus on the individual implies that cognitive development and learning unfold in largely predictable ways despite variations in the social and cultural contexts of individuals. While cultural and social factors might shape the *way* individuals learn, ultimately learning is an individual process and is measured at the individual level.

Vygotsky’s theory challenges Piaget’s theoretical assertions of the individual being an autonomous constructor of meaning, that learning happens internally within individuals, and that development prompts the increasing potential for complex thinking. For Vygotsky, knowledge is constructed externally in the social context prior to becoming an internal operation, and learning precedes and prompts development (Lourenço, 2012). Rather than a focus on the inner workings of the mind and cognitive development as a process within individuals, Vygotsky emphasized the significant role that the social, cultural, and historical context had on these processes in proposing that knowledge is socially constructed. Interactions with more competent others gives rise to natural development and construction of learning (Lourenço, 2012). Rather than measuring development and learning by observing and measuring specific behaviors of

individuals as the indicator of change, social constructivism recognizes that we are always growing in relation to others, and behavior and meaning-making are shaped socially and culturally, making *tasks* central as the focus of design and analysis, rather than *individuals*. An analysis of tasks offers insights into the thinking and behavior of individuals in relation to the group by acknowledging the significance of the social world in learning.

Features of Activity Theory

Leont'ev (1979) proposed that human activity and the tools that are used in tasks have arisen and evolved through social interaction. This was a dramatic shift away from conceptualizations of cognition as an autonomous process unfolding within the individual. Activity Theory proposes that measuring development or learning involves examining the task as meaning-making happens in relation to others rather than individually. The example of the discussion post from Laura indicates that the role of others is essential in constructing knowledge as she connects and contrasts her own ideas with those of other students as well as the reading content. Laura refers to Mark's post, quotes from Jenny's post, and brings up what was shared in a previous discussion. She is supporting the thinking of her peers, she is benefitting from her peers in having the opportunity to respond to their ideas, and she is furthering her own learning as she pushes her thinking to reconcile an increasingly wide range of possibilities.

Wertsch (1979) outlined six features of Activity Theory as proposed by Leont'ev that demonstrate how the theory could be useful in understanding the way that the design of the discussion activity might prompt social construction of knowledge. First, the Activity Theory framework offers various levels of analysis of the task, including the structure (i.e.., organization) and function (i.e., actions) of the task (Wertsch, 1979). Specific components of a

task, such as guidelines or rubrics for posting to the online discussion board (see Gilbert & Dabbagh, 2005; Penny & Murphy, 2009), can be the focus of analysis. Or, a system of activities, such as an entire online learning community (see Barab et al., 2004) can be analyzed. This offers a range of ways to understand the tasks and outcomes of an activity. In the discussion response examples from Anna and Laura, both students performed the function of posting, but went about it in different ways and to different degrees of depth. The organization of the task, or the different ways in which other participants engaged in the discussion, may have contributed to the different responses from Anna and Laura.

Second, activity involves goals and goal directedness, and recognizes that different participants might have different goals in the moment (Wertsch, 1979). The instructor might have goals around constructing knowledge in relation to specific concepts and Laura may share this goal. A student such as Anna may have the goal of responding in order to meet a personal goal of finishing quickly while also meeting the expectation for participation. Alternatively, she may not have experiences to share or an understanding of the possibilities the instructor had in mind. The instructor needs to convey the goals of the online discussion and become aware of individual student goals. The discussion prompt may be designed as open-ended in order to support a broader shared goal for all the participants in the group of constructing knowledge around the concepts of focus in the course.

Third, activity is mediated by tools, both physical objects and symbols (Wertsch, 1979). Vygotsky described tools as instruments that are used to carry out tasks and these reflect both the nature of the activity and the particular point in history (Vygotsky in Wertsch, 1979). For example, a pen, a typewriter, and a computer are all tools used to accomplish writing that have

evolved over time as people have engaged in this task. The use of each of these tools for writing mediate the task of writing differently and support the development of different mental processes related to the tool. Writing an essay response to a prompt by hand might involve thinking more carefully through the exact words to be written prior to actually putting them to paper, while writing a response using a computer could involve thinking more generally about what to write and moving forward and backward to adjust and edit while in the process of composing the writing.

Symbolic or mental tools (e.g., language, numbers, artwork, maps) also facilitate carrying out tasks, both instrumentally and psychologically (Vygotsky, 1962, as cited in Wertsch, 1979). Mental tools regulate human behavior, as is the case when a person uses language internally to create a mental checklist to help them keep track of responding to certain peers in an online discussion, refer to readings, and read the responses posted to them when they log into their course. Tools, whether physical objects or mental processes are socially and culturally created, and they "allow and even lead to the creation of types of activities that would not otherwise exist" (Wertsch, 1979, p. 26). Language as a tool (i.e., a symbolic and mental tool) allows students to come to the online discussion activity using a computer (i.e., a physical tool) in order to communicate and interact with others in the discussion. The difference between the responses posted by Anna and Laura may be related to different levels of prior experience with using written language for discussion. Access to and experience with typing on a computer might also influence the level of depth in their responses.

Fourth, Activity Theory places emphasis on a developmental explanation; that is, the ways in which the social setting, expectations of participants, and historical circumstances

interact (Wertsch, 1979), as well as the developmental history of individuals involved in the task. These developmental aspects influence the way in which the task unfolds. Online learning has evolved over the past few decades and prevailing social and cultural beliefs about the efficacy and quality of learning in online environments shapes the initial attitudes and beliefs that individuals have about it (Rudesham & Schoenholtz-Read, 2009). At the same time, the technological tools and systems involved in online learning have developed and been refined to open more possibilities. In addition, the individuals participating in online learning are also on their own developmental trajectories as humans. The development of new applications or learning management systems for online learning might contribute to the difference in the depth of Anna's and Laura's responses. The difference in their developmental level (e.g., emerging adulthood versus later adulthood) could also influence the depth of response.

Fifth, activities and the means to mediate them have arisen through social interaction and are in constant negotiation between the social context externally and the individual internally (Wertsch, 1979). The behavior of an individual is influenced by the evolving meaning of the functions and structure of the task as a social construction. For example, young college students who may be new to online learning but adept with text messaging as a means of written communication may have to modify their use of written language, such as avoiding using acronyms (e.g., LOL) typical in text messaging, to meet expectations for social interaction within this new learning context. Experience with certain tasks over time and the ways in which activities, such as online learning, become more commonplace over time both contribute to the evolving meaning of the task. The depth of Laura's response may be due to it being several

weeks into the course rather than the first week. Modeling and facilitation on the part of the instructor in the online discussion early in the course might influence the depth of the response.

Sixth, the process of internalization, or the inner thoughts and feelings of an individual, makes available to the individual and the group forms of knowledge that can mediate tasks over time (Wertsch, 1979). As knowledge is socially constructed and then internalized, this knowledge can then be applied to mediate the online discussion. The task evolves as students learn new content and ideas. Higher levels of thinking and knowledge can then be produced through this interaction as these ideas are applied and serve to mediate the task. Laura is adjusting her own thinking internally based on ideas shared by Mark and Jenny and from the course content. In sharing her changing thinking with the group and posing questions that she is still uncertain about she is reaching out *externally* to the group to continue the process of examining her own thoughts and feelings *internally*. In turn, this can prompt new ways of thinking and feeling among other individuals in the group. A sequence of related discussion prompts over time may allow for students to construct knowledge that allows them to post responses with greater depth as the course progresses. By focusing on the online discussion activity as the unit of analysis, these kinds of design considerations can be explored.

Figure 1 summarizes Wertsch's (1979) six features of Activity Theory, which have continued to be the essential elements even as variations on Activity Theory have emerged. Many theorists and researchers (e.g., Cole, 1998; Engeström, 2001; Hung & Chen, 2002; Rogoff, 2008) have proposed variations on Activity Theory and the ways it can apply to understanding learning and development in a range of different communities and activities, including the interaction between people and learning technologies (Kaptelinin & Nardi, 2018).

1. Activities can be analyzed on various levels, including structure and function
2. Activities involve goals and goal-directedness
3. Activities are mediated by physical and symbolic tools
4. Development of the activity itself and of the participants in the activity is emphasized
5. Activity is negotiated between the social context and the individual
6. Knowledge is constructed socially within activity, before it is internalized by the individual and used to mediate activity

Figure 1. Features of Leont'ev's Activity Theory as described by Wertsch (1979)

Fundamental to Activity Theory and social constructivist thinking is the understanding of the role that the cultural context plays in development and learning. Suzanne Gaskins (2006) expresses the idea of culture serving to amplify or constrain capacities indicating, "…humans are not designed to be "Social" in general, but to be "social" in a particular, culturally constrained way…" (p. 295). This recognition of the role of culture in mediating human development and learning, as opposed to a view of capacities unfolding in universal ways, differentiates Activity Theory from other prominent theories of cognitive development. Gaskins recognizes the influence of culture even prior to being born. "Infants do not demonstrate "raw" expression of capacity, but rather, an expression of capacity already heavily mediated by the specific social-cultural environment" (p. 295). An understanding of human behavior is only possible through an examination of the social and cultural groups in which people participate as they learn and develop.

Mediation and the Zone of Proximal Development

Mediation, in the view of Vygotsky (1978) and Leont'ev (1979), captures the dynamic interaction among the individual with other people and the tools available in the social and

cultural context for addressing a problem or engaging in a task (Cole & Wertsch, 1996). For Vygotsky, mediation represents the means for learning within the "zone" between an individual's current development and his/her potential for more advanced levels of development through interaction in the social context with both more and less capable peers (Cole & Wertsch, 1996).

Embracing a social constructivist perspective means activity is designed and analyzed in terms of interaction within groups. This recognizes that individuals come to group learning experiences with different levels of knowledge and understanding which promotes learning within the zone of proximal development for others in the group through interaction. Within online discussions, an individual student can share a perspective that offers a new way of understanding the content of focus for other students that is only possible because the discussion task is arranged for interaction within groups.

The goals, participants, and cultural components involved in activity are mediated by what Michael Cole (1998) refers to as artifacts. These are the physical tools, symbols, and mental processes of individuals that are available in the group as tasks related to the goal of the activity are undertaken. In addition, explicit and implicit rules and the roles individuals play serve to mediate these components of activity. In the case of online discussions, examples of artifacts that might mediate students' movement toward the goals of the discussion activity include language, internet or computer access, or the learning management system being used.

Rules mediate the activity through establishing expected behaviors and roles for participants (Scanlon & Issroff, 2005). Rules can encourage and constrain the actions of participants toward the goal by defining processes of the activity. In the case of online

discussions, examples of rules that shape the actions taken by students within the learning community are guidelines or protocols for posting responses, and rubrics for evaluating or grading the student's participation or quality of response. There are roles that participants within a group take on within goal-oriented activities (Scanlon & Issroff, 2005). Hung and Chen (2002) emphasize that within institutions of higher education, the roles of student and instructor have been heavily socialized and internalized over time. However, these roles might also be adjusted or transformed through the rules of the activity and the culture of the community.

Activity Theory as Applied to Discussions and Online Learning

Two artifacts that are highly relevant to the online discussion activity—language and technology—have been examined and explored within variations on Activity Theory. Language is the primary artifact mediating many activities (Cole & Engeström, 1993; Cole, 1998). Engeström (2001) refers to the role of *dialogue* and Wells (2007) examines the role of *discourse* as mediators of activity. Both authors are essentially referring to *discussion* in that they use dialogue and discourse to describe the back-and-forth exchange of ideas within a community in which the goal for participants is to construct knowledge collaboratively. Engeström outlines different contributions of theorists and researchers in the evolution of Activity Theory over time and highlights the role of discussion as one aspect of activity that has been expanded by Wertsch. Engeström indicates one of the core principles of a reconceptualized version of Activity Theory is that within discussion there is "always a community of multiple points of view, traditions, and interests" (p. 136) which inherently includes "contradictions as sources of change and development" (p. 137).

Wells (2007) also examines the idea of discussion as having a mediating role in activity that seeks to deepen understanding of concepts and ways of thinking. He asks, how might we "theorize the relationship between…[discussion] and the forms of joint activity in which it occurs?" (p. 160). Wells goes on to examine how discussion serves to mediate activity, but also the possibility of discussion as an activity in itself. These contributions to Activity Theory as originally proposed by Vygotsky, Leont'ev, and Luria and reconceptualized by Cole (1998) and others (see Engeström, 2001) offer interesting lines of inquiry into the role of the online discussion. It may be both a *tool* that mediates activity, and an *activity* to analyze depending upon the level of analysis.

Further, Kaptelinin and Nardi (2018) propose that situating human-technology interaction within an Activity Theory framework allows for an understanding of the meaning that technology has for people. In the 1980s and 1990s Activity Theory began to be used internationally to examine emerging challenges with information systems and computers (Cole et al., 2006; Kaptelinin & Nardi, 2018), helping "establish activity theory as a key theoretical approach in human-computer interaction" (p. 3) and more generally as a useful framework for understanding people and technology. The established efficacy of Activity Theory as a framework for understanding human-technology interaction and the centrality of language as a mediating tool of activity points to the potential for analyzing online discussions using Activity Theory.

Interaction Analysis Model

Activity Theory as an organizing framework for the design and analysis of online discussion means that the unit of analysis is the discussion activity itself. The goal of the

discussion is the social construction of knowledge among participants in the discussion. How can social construction of knowledge at the group level be measured?

The Interaction Analysis Model (IAM) was developed by Gunawardena, Lowe, and Anderson (1997) as an analysis technique for the negotiation of meaning and co-construction of knowledge in technology-mediated collaborative learning environments. The theoretical framework for the IAM is social constructivism and the model is based on the position that "the construction of knowledge is the result of interaction, meaning negotiation, and building of a shared understanding" (Lucas et al., 2014, p. 576). Two main questions were the focus of the original study in which the IAM was proposed (Gunawardena et al., 1997). First, whether transcript analysis yielded evidence that knowledge was constructed through exchanges among participants in a group; and second, whether individuals change understanding or create new constructions as a result of group interaction.

IAM was developed using grounded theory and resulted in five related Phases: Phase I. Sharing/comparing of information; Phase II. Discovery and exploration of dissonance or inconsistency among ideas, concepts, or statements; Phase III. Negotiation of meaning/co-construction of knowledge; Phase IV. Testing and modification of proposed synthesis or co-construction; and Phase V. Agreement statement(s)/applications of newly constructed meaning (Gunawardena et al., 1997). Interaction is viewed as "a process through which negotiation of meaning and co-creation of knowledge occurs" (Lucas et al., 2014, p. 576). The unit of analysis is an entire message (i.e., posting) given this definition of interaction, as the message is viewed as interconnected and responsive to others' messages. Gunawardena and colleagues (1997) use the analogy of a quilt block presented as a whole by joining and adding many unique and distinct

parts to convey that the phases of knowledge construction in the model are representative of the group involved in the discussion.

The IAM was critiqued through a literature review by Lucas, Gunawardena, and Moreira in 2014. The goal of the review was to identify the extent and adequacy of the application of IAM and its limitations. It is most often used in transcript analysis of online asynchronous discussions. “Literature reviewed suggests that complex thinking, and higher phases of knowledge construction are achievable in different types of communication tools, if activities are designed accordingly” (Lucas et al., 2014, p. 581). Important design elements to consider for knowledge construction include the discussion topic being one that allows for depth, the assignment of specific roles to participants, problem based learning, and collaborative work.

The IAM is a model that allows for the measurement of the social construction of knowledge for a group engaged in online discussion. This model has been used to measure socially constructed knowledge as related to higher order thinking in a number of studies examining aspects of the online discussion activity including the roles of participants in the discussion (Lai, 2015), the structure of the discussion activity (Koh et al., 2010), and the design of the prompt (Howell et al., 2017; Hou, 2012). The alignment of the IAM with Activity Theory in terms of the focus of analysis being on the interactive moves within a group (e.g., rather than the individual as the unit of analysis) makes the model an important tool for data analysis in studies using Activity Theory as the framework.

Summary of Activity Theory as Applied to Online Learning

Activity Theory is an effective framework for the design and analysis of the components of online discussion that influence participant behavior. The participants in the discussion are

one component that contributes to learning. The other components of the online discussion activity, including the goals for the discussion and the community of higher education, influence the activity and the learning process as well. The mediating factors of the activity, artifacts, rules, and roles come into play to expand or constrain aspects of the activity. An examination of the components and mediating factors within the online discussion could allow for an understanding about how the design of the discussion as a group learning activity can serve to promote the social construction of knowledge. The IAM model provides a means of measuring social construction of knowledge within groups.

The Community of Inquiry Model

A complementary model to Activity Theory that also serves to help operationalize the social construction of knowledge is the Community of Inquiry (CoI) model (Garrison & Arbaugh, 2007). The goal of the online discussion is social learning about the content of study. Activity Theory offers a means of identifying and examining the components of the task of the online discussion to understand how these relate to the behavior of the participants. In order to study the influence of the design of the discussion on participant behavior, the concept of participation as related to learning must be conceptualized in a measurable way.

In face-to-face course discussion, there are visual cues that accompany verbal exchange (e.g., eye contact, gestures, body language) that can offer a sense of social connection among participants in the discussion. In online discussions, the primary way of participating in the discussion is through writing, and social connections must be made through the content of participants' written posts. Social connection is an important part of socially constructing knowledge (Richardson & Swan, 2003) and must be just as intentionally included in design

elements of the online discussion as the content of study. Participation in online learning is captured through the concept of presence in the CoI model. The components of social presence, cognitive presence, and teaching presence within the CoI model provide a structure for understanding the design of the online discussion as related to different ways individuals participate and contribute to the social construction of knowledge.

The construct of presence is based on the phenomena of telepresence, or the impression of being in an online location that is different from one's physical environment, and social presence, which reflects that others are interacting in the online location (Biocca et al., 2001, as cited in Lehman & Conceição, 2010). The concept of presence in the CoI model examines the ways in which learners are connected and engaged with each other via technology and recognizes that learning involves social as well as cognitive connection. The three types of presence—social, cognitive, and teaching presence— in the CoI model conceptualize learning and problem solving as a social and cultural process that accounts for changes in the individual's thinking and knowledge. This change is a function of the interaction individuals have had in the online group context. In the online discussion, the exchange of thinking and ideas reveals and records in text what social and cultural learning looks like. In this way, the CoI model reflects the same conceptual premises of Activity Theory but applies them specifically to online learning contexts. The components of the CoI model have been included in studies of online discussion using Activity Theory as a framework (Penny & Murphy, 2009; Lai, 2015; Wang & Chen, 2010). These studies will be reviewed later in this paper. Using the CoI model in conjunction with the theoretical framework of Activity Theory, therefore, is a promising approach for a study of online discussion design.

Garrison and colleagues (1999) proposed CoI as a model for understanding the process of deep and meaningful learning in online higher education contexts. The CoI model is based upon social constructivist theory (Vygotsky, 1978) and the educational philosophy of John Dewey, which emphasizes inquiry and community (Swan et al., 2009). For Dewey, inquiry meant the application of the scientific method to learning and practical problem solving, with the understanding that inquiry happens most effectively in collaboration with others (Swan et al., 2009). Garrison and colleagues (1999) began with identifying interactive elements that are "crucial prerequisites for a successful higher educational experience" (p. 87) and how these elements might be maintained within online learning.

The CoI model includes three contributing components to the social construction of knowledge in online higher education contexts: (a) social presence, (b) cognitive presence, and (c) teaching presence. The combination of these three types of presence is conceptualized as interacting to support the educational experience (see Figure 2). Emphasis is placed on the role of discussion (called *discourse* in this model) in higher education as a means of supporting collaborative learning and higher-level thinking which is conceptualized at the intersection of social and cognitive presence (Garrison & Arbaugh, 2007).

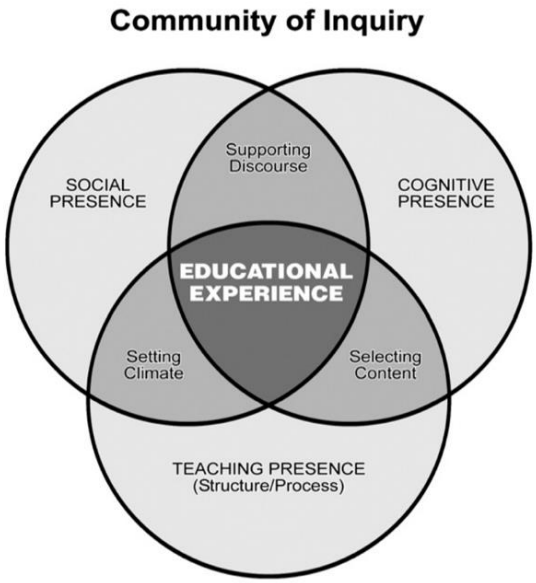

Figure 2. Community of Inquiry Framework (Garrison & Arbaugh, 2007)

The role of the instructor through teaching presence involves *setting climate* as intersecting with social presence and *selecting content* as intersecting with cognitive presence. The model emphasizes the essential role that social connection plays in the educational experience. The concept of social presence in online learning environments is integral to the social construction of knowledge. In Figure 2, the location of "Supporting Discourse" at the intersection of cognitive presence and social presence indicates that both are necessary within online discussion to support the educational experience. DeNoyelles and colleagues (2014) reviewed research around strategies for increasing presence in online discussions and determined that the CoI model was "designed with asynchronous text-based discussions in mind" (p. 154).

Since it was proposed, the CoI model has been widely cited as a framework for the design and analysis of online learning (Caskurlu, 2018). The three constructs in the model – social presence, cognitive presence, and teaching presence – were operationalized in a self-reporting instrument by Arbaugh and colleagues (2008) and established as reliable and valid.

Caskurlu (2018) conducted a confirmatory factor analysis including the multiple dimensions of each construct included in the self-reporting instrument (Arbaugh et al., 2008) as shown in Figure 3. Caskurlu's (2018) analysis confirmed the construct validity of each type of presence, with social presence demonstrating a three-factor solution, cognitive presence demonstrating a four-factor solution, and teaching presence demonstrating a three-factor solution, in alignment with the operationalization of the CoI model in the self-reporting instrument (Arbaugh et al., 2008).

Construct	Factors	Examples of indicators
Social Presence	· Open communication · Group cohesion · Affective expression	Expressing agreement/disagreement Salutations Self-disclosure
Cognitive Presence	· Triggering event · Exploration · Integration · Resolution	Sense of puzzlement Brainstorming Connecting ideas Defending solutions
Teaching Presence	· Design & organization · Facilitating discourse · Direct instruction	Establishing time parameters Seeking to reach consensus Presenting content

Figure 3. Operationalization of the CoI Framework (Caskurlu, 2018, p. 3)

The following sections will give detailed overviews of social presence, cognitive presence, and teaching presence within the CoI model. This is followed by a discussion of two studies that examine the interaction of the three types of presence within online discussion activities (Kilis & Yildirim, 2019; Koh et al., 2010).

Social Presence

Social presence is described by Garrison and Arbaugh (2007) as "the ability of learners to project themselves socially and emotionally, thereby being perceived as "real people" in

mediated communication" (p. 159). The three confirmed factors within the construct of social presence are open communication, group cohesion, and affective expression (Caskurlu, 2018). Establishing open communication within an online discussion means learners can contribute their ideas and thoughts freely without risk. Open communication showed the highest significance within the factor analysis (Caskurlu, 2018) which has implications for the design of online discussions as well as whether or how they are evaluated. Group cohesion involves creating clear, shared learning goals that allow for purposeful communication and gives students a sense of trust. Affective expression involves sharing emotional reactions and support. Students and instructors in an online discussion contribute to establishing and maintaining social presence.

Social presence creates the conditions for interaction and collaboration for the social construction of knowledge, but it is not enough for achieving educational goals on its own. However, Garrison and Arbaugh (2007) note, "Research suggests that although social presence alone will not ensure the development of critical discourse in online learning, it is extremely difficult for such discourse to develop without a foundation of social presence" (p. 160). Social presence has been viewed as laying the groundwork for higher-level thinking to be present within discussions and research has found a strong relationship between social presence and perceived learning, engagement, and satisfaction on the part of students (Richardson & Swan, 2003; Lohr & Haley, 2018).

The emphasis on social presence in the design of discussion activities might vary depending upon the students in the course (i.e., undergraduate versus graduate students) and the extent to which group cohesion is established (i.e., a first year, first semester course versus an established cohort that has already had several courses together). Social presence in a CoI

evolves as the community becomes established, being more evident in terms of affective expression and open communication early on and shifting into more focus on purposeful activity through group cohesion over time (Garrison & Arbaugh, 2007). In a review of research around strategies for online discussion design DeNoyelles and colleagues (2014) note that, "A strong sense of social presence supports the discourse necessary for cognitive presence to take place" (p. 156).

Cognitive Presence

Cognitive presence is described as "the extent to which learners are able to construct and confirm meaning through sustained reflection and discourse" (Garrison & Arbaugh, 2007, p. 161). In an online discussion, cognitive presence can be seen when students are puzzled, when they share new information or make a connection, or when they indicate how they might apply something they learned. Garrison and Arbaugh note the importance of well-designed tasks in online learning and add that, "The role of instructors in cultivating cognitive presence is significant, in terms of how they structure both the course content and participant interactions" (p. 163). Studies indicate that the design of discussion questions contributes to the level of cognitive presence on the part of students in online discussion activities (Darabi et al., 2011; Kanuka et al., 2007; Kilis & Yildirim, 2019).

Garrison and colleagues (1999) operationalized cognitive presence into a process of practical inquiry consisting of four phases: (a) A triggering event in which an issue is identified for inquiry, (b) Exploration of the issue which involves reflection and discussion both individually and collectively, (c) Integration of knowledge in which meaning is constructed from ideas developed during exploration, and (d) Resolution, which involves application of new

knowledge in practical contexts (see Figure 3). The practical inquiry phases have been used in research studies to examine increasing levels of critical thinking evident in discussion postings (Meyer, 2004; Hosler & Arend, 2012; Kilis & Yildirim, 2019).

Cognitive presence is clearly essential for the social construction of knowledge and central to the inquiry process, but the sharing of multiple perspectives which social presence supports is also a necessary component. In terms of accessing the higher phases of the practical inquiry process within online discussions, some factors to consider are the level of the students (i.e., undergraduate versus graduate), the amount of time devoted to individual discussion activities, and the length of the course. In addition, the design of the discussion activity might not support reaching integration and resolution phases of practical inquiry because reaching these levels might not be the goal of the activity (Caskurlu, 2018). Social presence paves the way for cognitive presence, and Garrison and Arbaugh (2007) indicate that there is a complementary relationship between cognitive presence and teaching presence.

Teaching Presence

Teaching presence is described as "the design, facilitation, and direction of cognitive and social processes for the purpose of realizing personally meaningful and educationally worthwhile learning outcomes" (Garrison & Arbaugh, 2007, p. 163). This is where social presence and cognitive presence are intentionally brought together, both in the design and the facilitation of online learning activities. Teaching presence involves three factors: instructional design and organization, facilitation of discourse, and direct instruction (Garrison & Arbaugh, 2007) (see Figure 3). These factors within teaching presence have been conceptualized and researched with the idea that the instructor is solely responsible for teaching presence (Conceição & Donohue,

2012; Hosler & Arend, 2012). The first factor, instructional design and organization, happens primarily before the course begins and typically is handled solely by the instructor. Facilitation of discourse and direct instruction, however, might be engaged in by students as well as the instructor.

Facilitation of discourse involves maintaining the motivation of the learners and encouraging active learning among learners through contributing to discussion during the course. According to Garrison and Arbaugh (2007) facilitating discourse is:

> ...associated with sharing meaning, identifying areas of agreement and disagreement, and seeking to reach consensus and understanding…requires the instructor to review and comment upon student responses, raise questions and make observations to move discussions in a desired direction, keep discussion moving efficiently, draw out inactive students, and limit the activities of dominating posters when they become detrimental to the learning of the group. (p. 165)

Direct instruction, which includes sharing content knowledge with students, providing "intellectual and scholarly leadership" (Caskurlu, 2018, p. 3), is similar to facilitation in that it happens during the course within the discussions. Teaching presence may encourage students to become aware of the inquiry process and support higher-level thinking in the practical inquiry phases of integration and resolution (Garrison & Arbaugh, 2007). Teaching presence has been referred to as the "'backbone' of the community as it sets the social climate and supports critical thinking" (DeNoyelles et al., 2014, p. 159).

DeNoyelles and colleagues (2014) bring up the potential for students to participate in teaching presence. While their position paper and review of literature focuses on strategies for building all three types of presence from the CoI model within online discussions, they imply that facilitating discourse and direct instruction within discussions are two factors within teaching presence that participants other than the instructor (i.e., students) can actively engage in

by connecting ideas, asking clarifying questions or identifying misconceptions (DeNoyelles et al., 2014). Garrison and Arbaugh (2007) indicate that there is a need for more research to examine how modeling critical discourse on the part of the instructor relates to student understanding and awareness of the phases of inquiry. The role of modeling could also be examined as it relates to students participating in teaching presence through facilitation and direct instruction.

The Interactive Nature of Social, Cognitive and Teaching Presence

Garrison and Arbaugh (2007) indicate that few studies have examined the three types of presence within the model simultaneously, though there are clear correlations among them, and studies often note that they overlap. Two studies focus on design elements of online discussions as related to all three aspects of presence within the CoI model (Kilis & Yildirim, 2019; Koh et al., 2010) and provide insights into the way all three types of presence interact and contribute to the social construction of knowledge.

In their case study, Kilis and Yildirim (2019) set out to understand posting behaviors of students relative to social, cognitive, and teaching presence. They analyzed transcripts from six discussion activities involving 91 students in an online information and communication technology course. The discussion prompts were designed to take place over two-week periods and to promote social and cognitive presence by being based on real-life situations and offering opportunities to share personal experiences, brainstorm ideas, explore diverse perspectives and apply solutions. The student postings were coded based on the validated factors for cognitive and social presence. Teaching presence was captured based on what students indicated about the instructor’s presence in their postings (as opposed to examining how students may be engaging

in teaching presence). Findings indicated that social presence within the students' posting was high, particularly for affective expression. Cognitive presence was also high across all four phases of the practical inquiry process (i.e., triggering event, exploration, integration, and resolution). Kilis and Yildirim (2019) conclude that the design of the discussion prompt can promote social and cognitive presence when questions are open-ended and include real-life experiences or provided scenarios.

The discussion prompts in this study were designed using the CoI model as a framework. For example, prompts aimed to promote social presence by asking for personal experiences and aimed to promote cognitive presence by being problem-based and asking students to generate and apply solutions. The design of the discussion prompt is included within teaching presence as part of the instructional design and organization factor. Kilis and Yildirim's (2019) findings suggest that the discussion prompt design may also serve as a triggering event which is the first step in the process of practical inquiry as part of cognitive presence. In using the CoI model both for the design and as a lens for analysis, the interaction and overlapping nature of the three types of presence is apparent.

Koh and colleagues (2010) also investigated the interaction of the three types of presence in their mixed methods case study, in which they set out to examine the quality of knowledge construction using a project-based approach within online discussion. Their research question was "What is the relationship, if any, between students' participation in project-based learning and their construction of knowledge at advanced levels during online discussions?" (p. 285). In a course on the design of e-learning experiences, 17 graduate students participated in online discussions related to a project-based activity as well as a non-project learning activity. The non-

project component of the course involved the instructor initiating online discussions of assigned readings. The project-based component of the course involved individual students designing e-learning courseware and posting artifacts from the design process within the online discussion for instructor and peer feedback.

A total of 419 messages from students and the instructor for both components of the course were analyzed using computer-mediated discourse analysis for recurrent patterns and then coded and categorized based on Interaction Analysis Model (IAM) and the phases of the practical inquiry process of cognitive presence from the CoI model in order to examine knowledge construction. The IAM is geared to capture collaborative knowledge construction, while the CoI model looks at both individual (i.e., isolating cognitive presence factors within the phases of the practical inquiry process) as well as collaborative knowledge construction (i.e., through social presence and teaching presence). Typically, studies using IAM or CoI models for analysis have found low numbers of discussion posts related to the highest levels of knowledge construction, application in IAM and resolution in CoI (Koh et al., 2010). However, the findings in this study indicated that for the online discussions during the project-based component of the course, 37% of postings were coded at the highest levels. During the non-project component of the course with the instructor focusing the discussion on assigned readings, only 9.3% of the discussion postings were coded at the highest levels of knowledge construction.

The qualitative analysis incorporated the three types of presence from the CoI model by coding discussion postings for social presence using “socialize” and “emotion” as coded factors, cognitive presence using phases of practical inquiry (i.e., triggering event, exploration, integration, resolution) as factors, and teaching presence using direct instruction and facilitating

discourse as factors. In this study, both instructor postings and student postings were analyzed for teaching presence. Findings indicate that most of the teaching presence evident in the discussions was produced by the instructor and most of the social presence evident in the discussions was produced by the students. Given Kilis and Yildirim's (2019) findings about the design of the prompt influencing social and cognitive presence on the part of students, further investigation of the way the design of the discussion prompt as it relates to facilitation and direct instruction on the part of students is needed to determine if the prompt itself can promote teaching presence.

Summary of Community of Inquiry Model

The Community of Inquiry model includes components that fit with Activity Theory in that social constructivism informed the development of the model. Social presence, cognitive presence, and teaching presence factors have been validated as constructs that can be measured and analyzed when examining responses in online discussions (Caskurlu, 2018). However, more research is needed that examines the interaction of these types of presence in online learning related to the design of the discussion activity and the goal of social construction of knowledge.

Studies using the CoI model for design and analysis of online discussion activities offer insights into strategies that might support all three types of presence and the social construction of knowledge. Some of these insights include intentionally designing discussion to invite social presence such as using real life situations or biographical prompts (Kilis & Yildirim, 2019; Lohr & Haley, 2018). Cognitive presence can be supported through incorporating strategies and structures (e.g., WebQuest or project-based discussion) that ask students to move through the practical inquiry process phases into the design of the discussion (Darabi et al., 2011). Other

types of discussion prompt designs (e.g., debate) and the scaffolding of discussion through facilitation also support cognitive presence (Kanuka et al., 2007). The design of the discussion prompt represents teaching presence in terms of instructional design and organization (Kilis & Yildirim, 2019). The discussion prompt itself is another area for research that could offer insights into types of presence and the design of the discussion activity.

Facilitation and direct instruction within the discussion are aspects of teaching presence that support cognitive presence and can only happen through engaging social presence in the setting. While teaching presence most often is conceptualized as within the role of the instructor, this type of presence might be valuable to examine on the part of students as well, as it may promote social construction of knowledge. Koh and colleagues (2010) conducted the only study referenced here that examines student postings for teaching presence, though Denoyelles and colleagues (2014) note the importance of studying students' teaching presence. Research focused on teaching presence on the part of students could address a clear gap in the literature on the CoI model and be a meaningful contribution to online higher education.

Social Construction of Knowledge in Online Discussions

In order to understand aspects of the design of online discussion that influence the social construction of knowledge within groups, a literature search was conducted to locate studies from the past 20 years focused specifically on online discussions and using social constructivism as a theoretical framework. Five studies were located that use social constructivism as a framework to analyze facilitation and expectations (i.e., rules and roles) as mediating factors in online discussions (Baran & Correia, 2009; Gilbert & Dabbagh, 2005; Lai, 2015; Penny & Murphy, 2009; Wang & Chen, 2010). In addition, three studies that specifically examine the

discussion prompt design as a mediating factor in discussions were located (Bradley et al, 2008; Hou, 2012; Howell et al., 2017). The following literature review will summarize studies that use social constructivism as a framework to analyze the influence of (1) The rules for how to participate and interact in the discussion; (2) The roles participants take on in online discussion; and (3) The design of the discussion prompt, as these influence higher level thinking and social construction of knowledge.

Facilitation and Expectations as Mediators of Online Discussion

There are several studies which use a social constructivist framework to focus on aspects of mediation (i.e., rules, and roles) as related to the online discussion activity (Baran & Correia, 2009; Gilbert & Dabbagh, 2005; Lai, 2015; Penny & Murphy, 2009; Wang & Chen, 2010). These studies point to the possibilities for focusing on the effect of specific mediating components within online discussion when the goal of the discussion is to promote the social construction of knowledge. Mediating components in an online discussion (i.e., the physical and mental tools that influence movement toward the goal of the activity) include artifacts such as rubrics or protocols which state or imply for participants the *rules* involved in the activity, such as expectations for the length or quality of discussion posts, or the *roles* of different participants involved in the activity, such as who might facilitate the discussion.

Rules. Penny and Murphy (2009) completed a systematic review of 50 rubrics used for evaluating online discussions in higher education settings in order to better understand how rubrics might support students' construction of knowledge. In online discussions, rubrics offer students clear expectations for their role as a participant and the rules for posting (i.e., content, length, format, etc.), so the rubric functions as a mediating factor in the online discussion

activity. The rubrics that were analyzed were identified using a Google search and the criteria on the rubrics were coded and sorted into categories. These categories were then grouped into four core categories, *cognitive* (e.g., reasoning, analysis, connection to content), which represented 44% of the criteria on the rubrics; *mechanical* (e.g., grammar, citations, organization), which represented 19% of the criteria; *procedural/managerial* (e.g., timing, deadlines, etiquette), which represented 18.29% of the criteria; and *interactive* (e.g., responses to peers, questions, feedback), which represented 17.17% of the criteria. The remaining 1.52% were coded as vague and not assigned to a core category.

The cognitive category had the highest representation across the criteria in the rubrics and included emphasis on "critical thinking, problem solving and argumentation, knowledge construction, creative thinking, and course content and readings" (Penny & Murphy, 2009, p. 810). Cognitive presence from the CoI model (Garrison et al., 2003) was referred to in discussing the high percentage of criteria on the rubrics representing the cognitive category. Penny and Murphy (2009) noted that studies using the CoI model find that social presence in combination with cognitive presence is necessary for higher order thinking and collaboration. However, they found small numbers of criteria used to assess social presence and conduct toward others across the 50 rubrics in their analysis (Penny & Murphy, 2009).

The mechanical category included criteria related to grammar and spelling, organization and use of references, while the procedural/managerial category included criteria related to participation and conduct. These two categories combined were nearly as highly represented within the criteria across the 50 rubrics at 37.29% as the cognitive category at 44%. Penny and Murphy (2009) suggest in their conclusions that including some procedural/managerial criteria

within a rubric is likely to support participation, which is necessary for construction of knowledge. However, an emphasis on mechanical criteria may serve to detract students from contributing in deep and reflective ways due to a preoccupation with composition, spelling and grammar. In addition, they conclude that more research is needed to understand the way social presence criteria within rubrics might contribute to students' construction of knowledge and higher order thinking.

Gilbert and Dabbagh (2005) also examined evaluation rubrics in addition to facilitator guidelines and posting protocols in a multiple case study involving four different sections of the same hybrid graduate course, Instructional Technology Foundations and Learning Theory. They wanted to examine how varying levels of structure contributed to "meaningful discourse" in online discussion, which they define as "the ability of learners to demonstrate critical thinking skills by (a) relating course content to prior knowledge and experience; (b) interpreting content through the analysis, synthesis, and evaluation of others' understanding; and (c) making inferences" (p. 6). Transcripts from three online discussions from each section (a total of 12 transcripts) were analyzed and coded using these three critical thinking skills categories.

The amount of structure was indicated by the varying availability of facilitator guidelines, posting protocols, and evaluation rubric criteria across the four sections. Section one was considered minimal structure and included no formal guidelines, protocols, or rubrics. Section two was considered low structure and included two guidelines for facilitation. Section three was considered medium structure and included specific protocols for posting as well as the guidelines for facilitation. Section four included the protocols and guidelines from section three as well as a comprehensive evaluation rubric and was considered high structure.

Gilbert and Dabbagh's (2005) findings suggest that the three types of structures (i.e., facilitator guidelines, evaluation rubrics, and posting protocols) that were available in varying degrees across the four sections had some positive and some negative impacts on meaningful discourse in the online discussion. The addition of facilitator guidelines positively influenced meaningful discourse as shown by an increase in the number and type of student facilitator postings in the discussion forum. Two criteria that were part of the evaluation rubric were found to lead to increased interaction within the online discussion and higher instances of making inferences within posting. The first was even distribution of postings, which specified that rather than posting the required number of responses all at once, students were expected to space them out over a period of days. The second was an increase in the percentage of the overall course grade associated with the online discussion activity. Among the posting protocols, the specific protocols limiting the length of a post and requiring citations from readings had a negative impact on meaningful discourse as students' posts included mostly content clarification and reading citations and lower levels of making inferences. Gilbert and Dabbagh conclude that students may have been more concerned with responding in the ways specified in the protocols rather than constructing their own understanding of the content through making inferences.

The course involved in this study was a hybrid course, so it is possible that there were mediating factors that contributed to the results that occurred during in-person class meetings. However, it is clear that artifacts such as guidelines, protocols, and rubrics do serve to mediate the participation and contributions of the students in online discussions.

Roles. Lai (2015) conducted a study that examines the way that the roles of different participants can serve to mediate the social construction of knowledge within online discussion.

Lai's mixed methods study followed a cohort of EdD students over two years of coursework and thesis development at a university in New Zealand. During the coursework stage in the first year of the EdD program, 12 students participated in nine, two-week online conferences that involved threaded discussions. Nine of these threaded discussions were analyzed and coded and all 12 students were interviewed. During the thesis stage in the second year of the EdD program, 10 students were placed into two groups of five along with five supervisors in each group. Each group participated in three online conferences during the thesis proposal development stage and one group's threaded discussions was selected for analysis. Six students and six supervisors from this second-year stage were interviewed.

Coding for social construction of knowledge in this study was done using the Interaction Analysis Model (IAM). In this study, student postings were coded at three levels for (a) sharing of knowledge, (b) negotiation of knowledge, and (c) confirmation and application of knowledge (Lai, 2015). These phases of knowledge construction were discussed using the perspective of Garrison and colleagues' (2003) CoI model as related to cognitive presence. The analysis of discussion postings examined patterns of interaction with instructor and peers and related to social presence from CoI model.

Within the first year (i.e., coursework stage) discussions, the instructor contributed 35% of the total number of postings. During this stage of the program, the design of the online conferences involved instructor facilitation using a high level of direct instruction. In examining specific discussion threads closely, Lai (2015) found that when the instructor posted a task that primarily involved recall of prior knowledge, the discussion was not conducive to constructing new knowledge as students did not engage in much peer interaction within the discussion. It was

also found that as the instructor presence increased in certain discussion threads (i.e., up to 55% of the postings) there was lower instance of metacognitive statements, implying that as long as the instructor's participation has reached a certain level, having more of it will not make a difference and in fact might hinder the construction of knowledge.

During the second year (i.e., thesis stage) discussions, Lai (2015) found that when supervisors provided responses very quickly to students, students did not engage in as much discussion with one another. Within discussions where the supervisor was not able to quickly respond to a student's posting, other students would respond ahead of the supervisor, resulting in students engaging in lengthier back and forth discussion with one another. In addition, a component of peer review during this thesis stage resulted in more peer-to-peer participation overall. These findings prompted Lai to conclude that social presence in combination with cognitive and teaching presence needs further examination as combinations of these relate to knowledge construction in online discussions.

Baran and Correia (2009) analyzed student-led facilitation strategies for online discussions in a 16-week graduate level instructional design course for elementary education students in a college in the U.S. Midwest. The 16 students in the asynchronous online course were all former or practicing K-12 teachers or college instructors. The case study involved three mini cases featuring different facilitation strategies used by students who volunteered to facilitate one week of online discussion. Each mini case represents a different facilitation strategy selected by the student discussion leader and the analysis focused on identifying ways that the strategies (1) Overcome challenges in instructor-led facilitation; (2) Enhance learning; and (3) Encourage participation.

The instructor for the course facilitated the online discussion for the first three weeks of the course and then stepped into the role of participant in the online discussions as students took over leading facilitation. Students who led discussions were encouraged to explore different ways to engage and interact to promote meaningful dialogue. The instructor determined the readings and focus of the content for each week, but student facilitators decided on the questions or focus and the structure of the discussion. “In this context, the reading materials were used as shared artifacts to start the online discussion and a pretext to come together and participate in professional conversation” (Baran & Correia, 2009, p.357). The three mini cases overview three different but effective facilitation strategies used by student discussion leaders: highly structured, inspirational, and practice focused.

The highly structured strategy involved the student facilitator applying the KWL (i.e., know, want, learn) structure to the online discussion format. This strategy started with students posting about what they know and want to know about the content for the week, which was task analysis, prior to reading about it. Then they posted again about what they learned from the module content and readings. This was a highly organized and systematic process which resulted in high engagement. The student who facilitated what the researchers named the inspirational strategy for discussion asked a series of questions about ideal initiatives the students dreamed of implementing in their contexts. This was related to weekly content focused on implementation of instructional design and served to engage students in sharing dreams, goals, and ideal scenarios. The practice focused facilitation strategy involved the student creating four discussion threads based on four paradigms for design introduced in the reading. In each thread was a discussion question asking participants to connect the ideas from the paradigm with their own teaching

practice or real professional situations. All three strategies were different, but highly effective in promoting discussion.

While each of the three featured student facilitators in the mini cases approached the task of leading the discussion activity in different ways, their strategies fit their personal teaching and learning style and resulted in effective engagement of participants and high levels of participation. The instructor did not need to intervene to prompt students to participate or to bring the discussion back to the content planned for the week. Baran and Correia (2009) refer to the CoI model, specifically teaching presence, noting that while the model situates teaching presence including discussion facilitation with the instructor, that teaching presence can also happen through meaningful interactions among students. Findings from this study indicate that student led facilitation strategies can promote innovation, motivation, active participation. Baran and Correia conclude that, "The change of responsibilities means giving students the power to take practical and meaningful roles in the online classroom" (p. 357).

Wang and Chen (2010) conducted a mixed methods study of an online discussion forum activity designed to promote spontaneous facilitation among participants. Different from being assigned the role of facilitation within an online discussion, Wang and Chen were interested in promoting spontaneous facilitation in an effort to promote student learning and success in the discussion in a way that instructor facilitated or assigned student facilitation might not. Online discussion was carried out as part of a research project assignment over three weeks in a graduate level hybrid course titled Training Strategies and Method at a university in an English-speaking Asian country. Participants included 20 graduate students who had no prior experience with online discussion and the discussion focused on sharing and exploring issues involved in training

strategies and methods. A social constructivist framework was used to design the activity which incorporated Hung and Chen's (2002) Adapted Activity Theory based in a community of higher education and prioritizing object (i.e., goals) and rules that dictate the use of tools and roles of participants. In addition, Garrison and colleagues' (2001) Community of Inquiry model was used in the design of ground rules to promote cognitive presence (i.e., expectations for deadlines, quality, structure and participation) and social presence (i.e., expectations for risk taking, questioning and disagreement).

The use of Adapted Activity Theory (Hung & Chen, 2002) prompted design considerations of creating commonality, or shared value around the object of the activity, and interdependence among participants. The research project that was the focus of the three weeks of online discussion involved peer review, which created a sense of mutual benefit for participation among students as incorporating peer feedback was required in the final product. The goal and rules of the activity set up participants to be in the role of collaborators rather than competitors. This also prompted a high level of spontaneous facilitation by students as evidenced by the total of 267 messages that were involved in the three weeks of online discussion among the 20 graduate students. Only two messages were sent by the instructor, who closely monitored the discussion but left facilitation to the students.

Researchers concluded that the design of the activity, involving clear goals and rules to promote commonality and interdependence, allowed for students to take on the role of spontaneous facilitation within the discussion. The facilitation method used most frequently by the students was questioning, which is associated with higher order cognitive skills; however, this also raises a new question about how to design online discussion activities that promote a

wider range of higher order cognitive skills within the discussion activity. In addition, as a hybrid course, it is unclear whether spontaneous facilitation on the part of the students within the online discussion was mediated during in-person class time in some way.

Online Discussion Prompt as a Mediator of Online Discussion

The design of the online discussion prompt or question using a social constructivist framework has been the specific focus in studies (Bradley et al., 2008; Howell et al., 2017; Hou, 2012). These studies examine the online discussion prompt as the mediator of the activity in which the object is to promote social construction of knowledge. The online discussion prompt itself can be viewed as a tool that establishes rules and roles for participation in the discussion.

Hou (2012) conducted a mixed methods study to analyze both cognition and interaction using a role-playing prompt design within an online discussion activity. Seventy college students majoring in information management were asked to take on roles within a fictional corporate office experiencing organizational management issues that was presented in a scenario serving as the prompt for the online discussion. Students were asked to participate in the online discussion over 20 days based upon their assigned job position with the goal of developing a draft of a proposal for organizational reform for the corporation. Hou used cognitive process dimensions based upon Bloom's taxonomy to code student postings for higher order thinking. Student postings were also analyzed for interaction related to progressing phases of social knowledge construction using the Interaction Analysis Model (IAM). Responses were coded using five categories: (a) sharing and comparing, (b) identifying areas of disagreement, (c) negotiating meaning and co-construction of knowledge, (d) evaluation and modification of new schemas that result from co-construction, and (e) reaching and stating agreement and application of co-

constructed knowledge. In addition to analyzing the proportion of each code, the codes for cognition and interaction were analyzed sequentially in order to understand behavioral patterns over time in the online discussion.

Analysis revealed that the IAM (knowledge construction) category with the highest percentage was sharing and comparing. The dimension of cognition with the highest percentage was understanding, shown by giving examples or explaining. Sequential analysis indicated that most students posted using the same cognitive process rather than incorporating a range of cognitive processes. Findings in this study suggest that the strategy of role-playing may serve to motivate learners and might develop cognitive skills in the areas of comparison and analysis of different opinions. Recommendations for the design of online discussion prompts include having the instructor post responses within the discussion to support a wider range of cognitive processes, or to use more structured strategies, such as a series of different scenarios or changing the roles of students within the scenario over time, in order to diversify the knowledge construction. The findings in this study indicate that the design of the discussion prompt can influence the social construction of knowledge and higher-level thinking within the individual.

Two studies (Bradley et al., 2008; Howell et al., 2017) use structured divergent prompt design based on Andrews' (1980) work examining how the form of the question influences the extent of the response. In studying question types, Andrews found that three types of prompts for discussion that fall under the category of structured divergent prompts correlate to more productive discussion. These are the playground prompt, brainstorming prompt, and focal prompt, and all three represent the three upper levels of Bloom's taxonomy of cognitive ability (Bradley et al., 2008). The playground prompt involves asking students to interpret or analyze

some aspect of the content by making connections with their own experience or with course content or reading. For example, “Using Family Systems Theory, explain how children’s personalities affect parenting styles” (Bradley et al., 2008, p. 890).

The brainstorming prompt is structured to ask students to generate a wide range of ideas or solutions. For example, “How would you encourage parents and teachers to emphasize praising children’s effort more than their intelligence?” (Bradley et al., 2008, p. 890). The focal prompt asks students to take a position or stance or share their opinion on an issue that has been presented. For example, “Should schools be held accountable for student performance even if it means losing funding?” (p. 891).

In a mixed methods study, Bradley et al. (2008) set out to examine how the structure of the question in online discussions influenced the students’ submissions. The online discussion postings of 114 undergraduate students enrolled in three sections of a hybrid child development course were analyzed for length, level of completion, and higher order thinking. Word count of postings was computer calculated, the completeness of the postings was rated by the instructor and research assistant, and higher order thinking was coded using a rating scale from 0 (incorrect) up to 5 (abstract thinking) based on Bloom’s taxonomy (Bradley et al., 2008). An application prompt was used in addition to playground, brainstorming, and focal prompts identified by Andrews’ (1980) work. The application prompt asked students to respond to a scenario that was provided using information from course readings. Students were given directions about completing the online discussion postings, but were not given an evaluation rubric, and the discussion was moderated by a research assistant rather than the course instructor.

Findings indicate that playground prompts that asked students to make connections to course content were most influential in terms of postings involving higher-level thinking, though least influential in terms of word count and completeness of response. Brainstorm prompts also rated highly in terms of higher-order thinking, while application prompts rated the lowest of the types of prompts used. Focal prompts, asking for students to take a stance or share an opinion, rated lower than playground and brainstorming prompts, but a bit higher than application prompts in terms of higher-level thinking represented in student postings. Bradley and colleagues (2008) conclude that "structuring a question to require synthesis of material can assist a student in thinking in more complex ways" ...and recommend continued research in this area to…"explore other question types that require students to answer using a real world or abstract example to see if their thinking level improves" (p. 898). They also note that task complexity seems to matter in knowledge construction as their study as well as studies they reviewed found that overly simple or overly complex discussion tasks resulted in less high-level thinking.

As a hybrid course, the amount of mediation for the online discussion that occurred during the in-person class meetings is not known. Also, while social constructivism is mentioned as underpinning the online discussion activity, the analysis focused on the thinking of the individual student evident in their postings rather than interaction between students or evidence of social construction of knowledge. It is possible that focal prompts, which ask students to take a position, or application prompts, which ask students to respond to a scenario, may prompt higher *interaction* between students though they rate lower in terms of higher-level thinking, as Bradley et al. (2008) found. Examination of discussion prompt design that includes analysis of

interaction between students could offer more insights in terms of social construction of knowledge, which the next study was designed to include.

Howell and colleagues (2017) conducted an experimental study to examine interaction within online discussion as related to question type in two sections of a graduate level instructional design course including 65 students. One section of the course was the experimental group and was given the structured divergent prompts, while the other was the control group and was given convergent prompts. Andrews' (1980) structured divergent prompts (i.e., playground, brainstorm, and focal prompts) were used in the experimental section. Student postings were analyzed using the Interaction Analysis Model (IAM) and responses were coded using five categories: (a) sharing and comparing, (b) identifying areas of disagreement, (c) negotiating meaning and co-construction of knowledge, (d) evaluation and modification of new schemas that result from co-construction, and (e) reaching and stating agreement and application of co-constructed knowledge (Howell et al., 2017, p. 483). In addition, concept mapping was incorporated into the online discussion activity, which involved the students writing down and linking ideas using arrows during the discussion to track their thinking and connections between complex ideas and then posting the maps as part of the discussion requirements. An "expert" concept map was developed for each discussion and student concept maps were analyzed for how closely they correlated to the expert map, with higher correlation being considered a higher level of knowledge construction. This allowed the researchers an additional source by which to assess the students' construction of knowledge around the concepts of focus in the online discussions.

Findings in this study indicated that the focal prompt was the most effective in terms of knowledge construction with a significant difference between the control group and experimental group within IAM coding of postings as well as concept map correlation with the expert map. The use of the concept map overall in conjunction with the structured divergent prompts in the experimental group was also shown to be effective in terms of knowledge construction as measured. The researchers conclude that "the Focal Prompt requires students to engage with the content at a higher level by presenting a complex controversy with more than one solution. By requiring students to choose an argument and support the viewpoint with a rationale, students were better able to construct knowledge as related to course content" (Howell et al., 2017, p. 487).

While Bradley and colleagues (2008) found focal prompts to be lower in terms of higher-level thinking, Howell and colleagues (2017) found focal prompts to be the most effective in terms of social construction of knowledge. Both studies indicate that the design of the discussion prompt can make a difference in student responses, and choices instructors make about the design of the discussion prompt may depend upon whether knowledge within the individual or knowledge that is socially constructed in the group is prioritized. One difference in these two studies that might contribute to these findings is that one study was at the undergraduate level (Bradley et al., 2008) and the other at the graduate level (Howell et al., 2017). Measuring the social construction of knowledge using a model that captures interactions between students rather than higher-level thinking within the individual reflects a theoretical stance on cognition that fits with social constructivism.

Relationship-Based Learning by Design

In order for knowledge to be constructed within an online community of inquiry, relationships are essential. Relationship-based learning online requires both instructor and student presence socially and cognitively. Students and instructors both need a sense of "being there and being together" (Lehman & Conceição, 2010, p. 3) in order to work collaboratively toward the goal of socially constructing knowledge about the content.

Students make their presence in an online class evident through posting in response to the discussion prompt designed by the instructor and in response to each other's postings. Within discussion activities in which both social and cognitive presence are involved, there are better outcomes for student learning and engagement (Darabi et al., 2011; DeNoyelles et al., 2014; Lohr & Haley, 2018; Penny & Murphy, 2009; Richardson & Swan, 2003). Designing the discussion activity using mediating artifacts (e.g., rubrics, facilitation guidelines) that invite cognitive and social presence allows for an exchange that involves more depth and meaning for the students participating. This is because social presence supports a connection and sense of togetherness that forms a foundation of relationships among students and instructor, leading to cognitive presence that includes an integration of multiple perspectives, ideas, questions, and even uncertainty.

Instructors make their presence in an online class evident through the course design itself, which sets the stage for student presence. Instructors also make their presence in an online class evident through posting in the discussion, through facilitation and direct instruction in response to students' postings. This is the way in which instructors build relationships with their students, through engaging in discussion together, modeling and encouraging both social and cognitive

presence. While some researchers locate teaching presence solely with the instructor, it is possible for students to also participate in facilitation and direct instruction (DeNoyelles, et al., 2014). The design of the discussion activity may invite students to engage in teaching presence as well.

Returning to the earlier examples of Anna's and Laura's responses to peers in an online discussion, it is clear that there are many components of online discussions that could contribute to the varying depth of responses students might post as studies examining aspects of facilitation and expectations in online discussion have found (Baran & Correia, 2009; Gilbert & Dabbagh, 2005; Lai, 2015; Penny & Murphy, 2009; Wang & Chen, 2010). The online discussion activity and student presence in the discussion is mediated by things such as rubrics, grading weight, timing and facilitation. Facilitation on the part of instructor and students within the online discussion activity will most certainly influence the three types of presence. An analysis of the design of the online discussion activity and the interactions of participants in the discussion could offer insights into aspects of the discussion that contribute to presence, the social construction of knowledge, and higher-level thinking, as well as future lines of inquiry. This is evident through the review of literature on social construction of knowledge in online discussions.

Applying Activity Theory as the theoretical framework allows for an understanding of how the goals, participants, social and cultural community, and mediating factors (i.e., roles, rules, discussion prompt) influence the online discussion activity. The goal of the online discussion from a social constructivist perspective is to support higher level thinking and socially constructed knowledge within an online course. The participants in the online discussion bring

their own prior experiences and ways of thinking to the online discussion activity. The community being situated within a higher education setting involves roles for instructors and students (Hung & Chen, 2002) that influence the ways participants approach the online discussion task.

Using Activity Theory as the theoretical framework, the online discussion activity becomes the unit of analysis. There are many course design features within online discussions that influence students' higher level thinking and social construction of knowledge including the design of the discussion activity itself (Baran & Correia, 2009; Hou, 2012; Lai, 2015). IAM and CoI are models that are rooted in social constructivism and offer the possibility of measuring and examining patterns of social, cognitive, and teaching presence in student discussion responses as related to social construction of knowledge. This will potentially allow for identification of aspects of the design of the discussion task that influence these patterns. Situating teaching presence with both the instructor and students reflects a social constructivist philosophy of teaching and learning. The lack of studies that conceptualize teaching presence for students, specifically the categories of facilitation and direct instruction, is a gap in the literature on the CoI model. The current study aims to examine patterns of teaching presence on the part of students as related to social construction of knowledge for the group. Findings from this study will make a positive contribution to the field of online higher education.

The Community of Inquiry model was created to understand learning in online contexts. The educational experience is situated at the intersection of social, cognitive, and teaching presence, reflecting that knowledge is constructed socially before it is internalized (Wertsch, 1979). Using the CoI model in conjunction with the IAM allows for student presence at the

individual level and social construction of knowledge at the group level to be measured. The IAM operationalizes interactive moves that occur within online discussions in a progression of phases. Evidence of higher phases of knowledge construction within an individual posting represents social construction of knowledge for the group. The CoI model offers validated factors (Caskurlu, 2018) for social, cognitive, and teaching presence for individual participants within online discussion and the Practical Inquiry Model (Garrison et al., 1999) within cognitive presence is a means of measuring higher order thinking.

The proposed study aims to describe the social construction of knowledge and patterns of presence that are evident in student postings for a discussion activity in a graduate level asynchronous online course. Different aspects of the online discussion activity, including the explicit directions and rules for the activity, the roles that students and instructors take on, and the individual skills and knowledge of participants in the discussion, are likely to influence the social construction of knowledge and the types of presence (i.e., cognitive, social, and teaching presence) students engage in through their posts. The primary focus of this study is to describe and explain how teaching presence on the part of students unfolds in online discussions and attempt to understand whether and how this contributes to the social construction of knowledge within groups of students. The following research questions are the focus of this study:

1. What evidence is there that social construction of knowledge is happening in small group online discussions?
2. What patterns of social, cognitive, and teaching presence on the part of students and the instructor are evident in discussion responses?

3. How does teaching presence on the part of students and the instructor contribute to social construction of knowledge in small group discussions?

Activity Theory is the guiding framework for the analysis of the online discussion task with the goal of social construction of knowledge.

The Interaction Analysis Model (IAM) was developed by Gunawardena et al. (1997) as a technique for analysis of co-construction of knowledge in technology mediated collaborative learning contexts. The Community of Inquiry (CoI) model was created by Garrison et al. (1999) to conceptualize the ways in which participants interact to support the educational experience through being present in different ways within online learning settings. Previous studies incorporating the CoI model as a framework have most often examined teaching presence only for the instructor (Conceição & Donohue, 2012; Hosler & Arend, 2012; Sheridan et al., 2013). This study aims to code student discussion responses using teaching presence indicators typically only assumed to be the responsibility of the instructor within online discussions, specifically facilitation and instruction. Thus, this study will fill a gap in the existing literature on the CoI model and raise awareness of the broader role that students can take in social constructivist educational contexts. IAM and CoI offer established constructs and validated indicators to use in coding discussion responses for evidence of social construction of knowledge and types of presence.

CHAPTER THREE

METHODOLOGY

Research Questions

The primary research question for this study is: How does teaching presence on the part of students contribute to socially constructed learning within online discussions? In order to examine this question, the following research questions are addressed in this study: (1) What evidence is there that social construction of knowledge is happening in small groups? (2) What patterns of social, cognitive, and teaching presence are evident in discussions? (3) How does teaching presence on the part of students and the instructor contribute to social construction of knowledge in small group discussions?

In this study it is hypothesized that some students' responses will include evidence of teaching presence, and this is anticipated to coincide with evidence of Phase III of the IAM as this represents negotiation of co-construction of knowledge. It is anticipated that within the small group where there is evidence of teaching presence on the part of students that there will be evidence of Phase IV or V of the IAM. A connection between teaching presence on the part of individual students and high phases of social construction of knowledge within small groups has implications for the design of online discussions, and the potential learning for students.

Context and Task

Erikson Institute, a graduate school in child development in Chicago, has been offering an online graduate degree program for over a decade and has recently been expanding these

efforts by including specialized degree tracks, certificate programs, hybrid, as well as stand-alone course options. Erikson Institute holds several core values that define and shape the educational opportunities it offers. These values include freedom of inquiry and expression, relationship-based education, commitment to social justice, diversity, complexity, high standards, and excellence (Erikson Institute, 2021). One value that is a defining characteristic of an Erikson education is the emphasis on relationships as central to professional learning and growth. Erikson describes its approach to education as "relationship-based" and this is evident in small class sizes, availability of supports for student success, and a commitment to a social constructivist philosophy. After 40 years of offering relationship-based education in face-to-face programs, Erikson made a commitment to ensure that its online programs were designed with this essential value, relationship-based education, in mind.

Online courses at Erikson Institute include discussion forums as one of the central activities in many of the modules, with each module representing one week of content. Discussions in Erikson Online have been described as "The nexus of interactions, relationships, collaboration, peer-to-peer learning and teaching" (Donohue et al., 2018). Along with readings, presentations, and other resources (e.g., audio and video content) that are made available, discussions serve to support students in developing an understanding of the central concepts of the module, and in a broader way, the goals of the course, the program of study, and Erikson Institute, by incorporating relationship-based design. Discussions are often arranged for small groups of students and involve students posting a response to a prompt and then engaging further in the discussion by responding to what their peers have posted. If responding to peers was not part of the design, students would not be engaging in constructing learning with others. Without

the series of back-and-forth responses in the discussion activity, it would essentially not be a discussion as much as an assignment that is submitted to the instructor alone.

This study examines discussion postings from two sections of an Erikson Institute online course titled *Social and Emotional Development II: Early Adolescence through Adulthood* (SED II). The course was held during the spring semester of 2021, during the global COVID-19 pandemic. The students in the course were all enrolled in on campus programs that offer options of in-person (face-to-face) courses and online courses. For these students, in-person courses during fall 2020 and spring 2021 were held in a synchronous remote format via video conferencing due to the pandemic.

In addition to the global COVID-19 pandemic, the spring semester of 2021 was a period of unprecedented political tension in the US surrounding the transfer of presidential power and the struggle to preserve democratic principles. There was also a heightened awareness of pervasive systemic racism and powerful movements toward racial equity taking place. The social and cultural concerns of the time were frequently incorporated by participants in the discussions during the semester and must be acknowledged as part of the social and cultural context that affected individual students during the time the course was held.

The SED II course is a core child development course at Erikson that builds on the concepts presented in a pre-requisite course, *Social and Emotional Development I: Infancy and Childhood* (SED I). The two main areas of focus for the content for SED II include: psychosocial development from middle childhood through adulthood; and issues involved in understanding and working with parents and families. There is emphasis on reflective practice through examining personal beliefs and expectations about parenting and professionalism.

The Discussion Task

The structure of the discussion activity in this course includes students posting an initial written response to an instructor designed prompt by Sunday at midnight and then going back into the discussion forum to respond to at least two peers' postings by Wednesday at midnight. The discussion takes place asynchronously with students posting their initial response any time between Friday morning when the module opens, through Sunday at midnight when the initial post is due. Students can post responses to at least two peers anytime from Sunday through Wednesday at midnight. The asynchronous format gives students time to think about the content from the module, the discussion prompt, and what other students have shared, before posting their responses. Unlike a face-to-face class, every student participates in the discussion at least three times. The discussion activity counts toward 60% of the total grade for the course.

As noted, the discussion task is designed to promote student engagement in social construction of knowledge. It is expected that cognitive presence will appear in the students' initial responses to the prompts, because of the use of open-ended discussion prompts that are tied directly to content from the module. In addition, students have the *opportunity* to potentially engage in all three types of presence (i.e., cognitive, social, and teaching presence) in the discussion activity. However, it is anticipated that findings will indicate that only *some* students engage in teaching presence. It is possible for students to bring teaching presence into their postings through indicators of instruction (e.g., presenting content or questions; injecting knowledge from diverse sources). For example, a student might bring in a term or concept from another course and explain it within their posting. Students might also engage in teaching presence in their postings through indicators of facilitation (e.g., drawing in participants or

prompting discussion). For example, a student might draw other students in by asking a question within their posting aimed at generating further discussion. A student may engage in teaching presence intuitively as an individual who has experience with academic discourse that involves facilitation and collaborative thinking.

The course design and organization as well as instructor modeling might also serve to invite students to engage in teaching presence. The rubric (see Figure 4) for the discussion activity outlines the expectations for student postings, and emphasizes posting on time, as posting late leaves students with less opportunity for interaction with each other.

The rubric (see Figure 4) for initial posts and responses to peers includes different expectations for each type of post. Criteria for the highest level for both initial postings and responses to peers' postings are focused on aspects of cognitive presence with emphasis on "demonstrating understanding" in the initial response and "clarifying ideas" in responses to peers. However, "furthering discussion" is also emphasized in the criteria for responses to peers. This fits with *Open Communication* indicators for social presence (see Figure 5).

The primary purpose of a Community of Inquiry is collaborative efforts on the part of all participants toward socially constructing understanding of the content of focus. Social constructivism is the foundation of the CoI model and also my philosophy of teaching and learning. As the SED II course instructor and primary researcher for this study, when referring to the course instructor I use first person for ease of reading. I intentionally include opportunities for social learning in the design and organization of the course. I participate in the online discussions to facilitate and instruct, but also with the intention of modeling for students how they might engage in the discussion with teaching presence.

Participation in Discussions: During most modules you will participate in a discussion around the module content. Each discussion is worth 5 points toward your final grade. In order to earn full points for the discussion response and response to peers you must post on time and provide thoughtful, in-depth responses to the questions posed. Posting late or responding to peers late will result in a reduction of .5 points for each day late.	
Discussion Prompt Response: 2.5 points possible	
Points	Criteria
2.5	Clear response which addresses all the points specified in the discussion prompt; post demonstrates an in-depth understanding of the module concepts; examples provide strong support in clarifying ideas.
2	Response addresses most of the points specified in the discussion prompt; post demonstrates a good understanding of the module concepts; examples provide some support in clarifying ideas
1.5	Response addresses only a few of the points specified in the discussion prompt; post demonstrates a moderate understanding of the module concepts; examples provide weak support in clarifying ideas
1	Response fails to address the points specified in the discussion prompt; post demonstrates a poor understanding of module concepts; examples do not contribute to clarity of ideas
.5	Confusing, lacks explanation of reasoning
0	Not submitted or unreadable
Late postings will automatically lose .5 points per day delayed.	
Response to Peers: 2.5 points possible	
Points	Criteria
2.5	Responses are thought provoking and insightful; responses do at least two of the following: clarify ideas, offer new perspectives, further discussion
2	Responses serve to clarify ideas, offer new perspectives, or further discussion
1	Responses do little to clarify ideas, offer new perspectives, or further discussion
0	No responses submitted or unreadable
Late postings will automatically lose .5 points per day delayed.	

Figure 4. Discussion Participation Rubric for SED II Online

	Categories	Examples of indicators
Cognitive Presence	Triggering Event	• Sense of puzzlement • Brainstorming; Information exchange • Connecting ideas • Defending solutions
	Exploration	
	Integration	
	Resolution	
Social Presence	Affective	• Self-disclosure • Expressing (dis)/agreement • Salutations
	Open Communication	
	Group Cohesion	
Teaching Presence	Design and Organization	• Establishing time parameters • Seeking to reach consensus • Present content; Focus the discussion on specific issues
	Facilitating Discourse	
	Direct Instruction	

Figure 5. CoI Framework, Presence categories and examples of indicators

The rubric for discussions includes criteria that align with teaching presence categories. Specifically, “offer new perspectives” and “further discussion” criteria align with the teaching presence categories *Facilitating Discourse* and *Direct Instruction* (see Figure 5). These criteria could also fall under cognitive presence categories *Exploration* and *Integration.* Teaching presence on the part of every student is possible, but not required for success in the online discussion activity or the course overall. The benefit to students of engaging in teaching presence is to push and stretch the group to contribute to the social construction of knowledge. Students within the group have greater opportunity to learn within their zone of proximal development (Vygotsky, 1978) when more group members engage in facilitation and instruction.

The Discussion Prompt

The invitation into the online discussion activity in the SED II course for the students is the prompt. Online discussion prompts reflect the category of teaching presence that resides with the instructor, design, and organization. The SED II discussion prompts were intentionally

designed to promote interaction and social construction of knowledge around the content of focus. This means that the questions or statements that students respond to in their initial posting were constructed to invite social and cognitive presence on the part of students.

The discussion prompts in the SED II course include a range of open-ended questions and activities. These reflect Erikson's relationship-based value through engaging students in discussions in which multiple perspectives are expected and welcomed. For example, in Module 2 students in small groups are assigned a case study about a child in middle childhood and then asked to apply a model for understanding middle childhood development in an integrative way (Garcia-Coll & Szalacha, 2004) from the assigned module reading. Then in their Module 2 discussion postings students are asked to generate ideas about factors at play in their assigned case through the application of the model and possible strategies for support.

In Module 6, students use a concept map introduced through one of the assigned module readings (Harkness & Super, 2006) to map a caregiving practice to examine underlying cultural beliefs and values. Then in their Module 6 discussion postings students are asked to discuss the cultural beliefs behind the caregiving practice they mapped and consider alternatives.

In Module 11, students read a case taken from Andrew Solomon's *Far from the Tree* (2012) having read two chapters from the book as assigned module readings. Then in their Module 11 discussion posting students choose one of the family members in the case and role play that they are the case worker for that individual. They self-reflect on challenges and strategies in working with this family member and apply Family Systems Theory (module content) to explain how they might best work with the family member they selected.

The patterns of social construction of knowledge and student presence over the course of the semester are of interest in this study. For this reason, the discussion postings for Modules 2, 6, and 11 are analyzed to describe social construction of knowledge and patterns of presence over time. The relationship between social construction of knowledge and teaching presence on the part of students and the instructor is the primary research question for the study. The ways in which the course design and the instructor's teaching presence in the discussions invites facilitation and instruction on the part of students in online discussions, and whether this promotes high phases of social construction of knowledge for the group is the main focus for the analysis. Understanding the role that the course design and instructor plays in promoting teaching presence on the part of students could be a meaningful contribution to the field of higher education, particularly if evidence of higher phases of social construction of knowledge within small groups accompanies evidence of teaching presence in students' postings.

Participants

Erikson Students

Students in SED II typically come into the course with some experiences that create a shared foundation on which to build a Community of Inquiry. Students at Erikson Institute have a shared goal of expanding knowledge and expertise in order to work with and for children and families because of the specific focus on child development for all programs of study. This shared purpose among students, even in core child development courses such as SED II which include students from a range of programs, promotes community. In addition, the continuation from the SED I course supports students in having shared knowledge of child development concepts which can function as a "common language" to bring into discussions. For example,

students become familiar with the concept of *parental ethnotheories* (Harkness & Super, 2006) in SED I in terms of how caregiver beliefs, values, and previous experiences in their cultural community shape the environment and experiences for the infant or child. Students often bring this into online discussions in SED II during modules focused on parenting related to adulthood development.

Because this is a graduate level course that is part of a course of study that students have sought out for themselves, students tend to have a strong sense of commitment and to participate actively. While some students may demonstrate teaching presence, there are factors that may interfere with *every* student demonstrating teaching presence in online discussions. Because students have spent many years "learning" the role of student, there may be some students who do not engage in teaching presence because it challenges established boundaries for roles in educational contexts. In addition, experience and comfort level with online courses may influence whether a student engages in teaching presence. If navigating the online course space is new and challenging for a student, the high cognitive load of adjusting to the new format of interaction in asynchronous written discussions may limit the student's ability to step into teaching presence.

The total number of students whose postings are analyzed is 26 (section 01=13, section 02=13). Three students fully participated in the course but did not consent to have their work included in the study. The instructor was the same for both sections and is the primary researcher for this study. For the discussion activity, students were grouped into small groups of five students and the groups changed every four weeks to allow students the opportunity to engage with everyone in the class. The postings from Modules 2, 6, and 11 are examined for indicators

and phases of social construction of knowledge and for cognitive, social, and teaching presence to allow for a view of how these might change over the course of the semester. Discussion postings from both sections (n=27; 26 students and the instructor) are coded and analyzed for the first two research questions: (1) What evidence is there that social construction of knowledge is happening in small group online discussions? and (2) What patterns of social, cognitive, and teaching presence are evident in student and instructor discussion postings? Discussion threads that include and that do not include teaching presence are analyzed in comparison to the coding for social construction of knowledge in the group. This addresses research question (3) How does teaching presence on the part of students and the instructor contribute to social construction of knowledge in small group discussions?

There is minimal risk posed to students from the two sections of SED II because the course was completed, and grades were submitted before the study commenced. The students are all adults enrolled in graduate level coursework. Analysis of the students' postings does not affect the students' academic standing or overall learning from the course. Students were informed of the study six weeks after the course was finished. They were given the following options: (1) Give consent for their discussion postings to be fully included for analysis in the study; (2) Give consent to their postings to be coded only but not to be quoted in the findings or discussion; or (3) Opt out of any participation in the study. Students were able to opt out of the study at any time. The actual names of students associated with any data that is shared or accessible beyond coding and analysis conducted by the researcher have been changed to pseudonyms.

Instructor as Researcher

One of the goals of a Community of Inquiry is for participants to construct knowledge through being present in the community both socially and cognitively (Garrison et al., 2001). Teaching presence in the model is most frequently conceptualized as the responsibility of the instructor. However, at the intersection of all three types of presence is the educational experience (see Figure 6). While inviting teaching presence on the part of students in the course discussions may not be the goal for every instructor or course, it is one of my goals as it reflects my social constructivist teaching philosophy.

My role as the instructor involves modeling teaching presence, both through facilitation of the discussion and through direct instruction (clarifying misunderstandings from students' posting or pointing out connections among concepts). I model facilitation of discussion by using strategies such as asking questions, presenting different viewpoints, directing students to another students' post, expressing appreciation for aspects of students' responses, sharing examples, and using quotes from students' responses. For the first three modules in the SED II online course, I responded to every student's initial response to the discussion prompts. For the remaining modules, I responded to small groups of students to point out similarities or differences in thinking about concepts and posed questions meant to extend thinking and promote new connections. I frequently posted throughout the week as students responded to me and to their peers.

Figure 6. Community of Inquiry Framework *(*Garrison & Arbaugh, 2007)

As a former early childhood classroom teacher with a social constructivist teaching philosophy, my efforts in teaching adults have centered on how to incorporate social constructivism into my college courses. I have found that forming relationships with my students helps me to know and understand what I need to prioritize to keep them engaged in the content of the course. As I get to know them through their posts in the discussion, I can challenge them to change their perspectives or incorporate additional ideas into their perspectives. I am also able to ensure they have supports they might need. This is a nuanced and sometimes intuitive process as an instructor. Throughout courses I teach I strive to communicate that we all have ideas and stories to bring into the course that help all of us learn and understand more about the concepts we examine. Forming relationships with my students involves listening to what students bring into discussion to gauge how to individualize my response to them. While I am not consciously thinking about cognitive, social, and teaching presence as I respond to student discussion

postings, I recognize that I incorporate these in different ways depending upon the student and what I know about them.

For example, I had a student who struggled to post on time or at all for the first two weeks of a course I taught. I emailed the student to check in to see if they needed some support and to let them know about the importance of posting on time and the online course attendance policy. I found out that this was the student's first course in graduate school and first asynchronous online course. They had not been in school for a long stretch of time, and they were parenting young children while also holding a full-time job. In the online discussion after I had connected with the student I responded to their post where they shared a personal example related to the content with this message:

> Thank you for sharing your story here. I think you and [Briana] are asking a very interesting question. How can caregivers / parents be supported in understanding what is happening developmentally for adolescents? What sorts of programs or resources might help with this?

While I did not consciously think about social presence as I was responding, I was keeping what I knew about the student in mind as I responded and incorporated all three aspects of social presence in my response (affective, open communication, and group cohesion). I intentionally connected them with another student who had shared a personal example that was similar to what they had shared in their initial response. I asked questions that extended their thinking without challenging their perspective, as this student may have needed validation and reassurance that they were part of the community, given what I knew about the student through the relationship we were building.

Reflexivity: Insider. As the primary researcher for this study, I view the analysis of the discussion activity in the course I taught as an opportunity for reflexivity. Reflexivity involves

critical self-reflection on the identities I have as instructor, as participant in the online discussions, and as researcher. It is essential for a researcher to "consider issues such as positionality and insider/outsider stance" (Merriam & Tisdell, 2016, p. 64).

As the instructor and a participant in the discussions, I am an insider, but also in a position of power. I am aware that one way in which I hold power is through grading. I give students feedback in the form of discussion points each week. If a student does not receive full points for the discussion for a module, I include comments with the grade in order to support students in understanding the expectations for their posts clearly. The rubric for discussion postings (see Figure 4) serves as a guide for students about what a well-constructed post should include. Students most often earn full points for their postings if they are on time and have posted something substantive. During spring semester 2021 as we were still navigating the global COVID-19 pandemic, if a student did not directly reference module content or respond to every point from the discussion prompt, I asked the student questions to guide them to discuss what they had missed in my response to them within the discussion rather than deducting points. Erikson Institute faculty collectively decided to offer more flexibility and understanding with grading due to the physical, social, and emotional toll of the pandemic.

I work to communicate to students that I have high expectations for their engagement and participation, and that we all have both the right and a responsibility to contribute to the learning of everyone in the course. If a student is struggling with earning points in the course, most often it is due to posting late or not at all. I view it as my responsibility to keep track of students who post late and reach out to them separately to check in and see if they need support. I track in a notebook each students' initial post and responses to peers for each discussion in order to easily

add discussion points to the gradebook weekly and to see if there are patterns developing for individual students in terms of posting late or missing posting entirely.

I also see the power I hold as the instructor in setting the agenda through the course design and organization. Students are regularly encouraged in several places (e.g., course syllabus, course welcome video, weekly announcements) and through different formats (e.g., in writing, audio, video) to post questions or concerns in the “Ask the Class” discussion thread or to email me directly. I do my best to respond to those posts and emails on the same day that I receive them. These messages range from asking for clarification about page numbers of a reading or access to module content that isn’t working, to more personal life events that might be interfering with a student’s ability to post on time. I strive to share power with students when possible. For example, I ask students to set a new due date if they request additional time to allow them to have input into what is reasonable from their perspective given the circumstances they face.

As the instructor, my perspective on the two course sections is that the group of students in each section participated and engaged in the discussion in comparable ways. There was a mix of child development and social work students in each section with nine social work and six child development students in section 01 (n=15), and four social work, eight child development, and two in other areas in section 02 (n=14). There were students who had been in courses together previously. In both sections there were some students that were in previous courses that I taught. In section 01 there were 12 students out of 15 and in section 02 there were six students out of 14 that had me as their instructor for a course previously. The class, for both sections, seemed to smoothly build community in the first few weeks of the semester. The ease with

which students became comfortable may be due to the familiarity some of the students had with each other and my having formed relationships with most of the section 01 students and many of the section 02 students in previous courses.

Reflexivity: Outsider. Schwandt (2014) refers to the potential for reflexivity to be a means of "critically inspecting the entire research process" (p. 260). As the researcher for the study, I move into an outsider stance to objectively analyze the online discussion, including my own presence as it relates to student presence. At the same time, I am aware that my goal as an instructor involves attempting to invite and encourage all three types of presence from students. Being aware of the potential bias involved in my goals as an instructor by acknowledging what I *hope* to find will allow me to exert more caution during coding and analysis. In addition, a second researcher independently coded a portion of the data to help establish coding reliability. The intercoder reliability process is carefully annotated to use as a means of reflection.

Understanding how my own teaching presence (i.e., design and organization, facilitation, and direct instruction) influences social, cognitive, and teaching presence for students contributes to meaningful adjustments in the design of my courses and the way I participate in online discussions. However, this understanding will only be valid if I keep in mind my own biases and the stance I take as an instructor and participant in the course as potentially influencing the data analysis and interpretation. As Fine and colleagues (2000) discuss regarding studying the Self-Other conjunction (i.e., being both a participant and a researcher), in order to "come clean at the hyphen" (p. 195) we must interrogate in writing who we are as we co-produce the data. My position as an insider and my own teaching philosophy allowed me to take a different perspective on teaching presence as something possible for students to engage in through online

discussions. This is a gap that I was able to identify because of the stance I take as an instructor, leading me to examine this question in this study as a researcher. My role as both an insider and outsider as it relates to the validity of the study is included in the discussion of the limitations for the study.

Methodology

Case study methodology is used to describe the social construction of knowledge within small groups, the patterns of social, cognitive, and teaching presence in discussion responses, and to explain how teaching presence on the part of students relates to social construction of knowledge for the group. Case study design is used to answer "how" and "why" questions, when the behavior of those involved cannot be manipulated, and/or you want to uncover the contextual conditions that are relevant (Baxter & Jack, 2008). The discussions, having already occurred for the course, offer postings that cannot be changed, but which can be analyzed for indicators of social construction of knowledge and presence as outlined in the CoI Model (Garrison et al., 1999). The primary research question for this study is: How does teaching presence on the part of students contribute to socially constructed learning within online discussions?

The discussion activity in the Spring 2021 SED II online course at Erikson Institute is the case. It is bounded by time, place and activity (Creswell, 2003; Stake, 1995). This is a single case with embedded units as there are two cohorts (section 01 and section 02) situated within the larger case. Each cohort might exert different influences on individuals within the cohort, but the larger case involves shared context in terms of time, place, course design, and course instructor. The content and discussion prompts in both sections are identical, though the discussion responses in each section are different due to the different individuals in each cohort.

Case study design is appropriate for this research because the goal is to gain understanding of the meaning of individual contributions to online discussions and explore the implications for learning within small groups. Descriptive case study design is used to describe a phenomenon and the real-life context in which it occurred (Yin, 2003). Explanatory case study design is used to explain an assumed causal link (Baxter & Jack, 2010). In this case study there is a need to describe patterns of social construction of knowledge and cognitive, social, and teaching presence evident in the discussion postings. There is also a need to explain whether and how teaching presence on the part of students contributes to the social construction of knowledge for the group. The study of the discussion activity in this course has the potential to offer insights into how the design of the activity, the presence of the instructor, and the presence of students contribute to social learning, and to inform online course design and instruction in other higher education settings.

Data

This case study examines existing data from two completed online course sections at Erikson Institute. The data is analyzed at the individual level and the group level to address the three research questions. Postings from individual students and the instructor across both sections for three modules are coded for phases of social construction and types of presence to address the first two research questions: (1) What evidence is there that social construction of knowledge is happening in small group online discussions? (2) What patterns of social, cognitive, and teaching presence on the part of students and the instructor are evident in discussions? Threads that include and that don’t include teaching presence are compared using the highest phase of social construction to represent group level data to address research question

(3) How does teaching presence on the part of students and the instructor contribute to social construction of knowledge in small group discussions?

The existing student discussion responses (initial prompt response postings and responses to peers' postings) for Module 2, Module 6, and Module 11 from both sections of SED II are analyzed to identify indicators of social construction of knowledge and cognitive, social, and teaching presence. Initial responses to the discussion prompt are around 450 words on average and responses to peers are around 200 words on average. There are a total of 266 student postings (26 total students, posting a minimum of three times per module for three modules) to code and analyze. In addition, there are a total of 68 instructor postings across the three modules in both sections. The unit of analysis is the message (i.e., posting) as a whole (see CoI Coding Tips in Appendix B).

Modules 2, 6, and 11 were selected to allow for tracking changes in social construction of knowledge and presence over the course of the 12-week semester. The discussion in Module 1 is introductory and aims to acclimate students who are new to online coursework to the typical pattern of each module and adjust to getting organized around the due dates for posting. The final discussion for the course, in Module 12, is summative and asks students to reflect back on content covered over the course of the semester. Module 4 has no discussion and Module 10 has an abbreviated discussion format because assignments are due during these modules. Of the remaining modules, these three (i.e., Modules 2, 6, and 11) are spaced somewhat evenly throughout the semester and represent the typical pattern of online discussion within this course in terms of due dates, number of required postings, and connection to readings and module content.

Data Analysis Plan

IAM Coding

Deductive coding using existing indicators from the IAM for social construction of knowledge (see Figure 7) is completed for 334 discussion postings (students' and instructor's posts) from both sections of SED II for Modules 2, 6, and 11. The unit of analysis for coding using IAM is the entire posting (Gunawardena et al., 1997) and codes are assigned by phase (i.e., I-V) and indicator (i.e., A-E). The IAM is arranged in a hierarchy, implying that knowledge construction occurs in progressive stages, represented in the phases of the model. In a literature review meant to identify the adequacy of the application and limitations of IAM (Lucas et al., 2014), authors suggest that Phases IV and V be merged. The goal of the knowledge construction process proposed within the model is that knowledge will ultimately be tested and applied (Phases IV and V). These processes are most conducive for students in the "real world" and may or may not be represented in postings within the discussion.

In an early review of the IAM, Gunawardena et al. (1997) assert that indicators for Phases III, IV, and V are characteristic of group level construction of new knowledge, while Phase I and II indicators are characteristic of an individual stating or creating their own understanding of the group's knowledge. One implication for measuring knowledge construction in small group discussions is that it might be less important to find a high frequency of messages with indicators related to Phases IV and V and more important to find that a range of different interactive moves identified by the indicators in the model have been incorporated by students within the group. If even one group member's posting is coded at Phase IV or V, there is implied

benefit for the learning of everyone in the group because the whole group reads and considers the posting, incorporating the posted ideas into their construction of knowledge of the content.

Ph I	**Sharing and Comparing of Information**	A. A statement of observation or opinion B. A statement of agreement from one or more participants C. Corroborating examples provided by one or more participants D. Asking and answering questions to clarify details of statements E. Definition, description, or identification of a problem
Ph II	**The discovery and exploration of dissonance or inconsistency among ideas, concepts, or statements**	A. Identifying and stating areas of disagreement B. Asking and answering questions to clarify the source and extent of disagreement C. Restating the participant's position and possibly advancing arguments or considerations in its support by references to the participant's experience, literature, formal data collected, or proposal of relevant metaphor or analogy to illustrate point of view
Ph III	**Negotiation of meaning/co-construction of knowledge**	A. Negotiation or clarification of terms B. Negotiation of the relative weight to be assigned to types of argument C. Identification of areas of agreement or overlap among conflicting concepts D. Proposal and negotiation of new statements embodying compromise, co-construction E. Proposal of integrating or accommodating metaphors or analogies
Ph IV	**Testing and modification of proposed synthesis or co-construction**	A. Testing proposed synthesis against "received fact" as shared by the participants or their culture B. Testing against cognitive schema C. Testing against personal experience D. Testing against formal data collected E. Testing against contradictory testimony in literature
Ph V	**Agreement statement(s)/ applications of newly constructed meaning**	A. Summarization of agreement(s) B. Application of new knowledge C. Metacognitive statements by participants illustrating their understanding that their knowledge or way of thinking (cognitive schema) have changed as a result of the conference interaction

Figure 7. Phases of knowledge construction (Gunawardena et al., 1997)

CoI Coding

The next phase of data analysis is deductive coding using existing indicators for CoI presence categories (see Appendix A). This coding is completed for 334 discussion postings (students' and instructor's posts) from both sections of SED II for Modules 2, 6, and 11. Coding for CoI is conducted at the message level as recommended by Garrison (see Appendix B). Codes are assigned by indicators for the category: four leveled categories of cognitive presence coded to the highest level, three categories of social presence, and three categories of teaching presence (see Appendix A). It is possible within a message (i.e., initial response posting or response to a peer) to have more than one type of presence and more than one category evident. Each message is coded for each type of presence and if there is no evidence of a type of presence within a message it is coded as such (i.e., no SP, no CP, no TP). Each type of presence is coded within the data separately, as recommended (see Appendix B).

The categories for cognitive presence are arranged as levels of lesser to greater depth of critical thinking (see Figure 8). These categories were developed by Garrison and colleagues (2001) as the Practical Inquiry (PI) model, and the categories have been used to assess critical thinking (Garrison & Akyol, 2012). Where indicators related to more than one category for cognitive presence are coded, the indicator and category at the higher level of the PI model are coded as primary and the other indicators and categories are noted as secondary codes. For example, if an indicator for exploration and an indicator for integration within cognitive presence are coded for the same message, the integration code is noted as the primary code and the exploration code is noted as secondary.

Level/Category	Description
1. Triggering Event	Conceptualizing a problem or issue
2. Exploration	Searching for information and ideas related to the problem or issue both through self-reflection and collaborative exploration
3. Integration	Focused critical discourse shapes understanding and specific solutions to problems or issues are proposed
4. Resolution	A solution is settled upon and implemented either virtually or in reality

Figure 8. Practical Inquiry Model (Cognitive Presence Categories)

For social presence and teaching presence, in a single posting with indicators related to more than one category within that type of presence, the category with the higher quantity of indicators is coded as primary and other categories are noted as secondary. For example, within a posting if there are two indicators for the direct instruction (DI) category of teaching presence and three indicators for the facilitating discourse (FD) category of teaching presence, FD is coded as primary, and DI is noted as secondary. Where the quantity of indicators related to social or teaching presence within a single posting are equal, the higher-level category is coded as primary and the other is noted as secondary. For example, if there is one indicator for open communication (OC) and one indicator for group cohesion (GC), GC is coded as primary, and OC is noted as secondary. The order of the presence categories in Appendix A: CoI Coding Indicators and Examples is arranged from lowest to highest level.

Inter-Coder Reliability

Coding for IAM and CoI types of presence was completed for a subset of the data by myself and a second researcher with considerable experience coding qualitative data. This helped build consistency in how codes were applied and established reliability in the coding process (O'Connor & Joffe, 2020). In addition, this was an opportunity for reflexivity (Merriam &

Tisdell, 2016). I had to recognize and analyze my own postings in the course discussions from a research stance as a participant in the coding process. Through collaboration with a second coder, I was able to talk about my potential influence on students' presence and reflect on my own biases. Having collaborated previously with my colleague, we quickly became comfortable with asking questions, challenging one another, and asserting our perspectives in negotiating the coding processes and guidelines. The intercoder reliability process allowed me to have a greater awareness of my biases and to develop a systematic process for coding.

Negotiated Agreement Process. We met eight times over the course of two months to negotiate agreement (Campbell et al., 2013), independently coding subsets of data between these meetings. Of 18 total data subsets consisting of small group discussions (three groups from each of the two sections for three modules), we coded 6 subsets. Of these six subsets, the first two subsets (35 total messages or 10% of the total data) supported establishing processes and the development of guidelines for coding. I re-coded these two subsets independently after achieving substantial intercoder reliability. The remaining four subsets (80 total messages or 24% of the total data) were fully negotiated to agreement and served to refine the coding agreements and guidelines. For each subset, we would hide each other's codes in Dedoose to complete our own coding. Then I would activate my colleague's codes to compare and calculate a straight percentage of agreement and make an agenda for our meetings.

The first agreements related to process that we arrived at were: (1) Data subsets needed to consist of all the threads for a small group for a module. Coding for IAM involves understanding whether the participant's message is contingent upon another participant's message (i.e., social construction) or whether ideas in the message are their own (i.e., internal construction). Subsets

were input into Dedoose with each thread added as a separate media file under the same small group so that messages could be understood in the context of the thread but also within the context of the group as all participants in the group were responding to the same prompt. (2) Messages needed to be excerpted in their entirety due to the way excerpting functioned in Dedoose. Smaller excerpts were too difficult to match up exactly and visually having many excerpts from two coders made discussing and negotiating codes cumbersome. (3) We would use the memo function in Dedoose to track notes or rationale when we were uncertain about which code might apply or when we wanted to assert a stance to create a coding agreement. Memos greatly aided the negotiation process, serving as insights into each of our thought processes when assigning particular codes as to which indicators from the IAM or CoI coding protocols fit with specific evidence (wording, excerpt, or idea) within a message.

In addition, as we continued working through the first two subsets, we realized it would aid our process to add at least one code for each type of presence and for IAM, so each message would have at least four codes. This meant that we needed to add code options for no cognitive presence, no social presence, and no teaching presence. In addition, for each category in each type of presence a secondary code option was added. For example, a message might include evidence both OC (i.e., open communication) and GC (i.e., group cohesion) from social presence, but the more prominent of these was OC as there were three instances where indicators of OC were evident versus one instance where GC was evident within the total message. In this case, the message would be coded OC for social presence, but an additional code of “Secondary GC” would be added. A full table of agreed upon protocols for coding that emerged through the

negotiation process can be found in Appendix D. These coding agreements were referred to heavily through the independent coding I completed for the remaining data.

Calculating Substantial Agreement. The goal for intercoder reliability indicated in the research proposal was a straight percentage of agreement at 80% or more on 10% of the data as noted by Miles and Huberman (1994) as indicative of substantial agreement. However, O'Connor and Joffe (2020) argue that straight percentage of agreement involves some inflation of agreement by chance. Krippendorff's Alpha is recommended as a calculation of reliability for datasets that involve multiple codes for the same data unit and because it can be applied for both ordinal and nominal data (Krippendorff, 2011; O'Connor & Joffe, 2020). IAM and cognitive presence (CP) within CoI are ordinal with directives to code to the highest level (Lucas et al., 2014; Garrison & Arbaugh, 2007). Social presence (SP) and teaching presence (TP) within CoI are nominal with directives to code the category that is most evident within a message (Garrison & Arbaugh, 2007). Coders are considered to have reached substantial intercoder reliability when the calculation for Krippendorff's Alpha reaches .61-.80 for 10% of the total data (O'Connor & Joffe, 2020).

Krippendorff's Alpha accounts for the *degree* of agreement, meaning that for the five code options for IAM, the difference between one coder applying Phase I and the other coder applying Phase II is weighted as closer in agreement than one coder applying Phase II and the other coder applying Phase V. Each variable is calculated separately for agreement when using Krippendorff's Alpha (Krippendorff, 2011), so there is a separate reliability calculation for IAM, CP, SP, and TP for this study. The Krippendorff's Alpha calculation for 10% of the total data was .63 for SP, .70 for TP, and .71 for IAM indicating substantial reliability. The Krippendorff's

Alpha calculation did not work for CP due to the lack of range in coding. The second coder and I rarely coded TE (i.e., level 1, triggering event, in CP) theorizing in our discussions that the discussion prompt served as the triggering event. We also rarely coded RES (i.e., level 4, resolution, in CP) as this is the highest level in CP and involves application or defending a proposed solution within the discussion. When there is not enough variation in what is coded in calculating reliability for ordinal data, Krippendorff's Alpha does not produce an accurate calculation for reliability. However, we achieved 84% agreement as a straight percentage for CP, meeting the threshold for substantial agreement indicated by Miles and Huberman (1994).

Understanding Bias in the Coding Models and Ourselves. After coding the first subset, the second coder and I recognized a few ways in which there could be bias in the coding models. First, an indicator for GC (i.e., group cohesion) within SP is to address a participant by name. For most of the messages posted as responses to peers the participant would begin the message addressing the peer by name (e.g., "Hi Mary"), resulting in many messages being coded GC for social presence. We theorized in our discussions that this was likely due to my modeling this in my own responses to participants. As a result, we opted not to code GC for a message if the *only* evidence of it was including the name of a peer in the greeting of the message.

We came to recognize through the agreement process that the progression of ordinal categories within CP is structured in a way that is reflective of Euro-American cultural values of being problem focused and a belief that problems can be analyzed to determine a solution (Shonkoff & Phillips, 2000; Rogoff, 2003). The first level within CP is TE (i.e., triggering event) in which a problem is identified. The discussion prompt often seemed to serve this purpose for the messages we coded. The next level is EX (i.e., exploration) which includes indicators such as

Divergence, *Suggestions for consideration*, and *Brainstorming*. The third level is INT (i.e., integration) and this includes indicators such as *Convergence* and *Creating Solutions.* Finally, the highest level is RES (i.e.., resolution) and this is about application or defending solutions. This might or might not be the goal of discussions focused on human development theories and concepts. As coders, we discussed threads that were very rich and productive that did not reach a code of RES.

We struggled with agreement in coding for IAM phases early in the process as the indicators we had access to were limited in detail (see Figure 7). We discussed the possibility of combining Phases I and II and Phases IV and V as other studies (see Howell et al., 2017; Koh et al., 2010) had used this approach. This discussion of collapsing the phases made it clearer that Phases I and II are internal construction, Phase III represents negotiation of ideas between self and others in the group, and Phases IV and V represent movement toward change in thinking or agreement on proposed social construction. In addition, we recognized and agreed that each message must be viewed in relation to the previous messages in the thread in order to understand more clearly if it reflected internal thinking or was contingent upon ideas shared by others. We located excerpts that we had agreed upon for each phase of IAM and I developed a more detailed document to reference while coding for IAM (see Appendix C). This included definitions that drew from our negotiated agreements about each IAM phase and the examples we located for each phase to expand on each category and the indicators in more detail. After the development of this coding guide, our reliability for IAM coding improved, ultimately to .71 agreement using Krippendorff's Alpha.

Early in the negotiation process we noted that I was more generous in applying a code for TP (i.e., teaching presence) for a student's message than the second coder. She discussed how she found it difficult to code a student post for teaching presence because of the power dynamic. It felt to her that a student was overstepping their role and I was the one with the authority to facilitate or instruct within the discussions. Only one study in the literature review (Koh et al., 2010) was found to code student messages for teaching presence. The second coder commented that the model itself might be biased through an assumption that students can't or don't engage in teaching presence. Both of us noted how the wording of the examples given for the teaching presence categories and indicators doesn't easily lend itself to apply to student postings. This resulted in setting very clear guidelines for coding teaching presence as part of the negotiated agreement process.

We arrived at several key agreements for coding TP. I will highlight three agreements here. Additional agreements related to TP can be found in Appendix D. One of the indicators for DI (i.e., direct instruction) is *Inject knowledge from diverse sources, e.g., textbooks, articles, internet, personal experience (includes pointers to resources).* We agreed that if a message included a specific reference to literature or a quote from a reading, we would code it as DI.

We also spent time discussing and negotiating the differences between FD (i.e., facilitating discourse) and DI. I viewed summarizing the discussion as something that functioned to facilitate the discussion, but this is listed as an indicator of DI in the model. The second coder indicated that FD from her perspective was when a comment or question was inclusive of multiple participants because of the FD indicator *Drawing in participants; prompting discussion* which includes examples (e.g., *Anyone got any ideas about*...) that imply that this is not between

only two participants. Whereas DI could be between two participants in terms of the indicators *Present content/questions* and *Confirm understanding through assessment and explanatory feedback.* These indicators include examples that are directed at individuals rather than the group. We agreed upon a guideline that if the message included comments or questions that were clearly directed to multiple participants or the small group, we would code the message FD, and if it was a response directed to an individual that included content or questions, we would code the message DI.

We found some excerpts within messages that included what we felt was evidence of teaching presence but did not fit the indicators and examples for TP included in the existing CoI model. The following message is an example of one of these excerpts:

> Laurie responding to Mary, 02M6G2 T4-7
>
> ...as you said, our understanding of things change, along with their cultural significance. Thinking about breastfeeding again, I know that my grandmother saw formula as being best because it was this new thing that had been created by science. Breastfeeding not only felt old and unsophisticated in comparison, it also harkened back to days when women of a certain class and/or race worked as wet nurses. After having the baby, richer women dried up their supply and went on with their lives, but women in my grandmother's class were either forced into breastfeeding due to poverty, or perhaps even became wet nurses themselves as a way to support their families. All of that would have informed her decision not to breastfeed.

Laurie, the student who authored the message was sharing something that was more than a personal story or example as it offered an important cultural (and in this case historical) perspective on the content. This was a clear presentation of content as an authority but did not include referencing or quoting literature. Rather, it was injecting knowledge as a cultural insider. After discussion, we decided to include this as part of the DI indicator *Inject knowledge from*

diverse sources, e.g., textbooks, articles, internet, personal experience. The guideline we developed was

> Code DI if injecting knowledge with authority as a cultural insider with clear intention to teach others in the course about non-dominant cultural experience relevant to the content. Providing knowledge of history or systems that offer a perspective to the content to further thinking. (see Appendix D)

Given that teaching presence is a primary focus of the research questions, setting specific rules for indicators of teaching presence helped me to become more conservative in coding for FD and DI. It also helped clarify for the second coder the specific ways that students could engage in teaching presence. In addition, it allowed us to be more inclusive of valuable student contributions that the model overlooks.

Comparative Analysis

After coding the phases and indicators in the IAM, categories for social and cognitive presence, and categories and indicators for teaching presence, a comparative analysis of individual level and group level data is conducted. The highest phase from the IAM for each small group discussion thread, representing group level data, is examined relative to evidence of teaching presence on the part of students and the instructor. This analysis aims to determine if there are patterns in the type of interactive moves (i.e., IAM indicators) in the group when students engage in teaching presence, and whether higher levels of social construction of knowledge (i.e., Phase IV and V in IAM) accompany teaching presence on the part of students.

Dedoose

Student discussion postings for both sections of SED II for Modules 2, 6, and 11 were coded and organized using Dedoose, a web application created for organizing and analyzing qualitative and mixed methods data. The phase and indicator codes from the IAM and the

category level codes for social, cognitive, and teaching presence for each message are organized into a matrix that allows for filtering data into subsets to address each research question.

When coding in Dedoose, messages are highlighted and connected to the coded phases in IAM or categories of presence in the CoI model, such that each code is associated with a specific message within the datasets. In addition, dynamic descriptors are used in Dedoose to allow for tracking data over time. Values for Modules 2, 6, and 11 are associated with the messages from those modules and included in the data filters for analysis of changes in phases in IAM and each type of presence over the course of the semester. Dedoose allows the researcher to set a hierarchy of codes within a code tree which allows for ease of analysis of the phases of IAM and cognitive presence which are arranged as levels.

Messages from three small groups in each section for the discussions in modules 2, 6, and 11 are the dataset used to examine change over time. Each of the 334 messages for consenting student participants (n=26) and the instructor is coded for evidence of social presence, cognitive presence, and teaching presence, using the CoI model indicators, definitions, and examples (see Appendix A) shared by Dr. Garrison. These messages are also coded using the Interaction Analysis Model (Gunawardena & Anderson, 1998) for evidence of social construction of knowledge. Definitions and examples were developed and refined for the IAM indicators in the model during the intercoder reliability process with a subset of the data (see Appendix C). The intercoder reliability process also resulted in coding guidelines used for independent coding after reliability was established (see Appendix D). Each message is assigned four primary codes for evidence (or lack of any evidence) of indicators for social, cognitive, and teaching presence,

and for one of the phases from the IAM. Figure 9 shows the coding categories and codes used. This figure can be used as a reference for abbreviated codes that are used in the findings.

Community of Inquiry										**CoI**	**Interaction Analysis Model**		**IAM**
Social Presence	**SP**	Affective	AF	Open Communica-tion	OC	Group Cohesion	GC				Internal construction	Phase I	Ph I
												Phase II	Ph II
Cognitive Presence	**CP**	Triggering Event	TE	Exploration	EX	Integration	INT	Resolution	RES		Negotiation of social construction	Phase III	Ph III
Teaching Presence	**TP**	Design and Organization	DO	Facilitating Discourse	FD	Direct Instruction	DI				Social construction	Phase IV	Ph IV
												Phase V	Ph V

Figure 9. Coding Categories and Codes

Social Construction of Knowledge and Teaching Presence for Students

An example of a discussion thread that includes evidence of teaching presence and social construction of knowledge on the part of students is provided here to help illustrate the premise of the primary research question, that there may be a connection between socially constructed knowledge and teaching presence on the part of students. This example can also offer some meaning to the quantitative data as it is discussed in Chapter Four.

Threads represent one strand within the discussion of a small group typically consisting of 4-5 students and the instructor. While not every participant in a small group posts messages in *every* thread, there in an assumption that participants are reading the posted messages within their group for each module. Participants in small groups changed three times during the 12-week course to allow students the opportunity to engage in discussion with most of their peers during the semester.

The following example (see Figure 10) is a thread from module 6 consisting of seven messages, one of which is not coded as it is from one of three non-consenting students. The thread includes evidence of IAM Phase IV, specifically indicators A: *Testing proposed synthesis against "received fact" as shared by the participants or their culture;* and C*: Testing against*

personal experience. IAM Phase IV indicates social construction of knowledge, rather than internal construction of knowledge. This thread also includes evidence of teaching presence on the part of students, specifically DI indicators: “Inject knowledge from diverse sources, e.g., textbook, articles, internet, personal experience” and “Present content, questions.”

Group 2: Audrey, Laurie, Eva, ---, Kendall	**Prompt: After completing the Developmental Niche Activity, discuss the caregiving practice that you chose to map. What are possible underlying cultural beliefs that inform this practice? What are alternative practices that you have encountered or heard about?**	**TP and IAM Codes**
2/14/21 11:51pm	**Eva** (initial post): Breast is best”; this is something I hear all the time in the field working with infants and mothers. However, that is not always the case. For example if the infant has intolerances or food allergies, maternal medications, maternal breast milk supply, maternal health conditions, etc. Breast milk has many nutritional values and benefits overall however, it is not necessarily the best for every infant and mother. Here is a brief background, Media, blogs, news sources, society, and even experts often emphasize and advertise that breastmilk is the best for infants. But not all mothers can breastfeed and that is okay. And not all infants can be breastfeed for different reasons (some of which were mentioned earlier in this post). The explicit ideas about appropriate practices Breast milk is most nutritional for the infant. And suggest that breast milk is high in vitamins, minerals, and nutritional value. Breast milk helps build a stronger immune system in infants, helps prevent/lower the risk of certain health conditions such as obesity, asthma, type 1 diabetes, acute otitis media (ear infections), sudden infant death syndrome (SIDS), gastrointestinal infections (diarrhea/vomiting), and more (Why it matters, 2020). It aids in brain maturation and development (Why it matters, 2020). Ideas about Outcomes state many benefits to breast milk for the infants overall health and wellbeing. Intervening Factors could be if the biological carrier of the newborn is not the mother or adoption, surrogacy, etc. Also, as mentioned before factors such as intolerances or food allergies, maternal medications, maternal breast milk supply, maternal health conditions, etc. Lastly, education can be a factor (parental lack of understanding of the benefits of breastmilk for an example). Actual Practices will vary on each individual family and also culture. Parents should work closely with their doctor to determine the best feeding solution for their infant and family. And consider cultural factors and values (which as we know is another key component in child rearing). Actual Outcomes will also vary depending on each individual infant and family. Some mothers might need to supplement with formula if they are not producing enough milk. Breast milk has many nutritional values and benefits overall however, it is not necessarily the best for every infant and mother which needs to be considered. References Harkness, S. & Super, C.M. (2006). Themes and variations: parental ethnotheories in western cultures. In K. Rubin & O.B. Chung (Eds.). Parental beliefs, parenting, and child development in cross-cultural perspective. (pp. 61-79). Psychology Press.	DI Ph II

	Why it matters. (2020, November 29). Retrieved February, 2021, from https://www.cdc.gov/breastfeeding/about-breastfeeding/why-it-matters.html	
2/15/21 7:28pm Kendall: Response to Eva	**Kendall**: Hi Eva, thank you for insight in this summary. I wrote about breastfeeding also, but from a personal experience. I agree with you about it may not be best for certain mothers but for the majority it is best practice. Some mothers that take medications for various reasons are probably not breastfeeding unless told otherwise and mothers that may not be producing much milk have options to help with that issue. If you have children would you want to breastfeed? What are the ethnotheories in your culture? Is this something that is discussed with you from your mother? Thank you again for your insight!	DI Ph III
2/15/21 8:50pm Eva: Response to Kendall	**Eva**: Thank you for your response! I would most definitely breastfeed / use breast milk for my children if my body allows! Like I said before, I work a lot with infants and I have had a fair amount of mother who just cannot produce enough supply no matter what they try. So I would choose to but I'm aware that it's something I might not have control over and that's okay. And it's most important for the infant to receive enough nutrition via feeding (formula supplement if needed).	NoTP Ph IV
2/16/21 3:18pm Laurie: Response to Eva	**Laurie**: Hi Eva! I love this! The problem with the statement "breast is best" is that it doesn't take into account the different sociocultural factors impact a woman's ability to breastfeed, and implies that doing something other than breastfeeding your child isn't doing your best. Though there can be many benefits to the infant, it might not always be best for the child OR mother. If mom is unable to produce enough to feed child, or the milk is not nutrient dense, it is not best for the child. You also have to have a certain amount of privilege that allows you to either be around to feed your child breast milk exclusively, or else to be able to afford the materials needed to pump and store breast milk. Many women cannot do this, and cannot afford to be off work for the recommended amount of time for extended, exclusive breastfeeding. Breast is likely not best if it means mom can't hold down a job and provide food for herself and her other children.	NoTP Ph IV
2/17/21 4:40pm Mary: Response to Laurie, Kendall, and Eva	**Mary**: Laurie makes a good point here about the messaging involved. Including a value statement can leave many parents feeling like they have done something wrong, when the given circumstances might make what they are doing the right thing for their family and child. The intention is good, but the messaging could be different.	FD Ph III
2/18/21 6:57pm Eva: Response to Mary, Laurie, and Kendall	**Eva**: Yes- exactly! You totally got what I was trying to say!	NoTP Ph I
2/17/21 11:12pm ---: Response to Eva	---	NO CODE

Figure 10. Thread from Section 2, Group 2, Module 6

This example is representative of threads that include social construction of knowledge through evidence of Phase IV or V of the IAM. The example also includes evidence of teaching presence on the part of more than one student. The data presented in Chapter Four will explore whether there is a relationship between evidence of teaching presence in the messages from individual students and evidence of social construction of knowledge within small groups.

Findings Overview

Findings are presented to address each of the three sub-questions that fall under the primary research question. The findings reported for first two provide a basis for examining the third question: Does teaching presence on the part of students contribute to social construction of knowledge in small group discussions? Findings are presented for all participants, for students only, and for instructor only, in order to understand the roles of instructor and students in the process of social construction of knowledge and engaging in teaching presence. Different levels of analysis are necessary to understand group activity according to Activity Theory (Wertsch, 1979). Therefore, individual participant data are analyzed for the first two questions and small group data from discussion threads are analyzed in comparison to individual data for the third question. IAM data and CoI presence data at the individual participant level (i.e., codes for individual messages) are used to address questions one and two and IAM data for small groups (i.e., the highest IAM code for a group within a thread) is used in comparison to patterns of presence for individuals to address question three.

In addition, development or change over time is also necessary to analyze within the Activity Theory framework (Wertsch, 1979). Analysis of data for modules 2, 6, and 11 is included for each of the three questions. The instructor's presence as evidenced by the number of

messages posted by the instructor, was much greater within module 2 compared with modules 6 and 11. This difference in total instructor messages is considered as patterns of presence and social construction of knowledge for all participants across the three modules emerge.

The first question, is social construction of knowledge happening in online discussions? What evidence is there that social construction of knowledge is happening in small groups? is addressed through examining frequencies of codes for each phase of IAM for individual participants. Phases I and II represent internal construction of knowledge, Phase III represents negotiation of social construction of knowledge, and Phases IV and V represent social construction of knowledge. The IAM data for individuals is presented by module and by small groups to examine patterns, if any, related to grouping and change over time. While the frequencies for IAM phases are presented for individual participants' messages, the intent of the IAM is to examine interactions among students in small groups. Within the coding process, determining the evidence for each phase is contingent upon whether and in what way the message is in response to another participant. Examining individual messages in isolation is counter to what the model is attempting to measure, which is social construction of knowledge. Therefore, while individual data is presented in response to question one, group data representing the highest IAM phase coded within a thread is included in the findings for question three.

The second question, how much social, cognitive, and teaching presence is evident in the discussions? is addressed through sharing frequencies of codes for each type of presence for individual participants. In addition, excerpts representing evidence of codes for social, cognitive, and teaching presence are shared to illustrate each type of presence as it appears in the data set. Social, cognitive, and teaching presence frequencies for students and the instructor are examined

across the three modules. Teaching presence frequencies for students are also be examined in comparison to frequencies of cognitive presence to look for any patterns indicating a relationship. Teaching presence findings for individual participants are presented for small groups and individuals. Presenting more detail for teaching presence findings at three levels: by module, by small group, and by individual student, is necessary to address the third question.

The third question, does teaching presence on the part of students contribute to social construction of knowledge in small group discussions? is first addressed through presenting the co-occurrence of teaching presence codes with IAM phase codes. The co-occurrence of teaching presence and IAM phases for student messages is examined relative to whether the message was an initial post or response to another participant and to patterns of co-occurrence for instructor messages. Second, categories for different types of threads including or not including teaching presence of the part of individual students and/or the instructor are examined relative to group level data. Group data is the highest phase of IAM coded for each of the 100 small group discussion threads in the data set. Finally, data for teaching presence and IAM phases over time across the three modules is examined.

The findings for the three questions provide a basis for discussion of whether teaching presence contributes to social construction of knowledge: (1) Due to the contribution of individual students through analyzing teaching presence data for individuals; (2) With or without the instructor present in the thread; (3) Within small groups through analyzing teaching presence data for small group threads; (4) Within large groups through analyzing data by course section; (5) Under different types of conditions through analyzing the categories of threads with

and without teaching presence; and (6) Over time through analyzing data across module 2, module 6, and module 11.

Summary

This case study describes social construction of knowledge in small group online discussions using the IAM to code for phases and categories that are evident in student and instructor postings. This case study also describes the social, cognitive, and teaching presence that is evident within student and instructor postings in online discussions using the CoI model to code for categories of presence. A comparative analysis of discussion threads including evidence of teaching presence on the part of students with the social construction of knowledge in small groups will help explain how teaching presence on the part of students contributes to socially constructed learning within online discussions.

In addition to findings that represent the frequencies and percentages of social construction of knowledge phases and types of presence, thick descriptions (Lincoln & Guba, 1985) of small group discussion threads, including excerpts from discussion postings will be included in the findings. These excerpts will serve to further describe social construction of knowledge and presence and explain how teaching presence on the part of students contributes to socially constructed knowledge. Detailed description allows readers to determine transferability to their own context or practice and builds trustworthiness within a case study (Lincoln & Guba, 1985). Figure 11 gives an overview of the representation of the findings based on the research questions, data analysis, and anticipated findings.

This case offers an opportunity to systematically explore what teaching presence on the part of individual students in online discussions means within small groups, and whether this

contributes to socially constructing knowledge with others. Working collaboratively, group members learn more and engage in higher level thinking in online discussions as they read the ideas and perspectives of peers and compose their own ideas to share with the group. The course was designed to invite teaching presence as relationship-based learning is a core value of Erikson Institute. Data being collected and analyzed in this study examines how teaching presence on the part of students and the instructor contributes to the socially constructed knowledge of the group.

Primary Research Question: **How does teaching presence on the part of students contribute to socially constructed knowledge within online discussions?**		
Data	**Anticipated Findings**	**Representation of Findings**
1. Is social construction of knowledge happening in online discussions? What evidence is there that social construction of knowledge is happening in small groups?		
334 coded discussion postings for IAM phase and indicator (single code for each posting)	The number of threads that include Phase IV/V indicators will increase over time.	Table for modules 2, 6, and 11 including the frequency and percentage of individual postings representing each phase of IAM (I-V).
	There will be some small group discussions with at least one code at Phase IV/V	Table of frequencies of each phase of IAM (I-V) for small groups for modules 2, 6, and 11.
		Excerpts from postings representing phases of IAM
2. How much social, cognitive, and teaching presence is evident in discussions?		
334 coded discussion postings for CoI categories (Primary code for each message for each type of presence including no code to represent no evidence of that type of presence. Secondary codes noted as relevant).	The pattern of social presence codes will change over time as rapport is built.	Table for modules 2, 6, and 11 including the frequency and percentage of social presence category codes.
	Cognitive presence will be evident consistently across the semester because the discussion prompts are designed for students to connect to content.	Table for modules 2, 6, and 11 including the frequency and percentage of cognitive presence category codes.
	Teaching presence will be evident for some students but not all students and percentage of teaching presence codes will increase over time.	Table for modules 2, 6, and 11 including the frequency and percentage of teaching presence category codes.
	Teaching presence will accompany higher levels of cognitive presence (Practical Inquiry Model level 3/Integration and 4/Resolution).	Table of the co-occurrence of teaching presence codes with cognitive presence codes for student messages.
	There will be a larger proportion of teaching presence indicators for students for the facilitation category; Teaching presence indicators for instructor will be evenly distributed across facilitation and direct instruction categories.	Table of frequencies of teaching presence categories for students and instructor.
		Excerpts from postings representing social, cognitive, and teaching presence.
3. Does teaching presence on the part of students contribute to social construction of knowledge in small group discussions?		
Threads including and not including evidence of teaching presence and highest IAM code for small groups by thread.	Students who engage in teaching presence will have IAM indicators at Phase III (negotiation of co-construction).	Table for categories of discussion threads that include or don't include teaching presence in comparison to the highest IAM phase for the small group threads.
	In small group discussions that include evidence of teaching presence on the part of students there will be at least one IAM indicator at Phase IV/V.	Excerpts and threads representing evidence of teaching presence and social construction of knowledge (IAM phase).

Figure 11. Representation of findings

CHAPTER FOUR

FINDINGS

The primary research question that this study explores is: How does teaching presence on the part of students contribute to socially constructed knowledge within online discussions? This question is based upon the theory that knowledge is constructed socially, in this case within small groups in asynchronous written discussions within an online course. In addition, it stems from a philosophy of teaching that there can and ought to be shared responsibility for teaching presence on the part of both the students and the instructor. Within the online discussion activity, this is evidenced through teaching presence on the part of students and the instructor, namely direct instruction and facilitating discourse, which are two indicators of teaching presence within the Community of Inquiry model (Garrison et al., 2003). The Interaction Analysis Model (Gunawardena & Anderson, 1998) measures social construction of knowledge as negotiation (i.e., Phase III) and movement towards change or confirmation of thinking due to the social interaction within the discussion (i.e., Phases IV and V).

Question 1: Is Social Construction of Knowledge Happening in Online Discussions? What Evidence is There That Social Construction of Knowledge is Happening in Small Groups?

There is evidence that social construction of knowledge is happening in the discussions. This finding is reflected in the frequencies of IAM phases evident in individual participant messages that indicate social construction of knowledge. The IAM model includes five phases reflecting a progression from individual effort to wrestle with problems toward doing this

explicitly with others in the discussion. The first two phases, Phase I and Phase II, include indicators of internal construction of knowledge, while Phases IV and V indicate social construction of knowledge. Phase III includes indicators of the negotiation of meaning or co-construction and represents social rather than internal construction. Messages coded Phase III include reference to ideas present in other messages rather than only an individual's internal construction of ideas. The emphasis of Phase III is negotiation and involves proposals or suggestions for the group to consider, whereas Phase IV and Phase V indicate movement toward a change in thinking for an individual due to the social construction process.

Table 1 presents the IAM codes for all 334 messages for students and instructor across the three modules. In the table, the bolded shaded cells represent the highest frequency and percentage of codes for each module.

Table 1. IAM coding frequencies for all participants

IAM codes for all groups for sections 01 and 02 including student and instructor messages (334 total messages)						
Module	**IAM Phase I**	**IAM Phase II**	**IAM Phase III**	**IAM Phase IV**	**IAM Phase V**	Total
2	8 (2.4%)	25 (7.5%)	**75 (22.5%)**	23 (6.9%)	2 (0.5%)	133 (40%)
6	4 (1.2%)	26 (7.8%)	28 (8.4%)	**39 (11.7%)**	10 (3%)	107 (32%)
11	5 (1.5%)	26 (7.8%)	**52 (15.6%)**	8 (2.4%)	3 (0.9%)	94 (28%)
Total	17 (5%)	77 (23%)	155 (46.5%)	70 (21%)	15 (4.5%)	334 (100%)

Table 1, which includes data for both students and the instructor, indicates that the highest frequencies of IAM are Phase III for modules 2 and 11 and Phase IV for module 6. This pattern remains when examining only the student data relative to the total messages in the data set and relative to the total messages in each module as seen in Tables 2 and 3.

Table 2 presents the frequencies and percentages of IAM codes for 266 student messages in the data set. The percentages are taken from the total number of student messages. The bolded shaded cells represent the highest frequency and percentage of codes for each module.

Table 2. IAM code frequencies for students only – percentages out of total messages

IAM codes for all groups for sections 01 and 02 including only student messages (266 total messages)					
Module	**IAM Phase I**	**IAM Phase II**	**IAM Phase III**	**IAM Phase IV**	**IAM Phase V**
2	7 (2.6%)	24 (9%)	**41 (15.4%)**	15 (5.6%)	1 (.4%)
6	4 (1.5%)	26 (9.8%)	24 (9%)	**38 (14.3%)**	4 (1.5%)
11	5 (1.9%)	26 (9.8%)	**43 (16.2%)**	8 (3%)	0
Total (of 266)	16 (6%)	76 (28.6%)	108 (40.6%)	61 (22.9%)	5 (1.9%)

The pattern for the highest frequency and percentage of IAM phases in each module is consistent when looking at only student messages. Table 3 presents frequencies and percentages of IAM codes for all students for 266 messages with percentages taken from the total number of messages for each module.

Table 3. IAM code frequencies for students only – percentages out of total messages for each module

IAM codes for all groups for sections 01 and 02 including only student messages (266 total messages)						
Module	**IAM Phase I**	**IAM Phase II**	**IAM Phase III**	**IAM Phase IV**	**IAM Phase V**	Total (of 266)
2	7 (8%)	24 (27.2%)	**41 (46.6%)**	15 (17%)	1 (1.1%)	88 (33%)
6	4 (4.2%)	26 (27.1%)	24 (25%)	**38 (39.5%)**	4 (4.2%)	96 (36%)
11	5 (6.1%)	26 (31.7%)	**43 (52.4%)**	8 (9.8%)	0	82 (31%)

Students posted the highest number of messages for module 6 with 96 total student messages, in comparison to 88 total messages for module 2 and 82 total messages for module 11. The highest percentage for each module remains the same when taken as a percentage of the total

messages or as a percentage of the total messages for the module. Phase III is the highest frequency for modules 2 and 11 and Phase IV is the highest frequency for module 6.

Do messages posted by the instructor indicate a different pattern from student's only IAM codes? The instructor's involvement was highest in Module 2 with 45 messages. The instructor had 11 messages in Module 6 and 12 messages in Module 11. Table 1d presents frequencies and percentages of IAM codes for the instructor's 68 messages. Percentages within the table are taken from the total number of messages for each module, while percentages in the total line are taken from the total of 68 messages across the three modules.

Table 4. IAM coding frequencies for instructor only

IAM codes for only instructor messages for sections 01 and 02 (68 total messages)						
Module	**IAM Phase I**	**IAM Phase II**	**IAM Phase III**	**IAM Phase IV**	**IAM Phase V**	Total
2	1 (2.2%)	1 (2.2%)	**34 (75.5%)**	8 (17.8%)	1 (2.2%)	45 (66.2%)
6	0	0	4 (36.5%)	1 (9%)	**6 (54.5%)**	11 (16.2%)
11	0	0	**9 (75%)**	0	3 (25%)	12 (17.6%)
Total	1 (1.5%)	1 (1.5%)	47 (69.1%)	9 (13.2%)	10 (14.7%)	68

Comparing the patterns of IAM codes across modules in Tables 1, 2, and 3 shows similar patterns for all participants, students only, and instructor only. There is a difference in Phase V codes for the instructor's messages in module 6. Students' messages have a higher frequency of Phase IV codes in module 6.

What do the phases of IAM mean within the context of the small group threads? The phases will be explained using excerpts to clarify what they look like within the discussions in the course. This will illustrate the importance for the thinking of the group of finding a pattern of high frequencies of social construction phases of IAM within individual student messages.

Phase I and II: Internal Construction

There is a very low frequency of Phase I codes for participants' messages. Phase I represents basic sharing and comparing of information. At times this can allow for clarifying details to move a discussion toward negotiation. A message coded Phase I might also serve to indicate that a participant read the messages in the discussion and agreed as this response message from Eva in module 6 represents: "Yes- exactly! You totally got what I was trying to say!"

Most of the initial posts were coded as Phase II (indicator C) as the initial post is an internal construction and not in response to other participants' ideas yet. There is a consistent range (3-6) for Phase II codes for each small group (see Table 1e). Each small group consisted of 4-5 students, thus this range of the number of messages coded Phase II primarily represents the initial posts of each student in their group. A thorough initial post will include stating your perspective and backing it up. The Phase II C indicator is: "Restating the participant's position and possibly advancing arguments or considerations in its support by references to the participant's experience, literature, formal data collected, or proposal of relevant metaphor or analogy to illustrate point of view" (Gunawardena et al., 1997). The following excerpt represents Phase II C:

> Group 1, Module 6, Thread 4, Andie's initial post, coded IAM Phase II - C
>
> In family and culture, we learned about co-sleeping and various cultural sleeping practices, and I think my parents preferred us to be in our own beds because they preferred to have their bed to themselves for the night since American parents often focus on keeping their own romantic and sexual life intact even after having children. My parents also wanted us to be able to sleep through the night on our own to help us become independent and face our childish fears of monsters in the closet and various nightmares.

In this excerpt, Andie introduces variations in sleeping practices as something related to cultural values. Andie backs up this assertion with reference to content from another course as well as childhood experience. As an initial post rather than a response to another participant, this is viewed as internally or individually constructed rather than socially constructed knowledge and was coded as Phase II.

Phase III: Negotiation of Social Construction

Overall, the highest frequency IAM code for all messages was Phase III. The highest frequencies of Phase III codes for both students and for the instructor came in modules 2 and 11. Of the instructor's 68 messages, 47 messages (69.1%) were coded Phase III: Negotiation of meaning/co-construction of knowledge. Of 266 student messages, 108 (40.6%) were coded Phase III. The Phase III B indicator is: "Negotiation of the relative weight to be assigned to types of arguments." The following excerpt represents Phase III B:

> Group 3, Thread 1, Module 11, Kiara responding to a peer, coded IAM Phase III - B
>
> I agree with you that Chuck may have some underlying issues that have led to his alcohol and drug use and I think that part of his care should involve getting to the root of this. This is where I think your suggestion of group counseling with his family would really help, but I think that he might also benefit from individual counseling as well especially if he did not feel comfortable speaking with his family about it at first.

In this excerpt, Kiara is responding to the ideas a peer has posted with agreement, but also arguing that another idea posted previously needs to be considered in conjunction. This weighing of different ideas helps the group negotiate varying perspectives in the discussion.

The Phase III E indicator is: "Proposal of integrating or accommodating metaphors or analogies." In the following excerpt, Debbie proposes an analogy related to an idea proposed by a peer:

Group 1, Thread 1, Module 6, Debbie responding to a peer, coded IAM Phase III - E

> I liked that you brought up the point in children's gross motor skills which are important…I believe it brings more stability in the child when picking up and learning new things to do on their own… I find that it also helps them grow and become more independent; it's almost like when a child first starts writing and eventually picks up learning to write in cursive.

This kind of connection helps the group to negotiate the different ideas that each individual has posed in the discussion.

Phase IV and Phase V: Social Construction

Module 6 has the highest frequency of IAM Phase IV and Phase V (social construction phases) for both students and the instructor. In module 6, 54.5% of the instructor's 11 messages were coded Phase V. For students, 39.5% of the 96 student messages for module 6 coded as Phase IV. This raises a question about what happened in the modules leading up to module 6 that might account for the high frequencies of Phase IV and Phase V.

The Phase IV C indicator is: "Testing against personal experience." In the following excerpt, Ingrid relates an idea from a peer to her own experience to test the idea out and come to an agreement with her peer:

Group 1, Thread 4, Module 6, Ingrid responding to a peer, coded IAM Phase IV - C

> I think the intervening factors you mentioned are really critical. It was always frustrating to me that health teachers in elementary school would preach about healthy food. It felt so strange to me, how is this thing that my mom and gran let me [eat] all the time horrible for me?! Students deserve more comprehensive education about nutrition but food deserts, poverty, and time are real factors for so many families.

The testing of ideas indicates consideration of changing one's own point of view by checking the negotiated idea against prior knowledge or understanding.

The Phase V C indicator is: “Metacognitive statements by participants illustrating their understanding that their knowledge or way of thinking (cognitive schema) have changed as a result of the conference interaction.” The following two excerpts represent Phase V C:

> Group 1, Thread 6, Module 6, Belinda responding to Mary, coded Phase V - C
>
> ...I now know how important it is to get more context before judging a situation, and to also not feel bad when I'm practicing my own ways of parenting that differ from my parents because parenting practices isn't a one size fits all situation.
>
> Group 3, Thread 2, Module 2, Ashley responding to a peer, coded Phase V – C
>
> Even as I write this however, I feel the answer is so obvious and frustrating it didn't immediately occur to me. To teach and encourage multiple languages is at odds with the white supremacist model that is also at work within schools, as well as so much of the American approach to things. Not embracing other languages beyond English is a means to keep non-English speakers from prospering to the degree native English speakers do.

In these excerpts, statements made by Belinda and Ashley indicate a change in thinking due to the ideas that were negotiated in the small group discussion. These statements capture self-reflection related to how the socially constructed knowledge could be applied.

Next, frequencies of IAM codes by small group will be examined to check whether the patterns are consistent or different for each group.

Small Groups

Table 5 represents the patterns of IAM codes for messages within small groups. The cells with bolded data represent the highest frequencies for each small group in each module. These cells include percentages taken from the total messages for each small group to illustrate what portion of messages for that small group are represented by the number. Examining the patterns of IAM coding by small group, five out of six small groups for module 2 and all six small groups for module 11 had high frequencies (i.e., more than five messages) of Phase III codes. For

module 6, five out six small groups had high frequency of Phase IV codes. The data shows there is consistency in social construction happening in the discussion threads across all small groups.

Table 5**.** IAM coding frequencies for small groups

Section	**Mod**	**Group**	**Phase I**	**Phase II**	**Phase III**	**Phase IV**	**Phase V**	**Total**
01	2	1	4	5	**11 (55%)**	0	0	20
01	2	2	1	3	**5 (45%)**	2	0	11
01	2	3	0	4	3	**4 (33%)**	1	12
02	2	1	1	6	**8 (42%)**	4	0	19
02	2	2	0	3	**5 (45%)**	3	0	11
02	2	3	1	3	**9 (60%)**	2	0	15
01	6	1	3	4	3	**6 (38%)**	0	16
01	6	2	0	4	1	**6 (50%)**	1	12
01	6	3	0	4	2	**6 (50%)**	0	12
02	6	1	0	6	4	**12 (50%)**	2	24
02	6	2	1	4	**9 (45%)**	**6 (30%)**	0	20
02	6	3	0	4	**5 (42%)**	2	1	12
01	11	1	0	4	**5 (50%)**	1	0	10
01	11	2	2	4	**5 (42%)**	1	0	12
01	11	3	1	4	**7 (54%)**	1	0	13
02	11	1	0	6	**9 (56%)**	1	0	16
02	11	2	1	5	**9 (47%)**	4	0	19
02	11	3	1	3	**8 (67%)**	0	0	12
Total			**16** (6%)	**76** (28%)	**108** (41%)	**61** (23%)	**5** (2%)	**266**

What contribution might the instructor make to social construction of knowledge in small groups? The instructor responded to each student's initial post in module 2, resulting in 45 total messages for the instructor for that module. The instructor posted one or more messages in each small group in modules 6 and 11, resulting in 11 total messages for the instructor for module 6 and 12 total messages for the instructor in module 11. In module 2, the high number of messages from the instructor along with the high percentage of these messages coded Phase III: Negotiation of meaning/co-construction of knowledge (75.5%) might indicate efforts to establish

practices related to co-construction of knowledge for the community. The modeling of negotiation early in the course may support students in engaging in negotiation in their own messages. The higher frequency of Phase IV within small groups for module 6 could be related to the type of discussion prompt. The possible influences of modeling and the discussion prompt will be discussed in Chapter Five.

Summary of Question 1 Findings

Social construction of knowledge is happening within the online discussions in the course. The high frequency of IAM Phases III, IV, and V are evidence that individuals are interacting to negotiate and come to shared understanding within small groups. There is a consistent pattern with the highest frequency of Phase III for modules 2 and 11 for individual participants and small groups. There is a pattern of high frequency of Phase IV for student messages and Phase V for instructor messages in module 6, both representing social construction of knowledge in the IAM.

Question 2: How Much Social, Cognitive, and Teaching Presence is Evident in Discussions?

Findings for this question are presented through examining the frequencies of social presence, cognitive presence, and teaching presence categories evident in individual participant messages. Each message was given one code for each type of presence including a count of messages with no evidence for each type. Social presence and teaching presence are nominal and coded by weight. The SP and TP category with the most indicators evident is coded for the message. Cognitive presence is ordinal and coded to the highest level. The highest-level CP category evident in a message is coded for that message, regardless of whether another category has higher total number of indicators.

Social Presence Data

In the CoI model, SP is produced by individuals and coded within the messages of individual participants. This is an important aspect of presence within the CoI model because social presence has been found to be integral to higher level thinking and supportive of cognitive presence (Denoyelles et al., 2014; Richardson & Swan, 2003). Social presence can be differentiated from social construction of knowledge in at least two specific ways. First, SP is situated at the individual level, whereas social construction of knowledge can only be understood within groups of people. Second, SP is a means to isolate aspects of individual messages that are social, whereas social construction of knowledge captures the combination of social, cognitive, and teaching aspects of learning evidenced through interaction or contingent responses. The use of the two models in this study (i.e., CoI and IAM) allows for analysis at the individual and group level for the discussion activity.

Social presence includes categories of Affective, Open Communication, and Group Coherence. Social presence is evident in the data with 86% of the 334 coded messages including SP codes. The frequencies of the different categories of SP will be analyzed across module 2, 6 and 11 to examine patterns of social presence over time. Additionally, an explanation for adjusting the approach to coding Group Cohesion will be discussed.

Social presence is evident on the part of students and the instructor throughout the three modules (see Table 6). The percentages reflect the number of messages coded for each category and module out of the 334 total messages in the data set.

Table 6. Social Presence coding frequencies for all participants

Social Presence: All groups for sections 01 and 02 including student and instructor messages (334 total messages)				
Module	**Affective**	**Open Communication**	**Group Cohesion**	**No Social Presence evident**
2	12 (3.6%)	**85 (25.4%)**	8 (2.4%)	28 (8.4%)
6	**48 (14.4%)**	41 (12.3%)	11 (3.3%)	7 (2.1%)
11	18 (5.4%)	**56 (16.8%)**	9 (2.7%)	11 (3.3%)
Total	78 (23.4%)	182 (54.5%)	28 (8.4%)	46 (13.8%)

Table 7 includes frequencies for students only. The percentages within the table are taken from the total number of messages for each module. The percentages in the total line are taken from the 266 total student messages. The patterns in Table 7 are similar to those for all participants with the highest frequencies being Open Communication for modules 2 and 11 and Affective for module 6.

Table 7. Social Presence coding frequencies for students only

Social Presence: All groups for sections 01 and 02 including only <u>student</u> messages (266 total messages)					
Mod	**Affective**	**Open Communication**	**Group Cohesion**	**No Social Presence evident**	**Total**
2	9 (10.2%)	**48 (54.5%)**	3 (3.4%)	28 (31.8%)	88 (33%)
6	**48 (50%)**	37 (38.5%)	4 (4.2%)	7 (7.3%)	96 (36%)
11	18 (22%)	**50 (61%)**	3 (3.7%)	11 (13.4%)	82 (31%)
Total:	75 (28.2%)	135 (50.8%)	10 (3.8%)	46 (17.3%)	266

Are the patterns for the instructor's social presence similar to those of students? Table 8 includes frequencies and percentages for social presence categories for instructor messages only. The percentages within the table are taken from the total number of messages for each module while the percentages in the total line are taken from the 68 total instructor messages.

Table 8. Social Presence coding frequencies for instructor only

Social Presence codes for only <u>instructor</u> messages for sections 01 and 02 (68 total messages)					
Mod	**Affective**	**Open Communication**	**Group Cohesion**	**No Social Presence evident**	**Total**
2	3 (6.7%)	**37 (82.2%)**	5 (11.1%)	0	45 (66.2%)
6	0	4 (36.4%)	**7 (63.6%)**	0	11 (16.2%)
11	0	**6 (50%)**	**6 (50%)**	0	12 (17.6%)
Total:	3 (1.5%)	47 (69.1%)	18 (26.5%)	0	68

The patterns for instructor messages for social presence differ from patterns for student messages. Only when presenting the instructor messages separately is this pattern evident. The instructor's messages all include some evidence of social presence. The highest frequencies for the instructor's messages are different from students' messages for module 6 with Group Cohesion being the highest frequency. Module 11 has an even amount of OC and GC codes for the instructor's messages.

Initial posts often did not include social presence because they are the beginning of the discussion, rather than related to or building upon someone else's message. The highest frequency of "NoSP" codes (i.e., no social presence evident) is in module 2. This finding fits with research incorporating CoI model (Garrison & Arbaugh, 2007) as it takes time to establish a sense of community in a course.

Open Communication (OC)

Examining Social Presence patterns over time shows that Open Communication is high for all three modules for students and the instructor, especially for modules 2 and 11. This may be due to "continuing a thread" being an indicator for OC. A message would be coded OC if it is

replying to a peer's posting, which is required as part of discussion participation, and referring to the previous post in some way. In module 2 this may be especially high frequency and Affective low frequency because one of the indicators for AF is "self-disclosure." In the second week of the course students might not feel comfortable sharing a personal story that involves vulnerability, as defined in the CoI coding indicators and examples (see Appendix A). The instructor's SP codes for module 2 are highest for Open Communication with 82.2% of her 45 messages coded OC.

The "Complimenting, expressing appreciation" indicator in the Open Communication category of social presence is defined as, "Complimenting others or contents of others' messages."

> Group 1, Thread 4, Module 6, Kari responding to a peer, coded OC
>
> I always enjoy reading your discussion posts. I really appreciate your insight and sharing about your own families experiences.

This excerpt shows how Open Communication can serve to express appreciation for messages from other participants.

Affective (AF)

While the instructor's messages do not include high frequency of AF across the three modules, there is evidence of AF for students across the three modules. By module 6, the mid-point of this 12-week course, students' messages include the highest frequency of evidence of AF across the three modules with 48 of 96 messages (50%) for module 6 coded AF. This might be due to a sense of community being more established by the mid-point of the course.

The prompt for module 6 asks students to explore a caregiving practice and many students opted to share a personal story in response to this prompt. The "Self-Disclosure"

indicator under the Affective category of social presence is defined as, “Presents details of life outside of class, or express vulnerability.”

> Group 1, Thread 2, Module 6, Debbie’s initial post, coded AF
>
> Growing up I was raised in a setting where healthier options were presented, however it was more forced upon rather then it being a way for me to grow and like the foods, this resulted in me later neglecting eating healthier foods as a kid.

This excerpt is an example of social presence within an initial post and also how the Affective category involves sharing something personal and possibly expressing vulnerability.

Group Cohesion (GC)

The Group Cohesion category includes indicators that participants refer to others or include one another within the content of their messages. The instructor’s SP codes for module 6 are highest for Group Cohesion with 63.6% of her 11 messages for that module coded GC. These indicators include using inclusive pronouns to refer to the group or referring to participants by name. The Vocatives indicator under the Group Cohesion category of social presence is defined as, “Addressing or referring to the participants by name.” The following excerpt shows group cohesion in terms of referring to participants by name, which helps bring attention to the contributions of different group members.

> Group 3, Thread 5, Module 6, Mary responding to group 3, coded GC
>
> Alex points out in her post about reading with babies how this can vary culturally and while we might believe in US culture that this models the importance of literacy, the expectation that babies are getting everything we believe out of that experience is questionable. Bonnie and Naomi both touch on manners in this regard.

The Group Cohesion category supports the process of social construction of knowledge in drawing attention to varying perspectives. This pattern of SP for the instructor is supportive of one of the goals of the discussion activity, which is the social construction of knowledge.

Greetings as Cultural Practice. Group Cohesion (GC) has the lowest frequency within SP for student messages across the three modules. This can be accounted for by a decision made within the coding process. Within the negotiated agreement process, the two coders decided not to include greetings (e.g., “Hi Mary”) as indicators of GC. The instructor modeled this from the first module and students quickly began to use this practice in their responses to peers. This skewed the coding toward very high frequency of codes for GC because nearly all of the students and the instructor did this to begin response posts. All other categories of SP being weighted equally, the protocol calls for using the highest-level code as the primary code. This was resulting in very high frequency of GC codes which overshadowed the evidence of AF and OC. Table 9 presents the number of response messages that include a greeting to illustrate the way the data could be biased toward GC codes if not adjusted in the coding process. There was only one initial post in module 2 which included a greeting, thus the data in the table is for the 256 response messages for all participants only. While some of these messages were coded GC, it is due to other evidence of group cohesion in the message rather than the greeting. This trend of including a greeting quickly became a cultural practice within both sections of the course with 76% of the total of 256 responses including a greeting.

Table 9. Messages including greetings - not coded Group Cohesion

Module	**All Responses: (256 total)**	**Student Responses: (189 total)**	**Instructor’s Responses: (67 total)**
2	86	50	36
6	63	53	10
11	45	36	9
Total:	**195** (76.2%)	**139** (73.5%)	**54** (80.6%)

Summary of Social Presence Data Analysis

The patterns of social presence data reveal change over time. For students, OC is the category of SP with the highest frequency for modules 2 and 11, and AF is the category of SP with the highest frequency for module 6. The change in SP from module 2 to module 6 might be due to students becoming more comfortable and familiar with each other as a community within the course. The development of community evident in the shift from high frequency of OC in module 2 to high frequency of AF in module 6 aligns with the pattern found for social construction of knowledge measured by the IAM. There is a change from high frequency of negotiation of social construction (i.e., Phase III) in module 2 to high frequency of social construction (i.e., Phase IV and V) in module 6. This finding illustrates that attending to social connection and building community is important to small group thinking and learning.

For the instructor, OC frequency is high for modules 2 and 11 and GC frequency is high for modules 6 and 11. Because GC involves addressing participants by name or referring to or quoting from participants' messages, the high frequency of this category of SP for the instructor is evidence of her facilitating social construction of knowledge. The decision not to code greetings as GC within messages allowed for the high frequency of GC within the instructor's messages to be visible within the data as greetings became a cultural practice among participants.

Cognitive Presence Data. It was anticipated that high levels (i.e., integration or resolution categories of CP) of cognitive presence would be consistent across modules, and integration is the category with the highest frequency. Cognitive presence is coded to the highest level (ordinal) thus the code is assigned not based on the number or relative weight of indicators within a message. For example, if much of a message includes indicators for exploration (EX)

but there is one statement within the message integrating an idea shared by another student, the message is coded as integration (INT). Cognitive presence frequencies for each type of CP (i.e., TE, EX, INT, and RES) are examined for modules 2, 6 and 11.

The highest frequency category coded for CP was Integration across the three modules. Table 10 presents CP codes for all 334 messages for all participants across the three modules.

Table 10. Cognitive Presence coding frequencies for all participants

Cognitive Presence: All groups for sections 01 and 02, both student and instructor messages (334 total messages)					
Module	**Triggering Event**	**Exploratio n**	**Integration**	**Resolution**	**No Cognitive Presence evident**
2	3 (.1%)	9 (2.7%)	**120 (35.9%)**	1 (.02%)	0
6	0	5 (.15%)	**93 (27.8%)**	7 (2.1%)	1 (.02%)
11	1 (.02%)	5 (.15%)	**88 (26.3%)**	0	0
Total	4 (.12%)	19 (5.7%)	301 (90.1%)	8 (2.4%)	1 (.02%)

Table 11 displays CP codes for 266 student messages only. Percentages are taken from the total number of student messages for each module. The percentages in the total line are taken from the 266 total student messages across the three modules.

Table 11. Cognitive Presence coding frequencies for students only

Cognitive Presence: All groups for sections 01 and 02 including only student messages (266 total messages)						
Mod	**Triggering Event**	**Exploration**	**Integration**	**Resolution**	**No CP evident**	**Total**
2	1 (1.1%)	8 (9.1%)	**78 (88.6%)**	1 (1.1%)	0	88 (33%)
6	0	5 (5.2%)	**82 (85.4%)**	7 (7.3%)	1 (1%)	96 (36%)
11	1 (1.2%)	5 (6.1%)	**76 (92.7%)**	0	0	82 (31%
Total	2 (.8%)	18 (6.8%)	236 (88.7%)	8 (3%)	1 (.04%)	266

Table 12 presents CP codes for the 68 instructor messages only. This allows us to see consistency in the high frequency of integration evident in messages for both students and the instructor. Percentages are taken from the total number of instructor messages for each module.

The percentages in the total line are taken from the 68 total instructor messages across the three modules. The consistent pattern of INT across modules and participants represents convergence around ideas, whether individually or relative to other participants' messages.

Table 12. Cognitive Presence coding frequencies for instructor only

Cognitive Presence: codes for only instructor messages for sections 01 and 02 (68 total messages)						
Mod	**Triggering Event**	**Exploration**	**Integration**	**Resolution**	**No CP evident**	**Total**
2	2 (4.4%)	1 (2.2%)	**42 (93.3%)**	0	0	45 (66.2%)
6	0	0	**11 (100%)**	0	0	11 (16.2%)
11	0	0	**12 (100%)**	0	0	12 (17.6%)
Total	2 (2.9%)	1 (1.5%)	65 (95.6%)	0	0	68

How might these patterns be explained? The TE, INT, and RES categories will be illustrated using excerpts to clarify what they look like within the discussions in the course. This will lend some context to finding very low frequency of TE and RES category codes and the very high frequency of INT.

Triggering Event (TE). Codes for triggering event are the lowest frequency for all three modules. This might be due to the discussion prompt serving as a triggering event. Students respond to the prompt and then to one another as part of the structure of the discussion. Indicators for TE include posing questions that recognize a problem.

Exploration (EX). There is low frequency of codes for exploration as well across the three modules. The ordinal coding of cognitive presence might contribute to the low frequency of exploration as messages including *any* evidence of integration would be coded INT, even if there are more excerpts within the message that include evidence of exploration.

Integration (INT). Integration is high for both sections and all three modules. This may be due to the structure of the discussion involving students posting an initial response to a prompt and then responding to a minimum of two peers' postings. The discussion prompts were designed to push students to integrate the module readings, resources, and their own experience. The grading rubric for discussions includes expectations for integration in both the initial response and in responses to peers. Students are expected in responses to peers to go beyond indicating that they liked the other student's post to challenge, question, or build upon the message. The "Connecting ideas, synthesis" indicator in the Integration category of cognitive presence is defined as, "Integrating information from various sources – textbook, article, personal experience." The following excerpt from a student message illustrates how a student uses a personal experience to make a connection to an idea shared by a peer:

> Group 1, Thread 1, Module 6, Maggie responding to a peer, coded INT
>
> It reminded me about an open house I attended with Montessori, they made a statement that was so true, they believe that children should start to dress themselves on their own as young as are capable of zipping up their jackets. She stated that parents are often so much in a hurry or impatient that we are the ones who fail to implement these things to our children. Often times the child will put their sweater backwards or shoes on the wrong foot and we as adults are so quick to try to correct them and do it for them instead of them handling the situation on their own.

Participants show evidence of integrating their understanding from a range of sources within 90% of the total of 334 messages in the data set.

Resolution (RES). There is a low frequency of codes for Resolution overall, with 8 student messages being coded RES out of all 334 messages (the instructor did not have any messages coded RES). The two indicators for Resolution are: "Vicarious application to real world testing solutions" and "Defending solutions". The "Vicarious application to real world

testing solutions" indicator under the Resolution category of cognitive presence is defined as, "Providing examples of how problems were solved." In the following excerpt, a student shares a solution to a problem with the group.

> Group 3, Thread 5, Module 2, Molly responding to a peer and Mary, coded RES
>
> A major component would be to use data and storytelling to convince stakeholders that these systemic changes would improve academic performance and life outcomes…Policymakers would also need to be convinced that there is meaningful return on investment…In my prior career…I worked with an education transformation non-profit…Here is a video we produced to tell the story of a school transformation in order to help convince stakeholders to implement this approach.

Resolution, as in this example, is not common in messages because within human development courses like Social and Emotional Development II at Erikson, the focus is often on the complexity of development rather than on determining a single solution. A problem and solution focus and stance of the existence of a single solution reflects white, middle class, Euro-American cultural values and beliefs (Rogoff, 2003; Shonkoff & Phillips, 2000). Supporting students in developing an understanding of the cultural nature of development is a central goal of Erikson's mission and values (Erikson Institute Student Handbook, 2021, p. 7).

This means that online discussions in development courses are not often structured to imply or direct students toward a single solution, but rather to embrace multiple perspectives and ideas with "it depends" as an acceptable response to problems of applying human development knowledge in practice. Given this perspective, the high frequency of codes for Integration and low frequency of codes for resolution better aligns with the mission and values of Erikson as a whole. It also aligns with the goal of socially constructed knowledge which inherently embraces multiple perspectives and solutions.

Summary of Cognitive Presence Data Analysis

Triggering event had the lowest frequency which might be due to the discussion prompt serving as the triggering event for the discussion (Kilis & Yildirm, 2019). The frequency of Resolution codes was low, which is consistent with CoI literature (Garrison & Arbaugh, 2007; Kilis & Yildirim, 2019) as RES is evidenced by reaching a solution or application which might not be the goal of the discussion.

For all participants, Integration codes had the highest frequency. The high frequency of INT codes was consistent across participants and modules. In addition, all but one message had evidence of CP. This might be due to the discussion prompt (Meyer, 2004) and directions for the discussion activity (Kanuka et al., 2007) being structured to promote CP, and specifically integration. These findings point to a need for a more sensitive measure to capture the process of integration as cognitive presence. A more detailed measure of the integration category within cognitive presence could allow for a clearer understanding of any connections between cognitive presence and teaching presence for individuals, and social construction of knowledge in small groups.

Teaching Presence Data. Teaching presence in research incorporating CoI as a framework has largely looked at this type of presence only for the instructor. In this study teaching presence is coded for all participants, students, and the instructor. The frequency of each type of teaching presence in the 334 coded messages across module 2, 6, and 11 is examined in a variety of ways including: (1) Comparing student frequencies of TP with instructor frequencies of TP; (2) Frequency of TP in initial postings versus in messages responding to peers; (3) The co-occurrence of TP and CP; (4) Frequency of TP within small

groups; and (5) Frequency of TP for individual students. The frequency of TP for individual students is also examined in terms of whether the student was previously in a course that the instructor taught and demographic data. Analyzing TP data in this wide range of ways will allow for an understanding of any patterns related to individuals, groups, the instructor, other types of presence, the design of the activity, and over time.

Teaching presence is evident in 39% of the messages for all participants, students, and the instructor. Table 13 presents the number of messages coded for evidence of TP across the three modules for students and the instructor. Percentages are taken out of the total of 334 messages.

Table 13. Teaching Presence coding frequencies for all participants

Teaching Presence: All groups for sections 01 and 02 including student and instructor messages (334 total messages)		
Module	**Facilitating Discourse**	**Direct Instruction**
2	11 (3.3%)	55 (16.5%)
6	10 (3%)	34 (10.2%)
11	5 (1.5%)	16 (4.8%)
Total	26 (7.8%)	105 (31.5%)

It was anticipated that students would have a higher frequency of Facilitating Discourse (FD) as compared to Direct Instruction (DI) codes, and that these would be evenly distributed for the instructor. However, across all participants, DI has a much higher frequency in comparison to FD. This is accounted for in several ways. First, the coding protocol calls for coding to the highest category if evidence of both FD and DI in a single message are of equal weight, with DI being the higher category. Second, within the negotiated agreements during the coding process, the two coders determined that evidence of FD should include actively drawing in participants as

a group rather than directed at a single individual. Third, within initial posts, if students make direct reference to a source it is coded for DI.

Table 14 presents a comparison of the frequency of TP codes for student and instructor messages across the three modules. Percentages are taken out of the 131 total messages including TP.

Table 14. Teaching Presence coding frequencies comparison for students and instructor

Teaching Presence: All students for sections 01 and 02 compared with instructor					
	Facilitating Discourse		**Direct Instruction**		
Module	**Students**	**Instructor**	**Students**	**Instructor**	**Total**
2	4 (3.1%)	7 (5.3%)	21 (16%)	34 (26%)	66 (50.4%)
6	0	5 (7.6%)	28 (21.4%)	6 (4.6%)	39 (29.8.6%)
11	3 (2.3%)	7 (5.3%)	11 (8.4%)	5 (3.8%)	26 (19.8%)
Total	7 (5.3%)	19 (14.5%)	60 (45.8%)	45 (34.4%)	131

There were 67 total student messages with evidence of TP. This represents roughly 25% of the 266 total of student messages in the data set. There were 64 total instructor messages with evidence of TP. While the frequency of TP for the instructor is greater relative to the 68 total instructor messages, student messages account for over half of the 131 total TP codes in the data set. Teaching presence frequency for the instructor was higher in module 2 because the instructor responded to each student's initial post for that module (44 total messages) and responded in a separate thread to each small group for module 6 (11 total messages) and module 11 (12 total messages).

Table 15. Teaching Presence coding frequencies for students by type of message

Frequency of TP in students' initial posts and in students' responses to peers (67 total messages)					
Module	**TP: DI in Initial Post**	**TP: FD in Initial Post**	**TP: DI in Response Messages**	**TP: FD in Response Messages**	**Total**
2	11	0	10	4	25 (37%)
6	14	0	14	0	28 (42%)
11	7	2	4	1	14 (21%)
Total	**32** (47%)	**2** (3%)	**28** (42%)	**5** (8%)	**67**
	34 (50.5%)		**33** (49.5%)		

Roughly half of the TP codes for student messages were for initial postings and half were for responses to peers. This has implications for social construction of knowledge which will be explored in the findings for question 3.

What do Direct Instruction and Facilitating Discourse look like within the context of small group discussion in this course? Each category will be illustrated using excerpts to clarify what they look like within the discussions in the course. This will lend some context to both understanding the high frequency of DI and how teaching presence on the part of individuals might serve to contribute to the process of socially constructing knowledge within small groups.

Direct Instruction

Of the 60 student messages coded DI, 32 were initial postings and 28 were responses to peers and/or instructor. Of the 28 messages coded DI that were responses, seven responses were directed to the instructor or the instructor and one or more other students, and 21 were responses to other students.

Messages were coded for DI when they included quotes or direct references to research literature or readings per the negotiated coding agreements, and initial posts often included references or quotes. An indicator under the Direct Instruction category of teaching presence is:

Present content/questions; Inject knowledge from diverse sources (includes pointers to resources) indicator. Direct instruction is evident in the following excerpt from a message posted by a student responding to a peer and the instructor. Bolded text indicates evidence of presenting content through injecting knowledge from diverse sources with pointers to resources.

Group 3, Thread 2, Module 2, Molly responding to Mary and a peer, coded DI

> ...I'm thinking about your question regarding systemic barriers to making this connection and remembering **reading in Rogoff (2003)** about how traditional US education environments are about developing skills in ways that are divorced from real life. I'm thinking about how a project-based learning approach where Manuel is given math and language assignments that relate to the family business (e.g., math about products sold, profits etc. or writing a slogan or advertisement), could help make these connections.

This excerpt illustrates how Molly is able to present content from a previous reading, represented by the bolded text, to add knowledge into the discussion relevant to the ideas being negotiated.

Another indicator under the Direct Instruction Category of teaching presence is: Summarize the discussion. In the following excerpt from a student message responding to the small group, bolded text indicates evidence of summarizing.

Group 2, Thread 5, Module 6, Molly responding to group 2, coded DI

> Many posts referenced themes of conflict, competition and pressure coming out of ambiguity in US cultural practices. **Ashley writes** “aspects of parenting… [have] become performative or weaponized through media.” **Eleanor notes** that, "children who are older and are not toilet trained and are still in diapers are at a disadvantage and might experience teasing from their peers**." Jenny talks about** "the weight that American parents seem to place on "getting it right."
>
> I wonder how prevalent these experiences are in other cultures and what contributes to these dynamics. A few ideas: (1) living in a multicultural society leads to more diverse parenting practices and less certainty about which is best, (2) the emphasis on each child as an individual with different temperaments creates greater ambiguity in decisions about caregiving practices (see Harkness and Super (2006) on sleep training) (3) a more competitive and individualistic society leads to greater competition in all areas of life, including parenting.

What might be some other causes for **these stressors in US society**?

In this excerpt, Molly refers to arguments made within the larger discussion of the small group, beyond this thread, and directly references peer's messages in summarizing ideas from the discussion. The final question from Molly serves to summarize the ideas of the small group as "stressors" of parenting.

Facilitating Discourse

Of the seven student messages coded FD, two were initial postings and five were responses to peers. The two student messages coded FD that were initial posts included questions posed to the whole group, rather than to an individual, as per the negotiated coding agreements. The following excerpt is from one of the initial posts that was coded FD:

Group 1, Thread 4, Module 11, Brenda's initial post, coded FD

> Throughout the case, we read that Chuck was "both reliant on and enraged by his parents' generosity" which also stuck out to me. Sophia and Josiah seemed to always save Chuck whenever he needed help (even late into his adult age), yet when Mackenzie needs help in her young age they suddenly put their foot down and essentially say "enough is enough".
>
> **Any thoughts on why they might be doing this with Mackenzie?**

The final question posed by Brenda in this excerpt is directed to the small group, which can serve to generate further discussion within the group.

Co-Occurrence of Teaching Presence and Cognitive Presence. It was anticipated that evidence of TP in student messages would co-occur with higher levels of CP (i.e., INT or RES). Teaching presence is analyzed as it co-occurs with cognitive presence to examine what levels of CP coincide with TP. The high frequency of INT across modules is also seen in the co-occurrence of CP and TP. It is not clear whether there is a relationship between TP and INT

because of the high frequency of INT overall. Table 16 presents a summary of the co-occurrence of CP and TP codes for the 67 student messages coded as including evidence of TP. Of the six messages coded both DI and RES, five were from module 6. Four of those five were initial posts. The other message coded DI and RES was from module 2 (01 T5).

Table 16. Co-Occurrence of Cognitive Presence and Teaching Presence

Co-Occurrence of Teaching Presence and Cognitive Presence for student messages (67 total messages)					
	CP: TE	**CP: EX**	**CP: INT**	**CP: RES**	**Total**
TP: Facilitating Discourse	1	2	4	0	7
TP: Direct Instruction	0	2	52	6	60
Total	1	4	56	6	67

There is a pattern of co-occurrence of TP with the INT category of CP. While the anticipated finding is confirmed with this finding, a more detailed or sensitive measure that captures levels within the category of Integration might allow for a clearer understanding of what TP on the part of individual students means for their cognitive process and the social construction of knowledge in small groups.

Small Groups. Does the pattern of teaching presence vary across course sections or small groups? The frequencies of TP for individuals within small groups are examined to determine whether small groups within sections 01 and 02 display different patterns of teaching presence. Every small group includes at least one student message with evidence of TP. Module 11 has the lowest frequency of TP for both sections. While some small groups include seven or eight TP codes, the changing of participants every 3-4 modules means the individuals are not consistent in small groups in each module.

Table 17. Teaching Presence coding frequencies by small group

Teaching Presence in student messages by group (67 total messages including TP for students; Section 01=32; Section 02=35)							
Section	**Mod**	**Group**	**DI**	**FD**	**Total**	**Section Total**	**Module Total**
01	2	1	**1**	**1**	**2**	11	**25**
01	2	2	**2**	**0**	**2**		
01	2	3	**7**	**0**	**7**		
02	2	1	**3**	**1**	**4**	14	
02	2	2	**5**	**2**	**7**		
02	2	3	**3**	**0**	**3**		
01	6	1	**3**	**0**	**3**	13	**28**
01	6	2	**8**	**0**	**8**		
01	6	3	**2**	**0**	**2**		
02	6	1	**7**	**0**	**7**	15	
02	6	2	**5**	**0**	**5**		
02	6	3	**3**	**0**	**3**		
01	11	1	**1**	**0**	**1**	8	**14**
01	11	2	**1**	**0**	**1**		
01	11	3	**5**	**1**	**6**		
02	11	1	**2**	**1**	**3**	6	
02	11	2	**0**	**1**	**1**		
02	11	3	**2**	**0**	**2**		

Individuals. How many *individual* students posted messages with evidence of TP? Data for individual students is analyzed to determine if there are differences based on course section, prior experience with this instructor, and demographic information. Table 18 presents the frequency of TP codes for messages for each of the 26 individual students who consented to participate in the study. Students with * indicate this instructor previously had them as a student in SED I in synchronous remote format. Students with ** indicate this instructor previously had them as a student in SED I in asynchronous online format.

Table 18. Teaching Presence coding frequencies for individual students

Student	section	**DI** (Initial post)	**DI** (Response)	**FD** (Initial post)	**FD** (Response)	**Total**
Andie *	01	3	3	0	0	**6**
Eva **	02	3	3	0	0	**6**
Brenda *	02	2	2	1	1	**6**
Molly	01	2	4	0	0	**6**
Alex *	01	3	3	0	0	**6**
Maya	02	2	2	0	1	**5**
Brady **	02	1	3	0	1	**5**
Belinda **	02	3	1	0	0	**4**
Laurie	02	2	1	0	0	3
Naomi	01	2	0	0	1	3
Bonnie **	01	2	1	0	0	3
Jenny *	01	1	2	0	0	3
Ashley **	01	1	1	0	0	2
Ingrid	02	1	0	1	0	2
Eleanor *	01	0	0	0	1	1
Audrey *	02	1	0	0	0	1
Sofia **	02	1	0	0	0	1
Brandy	02	1	0	0	0	1
Maggie **	01	1	0	0	0	1
Debbie **	01	0	1	0	0	1
Kendall	02	0	1	0	0	1
Laura*	01	0	0	0	0	0
Carla**	01	0	0	0	0	0
Kari**	01	0	0	0	0	0
Linda**	02	0	0	0	0	0
Kiara	02	0	0	0	0	0
Total: 26		32	28	2	5	67

Out of 26 participants, 21 had codes for teaching presence. Of those 21 students, eight had 4, 5, or 6 TP codes. Of the 67 messages coded for teaching presence on the part of students, 33 were from 10 students in section 01 and 34 were from 11 students in section 02.

Among the 26 students in the sample, 18 had this instructor previously for SED I. There were 14 students out of these 18 who had messages coded for TP. Out of eight students who did not have this instructor in the past, seven had messages with TP codes. Of the 18 students who

previously had a course with this instructor, 11 had been in an asynchronous online section of SED I and seven had been in a remote (synchronous zoom sessions) section of SED I. There were eight students (out of 11) who had previously been in an online course with this instructor who had messages with TP codes. Six out of the seven students who had been in a remote course with this this instructor had messages with TP codes. The distribution of students with messages coded for TP does not appear to be related to whether they had this instructor previously either online or remote format, or to which section they were in.

Demographic information provided by students with their consent to participate in the study was examined to determine if there were patterns for TP relative to age or race. Table 19 presents the frequency of TP codes for student messages by race/ethnicity.

Table 19. Teaching Presence coding frequencies for individual students by self-reported race/ethnicity

Race/Ethnicity	Number of participants	% of total participants (26)	# participants with TP codes	Total TP codes (67)	% of total TP codes
White	17	65.4%	14	49	73.1%
Black/African American	6	23.1%	6	15	22.4%
Hispanic/Latin/Spanish	1	3.8%	1	3	4.5%
Asian & Am. Indian	2	7.7%	0	0	0

Table 20 presents the frequency of Teaching Presence codes for student messages by age. The distribution of teaching presence codes for students appears even across race/ethnicity and age in comparison to the percentages of each demographic category.

Table 20. Teaching Presence coding frequencies for individual students by self-reported age

Age	Number of participants	% of total participants (26)	# participants with TP codes	Total TP codes (67)	% of total TP codes
21-25	5	19.2%	3	13	19.4%
26-35	15	57.7%	12	33	49.3%
36-45	4	15.4%	4	15	22.4%
46-55	1	3.8%	1	3	4.5%
56+	1	3.8%	1	3	4.5%

Summary of Teaching Presence Data Analysis

There is evidence of teaching presence in 25% of messages posted by students and 80% of students in the sample having at least one message including evidence of TP. There is a higher frequency of DI with 90% of student messages coded as including TP being coded for DI and 70% of the instructor's messages coded as including TP being coded for DI. About half of the student messages with evidence of TP were initial posts and about half were responses to peers. There is not any clear evidence about whether TP influences the level of CP within individual messages. There are not any significant patterns of occurrence of TP within sections or small groups, or for individual students by demographic information. The frequency of TP in student messages may be explained by the design and organization of the discussion activity including the discussion prompt, or by instructor modeling and interaction in small group threads.

Question 3: Does Teaching Presence on the Part of Students Contribute to Social Construction of Knowledge in Small Group Discussions?

For small groups that include TP on the part of students, what level of IAM is evident? Does the small group reach a higher level of IAM when TP for students is evident? Examining this question requires analysis at the individual and group levels. Activity Theory as it informed

the design of the study, and the analysis indicates that different levels of analysis are necessary to understand group activity (Wertsch, 1979).

Figure 12 presents an overview of how the data was examined at the individual and group levels to explore how TP potentially contributes to the social construction of knowledge. To address sub-question 3, individual level data and findings from sub-questions 1 and 2 in the previous sections are analyzed alongside group level data (i.e., the highest IAM code) for small group threads. Threads are a line of discussion within small groups that build upon a student's response to the discussion prompt, as the thread shared in Chapter Three (see Figure 10 on p. 93) represents. Threads are organized into different categories as shown in Figure 12.

Sources of Data for Q3: Individual and Group Level Analysis				
Individual Level Data: Coded Messages			**Group Level Data: Small Group Threads**	
Students' Coded Messages	IAM Phases	266 messages	Highest IAM code for students	100 threads
			Highest IAM code for anyone[a]	14 threads
	With TP	67 messages	With TP for students	48 threads
Instructor's Coded Messages	IAM Phases	68 messages	With TP for instructor / No TP for students	18 threads
			No TP for anyone	25 threads
	With TP	64 messages	Single message threads	9 threads

[a]There are 14 threads in which the instructor's message includes the highest IAM code for thread.

Figure 12. Individual and Group Data Sources

To address question 3, first, messages for individual students that include teaching presence will be examined along with the IAM Phase that is coded for these messages. Understanding the patterns of interaction when an individual student and the instructor engage in teaching presence will allow for better understanding of whether and how individuals with teaching presence are prompting social construction of knowledge within small groups. Then,

group level analysis will help examine patterns of interaction when teaching presence is evident in small group threads, within small groups, and within course sections. Additionally, patterns of teaching presence alongside patterns of interaction (i.e., IAM phases) over time will be analyzed throughout by examining data from Module 2, 6, and 11. The data sources for individual and group level analysis for sub-question 3 are outlined below.

Individual Level Analysis: Co-Occurrence Teaching Presence and Social Construction of Knowledge

Students' Messages. The first area of analysis for question three focuses on exploring whether there are patterns for individuals in terms of teaching presence and interaction leading to social construction. Examining teaching presence codes with the level of IAM that co-occurs for a student, or the instructor helps to establish whether an individual engaging in teaching presence might have the effect of higher phases of IAM for the small group.

Table 21 presents the co-occurrence of TP and IAM codes for students' messages. Initial posts are most often coded as IAM Phase I or II as these are coming from the individual student as an internal construction based on the prompt. There is not interaction in the discussion until responses are posted. This is reflected in the data in the table above for student messages including evidence of teaching presence. All but two of the messages that include teaching presence that are initial posts were coded as IAM Phase II. Student messages including teaching presence that are responses to others' messages have similar frequency of IAM Phase III and IV.

Table 21. Co-Occurrence of Teaching Presence and IAM for student messages

Co-Occurrence of TP (DI and FD) and IAM Phases for student messages (67 messages including TP)					
IAM	Initial posts coded DI (32 total)	Initial posts coded FD (2 total)	Responses to others coded DI (28 total)	Responses to others coded FD (5 total)	total
Phase I					
Phase II	30	2		1	33 (49%)
Phase III	1		11	3	15 (22%)
Phase IV	1		14	1	16 (24%)
Phase V			3		3 (5%)
Total:	32	2	28	5	67

Next, an overview of the findings related to the co-occurrence of teaching presence and social construction of knowledge will be examined, including excerpts to illustrate what this co-occurrence look likes for individual students within the context of small group discussions in this course.

Facilitating Discourse (FD). Of the seven student messages coded FD, five were responses and two were initial posts. The two messages coded FD that were initial posts were coded IAM Phase II (see explanation from IAM section about initial posts being most often coded as Phase II - C).

Of the five responses coded FD, three were coded IAM Phase III and one was coded IAM Phase IV. There was one response coded FD that was coded IAM Phase II because the student in the post disagreed with the student they were responding to, which is an indicator for Phase II. In the same message the student posed questions to the small group to ask others to weigh in on the disagreement.

Group 1, Thread 2, Module 2, Brenda's responding to Brandy, coded FD and IAM Phase II

> I totally understand where you're coming from in saying this, but I'm just curious- do you really think this type of home treatment is "necessary" for Anthony? The use of the word "necessary" sticks out to me so much in this statement and I'm just curious if you or anyone else in this group has any further thoughts. Personally, I don't think that type of home treatment is ever necessary regardless of the environment a child finds themselves in- but maybe that's naive of me to think that way.

Facilitating Discourse (FD) is not evident in student messages as frequently as Direct Instruction (DI). Based on the co-occurrence of FD and phases of IAM in this sample there is no evidence that FD on the part of students supports higher levels of social construction of knowledge. However, the small number of FD codes does not offer enough data to draw conclusions.

Direct Instruction (DI). Of the 60 student messages coded DI, 32 were initial posts and 30 of these were coded as IAM Phase II. Of the remaining 30 student messages coded DI, 28 were response messages, 11 were coded IAM Phase III, 14 were coded IAM Phase IV, and 3 were coded IAM Phase V.

An excerpt from a student message including teaching presence as well as evidence of IAM Phase V demonstrates what summarizing what others in the group have contributed along with how agreed upon understandings from the group apply in practice looks like in an online discussion. In this excerpt, the discussion prompt asked students to use the Developmental Niche Framework (Harkness & Super, 2006) to map a caregiving practice and discuss the underlying cultural beliefs behind the practice. Brady is responding to Linda who has discussed toilet learning.

Group 3, Thread 4, Module 6, Brady responding to Linda, coded DI and IAM Phase V

> I think the "anecdotal advice vs expert advice" piece you mentioned can be confusing to parents. There seems to be an argument in either direction for all the issues brought up this week even among experts. It is helpful for me to think about what Mary has mentioned about the social construction of these practices, and how as much as their effectiveness might be grounded in empirical evidence, the reality may make them difficult to implement or downright unsuitable for certain situations. You point out that some preschools encourage children to be toilet-trained before enrolling. This is a great example of how cultural and societal factors contribute or interfere with development. Environment plays a role in facilitating intervening factors.

Based on the co-occurrence of DI and phases of IAM in this sample there is some evidence that DI on the part of students supports higher levels of social construction of knowledge. Of the 61 student messages coded to have evidence of IAM Phase IV, 14 messages (23%) also included evidence of DI. Of 5 student messages coded to have evidence of IAM Phase V, 3 (60%) also included evidence of DI. More than half of the 33 individual students' messages including teaching presence that are responses to others' messages include evidence of IAM Phase IV or V.

Instructor's Messages

The instructor's messages that include teaching presence are analyzed for patterns as these co-occur with phases of IAM in order to understand if there are similar patterns related to interaction to those seen for student messages including teaching presence for the instructor's messages. Table 22 presents the co-occurrence of TP codes and IAM codes for the instructor's messages.

Table 22. Co-Occurrence of Teaching Presence and IAM for the instructor's messages

Co-Occurrence of TP and IAM Phases for instructor messages (64 messages including TP)			
IAM	Instructor posts coded FD	Instructor posts coded DI	Total
Phase I		1	1 (1%)
Phase II			
Phase III	16	29	45 (70%)
Phase IV	1	7	8 (13%)
Phase V	2	8	10 (16%)
Total	19	45	64

Of the instructor's 64 messages that were coded for TP, all but one had codes for IAM Phase III, IV, or V. All of the instructor's messages are responses rather than initial posts, and the pattern of co-occurrence between teaching presence primarily being with IAM Phases III, IV, and V as was seen with students' response messages is similar. However, the instructor's responses that include teaching presence much more frequently co-occur with Phase III in comparison to student responses with teaching presence which co-occur with Phase III and Phase IV mostly evenly.

Individual Level Analysis: Summary of Findings

The co-occurrence of teaching presence codes with IAM Phases III, IV, and V indicate that there might be a connection between teaching presence and promoting social construction of knowledge. This is particularly evident for the instructor's messages, all of which are responses to student messages, and for student messages that are responses to peers or the instructor.

This co-occurrence of teaching presence codes with the phases of the IAM representing negotiation, testing, and agreement/application of co-constructed knowledge implies that the more students or the instructor engage in teaching presence, the more likely social construction of knowledge occurs. While the instructor could take on sole responsibility for teaching

presence, it is to the benefit of the group of students and the instructor for students to also take up this responsibility.

Group Level Analysis: Code Co-Occurrence Teaching Presence and Social Construction of Knowledge

IAM measures individual construction of knowledge, negotiation of construction of knowledge, and social construction of knowledge as interaction occurs between individuals in groups. Having analyzed the co-occurrence of teaching presence with phases of IAM at the individual level, attention now comes to group level analysis.

This analysis examines the threads of discussion that groups participate in within the assigned small groups. For each small group in each module discussion, there are typically 5-6 threads that build from the discussion prompt. In the directions for the discussion, each student participant posts an initial response to the prompt by Sunday and then goes back to respond to a minimum of two peers' messages by Wednesday. Not every participant within a small group (i.e., the assigned students and the instructor) will post messages within every thread, but it is assumed that each participant will read all of the messages within all of the threads in their assigned small group. This assumption could be compared to the way instructors might assume all students are listening during a discussion during an in-person class meeting even if they do not verbally contribute to the discussion. Given that IAM is measuring interaction and whether the interaction reaches social construction, the total number and range of IAM codes within threads might be less significant than the highest phase coded for the thread. Thus, in this level of analysis evidence of the highest phase of IAM within small group threads will be examined with and without evidence of teaching presence occurring in the same thread.

Group Level Analysis: Comparison of Section 01 and 02. This first analysis compares the two sections of the course to understand whether there is a cohort effect (i.e., a combination of individuals in that section who influence one of the groups strongly in terms of teaching presence and interaction).

The comparison of the two sections examines first the highest IAM code for each thread by section and module, both for students only (i.e., without the instructor's data) as well as for students and the instructor. This allows for a point of comparison with different types of threads that include or don't include teaching presence. Table 23 presents the highest IAM code for students for each discussion thread in section 01 and 02. The percentages for the section totals are taken out of the total threads for that section and the percentages for the total are taken out of the 95 total threads in the data set. Five threads consisting of single messages posted by the instructor are not included in the total. Phase III and Phase IV have the highest overall frequencies for the highest IAM code for students in each thread. Section 02 has a higher percentage of Phase IV and V codes in comparison to section 01.

Table 23. Highest IAM code for students within threads

Highest IAM code for students within each thread, with and without teaching presence (95/100 total threads)						
Highest IAM code for student message within a thread	Phase I	Phase II	Phase III	Phase IV	Phase V	Total Threads
Section 01 Module 2	1	2	8	3	1	15 (16%)
Section 01 Module 6		3	2	11	1	17 (18%)
Section 01 Module 11		4	11	3		18 (19%)
Section 01 Totals:	**1 (2%)**	**9 (18%)**	**21 (42%)**	**17 (34%)**	**2 (4%)**	**50**
Section 02 Module 2		1	4	8		13 (14%)
Section 02 Module 6		1	2	10	3	16 (17%)
Section 02 Module 11		1	11	4		16 (17%)
Section 02 Totals:		**3 (7%)**	**17 (38%)**	**22 (49%)**	**3 (7%)**	**45**
Total:	1 (1%)	12 (13%)	38 (40%)	39 (41%)	5 (5%)	95

There are nine threads in which a message posted by the instructor includes the highest IAM code for the thread. In addition, there are five threads posted by the instructor that consist of only a single message, thus only a single IAM code. Table 24 presents the pattern of data for both sections when the instructor's data is included. This results in slightly higher frequencies across phases and higher frequency for Phase V for the whole data set. The percentages for the section totals are taken out of the total threads for that section and the percentages for the total are taken out of the 100 total threads in the data set. Section 02 appears to have slightly higher frequency of IAM Phase IV and V when examining student data only. However, when the instructor's messages are included, the difference between section 01 and 02 narrows. This suggests that the instructor's messages serve to push the discussion threads to higher levels of social construction. The differences across section 01 and section 02 in the highest IAM code for small groups within threads is not large enough to indicate a cohort effect.

Table 24. Highest IAM code for any participant within threads

Highest IAM code for students or the instructor within each thread, with/without teaching presence (100 total threads)						
Highest IAM code within a thread	Phase I	Phase II	Phase III	Phase IV	Phase V	Total Threads
Section 01 Module 2	1	2	6	5	2	16 (16%)
Section 01 Module 6		3	2	11	2	18 (18%)
Section 01 Module 11		4	10	3	1	18 (18%)
Section 01 Totals:	**1 (2%)**	**9 (17%)**	**18 (35%)**	**19 (37%)**	**5 (9%)**	**52**
Section 02 Module 2		1	5	8		14 (14%)
Section 02 Module 6		1	2	10	4	17 (17%)
Section 02 Module 11			11	4	2	17 (17%)
Section 02 Totals:		**2 (4%)**	**18 (38%)**	**22 (46%)**	**6 (12%)**	**48**
Total:	1 (1%)	11 (11%)	36 (36%)	41 (41%)	11 (11%)	100

Next, threads that include teaching presence for students are compared with the highest phase of IAM coded for a student message in the thread. Examining student data at the group level allows for a comparison of what happens in the small group with individual student messages including teaching presence. Table 25 presents the highest IAM phase for students in each thread in which there is evidence of TP within a student's message for each section and each module. The percentages for the section totals are taken out of the total threads for that section and the percentages for the total are taken out of the 48 total threads that include TP in at least one student message. In section 01 there were 10 students who had a total of 32 teaching presence codes for messages in that section. In section 02 there were 11 students who had a total of 35 teaching presence codes for messages in that section. In examining the highest IAM code for student messages for threads that include teaching presence on the part of students, section 02 has a higher frequency of Phase IV.

Table 25. Highest IAM code for students within threads with Teaching Presence

Highest IAM code for students within threads including teaching presence for students (48 threads with TP for students/100 total threads)						
Highest IAM code for student message within a thread	Phase I	Phase II	Phase III	Phase IV	Phase V	Total Threads w/ TP for students
Section 01 Module 2		1	1	3	1	6
Section 01 Module 6			2	6	1	9
Section 01 Module 11		2	2	2		6
Section 01 Totals: *		**3 (14%)**	**5 (24%)**	**11 (52%)**	**2 (10%)**	**21**
Section 02 Module 2			3	7		10
Section 02 Module 6				9	2	11
Section 02 Module 11			4	2		6
Section 02 Totals: *			**7 (26%)**	**18 (67%)**	**2 (7%)**	**27**
Total: *	0	3 (6%)	12 (25%)	29 (60%)	4 (8%)	48

It appears that individual students who engage in teaching presence are not solely responsible for patterns of interaction in small groups when comparing group data with the individual data. The highest IAM code for students in threads including teaching presence for students shows a much higher frequency of Phase IV than is seen co-occurring within messages for individual students who engage in teaching presence. This suggests that other students participating within these threads contribute to bringing the threads to a higher phase of IAM. Table 26 presents the co-occurrence of TP with IAM codes for individual student messages, and then for small groups. The group data includes the 48 threads in which there is at least one student message with evidence of TP and the highest IAM code for student messages within these threads.

Table 26. Summary of Individual and Group Teaching Presence and IAM Co-Occurrence Data

Individual				**Group**
Co-Occurrence of TP and IAM Phases for student messages (67 student messages including TP)				**Highest IAM code for students in threads with TP for students**
IAM	Initial posts coded TP (34 total)	Responses to others coded TP (33 total)	Total messages w/TP (67 total)	48 total threads with TP for students
Phase II	32	1	**33 (49%)**	**3 (6%)**
Phase III	1	14	15 (22%)	12 (25%)
Phase IV	1	15	**16 (24%)**	**29 (60%)**
Phase V		3	3 (5%)	4 (8%)
Total:	34	33	67 (100%)	48 (100%)

Table 26 shows that Phase III frequency is slightly lower for individual student messages with teaching presence at 22% as compared to 25% for small group threads including teaching presence for students. Phase IV and V frequency for threads (i.e., group data) is 68% in comparison to 29% for individual student messages including TP. A significant decline in Phase II for individual data in comparison to group data, from 49% to 6%, can be explained through initial posts coded as Phase II with high frequency. As the discussion continues beyond the initial post, response messages posted by other participants are likely to move the discussion to a higher phase of IAM. However, the increase in frequency of Phase IV for individual data in comparison to group data from 24 % to 60%, is primarily occurring within responses. The group data (i.e., thread level) suggests that other students in groups respond to student messages including teaching presence and bring the interaction to a higher phase of IAM.

To understand the role that the instructor might play in interactions as compared to students only, data including the instructor's messages is examined. These are all threads that include messages with TP and the highest phase of IAM coded for the thread for any participant,

student or the instructor. Table 27 presents the highest IAM code for small groups in threads including at least one message with evidence of TP for all participants (i.e., students and the instructor) for each section and module. The percentages for the section totals are taken out of the total threads for that section and the percentages for the total are taken out of the 70 total threads that include TP in at least one message.

Table 27. Highest IAM code for any participant within threads with Teaching Presence

Highest IAM code for messages within each thread that includes TP for anyone (70/100 total threads)						
Highest IAM code within a thread	Phase I	Phase II	Phase III	Phase IV	Phase V	Total Threads w/ TP for anyone
Section 01 Module 2	1	1	4	5	2	13
Section 01 Module 6			2	7	2	11
Section 01 Module 11		2	4	3	1	10
Section 01 Totals:	**1 (3%)**	**3 (9%)**	**10 (29%)**	**15 (44%)**	**5 (15%)**	**34**
Section 02 Module 2		1	5	8		14
Section 02 Module 6				9	3	12
Section 02 Module 11			7	2	1	10
Section 02 Totals:		**1 (3%)**	**12 (33%)**	**19 (53%)**	**4 (11%)**	**36**
Total:	1 (1%)	4 (6%)	21 (30%)	36 (51%)	9 (13%)	70

There are 22 additional threads that include TP for the instructor. Out of 64 messages posted by the instructor that include teaching presence, 45 were also coded IAM Phase III, which is negotiation. The following excerpt illustrates what Phase III: Negotiation of Meaning/Co-Construction of Knowledge looks like in the online discussion. The instructor is responding to Ashley's initial post. The prompt asks students to apply Garcia-Coll and Szalacha's (2004) integrative model of child development to a case of a child in middle childhood to analyze the

case and propose interventions at varying systems levels. The instructor's response to Ashley demonstrates "negotiation of the relative weight to be assigned to types of arguments", one of the indicators for Phase III:

> Group 3, Thread 2, Module 2, Instructor responding to Ashley's initial post, coded IAM Phase III
>
> Hi Ashley-
> Thanks for your points here about the likelihood that Manuel has experienced discrimination in his new social context and also for recognizing his family ties as a strength. I appreciate your idea to help Manuel to connect his school work and performance with the family business as a potentially motivating factor.
> What are some systemic barriers involved in implementing this strategy? Does the typical school recognize the kinds of strengths that Manuel and his family bring? Are there potentially opportunities in the larger community that might also play a role in supporting positive developmental outcomes for Manuel?
> Thanks,
> Mary

The instructor's questions signal direct instruction (TP) and serve to push Ashley and other students in the group to consider beyond the family level in terms of systemic barriers and supports.

Later in the same thread, there is a message posted by Ashley in response to another student's message that brought up school and society level considerations that has evidence of IAM Phase V:

> Group 3, Thread 2, Module 2, Ashley responding to a peer, coded IAM Phase V
>
> I found your response hear so incredibly intriguing. I myself am working for my field placement teaching with entirely ESL students and have often felt the frustration of the public system forcing children into an all English based curriculum…
>
> Even as I write this however, I feel the answer is so obvious and frustrating it didn't immediately occur to me. To teach and encourage multiple languages is at odds with the white supremacist model that is also at work within schools, as well as so much of the American approach to things. Not embracing other languages beyond English is a

> means to keep non English speakers from prospering to the degree native English speakers do.
>
> I am really interested in…your idea about duel [sic] language programs and its something I may be able to look into for some of the kids I work with at my field placement.

In Ashley's response there is evidence that her "knowledge or way of thinking (cognitive schema) has changed as a result of the interaction" which is an indicator for IAM Phase V. While her response does not include evidence of teaching presence, it does seem contingent upon the responses from the instructor and other students. The instructor's response coded for DI and IAM Phase III prompted other students in the group to interact and engage in negotiation and testing of socially constructed knowledge.

When including the instructor's messages that include teaching presence, there is only a slight increase in Phase III at 30% rather than 25% for students only. This indicates that students in threads may be responding to the instructor's messages including Phase III negotiation with responses that take the thread to a higher level of IAM and into social construction. Phase IV and V frequency is similar for students only (68%) and when including the instructor's data (64%). Section 02 has a slightly higher frequency of Phase IV, but a slightly lower frequency of Phase V compared with section 01. Overall, the data comparing section 01 and section 02 does not indicate that there was a cohort effect.

Group Level Analysis: Comparison of Small Groups. The next level of analysis is the small group. Data is arranged by small group for threads that include teaching presence for student messages with the highest IAM code for student messages within the thread. This allows for an examination of whether there are small groups with notable patterns of interaction. Table 28 presents data for the highest IAM code for a student message in threads that includes at least

one student message with evidence of TP for each small group in the three modules in the data set.

Table 28. Highest IAM code for students within threads with Teaching Presence by small group

Highest IAM code for students within each thread that includes teaching presence for students by small group (48 threads out of 100 total)						
Highest IAM code for student message within a thread	Phase I	Phase II	Phase III	Phase IV	Phase V	Threads w/ TP for students
01 M2 Group 1			1			1
01 M2 Group 2				1		1
01 M2 Group 3		1		2	1	4
01 M6 Group 1			1	2		3
01 M6 Group 2				3	1	4
01 M6 Group 3			1	1		2
01 M11 Group 1				1		1
01 M11 Group 2			1			1
01 M11 Group 3		2	1	1		4
Section 01 Totals:		**3**	**5**	**11**	**2**	**21**
02 M2 Group 1			1	3		4
02 M2 Group 2			1	2		3
02 M2 Group 3			1	2		3
02 M6 Group 1				4	1	5
02 M6 Group 2				3		3
02 M6 Group 3				2	1	3
02 M11 Group 1			2	1		3
02 M11 Group 2				1		1
02 M11 Group 3			2			2
Section 02 Totals:			**7**	**18**	**2**	**27**
Total:		3	12	29	4	48

In examining student data for small groups there appears to be small groups in section 01 that have more threads including TP: group 3 for module 2 and group 3 for module 11. In section 02 the small groups have more even numbers of threads with TP with the exception of group 2 in module 11. For both sections 01 and 02 module 6 stands out as having more threads including teaching presence and higher frequencies of these threads reaching Phase IV and V. Every small

group has at least one message including teaching presence for students. The range is between 1-5 messages for each small group that contain evidence of teaching presence.

To understand the role that the instructor might play in interactions within small groups as compared to students only, data including the instructor's messages with teaching presence in threads is examined. Table 29 presents data for the highest IAM code for any message in threads that includes at least one message from any participant with evidence of TP for each small group in the three modules in the data set. When including threads in which the instructor has messages with teaching presence, we can see the number of threads including teaching presence for small groups evens out somewhat, particularly for Module 2 in section 01. This may be due to the instructor responding to each student's initial post in the early modules in the course and shifting to primarily responding to groups after module 4. Overall, no definitive patterns emerge when examining the data comparing teaching presence across small groups. The data for small groups supports findings from individual data that module 6 includes higher frequencies of both teaching presence and high phases of IAM.

Table 29. Highest IAM code for any participant within threads with Teaching Presence by small group

Highest IAM code within each thread that includes teaching presence for any participant (70 total threads)						
Highest IAM code within a thread	Phase I	Phase II	Phase III	Phase IV	Phase V	Total Threads w/ TP for anyone
01 M2 Group 1	1		1	2		4
01 M2 Group 2			2	2		4
01 M2 Group 3		1	1	1	2	5
01 M6 Group 1			1	3		4
01 M6 Group 2				3	1	4
01 M6 Group 3			1	1	1	3
01 M11 Group 1			1	1		2
01 M11 Group 2			1	1		2
01 M11 Group 3		2	2	1	1	6
Section 01 Totals:	**1**	**3**	**10**	**15**	**5**	**34**
02 M2 Group 1			2	4		6
02 M2 Group 2		1	1	2		4
02 M2 Group 3			2	2		4
02 M6 Group 1				4	1	5
02 M6 Group 2				2	1	3
02 M6 Group 3				3	1	4
02 M11 Group 1			2	1	1	4
02 M11 Group 2			2	1		3
02 M11 Group 3			3			3
Section 02 Totals:		**1**	**12**	**19**	**4**	**36**
Total:	1	4	22	34	9	70

Group and Individual Analysis: Comparison of Threads with and Without Teaching Presence Codes for Students with IAM Phase Codes

Different types of threads including and not including teaching presence will be analyzed relative to IAM phases in order to examine if there are patterns or relationships between teaching presence and interaction. The IAM data at the thread level will be analyzed relative to teaching presence for students and the instructor and by module. In addition, small groups that have

multiple threads with and without teaching presence will be analyzed to search for any consistent trends related to teaching presence for individuals and interactions within groups.

Out of 100 total threads across the three modules, two sections, and 18 small groups, there were 48 threads that had at least one student message coded as including evidence of teaching presence (either DI or FD). Threads were grouped into categories (see Figure 13) to view the patterns, if any, of codes for teaching presence on the part of individuals compared with interaction in threads. There are 25 threads with no teaching presence. Nine threads consist of a single message so there is no interaction to measure. Figure 13 displays these categories of data from the 100 threads total.

Threads that include Teaching Presence (66 total threads)			**No TP**	**No Interaction**
Threads with more than 1 TP code for student messages	Threads with one TP code for student messages	Threads with TP for instructor messages (none for students)	Threads with no TP for any messages	Threads consisting of a single message
13	35	18	25	9

Figure 13. Categories of Threads with and without Teaching Presence (100 threads total)

The data from each category of thread is discussed in the following sections.

Threads With More Than One Teaching Presence Code for Students. The first category includes the threads that had more than one code for teaching presence on the part of students. The highest IAM phase coded for student messages within each of these threads includes only Phases III, IV, and V codes. Table 30 presents the highest level IAM code for student messages within the 13 threads that include more than one TP code for student messages.

Table 30. Group data for students for threads with more than one Teaching Presence code for students

Group Level: Highest IAM code for students within threads that include more than one TP code for student messages (13 / 100 total threads)	
Phase I	0
Phase II	0
Phase III	3 (23%)
Phase IV	9 (69%)
Phase V	1 (8%)

There were 13 threads with more than one TP code for students. Six of the 13 threads in this category are from module 2, five are from module 6, and two are from module 11. Within these 13 threads, there were 72 total messages. Out of 13 threads, 10 threads had IAM codes of Phase IV or Phase V for student messages and there were 18 total Phase IV or Phase V codes for all student messages in this category. Table 31 presents the data on the individual students within the 13 threads with more than one TP code for student messages. Students' coded messages are represented in the table. Non-coded messages and the instructor's messages are not included in the table.

Table 31. Individual student data for threads with more than one Teaching Presence code for students

Individual Level: Student IAM codes for threads with more than one TP code for students 53 coded student messages out of 72 total messages in the 13 threads in this category							
>1 TP code	Ph I	Ph II	Ph III	Ph IV	Ph V	Total **coded student** messages	total threads with >1 TP code
Module 2	2	5	12	7	0	26	6
Module 6	1	4	6	9	1	21	5
Module 11	0	1	4	1	0	6	2
Total	3	10	22	17	1	53	13

The question the data for this category attempts to answer is whether more teaching presence for students means higher levels of IAM (i.e., social construction of knowledge) for students. The individual data shows the total number of Phase IV and V codes for all student messages in the threads in this category is 18 representing 25% of the 72 total messages within these threads. However, in comparing the group data with the individual data, the group data suggests that more teaching presence for students results in higher phases of IAM within threads, with 77% of the 13 threads (i.e., 10 threads out of 13 total) including the highest IAM code at Phase IV or V.

To understand the role that the instructor might play in interactions within this category of 13 threads including more than one TP code for students as compared to students only, data including the instructor's messages in these threads is examined. The instructor has messages in nine out of these 13 threads. Table 32 presents the data on the individual participants (i.e., students and the instructor) within the 13 threads with more than one TP code for student messages. Coded messages are represented in the table.

Table 32. All individual data for threads with more than one Teaching Presence code for students

Individual Level: All IAM codes for students and instructor for threads with more than one TP code for students 67 coded participant messages out of 72 total messages in the 13 threads in this category							
>1 TP code	Ph I	Ph II	Ph III	Ph IV	Ph V	Total **coded** messages	Total threads with >1 TP code
Module 2	2	5	20	9	0	36	6
Module 6	1	4	8	9	2	24	5
Module 11	0	1	4	2	0	7	2
Total	3	10	32	20	2	67	13

The individual data including the instructor's messages and student messages shows the total number of Phase IV and V codes for all messages in the threads in this category (72 total) is 30%, only slightly higher than for student messages only. Phase III frequency is much higher when including the instructor's messages in this category of threads.

Table 33 presents the highest level IAM code for any message (i.e., posted by either student or instructor) within the 13 threads that include more than one TP code for student messages.

Table 33. Group data for threads with more than one Teaching Presence code for students

Group Level: Highest IAM code within threads that include more than one TP code for student messages (13 / 100 total threads)	
Phase I	0
Phase II	0
Phase III	2 (15%)
Phase IV	9 (69%)
Phase V	2 (15%)

Comparing group data with individual data when including students' and instructor's messages, there is only one thread that includes a message from the instructor coded at a higher phase of IAM. The data for the 13 threads that include more than one student message with evidence of TP points to the possibility that the more TP included in a thread, the higher the IAM phase.

Threads With One Teaching Presence Code for Students. There are 35 threads that include one TP code for students. Of these 35 threads, 10 were from module 2, 15 were from module 6, and 10 were from module 11. Does even one TP code for students result in higher phases of IAM in a thread? Table 34 presents the highest level IAM code for student messages within the 35 threads that include one student message coded as including TP.

Table 34. Group data for students for threads with one Teaching Presence code for students

Group Level: Highest IAM code for students within threads that include one TP code for student messages (35 / 100 total threads)	
Phase I	0
Phase II	3 (9%)
Phase III	9 (26%)
Phase IV	20 (57%)
Phase V	3 (9%)

At the group level, the highest IAM phase coded for student messages within each of these 35 threads shows that there are 23 threads (66%) that had Phase IV or Phase V as the highest IAM code.

Table 35 presents the data on the individual students within the 35 threads with one student message coded as including TP. Coded messages are represented in the table. Non-coded messages and the instructor's messages are not included in the table.

Table 35. Individual student data for threads with one Teaching Presence code for students

Individual Level: Student IAM codes for threads with one TP code for student messages 101 coded student messages out of 141 total messages in the 35 threads in this category						
1 TP code	Ph II	Ph III	Ph IV	Ph V	Total **coded student** messages	Total threads with 1 TP code for students
Module 2	10	12	7	1	30	10
Module 6	12	10	20	2	44	15
Module 11	11	12	4	0	27	10
Total	33	34	31	3	101	35

There were 141 total messages in these 35 threads (including non-coded messages). In examining individual level data within these 35 threads, 34 total messages were coded as IAM Phase IV or Phase V. This represents 24% of the 141 total messages posted by individuals.

However, in looking at the group level data including the highest IAM phase code for student messages in these 35 threads, 66% of the threads are at Phase IV or V. What happens when the instructor's messages are included in the data?

Table 36 presents the data on the individual participants (i.e., students and the instructor) within the 35 threads with one student message coded as including TP. Coded messages are represented in the table. There are 141 total messages in these threads including non-coded messages.

Table 36. All individual data for threads with one Teaching Presence code for students

Individual Level: All IAM codes for students and instructor for threads with one TP code for students 126 coded participant messages out of 141 total messages in the 35 threads in this category						
1 TP code	Ph II	Ph III	Ph IV	Ph V	Total **coded** messages	Total threads with 1 TP code for students
Module 2	10	27	10	2	49	10
Module 6	12	11	21	5	49	15
Module 11	11	12	4	1	28	10
Total	33	50	35	8	126	35

Phase III, IV, and V increase when including the instructor's IAM codes within the 35 threads that have one student message coded as including TP. The total amount of TP codes also increases due to the instructor's messages that are coded as including TP. This data shows that the instructor contributes individually to social construction and teaching presence, but does the instructor contribute within small groups to higher phases of IAM within these 35 threads?

Table 37 presents the highest level IAM code for any message (i.e., posted by either student or instructor) within the 35 threads that include one student message coded as including TP.

Table 37. Group data for threads with one Teaching Presence code for students

Group Level: Highest IAM code within threads that include one TP code for student messages (35 total threads)	
Phase I	0
Phase II	3 (9%)
Phase III	7 (20%)
Phase IV	19 (54%)
Phase V	6 (17%)

There is a slight increase in Phase IV and V as the highest IAM code within the 35 threads when instructor data is included. This data suggests that even one message including TP for students within a thread might increase the IAM phase that the thread reaches. Does this pattern continue when a thread only includes instructor messages with TP and no student messages with TP?

Threads With No Teaching Presence for Students but Including Teaching Presence for the Instructor. There were 18 threads that did not include any messages with teaching presence codes for students but did include a message with teaching presence posted by the instructor. Of these 18 threads, 10 threads are from module 2, 1 thread is from module 6, and 7 threads are from module 11. Table 38 presents the highest level IAM code for student messages within the 18 threads that include instructor messages coded as including TP.

Table 38. Group data for students for threads with Teaching Presence for the instructor

Group Level: Highest IAM code for students within threads that do not include TP for student messages, but do include TP code for instructor (18 / 100 total threads)	
Phase I	1 (6%)
Phase II	2 (11%)
Phase III	12 (66%)
Phase IV	3 (16%)
Phase V	0

In examining the group level data for the highest IAM phase coded for student messages in each of these threads, the highest frequency of IAM codes is Phase III with 12.

Table 39 presents the data on the individual students within the 18 threads with instructor messages coded as including TP, but no student messages coded as including TP. Coded messages are represented in the table. Non-coded messages and the instructor's messages are not included.

Table 39. Individual student data for threads with Teaching Presence for the instructor

Individual Level: <u>Student</u> IAM codes for threads with no TP codes for student messages including TP for instructor 39 coded student messages out of 62 total messages in the 18 threads in this category							
No student TP codes	Ph I	Ph II	Ph III	Ph IV	Ph V	Total **coded student** messages	Total threads with no **student** TP codes
Module 2	4	6	15	1	0	26	10
Module 6	0	0	0	1	0	1	1
Module 11	2	2	8	0	0	12	7
Total	6	8	23	2	0	39	18

Individual level data for students shows the highest frequency of IAM for student messages within threads with TP for the instructor but no TP for students is Phase III. Among the 18 threads that did not include any messages with teaching presence codes for students but did include a message including teaching presence posted by the instructor, only two student messages had IAM Phase IV codes.

Do the instructor's messages influence the interaction patterns in this group of threads? Table 40 presents data on the individual participants (i.e., students and the instructor) within the 18 threads with instructor messages coded as including TP, but no student messages coded as including TP. Coded messages are represented in the table. There are 62 total messages posted in these threads, including non-coded messages.

Table 40. All individual data for threads with Teaching Presence for the instructor

Individual Level: All IAM codes for students and instructor for threads with no TP codes for students including TP for the instructor 59 coded participant messages out of 62 total messages in the 18 threads in this category							
No student TP codes	Ph I	Ph II	Ph III	Ph IV	Ph V	Total **coded** messages	Total threads with no student TP codes
Module 2	5	6	22	4	0	37	10
Module 6	0	0	1	2	0	3	1
Module 11	2	2	15	0	0	19	7
Total	7	8	38	6	0	59	18

The instructor has more messages for module 2. This is due to the pattern of the instructor responding to each student's initial post for the early modules and shifting after module 4 to responding to groups. Phase III frequency increases when including the instructor's data, consistent with the pattern for student only data. There is an increase in Phase IV when including the instructor's data.

Table 41 presents the highest level IAM code for any message (i.e., posted by either student or instructor) within the 18 threads that with instructor messages coded as including TP, but no student messages coded as including TP.

Table 41. Group data for threads with Teaching Presence for the instructor

Group Level: Highest IAM code within threads that do not include TP for student messages, but do include TP code for instructor (18 / 100 total threads)	
Phase I	1 (6%)
Phase II	1 (6%)
Phase III	10 (56%)
Phase IV	6 (33%)
Phase V	0

When the instructor's data is included at the individual and group level, the highest frequency continues to be Phase III. Both at the individual and group level an increase in Phase

IV is also noted. The instructor's messages double the frequency of Phase IV as the highest code for these 18 threads. For the group level, the highest IAM code for any messages in these 18 threads most frequently is Phase III. This pattern suggests that teaching presence for the instructor might result in elevating the discussion to negotiation (i.e., Phase III) but is less effective in prompting higher phases of IAM than when students engage in teaching presence.

Threads with no Teaching Presence for Students or the Instructor. There were 25 threads that did not have teaching presence codes. Among these 25 threads with no teaching presence for anyone, two threads were from module 2, nine threads were from module 6, and 14 threads were from module 11. The highest IAM code within threads that do not include TP for anyone (students or instructor) is the same for student messages and when including the instructor's messages.

Table 42 presents the highest level IAM code for any message (i.e., posted by either student or instructor) within the 25 threads that do not include any messages coded as including TP. The group data remains the same whether the instructor's data is included or not.

Table 42. Group data for threads with no Teaching Presence

Group Level: Highest IAM code within threads that do not include TP for anyone (25 / 100 total threads)	
Phase I	0
Phase II	3 (12%)
Phase III	14 (56%)
Phase IV	7 (28%)
Phase V	1 (4%)

In examining the group level data for the highest IAM phase coded for student messages for each of these threads, the highest frequency of IAM codes is Phase III with 14. Of the eight

threads at IAM Phase IV and V, six are from module 6, which has the highest frequency of teaching presence for students overall across the three modules.

Table 43 presents data on the individual participants (i.e., students and the instructor) within the 25 threads with no messages coded as including TP. Coded messages are represented in the table. There are 74 total messages in this category of 25 threads when including non-coded messages.

Table 43. All individual data for threads with no Teaching Presence

Individual Level: All IAM codes for students and instructor for threads with no TP codes for any messages 64 coded student messages out of 74 total messages in the 25 threads in this category							
No TP codes	Ph I	Ph II	Ph III	Ph IV	Ph V	Total **coded** messages	Total threads with No TP codes
Module 2	0	2	3	0	0	5	2
Module 6	4	6	8	7	1	26	9
Module 11	2	11	18	2	0	33	14
Total	5	19	29	9	1	64	25

It is possible that other threads within module 6 that do include TP for students could influence the higher phases of IAM that are seen in this category of threads for module 6. There is not a way to analyze the data to confirm this possibility. Students have read the messages within threads when they post response messages building on or integrating ideas from previous messages in the thread. It is assumed that students read all of the threads in their small group, but there is no evidence within the data set to say definitively that this is happening.

There were 74 total messages within these 25 threads that did not include teaching presence. In examining the individual level data for students for messages in this category of threads, about one-third of the total messages were coded at IAM Phase I or II. IAM Phases II

and III have the highest frequency within this group. The data for threads that do not include teaching presence for students, or the instructor suggests that threads are less likely to reach IAM Phase IV or V in comparison to data for threads including teaching presence on the part of students.

Threads With Single Message. There were nine threads that only consisted of a single post on the part of a student or the instructor and did not have any responses. Four of the 9 threads that were single messages were initial posts on the part of students and were coded as IAM Phase II. One of these four initial student posts was also coded as including evidence of teaching presence (DI). Table 44 presents the single messages posted by students.

Table 44. Student Single Messages

Single message for students (4 total)	**IAM Phase II**
Module 6	3 *one of these also DI
Module 11	1

The remaining five threads in this group were response messages posted by the instructor as new threads directed to a group but without any responses from group members. All five of these messages included evidence of TP. Two of these were coded IAM Phase III, one was coded IAM Phase IV and two were coded IAM Phase V. The instructor's messages were new threads but in response to messages that had been posted within the small group. Table 19b presents the single messages posted by the instructor.

Table 45. Instructor Single Messages

Single message for Instructor (5 total)	**IAM Phase III**	**IAM Phase IV**	**Phase V**
Module 2	2		
Module 6		1	1
Module 11			1

It is difficult to draw conclusions about interactions and social learning for threads that consist of a single post. This does not mean that other participants aren't reading or thinking about the content of the message outside the bounds of the "class time" simply because there is not a written response. However, there is no evidence in the data set that students read or learned from these single messages.

Group Level Analysis: The Number of Messages Included Within Threads Including Teaching Presence and Without Teaching Presence. In reviewing the data, a question arises: Might the total number of messages within a thread contribute to higher phases of IAM as the length of the discussion increases with each new response? The number of messages within threads that include TP and threads that do not include TP were examined to analyze whether reaching higher phases within IAM might be contingent upon the number of interactions (i.e., messages). The tables below examine the number of messages in threads with and without TP to explore this possibility. Table 46 presents the number of messages in the 25 threads that do not include TP codes for any messages across the three modules.

Table 46. Total messages in threads with no Teaching Presence

Number of Messages within threads with no teaching presence (25 / 100 total threads)					
Total messages in thread	2	3	4	5	total
Module 2	1	1			2
Module 6	2	4	2	1	9
Module 11	5	6	3		14
total	8 (32%)	11 (44%)	5 (20%)	1 (4%)	25

The range of the total number of messages in threads with no messages coded as including TP is from 2-5 total messages.

Table 47 presents the highest IAM code for these 25 threads with no messages coded as including TP.

Table 47. Group data for threads with no Teaching Presence

Highest IAM within threads that do not include TP (25 / 100 total threads)	
Phase I	0
Phase II	3 (12%)
Phase III	14 (56%)
Phase IV	7 (28%)
Phase V	1 (4%)
Total threads:	25

Among the 25 threads that do not include teaching presence, 19 consist of 2 or 3 messages total. This represents 76% of the total threads. In this category of threads with no teaching presence, 68% included Phase II or Phase III as the highest IAM code, while 32% are Phase IV or V. The limited interaction evidenced by fewer messages in the threads might explain the higher frequency of lower IAM phases.

In contrast, the data presented next examines the total number of messages for the 48 threads that include student messages coded as including TP (i.e., one or more student messages

in the thread include TP) relative to the highest IAM code for these threads. Table 48 presents the total messages within the 48 threads that include student messages coded as including TP.

Table 48. Total messages in threads including Teaching Presence for students

Number of messages within threads including teaching presence codes for students (48 / 100 total threads)										
Total messages in thread	2	3	4	5	6	7	8	9	10	Total threads
Module 2			3	3	5	4			1	16
Module 6	1	11	3	1	2	1		1		20
Module 11	3	5	3	1						12
Total	4 (8%)	16 (33%)	9 (19%)	5 (10%)	7 (15%)	5 (10%)		1 (2%)	1 (2%)	48

Of the 48 threads that include teaching presence for students, 28 threads include four or more messages. This represents 58% of the total threads in this group.

Table 49 presents the highest IAM code for student messages within the same data set of 48 threads with student messages coded as including TP.

Table 49. Group data for threads with Teaching Presence for students

Highest IAM code for <u>students</u> within threads that include TP for students (48 / 100 total threads)	
Phase I	0
Phase II	3 (6%)
Phase III	12 (25%)
Phase IV	29 (60%)
Phase V	4 (8%)
Total Threads:	48

In this group of 48 threads including teaching presence for students, 68% of the threads reached IAM Phase IV or V as the highest IAM code, while 31% of the threads reached IAM

Phase II or III. Is this pattern consistent for any thread including TP, whether within a student or instructor message?

Table 50 presents the total messages within the 66 threads that include any messages coded as including TP.

Table 50. Total messages in threads including Teaching Presence for any participant

Number of messages in threads including teaching presence codes for students and/or instructor (66/100 threads)										
Total messages in thread	2	3	4	5	6	7	8	9	10	Total threads
Module 2		4	7	3	6	4	1		1	26
Module 6	1	12	3	1	2	1		1		21
Module 11	5	7	5	1	1					19
total	6 (9%)	23 (35%)	15 (23%)	5 (7.5%)	9 (14%)	5 (7.5%)	1 (1.5%)	1 (1.5%)	1 (1.5%)	66

Among the 66 threads that include teaching presence for student messages or for the instructor's messages, 37 threads, representing 56.5% of the total threads, included four or more messages total. Among the 66 threads that include teaching presence 44% consist of only two or three messages total.

Table 51 presents the highest IAM code for student messages within the same data set of 66 threads with any messages coded as including TP.

Table 51. Group data for threads with Teaching Presence for any participant

Highest IAM code for <u>students</u> within threads that include TP for students or instructor (66 / 100 total threads)	
Phase I	1 (2%)
Phase II	5 (8%)
Phase III	24 (36%)
Phase IV	32 (48%)
Phase V	4 (6%)
Total Threads:	66

In this category of threads including teaching presence for anyone, 54% included Phase IV or Phase V as the highest IAM code, while 46% are Phase I, II, or III. The more extended interaction within these threads might explain the higher frequency of higher IAM phases.

Is it possible that students respond to messages that include teaching presence with higher frequency than to messages without teaching presence? While there is not enough data included in these totals to support a conclusion about relationships between teaching presence, high phases of IAM, and thread length, this limited data raises the question that the number of messages in the thread might be what promotes higher IAM phases. This data also shows slightly higher frequency of both thread length and IAM Phase IV and V for the group of threads including teaching presence for students in comparison to teaching presence for anyone (i.e., for students or for the instructor) or no teaching presence. This raises a question about whether teaching presence on the part of students causes increased interaction among students.

Summary of Group IAM Data for Threads with and Without Teaching Presence

The examination of different types of threads with and without teaching presence for students and the instructor in the previous section indicates that when *student* messages include evidence of teaching presence that the thread reaches higher phases of social construction of knowledge as measured by the IAM. These patterns are consistent even when the categories for TP are combined into larger groups of data for threads with and without TP. The tables below present the data for the different configurations of the group data for the categories of threads that have been analyzed.

Table 52 presents the first summary comparing the highest IAM phase coded for student messages in three categories of threads including messages with evidence of TP with 25 threads

that have no TP codes for any messages. The three categories representing threads that include TP in Table 52 are: 13 threads with more than one student message coded as including TP, 35 threads with a single student message coded as including TP, and 18 threads with instructor messages coded as including TP but no student messages coded as including TP. There are nine threads consisting of a single message that are not included in this comparison as there is no interaction that can be measured for a single post.

Table 52. Comparison of 3 types of threads with Teaching presence and threads with no Teaching Presence

Highest IAM code for students within threads (Percentages taken from 91 total threads)				
	Threads that include TP			**No TP**
IAM	Threads with > 1 TP code for student messages	Threads with = 1 TP code for student messages	Threads with no TP for students including TP for instructor	Threads with no TP for anyone
Phase I			1 (1%)	
Phase II		3 (3%)	2 (2%)	3 (3%)
Phase III	3 (3%)	9 (10%)	**12 (13%)**	**14 (15%)**
Phase IV	**9 (10%)**	**20 (22%)**	3 (3%)	7 (8%)
Phase V	1 (1%)	3 (3%)		1 (1%)
Total threads:	13	35	18	25

Phase IV is the highest frequency of highest phase of IAM within threads (i.e., group level) including one or more TP code for students. Phase III is the highest frequency of highest phase of IAM within threads that include TP for the instructor but not students, and for threads that do not include TP for any participant. Does this pattern remain consistent when the categories are combined?

Table 53 consolidates the three categories that include TP that were presented in Table 52 into a single category of 66 threads that include TP codes for messages posted by anyone (i.e., student or instructor) as compared to 25 threads with no TP codes for any messages. The highest

IAM phase coded for student messages for these 91 threads, with and without TP, is presented in Table 53.

Table 53. Comparison of threads with Teaching Presence and threads with No Teaching Presence

Highest IAM code for students within threads (Percentages taken from 91 total threads)		
IAM	**Threads that include TP for anyone**	**Threads that do not include TP for anyone**
Phase I	1 (1%)	
Phase II	5 (5%)	3 (3%)
Phase III	24 (26%)	**14 (15%)**
Phase IV	**32 (35%)**	7 (8%)
Phase V	4 (4%)	1 (1%)
Total Threads:	66	25

The pattern represented in Table 52 is consistent in Table 53 which presents the data for all threads including TP for any participant and all threads with no TP for any participant. Does this pattern remain consistent when comparing threads that include TP codes for student messages are compared to threads that do not include TP for students (i.e., no TP in the thread at all or TP for the instructor)?

Table 54 combines the two categories of threads that include student messages coded as including TP and combines the categories of threads with no student messages coded as including TP. The highest IAM phase coded for student messages for these threads, with and without TP codes for student messages, is presented in Table 54.

Table 54. Comparison of threads with TP for students and threads with No TP for students

Highest IAM code for students within threads (Percentages taken from 91 total threads)		
IAM	**Threads that include TP in student messages**	**Threads that do not include TP for student messages (some include TP for instructor)**
Phase I		1 (1%)
Phase II	3 (3%)	5 (5%)
Phase III	12 (13%)	**26 (29%)**
Phase IV	**29 (32%)**	10 (11%)
Phase V	4 (4%)	1 (1%)
Total Threads:	48	43

There is high frequency of Phase IV for threads with TP for students. The highest frequency for threads that do not include TP for students combined with threads that have TP for the instructor is Phase III. This comparison of group level data suggests that when *students* engage in teaching presence the group reaches higher levels of social construction of knowledge as measured by the IAM. When the instructor's messages include TP but student messages do not, or there is no TP at all in the thread, it is more likely that the discussion moves to Phase III, negotiation.

This pattern of a high frequency of IAM Phase IV in threads that include student messages with TP raises additional questions. Why does TP within student messages result in higher social construction of knowledge for the small group? Are peers more invested in responding to a student who engages in teaching presence as compared to when the instructor does?

Group Data Over Time. Are these patterns of TP within student messages co-occurring with IAM Phase IV consistent over time or is there variability across modules? Table 24 presents two categories of threads with messages including TP as compared to threads without TP by

module. The highest IAM code for student messages within the threads (i.e., group level data) is represented in this table.

In examining the threads with and without teaching presence by module, there are different patterns that appear to have emerged over time. Module 2 had only two threads that did not include teaching presence. This is likely due to the instructor responding to each student's initial post for this module and the high frequency of teaching presence evident in the instructor's messages. However, there are also 16 threads out of 28 for that module that include evidence of teaching presence on the part of students. For Module 2, 11 threads out of 28 (39%) for this module that include teaching presence on the part of students reach Phase IV or V. Only one thread that did not include teaching presence for students, but did include teaching presence for the instructor, reached Phase IV.

Module 6, similar to module 2, has high frequency of Phase IV and V for threads that include teaching presence on the part of students with 18 out of 30 threads (60%) including both TP for students and Phase IV or V. The instructor mostly responds to small groups in module 6 rather than responding to each student, which might account for only two threads with teaching presence for the instructor but not for students. However, for threads that do not include any teaching presence, there are still six out of nine threads that reach Phase IV or V. Is it possible that teaching presence or interactions from other threads influences the threads here that don't have teaching presence evident, but still reach Phase IV or V? There is not a means of measuring this possibility using this data.

Table 55. Group data by module

Module 2: Highest IAM code for students within threads (28 threads in module 2)			
Threads that include Teaching Presence			**No Teaching presence**
IAM	**TP for students**	**No TP for students** including TP for instructor	Threads with no TP for any messages
Phase I		1	
Phase II	1	1	1
Phase III	4	7	1
Phase IV	**10 (36%)**	1	
Phase V	1		
Total Threads:	16	10	2
Module 6: Highest IAM code for students within threads (30 threads in module 6)			
Threads that include Teaching Presence			**No Teaching presence**
IAM	**TP for students**	**No TP for students** including TP for instructor	Threads with no TP for any messages
Phase I			
Phase II			1
Phase III	2		2
Phase IV	**15 (50%)**	1	5
Phase V	3		1
Total Threads:	20	1	9
Module 11: Highest IAM code for students within threads (33 threads in module 11)			
Threads that include Teaching Presence			**No Teaching presence**
IAM	**TP for students**	**No TP for students** including TP for instructor	Threads with no TP for any messages
Phase I			
Phase II	2	1	1
Phase III	6	5	**11 (33%)**
Phase IV	4	1	2
Phase V			
Total Threads:	12	7	14

Module 11 includes 22 threads out of 33 (67%) at Phase III across all types of threads, with and without teaching presence. Again, in module 11, the instructor mostly responds to small groups rather than responding to each student. This module does not follow the pattern of the previous modules in which teaching presence on the part of students contributes to higher phases of social construction. This may be accounted for given that the 12-week course is nearly over, or because of the discussion prompt for this module. While there is less TP overall in module 11, threads still have a high frequency of Phase III and Phase IV which reflects social rather than internal construction of knowledge. These findings for Module 11 will be discussed in depth in Chapter Five.

How do the patterns over time in the group level data by module compare with the individual frequencies of TP by module? Table 56 presents individual data on the frequency of TP codes within students' and the instructor's messages. Percentages in the table are taken out of the 131 total messages coded as including evidence of TP.

Table 56. Individual frequency data for messages with Teaching Presence

Teaching Presence: (266 student messages/68 instructor messages)			
Module	**Students**	**Instructor**	Total
2	25 (19.1%)	**41 (31.1%)**	66 (50.4%)
6	**28 (21.4%)**	11 (12%)	39 (29.8.6%)
11	14 (10.7%)	12 (9.1%)	26 (19.8%)
Total	67 (51.1%)	64 (48.9%)	131

The highest frequency for the instructor's messages including TP is in module 2 with 41 messages posted by the instructor including evidence of teaching presence. This represents 64% of the total messages for the instructor in this data set. In examining the co-occurrence of TP and IAM phases for instructor messages (see Table 43), 70% of instructor messages coded as

including TP were also coded at IAM Phase III, negotiation. The IAM group level data for module 2 shows a high frequency of Phase IV when student messages include TP.

The highest frequency of student messages including TP is in module 6 with 28 total messages (within 20 threads) including TP. The IAM group level data for module 6 shows that 60% of the threads including student messages coded as including TP reached IAM Phase IV or Phase V. The increase in frequency of student messages including TP and increase in small groups reaching Phase IV and V in threads from module 2 to module 6 raises a question. What role does modeling on the part of the instructor play in promoting TP within individual student messages and in promoting social construction of knowledge in small groups?

Module 11 includes the lowest frequency of student messages including TP with 14 total messages. The instructor had 12 messages including TP in module 11, similar to the instructor's messages that include evidence of TP for module 6. The IAM group level data for module 11 shows that across all types of threads, with or without evidence of teaching presence, the highest frequency is Phase III. There are 22 threads in module 11 that represent 67% of the total threads coded for this module for which the highest IAM code was Phase III. This raises another question: What changes between module 6 and module 11 to account for the decrease in individual messages including TP and the lack of progress beyond negotiation of social construction in small groups?

Summary of Major Findings

The examination of the individual and group data for student and instructor messages for IAM Phase codes and Teaching Presence codes reveals five major findings. A bullet point list of the findings for the individual and group level analysis is presented here to clearly summarize the

findings for the primary research question: *How does teaching presence on the part of students contribute to socially constructed knowledge within online discussions?* These findings will be discussed in Chapter Five.

1. There is a pattern of co-occurrence for Teaching Presence and IAM codes within individual messages.
    - Student messages including teaching presence that are *responses* to others' messages have similar frequency of IAM Phase III and IV (see Table 21).
    - Based on the co-occurrence of Facilitating Discourse (FD) and phases of IAM in this sample there is no evidence that FD on the part of students supports higher levels of social construction of knowledge. However, the small number of FD codes does not offer enough data to draw conclusions (see Table 21).
    - Based on the co-occurrence of Direct Instruction (DI) and phases of IAM in this sample there is some evidence that DI on the part of students may support higher levels of social construction of knowledge. More than half of the 33 individual students' messages including teaching presence that are responses to others' messages include evidence of IAM Phase IV or V (see Table 21).
    - The instructor's responses that include teaching presence more frequently co-occur with Phase III in comparison to student responses that include teaching presence which co-occur with Phase III and Phase IV evenly (see Tables 21 and 22).

There is a difference in patterns for students' initial posting to the discussion based on the prompt and students' response messages to other participants. Initial postings are the first messages within a thread. Initial postings most often included evidence of IAM Phase II, internal

construction. This is likely because these messages are not contingent upon ideas within another participants' message.

When examining response messages including evidence of TP there is a pattern of higher frequencies of IAM Phases III, IV, and V (i.e., social construction phases). Student response messages including evidence of TP have a high frequency of co-occurrence with IAM Phases III and IV (see Table 21). There is not enough data for the FD category within TP for student messages to draw conclusions about patterns. The data for co-occurrence of DI and IAM Phase IV and Phase V indicates that evidence of DI within student response messages supports higher levels of social construction of knowledge as measured by IAM.

The instructor's messages are all response messages and include a high frequency of evidence of TP. Patterns for instructor messages reveal high frequency, 70%, of co-occurrence of TP and IAM Phase III (see Table 22).

2. Teaching presence invites a process of interaction that leads to social construction levels of IAM.
    - In comparing group data with the individual data, individual students who engage in teaching presence appear to not be solely responsible for patterns of interaction in small groups. The group data (i.e., thread level) suggests that other students in groups respond to student messages including teaching presence and bring the interaction to a higher phase of IAM (see Table 25)
    - When including the instructor's messages that include teaching presence, there is only a slight increase in Phase III at 30% rather than 25% for students only. This indicates that

students in threads may be responding to the instructor's messages including Phase III, negotiation, with responses that take the thread to a higher level of IAM (see Table 27).

Threads that include student messages with evidence of TP include high frequencies of Phase IV and Phase V, 68%, as the highest IAM code for the thread (see Table 25). There is a slight increase in Phase III when including instructor data in the group level analysis (see Table 27). This indicates that the role the instructor takes on through TP is more focused on negotiation of social construction (i.e., Phase III). Overall, the analysis of group data for the highest IAM phase evident in small group discussion threads shows that other students in response to either student or instructor messages including evidence of TP are responsible for taking the thread to a higher phase of social construction as measured by the IAM.

3. When comparing threads with and without TP codes for students at the group level, there is a high frequency of IAM Phase IV in threads with TP codes for students.
    - The differences across section 01 and section 02 in the highest IAM code for small groups within threads (see Tables 23 and 24) is not large enough to indicate a cohort effect. Co-occurrence of highest IAM code and TP for small groups within threads (see Tables 25 and 27) also do not indicate a cohort effect.
    - Threads with more than one TP code for students: The data suggests that more teaching presence for students results in higher phases of IAM within threads, with 77% of the 13 threads including the highest IAM code at Phase IV or V (see Tables 30-33).
    - Threads with one TP code for students: The data suggests that even one message including TP for students within a thread increases the IAM phase that the thread reaches (see Tables 34-37; Tables 48 and 49).

- Threads with TP for the instructor but no TP for students: The data suggests that teaching presence for the instructor might result in elevating the discussion to negotiation (Phase III) but is less effective in prompting higher levels of IAM than when students engage in teaching presence (see Tables 38-41; Table 54).
- Threads with no TP for students or the instructor: The data for threads that do not include teaching presence for students, or the instructor suggests that threads are less likely to reach IAM Phase IV or V in comparison to data for threads including teaching presence on the part of students (see Tables 42-43; Table 54).

It is more likely that small group threads will include evidence of higher social construction of knowledge (IAM Phase IV or V) when there is evidence of TP within student messages in the thread. Threads that include evidence of TP within one or more student message are more likely to reach IAM Phase IV or Phase V as the highest IAM phase for the small group thread (see Tables 30-33, 34-37, and 52-53). Threads that include evidence of TP within instructor messages but no student messages with evidence of TP are more likely to co-occur with IAM Phase III as the highest IAM code for the small group threads (see Tables 38-41 and 54). When threads do not include evidence of TP for any participants' messages, it is less likely that the highest IAM phase for the small group thread will reach IAM Phase IV or V (see Tables 42-43 and 54).

4. There is variation in the patterns of teaching presence and IAM phases across the three modules.
   - Module 2 patterns are consistent with evidence of teaching presence for students' messages resulting in threads reaching higher phases of IAM (see Table 55).

- Module 6 patterns also suggest that teaching presence on the part of students might contribute to higher phases of IAM within threads. However, for some threads with no teaching presence evident, the thread was able to reach IAM Phase IV or V (see Table 55).
- Module 11 has the lowest frequency of teaching presence for students and the highest frequency of IAM Phase III of the three modules in the dataset (see Table 55).

There is variation in patterns across the three modules in the data set (see Table 55). Module 2 patterns are consistent with the overall patterns of evidence of TP within student messages resulting in higher phases of IAM. Instructor messages are highest for module 2, with 45 total messages posted by the instructor. Nearly all of the instructor's messages include evidence of TP. Module 6 also shows this pattern, but includes some threads with no TP that reach IAM Phase IV or V. The total instructor messages for module 6 are much lower than for module 2 with only 11 messages total posted by the instructor, all including evidence of TP. This means that students are more responsible for the patterns of TP and high phases of IAM in module 6. Module 11 reveals a different pattern with lower frequency of TP for student messages and higher frequency of IAM Phase III as the highest IAM phase code for small group threads. The instructor has a total of 12 messages in module 11, all including evidence of TP.

5. The length of the thread along with teaching presence on the part of students may together contribute to higher phases of IAM.
    - The number of messages in the thread makes a difference in the highest phase of IAM that a thread reaches (see Tables 46-51).
    - Threads with no TP most often consisted of 2 or 3 messages (see Tables 46 and 47).

- Threads including TP more often included 4 or more messages. This trend is slightly stronger for threads including teaching presence for students (see Tables 48-51).

There is some evidence that points to the possibility of a relationship between high phases of IAM for small group threads, evidence of TP within student messages in threads, and the total number messages within threads. Threads that do not include evidence of TP most often consist of only two or three messages (see Tables 46 and 47). When threads include evidence of TP for any participant it is more likely that the threads include four or more messages (see Tables 50 and 51). This is a slightly stronger trend for threads including evidence of TP for student messages (see Tables 48 and 49). Given the pattern of higher frequency of IAM Phase IV and V as the highest IAM code for small groups within threads that include student messages with evidence of TP, the higher number of messages within these threads may be a result of TP, a result of social construction, or the reverse. The high number of messages in the thread might allow for more opportunity for TP or time for social construction of knowledge to unfold. Whether there is a relationship or sequence involved cannot be determined with the data available.

CHAPTER FIVE

DISCUSSION

The current study offers five new findings regarding teaching presence to the research literature on social construction of knowledge:

1. Teaching presence on the part of students is possible.
2. Teaching presence on the part of students is beneficial for students and for the social construction of knowledge.
3. Instructor presence, particularly early in the course serving as modeling, is important for promoting teaching presence on the part of students and supporting learning in small groups.
4. The design of the discussion prompt can promote socially constructed learning within groups of students.
5. Existing models of teaching and learning can be challenged to recognize the resources and assets of learners.

This study describes the social construction of knowledge within small groups, the patterns of social, cognitive, and teaching presence in individual student discussion responses, and seeks to explain how teaching presence on the part of individual students relates to socially constructing knowledge in groups. Teaching presence in student messages was found to lead to social construction of knowledge in small groups, to an even greater degree than teaching presence in the instructor's messages. Findings also indicate that teaching presence co-occurs with a greater number of total messages in discussion threads. Finally, the results show that there

is variation in the patterns of teaching presence and social construction across the three modules. The way teaching presence emerges in discussions and its effects on group learning dynamics depends in part on specific circumstances in online discussions: the design of the discussion activity, including the rules and the nature of the discussion prompt; and the changing roles of the instructor and students over time. These findings provide a basis for discussing the contributions of teaching presence as it influences the social construction of knowledge.

This discussion examines the findings in light of Activity Theory, the conceptual framework for this study. The discussion focuses on what we can learn about the contributions made by individuals to an online discussion and the effect that these contributions have on the social construction process for the group. Implications for the design of the online discussion activity and presence on the part of the instructor will be explored.

Studying the Individual and the Group

Activity Theory affords us the opportunity to shift from a focus solely on the individual to an examination of the behavior of individuals in a group engaged in an activity. Various aspects of a task, including social and cultural influences, can be examined as they shape the participation of individuals and groups in the task. A key feature of Activity Theory as outlined by Wertsch (1979) is that activities can be analyzed on various levels, including different aspects of the tasks involved in the activity, the roles of individuals, and interactions within groups. Activity Theory stands in contrast to other theoretical perspectives that emphasize individual performance and behavior as the main source of data. It emphasizes the value in analyzing the participation of individuals engaging in activity with others. Activity theory asserts that cognitive

growth and change is a process that is first negotiated with others in the social context before becoming internalized knowledge guiding thinking and skill development for an individual.

In this study, two existing models that are compatible with Activity Theory were used to analyze data at the individual and group levels. The IAM and CoI models are both built on a foundation of social constructivist educational philosophy. This means that both models recognize that teaching and learning are inherently social processes; that interactions among participants are necessary in the process of learning. The CoI model identifies and measures the ways that *individuals* are present and contributing to social learning. The IAM identifies and measures the ways participants in the *group* interact. Applying these two models to this data set allows for analysis of how individuals contributed to the discussions and the impact of individual contributions on the level of thinking within the group. Utilizing these two models in discussing the findings provides insights into what individuals are doing that contributes to the social construction process for the group. This makes it possible to address the primary research question: How does teaching presence on the part of students contribute to socially constructed learning within online discussions?

The following findings will be discussed:

1. Teaching presence on the part of students is possible.
2. Teaching presence on the part of students is beneficial for students and for the social construction of knowledge.
3. Instructor presence, particularly early in the course serving as modeling, is important for promoting teaching presence on the part of students and supporting learning in small groups.

4. The design of the discussion prompt can promote socially constructed learning within groups of students.
5. Existing models of teaching and learning can be challenged to recognize the resources and assets of learners.

Teaching Presence on the Part of Students is Possible (Individual Level)

This discussion begins with looking at the evidence of teaching presence for participants in this study—the students and the instructor. Teaching presence is evident in 25% of student messages in the data set and out of the 26 student participants, 21 students had messages that included evidence of teaching presence. What contributed to the students in this case challenging the expectations for the role of students they may have learned in previous educational experiences? The design of the discussion activity in this course included expectations (i.e., rules) that served to allow and encourage students to engage in teaching presence. The guidelines for the discussion activity required students to post at minimum an initial response to the prompt and two responses to peers. Without a requirement for responses to peers there would be no interaction to examine. The rubric for the discussion activity included criteria for students' responses to peers to be thought-provoking and insightful, and to clarify ideas, offer new perspectives, or further discussion. These directions and criteria for responses were designed around the goals (i.e., object) of promoting interaction among students, encouraging facilitation of the discussion on the part of students, and supporting deeper learning for groups. This fits with Penny and Murphy's (2009) assertion that rubric criteria can promote socially constructed learning by clarifying expectations.

The finding that teaching presence is possible for students in online discussions and the implications of this finding for the design of online discussions contributes to the knowledge base of online education and the existing body of research on the CoI model. Guidelines for the discussion activity and rubric criteria can promote a shift in expectations for the ways in which students are present and contribute to online discussions. If learning through social interaction is the goal for an online discussion, the activity can be intentionally designed to support and promote that goal.

Cole and Engeström (1993) expanded Activity Theory to incorporate the influence of social rules, community, and division of labor into the existing conceptualization of activity. Graduate students who have spent 16 or more years in educational settings have been socialized into expectations for the division of labor, or roles, for students and an instructor. Often these socialized student roles reflect a knowledge transmission philosophy of teaching and learning, where much of the power of using knowledge to shape the path of learning is assumed to be held by the teacher or instructor rather than the students.

Courses in higher education are designed, whether intentionally or through implicit bias, with roles for students and the instructor in mind. The role of a student in a course that has been designed with a knowledge transmission philosophy is to be a receiver of knowledge, without the ability or power to contribute to the learning of the group. In contrast, the role of a student in a course that has been designed with a social constructivist philosophy is to be actively involved in contributing to the learning of the group. The discussion activity in this case was intentionally designed with the role of students as active contributors to the learning of the group in mind. The rules for the activity contribute to the roles taken on by the students.

Teaching Presence on the Part of Students is Beneficial (Group Level)

When the analysis of teaching presence on the part of students and instructor moves to the group level, we see striking results: teaching presence on the part of individual students is beneficial for the group. Social construction of knowledge for groups gets to higher phases as measured by the IAM (i.e., Phase IV or V representing social construction) when students have teaching presence. Messages including evidence of teaching presence for students are in 48 of the 100 threads in the data set. Threads with no teaching presence on the part of students most frequently reached Phase III of the IAM representing negotiation of social construction. Threads with one or more messages including evidence of teaching presence for students most frequently reached Phase IV of the IAM representing social construction of knowledge.

The following excerpts from group 3 in module 2 represents the progression of IAM from Phase III: negotiation to Phase IV: social construction within messages including evidence of teaching presence on the part of students:

Andie responding to Alex, coded DI and IAM Phase III

> Hi Alex,
> I appreciate your comment that most of the concerns we see about Manuel are from the school and not his family or Manuel himself. In order to properly assess Manuel and provide him with appropriate interventions it would be helpful to hear from both of them how they think he is doing in school and at home.
>
> At the same time, later on in your analysis I see you asking for more information about how he feels about the move. While this is very important information to have, the case we were provided with provides more information than I typically receive when working with a child. Often when I walk into a room to work with a child all I have is their name and age and sometimes developmental delays, and I'm forced to learn the rest as I go. Having all of the information on Manuel would be helpful in developing interventions but often we are left to figure out the best solution with limited information…

Alex responding Andie, coded IAM Phase IV

> Hi Andie,
> That's such an interesting point. I rarely look at these case studies from a social worker/counselor perspective because that is not my background but if it was I'm sure I would have been overwhelmed by the amount of details. As a former teacher, I am used to having a very in-depth understanding of a few students versus having to work with a high volume of students and being given very little information…

The first message in the above exchange shows teaching presence evidenced by the indicators "focus the discussion on specific issues" and "identifying areas of agreement/disagreement" accompanied by IAM Phase III as Andie proposes a different perspective from their work in clinical social work settings into the negotiation in response to Alex's initial post to this discussion. The excerpt from Alex's response to Andie shows the progression to IAM Phase IV evidenced by indication that Alex is considering Andie's perspective and testing this against their own experience as a teacher, moving toward agreement.

Another indicator of the beneficial effect of teaching presence on the part of students is seen in the length of the thread. The data show that the total number of messages is greater when there is teaching presence in the thread. Of the 48 threads including teaching presence for students, 28 (i.e., 58%) consisted of four or more messages. This suggests that teaching presence promotes longer threads, which seems to open the way for movement to higher phases of social construction. The co-occurrence of these three elements, teaching presence for students, higher phases of social construction, and longer threads, suggests that it is beneficial for both engagement and learning when students are bringing teaching presence to the discussion. The data do not reveal whether it is the lengthier interaction, or the teaching presence on the part of students, or both, which contributes to higher phases of social construction of knowledge. However, the important finding is the evidence of the co-occurrence of these three factors:

teaching presence for students, longer threads, and higher phases of social construction, as all three are desirable in an online discussion with the goal of socially constructed learning.

In this case, individual students took on the role of teaching through their messages posted in the discussion which resulted in higher frequency of social construction in small groups. Teaching presence for students promoted slightly higher engagement within small groups in terms of the number of response messages compared with teaching presence for the instructor. What might account for this higher engagement and higher frequency of social construction in response to student messages with teaching presence as compared with instructor messages with teaching presence? Again, the roles of students and instructors can be considered. For this finding, our attention turns to the data for social presence to explore how community developed over time within this course and how this influenced student and instructor roles.

Findings indicate that the social presence category of Open Communication was the highest frequency for students for module 2. This may be due to “continuing a thread” being a common indicator for OC which is often evident in response messages. This changed by module 6. The social presence category with the highest frequency for students in module 6 was Affective, evidenced most frequently by the indicator “self-disclosure.” Engaging in self disclosure in an online discussion indicates that there was a level of trust within the relationships among students that allowed them to share personal details and show vulnerability. This change in social presence over time reveals how relationships as members of the course and roles within the course community changed. This has implications for student motivation and engagement with each other and could explain the higher phases of social construction and longer threads when students engage in teaching presence. The social connection and sense of community that

was established by module 6 contributed to the pattern of students responding to teaching presence on the part of other students. Students were invested in each other through the social connection they established. This finding is in line with other CoI research (DeNoyelles et al., 2014; Lohr & Haley, 2018; Richardson & Swan, 2003) confirming the value of establishing community through social presence as related to engagement and learning.

Instructor messages also were most frequently coded Open Communication for module 2, but for modules 6 and 11 the highest frequency social presence category for instructor messages was Group Cohesion, most frequently evidenced by the indicators “referring to the participants by name” or “using inclusive pronouns” (e.g., “we,” “us”). Messages with evidence of Group Cohesion align with IAM Phase III in representing statements reflecting negotiation through proposing co-construction or identifying areas of agreement. This indicates that the instructor’s role also changed over time. In module 2 the instructor responded to every student’s initial response to the prompt. The high number of messages posted by the instructor in module 2 reflects the instructor’s intention to model early in the course. There are far fewer messages posted by the instructor in modules 6 and 11. The shift in the intensity of the presence of the instructor, along with the high frequency of Group Cohesion codes for instructor messages, indicates that the instructor’s intention changed from modeling in module 2 to facilitating the negotiation of social learning in module 6.

The finding in this case that teaching presence on the part of students co-occurs with longer threads and higher phases of social construction contributes to the knowledge base in emphasizing the importance of establishing community. Students are motivated to respond to each other because of relationships that develop over time. The expectations of the discussion

activity, established through the guidelines and rubric in this case, partly explain the change in social presence through the participation requirements. However, the instructor's presence can also play a role in the way social presence changes over time. The instructor in this case models how to engage in social construction early in the course with high intensity of presence and shifts to a more facilitative role with lower intensity of presence by module 6. This intentional shift in roles on the part of the instructor is responsive to the way students' roles are changing over time as they establish and develop relationships. Social presence is valuable because it contributes to relationships that promote students' motivation to respond to peers engaging in teaching presence.

Activity theory contends that there is negotiation between the social context and the individual, and that social construction within a group in the activity is a necessary part of an individual wrestling with new ideas and building an understanding of those ideas (Wertsch, 1979). This assertion within Activity Theory is evident in the findings in the co-occurrence of greater numbers of messages and evidence of Phases IV and V of the IAM within threads including teaching presence for students. The individual student who contributes to the group through teaching presence promotes negotiation (i.e., Phase III of the IAM). Increased interaction within the group in response to the negotiation promotes social construction (i.e., Phases IV and V of the IAM).

Activity Theory draws our attention to the role of development over time (Wertsch, 1979). The activity changes as participants change and take on different roles. The changes in roles for students and instructor across the three modules, evident in the changes in social presence data between modules 2 and 6, points to the interaction of the rules and roles (i.e.,

division of labor) in the development of community (Cole & Engeström, 1993). The role of the development of the activity and participants over time will be explored further in the discussion of the next finding.

Instructor Presence is Important for Promoting Teaching Presence for Students

Analyzing the patterns of interaction for the instructor in this course reveals change over time. Modeling on the part of the instructor not only supports social presence and the establishment of community, but it also promotes teaching presence for students. The changing patterns of teaching presence for the instructor and students can be understood through examining the timing of instructor modeling and facilitation. In this case, the instructor posted 45 messages in module 2, 11 messages in module 6, and 12 messages in module 11. Nearly all (i.e., 64 out of 68 total messages) of the instructor's messages include evidence of teaching presence. The intention of the intensity of responses on the part of the instructor early in the course in this case was to support students in getting oriented and organized around participating in online discussions. Responding to the initial post of each student as well as responses within threads in module 2 gave students a model for how to participate.

While the highest number of instructor messages was in module 2, the highest number of student messages was in module 6. Of the 96 student messages posted in module 6, almost 30% included evidence of teaching presence. The change in the total number of messages posted by the instructor and students from module 2 to module 6 accounts for part of an explanation of the change in patterns of teaching presence. As the instructor posts fewer messages overall, the share of teaching presence on the part of the instructor is naturally lower.

There were 25 student messages with evidence of teaching presence in module 2 in comparison to 28 in module 6. This may not appear to be a substantial difference. However, the more meaningful difference across the two modules is the ratio of messages including evidence of teaching presence for the students and the instructor. Examining the percentage of the 131 total messages in the data set that included teaching presence by module and role (i.e., instructor or student) reveals that students took up responsibility for teaching presence as the instructor reduced the total number of messages posted in threads over time. Of the 66 messages that include teaching presence in module 2, the instructor posted 62%, while students posted 38%. By module 6 the proportion more than reversed, as students posted 72% of the 39 total messages including teaching presence and the instructor posted 28% (see Figure 14).

Explaining this pattern brings the discussion back to Activity Theory and the changes in interaction as the activity and participants develop over time (Wertsch, 1979). Both the pattern of the instructor posting less across modules and the students taking up more responsibility for teaching presence can be understood through Vygotsky's concept of the zone of proximal development (Cole, 1998; Vygotsky, 1978). Within the social construction of knowledge, the zone of proximal development represents an optimal level of cognitive challenge; one that is just out of reach for an individual, but that other participants in the learning activity can challenge and stretch by contributing to the thinking of peers. In this case, the instructor decreasing the total number of messages is responsive to students taking over more responsibility for pushing the boundaries of current understanding toward new possibilities within groups. The instructor remains present and available, but students have more opportunity to contribute teaching

presence over time and more motivation in responding to each other through the establishment of community.

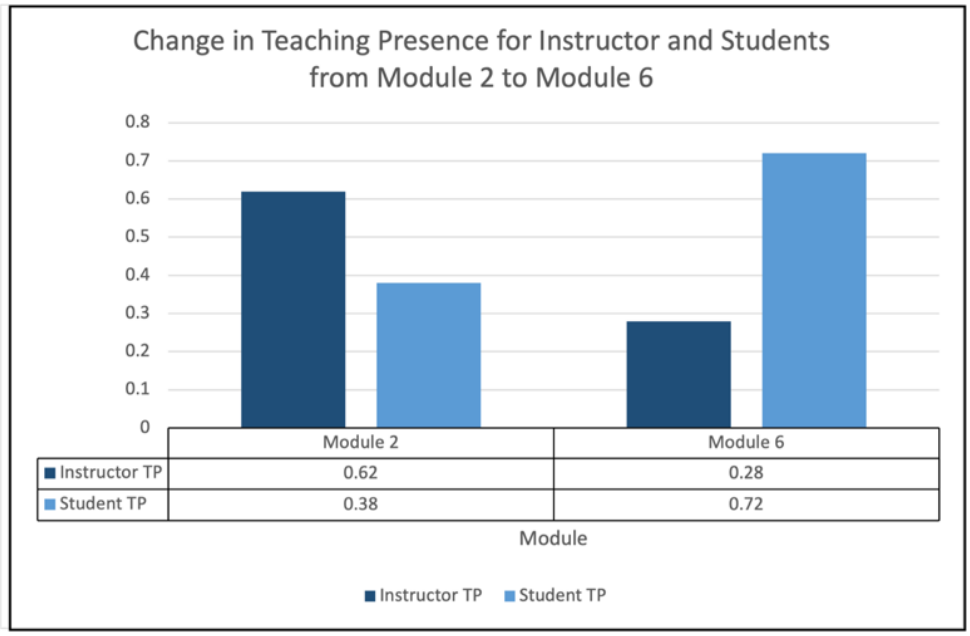

Figure 14. Change in Teaching Presence from Module 2 to Module 6

The social construction of knowledge in small groups improved over time alongside the increase in students taking on a greater ratio of the overall teaching presence by module 6 (see Figure 15). Out of the 33 threads in module 6, there were 25 with Phases IV or V as the highest phase of IAM and only four with Phase III as the highest phase of IAM. In contrast, out of the 28 threads in module 2, there were 12 with Phase III as the highest phase of IAM and 12 with Phases IV or V as the highest phase of IAM. This indicates that modeling on the part of the instructor early in the course and then pulling back the intensity of involvement to shift to facilitation may have contributed to students engaging in teaching presence leading to higher phases of social construction. Modeling by the instructor early in the course helped establish cultural practices for the community around the value of teaching presence as it contributes to

social construction of knowledge in the group, similar to the way greetings became cultural practice in this course.

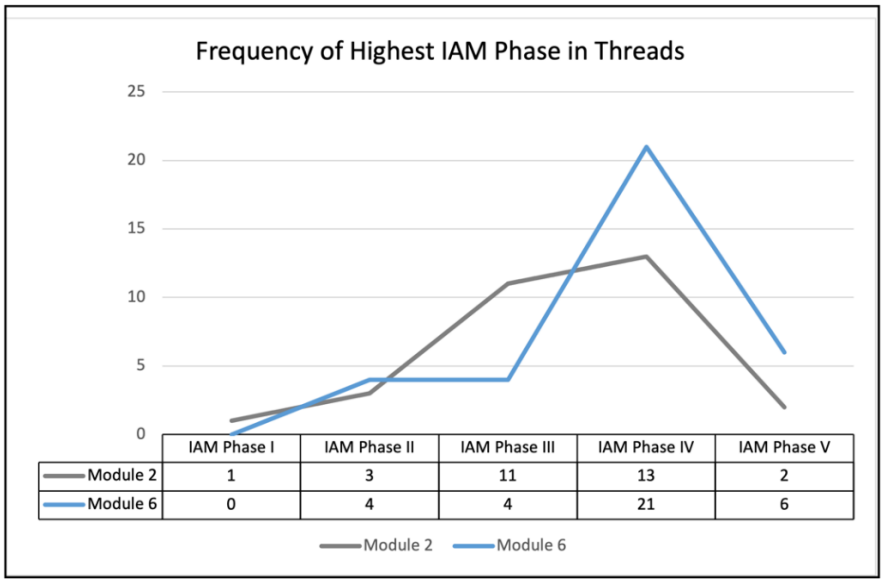

Figure 15. Change in IAM from Module 2 to Module 6

The finding that instructor presence through modeling early in the course likely promotes teaching presence for students is a contribution to the knowledge base of online course design and online teaching. Knowing this, instructors can be intentional and plan for more intense modeling early in the course to support the establishment of cultural practices around the social construction process in the discussion. Instructors can also be intentional in being responsive to the changing role of students, switching to a more facilitative role over time. This validates and allows students to increasingly take on teaching presence over time.

Activity Theory emphasizes development (Wertsch, 1979). The change in the role and intensity of presence on the part of the instructor across the three modules likely contributed to the variation in patterns of teaching presence for individuals and phases of IAM in small group threads across the three modules. The students also took on different roles over time in the

course, as relationships and sense of community were established. The instructor was responsive as students became comfortable and familiar with the expectations for the discussion and with one another as a community. The instructor's intentional shift from responding to each student's initial post and responses within threads early in the course to responding to pairs or small groups by the mid-point of the course allowed students opportunity to take on more responsibility in contributing ideas to discussion. Had the instructor continued responding to every student in every module the students would have less chance and perhaps less motivation to engage in teaching presence.

The Design of the Discussion Prompt Can Promote Social Construction Within Groups of Students

There are several aspects of the design of the discussion activity that promote social construction of knowledge within groups of students, including the guidelines for participation in the discussion, rubrics, and the specific discussion prompt for each module. The importance of rules (i.e., guidelines and rubrics) in the design of the discussion activity has been established. Rules are one means of intentionally communicating expectations for the roles that individuals will play in socially constructing knowledge in small groups.

Another design element that affects the dynamics of learning within groups of students is the discussion prompt. In this case, there is variation in the patterns of teaching presence and IAM phases across the three modules. This is due in part to the intensity of the instructor's presence in module 2 and to establishing community over time as previously explained. However, module 11 has a pattern that suggests that a design element, specifically the discussion prompt itself, might contribute to different patterns of teaching presence and IAM phases.

Module 11 has the highest frequency of IAM Phase III for small group threads and the lowest frequency of teaching presence for students of the three modules in the data set. There are 14 teaching presence codes for students in module 11 as compared with 28 in module 6 and 25 in module 2. Out of the 34 small group threads in module 11, the highest IAM phase for students in 22 of these threads is Phase III (i.e., negotiation).

One explanation for the differences in the amount of teaching presence and social construction in module 11 is that the discussion prompt is a different structure. The prompts used in modules 2 and 6 reflect the qualities of playground prompts as described by Andrews (1980). Playground prompts are a type of structured divergent prompt that ask students to explore some aspect of the content by making connections with their own experience, course content, or readings. The "playground" reflects that there are given parameters for the discussion, but the prompt is open ended and allows for a wide range of ideas and perspectives relative to the content to be explored in the discussion. In response to a playground prompt, the students are asked to generate actual examples or connections from within the "designated intellectual sphere (i.e., the "playground")" (Andrews, p. 146). Drawing on actual experiences or tangible connections allows more certainty on the part of students in asserting and backing up ideas about the application of the content of focus in practice within the discussion.

The prompt in module 11 has a different intention and goal. It asks students to respond to the prompt as if they were in the role of a case worker within a provided case study. This type of prompt reflects the qualities of role-playing prompts as described by Darabi and colleagues (2011). In response to this type of prompt students are expected to "embrace the perspective of the role they play and to consider…multiple perspectives" (Darabi et al., 2011, p. 219). The

premise for this type of prompt is to engage in hypothetical application. Students are not expected to arrive at a single solution or conclusion that the group agrees upon given that the prompt is open-ended like the playground prompt. However, this sort of application prompt, though open ended, reflects a different goal than the prompts in module 2 and module 6. The goal is for students to consider the complexity involved in applying human development knowledge to a practice problem. This kind of hypothetical application may or may not draw on student's actual experiences or tangible connections and this is reflected in the finding that negotiation (i.e., Phase III) had the highest frequency for threads in module 11.

The following excerpts from the module 11 discussion include evidence of IAM Phase III representing negotiation:

> Group 3, Module 11, Kiara responding to a peer
>
> …I agree with you that Chuck may have some underlying issues that have led to his alcohol and drug use and I think that part of his care should involve getting to the root of this. This is where I think your suggestion of group counseling with his family would really help, but I think that he might also benefit from individual counseling as well especially if he did not feel comfortable speaking with his family about it at first…
>
> Group 2, Module 11, Ingrid's initial post
>
> …The relationships within this family are unique and each requires exploration through a different lens. Mackenzie is young and perhaps sees herself in her absent parents. How can this become a positive reflection? The level of stress brought to families from drug addiction is monumental and Mackenzie deserves a shot at health and happiness. The family, as a system, views each person as a meaningful part of the whole. How can Mackenzie become a loving and stable contributor to her nuclear community? I would need additional data before I could suggest anything else…

These excerpts reflect a sort of productive struggle in negotiating how to apply knowledge to a case that might not be connected to students' previous experience.

In this case, the high frequency of negotiation within small groups indicates some progress toward reaching the objective of understanding how knowledge applies in practice. Small groups indicate movement beyond internal construction even though there is lower frequency of social construction phases (i.e., Phase IV and V of the IAM) in the module 11 discussion as compared with modules 2 and 6. As a core course, SED II is typically taken early in students' programs and primarily serves to build foundational content knowledge that students continue to draw on as they move into program specific and practice courses. A high level of negotiation among small groups within the hypothetical application discussion structure in module 11 can be viewed as positive movement toward integrating new ideas. The lower frequency of teaching presence on the part of students can be attributed to the way role playing asks students to imagine beyond their experiences, leaving them with less certainty. The indicators and examples for identifying evidence of teaching presence in the coding process represent asserting questions or information with certainty or authority (see Appendix A).

The structure of the playground prompt versus the structure of the role-playing prompt reflects different learning goals. The SED II course has five main objectives. The playground prompt structure works well to address one of these objectives, "To engage in the process of reflecting on one's own experience and relationships with the goal of developing self-knowledge, and to understand how this knowledge influences professional practice in the field." The playground prompt structure asks students to make connections to their own experiences in order to understand the content of focus. The role-playing prompt was included to address a different course objective, "To demonstrate an understanding of how knowledge of development applies to a diverse range of families." The role-playing prompt structure asks students to

imagine how their understanding of the content of focus could be applied as a professional in the field. However, a different prompt structure might better meet this course objective that is aimed at application given that students may be early in the development of a professional identity. Given these findings, two options for adjusting the design of the module 11 prompt in this course in the future are: (1) Extend the role-playing prompt across multiple modules to allow more time for students to negotiate ideas; or (2) Change the prompt to a different structure to better align with the overarching goals of the course.

Timing is another factor that might have contributed to the differences in module 11 because students submitted a final paper assignment in module 10 and the last module for the course was module 12. However, the dramatic difference between the findings for module 6 and module 11 draws attention to the fact that the structure of the module 11 discussion prompt is different from the other two modules in the data set. The finding that the playground prompt structure used in modules 2 and 6 resulted in higher frequency of teaching presence for individual students and social construction in small groups fits with the findings of Bradley and colleagues (2008). Their study examined how the structure of different types of prompts influenced students' posted messages in online discussion and they found that the playground prompt design promoted higher level thinking.

The design of the discussion activity, specifically the design of the discussion prompt, as a means of promoting social construction of knowledge within groups of students makes a contribution by drawing attention to the importance of aligning the design of the discussion activity with goals. The guidelines and rubric served to support a goal of social construction. The different structures of the discussion prompt also supported social construction through being

open ended. However, the playground prompt supports a goal of reflection (i.e., looking inward) while the role-playing prompt supports a goal of application (i.e., imagining outward). Instructors need to be intentional in aligning the design of the online discussion with course goals. This finding also brings to light that not every discussion needs to be aimed at students coming to agreement about a single solution. This perspective reflects Euro-American cultural values of being problem focused and a belief that problems can be analyzed to determine a solution (Shonkoff & Phillips, 2000; Rogoff, 2003). A more expansive view embraces an exploration of nuance, complexity, and multiplicity as the goal (Dahlberg & Moss, 2004). The excerpts from Kiara and Ingrid above illustrate benefit in negotiating multiple perspectives in response to complex human problems as opposed to implying that there could be one correct answer.

Activity Theory recognizes that all activities involve goals and goal-directedness (Wertsch, 1979). Goals are conveyed through different aspects of the design of the discussion activity and through modeling on the part of the instructor within the discussion. The design of the discussion prompt should align with the object (i.e., goal) of the activity generally in promoting social learning in small groups. In this case the open-ended nature of the discussion prompts for each module supports this goal. The structure of the different discussion prompts included within a course can serve to meet a number of course objectives, as was found in this case.

Challenging Existing Models

Findings in this study point to the need for researchers and educators to critically examine models of teaching and learning to ensure that the resources and assets that learners bring to

learning activities are recognized and valued. The research question for the study and the expansion of the teaching presence construct through the coding process are two examples of how this type of critical stance can acknowledge the innate drive learners have to engage in social learning as Vygotsky (1978) describes. Within the zone of proximal development, teacher and student roles are synonymous as each brings prior experiences and learning to the process of constructing ideas. Engaging in teaching presence involves taking a critical meta-analytic stance within the discussion as this excerpt shows:

> Group 3, Thread 2, Module 2, Molly responding to Mary and a peer, coded DI
>
> ...I'm thinking about your question regarding systemic barriers to making this connection and remembering reading in Rogoff (2003) about how traditional US education environments are about developing skills in ways that are divorced from real life. I'm thinking about how a project-based learning approach where Manuel is given math and language assignments that relate to the family business (e.g., math about products sold, profits etc. or writing a slogan or advertisement), could help make these connections.

In this response, Molly is essentially “thinking aloud” within the group by making connections between a question that was posed in the discussion, a reading, and personal experience to suggest an idea. This demonstrates how individuals can support the negotiation of building new social constructs through their teaching presence contributions in small group discussions.

Recognizing that teaching presence extends beyond the instructor and findings that this is not only possible for students but beneficial for groups when students engage in it contributes to the knowledge base for online learning in higher education. The research question and the expansion of the teaching presence construct create a reconceptualization of teaching presence. This has implications for instructors in terms of intentionality in their role and the design of online discussions.

The Research Question

The primary research question for this study challenges the CoI model and existing CoI research. Within the intercoder reliability process, one of the coders noted that applying teaching presence codes to student messages was difficult because the wording of the indicators did not easily lend itself to being applied to student messages (see Appendix A). Only one study conducted by Koh and colleagues (2010) was located that coded student messages for evidence of teaching presence. Teaching presence is assumed to be something that only the instructor engages in and only instructor messages are coded for teaching presence in nearly all of the literature incorporating the CoI model. This assumption overlooks a salient way that students may be learning from others in the discussion and contributing to the learning of the group (i.e., social construction of knowledge). The current conceptualization of teaching presence reflects instructor and student roles that align with a knowledge transmission perspective on teaching and learning, one in which students are receivers of knowledge from instructors. A social constructivist perspective recognizes the potential for *all* participants to contribute to the learning of the group. The primary research questions for the study emerged through recognizing this gap in the CoI research literature.

Findings from this study revealed that 25% of the student messages in the data set contained evidence of teaching presence. There is a higher frequency of high phases of social construction evident in small groups (i.e., Phase IV and Phase V in the IAM) when the thread contains teaching presence on the part of students. Drawing attention to this important way that students contribute to social construction of knowledge through engaging in teaching presence

was captured by challenging the CoI model and research literature through posing the primary research question.

By challenging existing models of learning dynamics, this study contributes new insights to the existing body of research on online learning in higher education. Focusing on teaching presence for students in this case uncovers the contributions made by students individually to the social construction process in the group. This distributes power that is typically assumed as part of the instructor's role across all participants and acknowledges the importance of each participant's voice in the learning process. This case study illustrates how a social constructivist philosophy applied to the design of the discussion activity specifically and the course more broadly can serve to deepen learning by recognizing the assets of all participants. Intentional design and presence on the part of the instructor can promote teaching presence on the part of individual students and social construction of knowledge in small groups. Questioning and critically examining assumptions about teaching and learning and the research base that educators draw from to inform their teaching practice is essential for ensuring all voices are included. Drawing attention to the ways that online learning spaces can be designed to promote equity along with high levels of thinking as the world has faced a pandemic that has made in-person gatherings unsafe counters assumptions that online learning is inferior to face-to-face experiences.

Activity Theory as the theoretical framework for this study represents a challenge to dominant paradigms for learning and development. Activity Theory shifts attention away from a sole focus on the individual as the unit of analysis to recognize the dynamics of groups of people engaging in tasks within particular social and cultural contexts. These contexts shape interactions

in implicit ways and change over time as individuals and groups participating in tasks develop. The key features of Activity Theory (Wertsch, 1979) and the expansion of the AT model (Cole & Engeström, 1993) to include rules, roles, and community, taken with the key findings in this study for individuals and small groups illustrate the complex processes at play within social construction.

Expanding the Teaching Presence Construct

In addition to drawing attention to the fact that teaching presence on the part of students is possible, this study expands one of the indicators of teaching presence to recognize significant contributions that the existing indicators overlook. The expansion of this indicator was prompted through the intercoder reliability process as the two coders encountered some excerpts that fit the intention of one of the indicators but not the examples. The Direct Instruction (DI) category of teaching presence includes the indicator: "Inject knowledge from diverse sources, e.g., textbooks, articles, internet, personal experience." This indicator includes a note that there should be pointers to resources included in the evidence. The examples given for this indicator refer to literature or web resources (see Appendix A).

The following is an excerpt that the two coders encountered that both saw as representative of teaching presence but did not fit the existing indicator and examples in the model:

> Group 2, Thread 4, Module 6, Laurie responding to Mary
>
> ...as you said, our understanding of things change, along with their cultural significance. Thinking about breastfeeding again, I know that my grandmother saw formula as being best because it was this new thing that had been created by science. Breastfeeding not only felt old and unsophisticated in comparison, it also harkened back to days when women of a certain class and/or race worked as wet nurses. After having the baby, richer women dried up their supply and went on with their lives, but women in my

> grandmother's class were either forced into breastfeeding due to poverty, or perhaps even became wet nurses themselves as a way to support their families. All of that would have informed her decision not to breastfeed.

Laurie, the student who authored the message was sharing something that was more than a personal story or example as it offered an important cultural (and in this case historical) perspective on the content. This was a clear presentation of content as an authority but did not include referencing or quoting literature. Rather, it was injecting knowledge as a cultural insider. After discussion, the two coders decided to include additional guidance and examples as part of the DI indicator "Inject knowledge from diverse sources, e.g., textbooks, articles, internet, personal experience." The coding guideline that was developed was "Code DI if injecting knowledge with authority as a cultural insider with clear intention to teach others in the course about non-dominant cultural experience relevant to the content. Providing knowledge of history or systems that offer a perspective to the content to further thinking" (see Appendix D).

This guideline allowed for excerpts in the data set representing cultural insider knowledge to be coded as including evidence of teaching presence. The value in acknowledging these contributions as teaching presence that promote social construction of knowledge cannot be overstated. Academia has long valued that which can be *proven empirically* with an assumption that objectivity is possible. Privileging this narrow view of knowledge perpetuates the exclusion of the voices and experiences of historically marginalized people (Yosso, 2005). Expanding teaching presence to include experiential knowledge as cultural capital contributes to valuing a broader range of knowledge and de-centering whiteness. Community Cultural Wealth (Yosso, 2005) and Funds of Knowledge (Moll et al., 1992) become tangible rather than conceptual.

The benefits for the group when participants engage in the discussion through contributing knowledge as a cultural insider can be seen through the following exchange:

> Group 1, Thread 2, Module 6, Excerpt from Belinda's initial response to the discussion prompt
>
> ...Although I didn't like it my grandmother always modeled the behavior she wanted from us from the most part. She never dated, and she went to work everyday, she knew how to fix any and everything, and was very smart and always seeking to educate herself. As a result of that the women she raised turned out to be very disciplined in our own lives in regards to how we do things. Some of the things she instilled in us we use while raising our kids. However, we don't hit them to discipline them like we got disciplined. Now we talk to the kids in the family to help them understand why we're teaching them certain things.
>
> My grandmother grew up during the civil rights movement. Back then Blacks had to act and be a certain way or else they could easily get put into harms way. Because of her lived experiences she projected it on to us. Once we began raising children we understood that we had more opportunity to act how we want but we still instill a lot of the same values in our children without the hitting aspect.
>
> Group 1, Thread 2, Module 6, Maya's response to Belinda
>
> I share some similarities with you in my upbringing on the Southside in regards to having voice and choice, church being a big identity-former, and having opportunity to make risky choices, but didn't and felt left out or confused at the choice. My mother was handy around the house like your grandmother! You mentioned that she mostly modeled the behaviors that she wanted you all to repeat. As a teacher, I feel like the power of modeling has been undervalued by some of my parents over the years. What do you think her beliefs were behind choosing to model certain behaviors to enforce them and choosing to whoop to enforce others?

Both messages were coded as including evidence of teaching presence, and the thread, consisting of five messages total, reached IAM Phase IV. Neither message includes a reference to literature or a resource, however there is clearly tremendous value for all participants in the group in discussing and exploring parental ethnotheories around disciplinary practices and how these have changed over time (Harkness & Super, 2001). These excerpts represent Community Cultural Wealth described by Yosso (2005) in that those injured by racism and oppression find they are

not alone, that they are empowered in hearing their own and others' stories, and they are "part of a legacy of resistance to racism and …oppression" (p. 75).

Implications for Teaching Presence Reconceptualized

There are implications for instructors given the findings in this study that are a result of challenging the existing perspective of teaching presence to include students and expand the range of knowledge that is included as evidence within the Direct Instruction category. Indicators of teaching presence for Direct Instruction or Facilitating Discourse can apply to student or instructor messages. Direct Instruction within this reconceptualization of teaching presence can be evidenced by any participant injecting knowledge from diverse sources including the intentional sharing of cultural insider knowledge with authority. While not a tremendous departure from the existing teaching presence construct, the inclusion of students in this reconceptualization of teaching presence raises some questions.

There might be a question about whether students will learn what they need to if they are invited to engage in teaching presence. Or whether it is inappropriate or overstepping the student role to contribute in this way. It might be tempting to think that if students are engaging in teaching presence the instructor can be less involved in online discussions after the early weeks of a course. Similar to an early childhood classroom using a social constructivist approach (e.g., emergent curriculum; play-based program; project-based learning) there can be assumptions that students are not going to learn anything, that it is chaotic, or that the teacher is not playing an active role in learning.

When teaching from a social constructivist philosophy that includes teaching presence on the part of students and instructor, it is important to recognize that there is a great deal of

intentional structure that is put into place and maintained by the instructor throughout the course. The structural design for learning is not easily visible to someone outside of the classroom community. In online courses using a social constructivist approach the structure becomes visible when examining the intentional goals, the intentional design, and the intentional presence on the part of the instructor.

Intentional Goals

Course objectives are related to outcomes for students. These are important for students and the instructor to communicate the intent behind the activities undertaken in the course (Mager, 1997) and to keep participants on track because there is a destination in mind. There are also goals embedded in the processes used to achieve the objectives within courses. These process goals may not be stated in the objectives, but they guide and inform the design of the activities that participants undertake, and the roles participants play on the path to the destination (Carter & Curtis, 2002). In this case the process goal is socially constructing learning through the discussion activity.

Students who engage in teaching presence respond to the intentional process goal of socially constructed learning. The findings in this study indicate that teaching presence on the part of individual students co-occur with higher phases of social construction and longer threads in small groups. In this case teaching presence for students supports motivation and engagement for all participants.

An instructor who believes in socially constructed learning as a means of more deeply and equitably developing understanding will view their role as one of facilitator and guide for students who bring experiences and knowledge to contribute rather than as the one who transmits

knowledge to students who lack it. This instructor will take time to support developing a community and be more concerned with building on students' existing knowledge to achieve greater depth of understanding rather than breadth of knowledge of many concepts. The structure supporting the process goal is embedded in the design of the guidelines for the discussion activity while the presence of the instructor and the design of specific discussion prompts serve both to maintain the process goal and to guide participants toward course objectives.

Intentional Design

Teaching presence includes a third category, Design and Organization, which was not directly measured in this study as this largely occurs before the course begins and it is the responsibility of the instructor (see Appendix A). However, findings from this study point to the importance of this element of teaching presence on the part of the instructor. The intentional alignment of discussion guidelines, rubric criteria, and discussion prompts for each module with the larger goal of promoting social construction of knowledge is preparation "behind the scenes" that creates the context for the discussion activity. The design and organization of the discussion activity in this course served to support teaching presence on the part of students and to invite and acknowledge a broad range of ways that students contribute their voices to socially constructing knowledge.

Intentional Presence

An effective instructor is intentional about being present within the online discussion. In this case, the instructor was more heavily present by posting responses to all students in the discussion early in the course. This served to model for students the possibilities for how they might be present in the discussion. Shifting to posting fewer messages but remaining present in

each thread served to guide the discussion in some threads but also alert students that the instructor was still there as a co-participant in the discussion. This is similar to an instructor circulating the classroom while having a small group discussion in a face-to-face course meeting. There is a sense that the instructor is following along and available if needed, but there is more room afforded to students to share their own ideas, knowledge, and expertise. It allows more space for student voices in a context of support. This fits with Lai's (2015) findings in which the EdD students in their study were less likely to respond to each other when moderators (i.e., teaching assistants) provided responses quickly to student messages. When there was not a quick response by a moderator, students were more likely to respond to one another and for threads to be longer in length.

In this case, 94% of the instructor's messages included evidence of teaching presence. This should not be overlooked as it contributes to the overall learning within the course. The instructor is responsible for ongoing assessment of student learning and guiding students toward course objectives and thus, must maintain presence within discussions. Observing interactions and listening, or in the case of online discussions reading, are as much a part of effective teaching as instruction and facilitation. Expanding the conceptualization of teaching presence to include students brings attention to the nuances of the instructor's role and the many ways that learning can be supported. Thus, considering course preparation in terms of design and organization coupled with the presence of the instructor can serve to promote learning in online discussions in new and potentially powerful ways.

Future Possibilities for Teaching Presence Reconceptualized

The Community of Inquiry model situates the educational experience at the intersection of cognitive presence, social presence, and teaching presence. At the time that Garrison and colleagues (1999, 2003) proposed the CoI model it served to counter assumptions about both the possibility and necessity of social connections within technology mediated learning contexts. Studies that confirmed the three presence constructs as integral to the learning experience (Caskurlu, 2018; Garrison & Arbaugh, 2007; Hosler & Arend, 2012; Kilis & Yildirim, 2019; Lee, 2014; Richardson & Swan, 2013; Sheridan et al., 2013) critically challenged these assumptions, finding not only that social presence can be fostered but it is integral to learning within online contexts. A strong connection between social presence and cognitive presence for students in online coursework has been established within literature incorporating the CoI model.

The strong existing body of CoI literature supports the legitimacy of social construction of knowledge within online learning contexts as a line of inquiry. The current study considers how Activity Theory can deepen our understanding of social construction of knowledge within a community of inquiry in online discussions. The study stands on the strong foundation of the CoI model while also reconceptualizing the construct of teaching presence to include students. This study challenges assumptions about the role of students within online learning contexts. The findings are only a beginning of an understanding of what teaching presence on the part of students means for the learning experience. While in this case evidence of teaching presence on the part of students co-occurred with evidence of higher phases of social construction within the IAM and longer threads, the findings do not point to a simple formula that more teaching presence for students equals better learning for the group. The findings do reveal that students

can and do engage in teaching presence and this serves to draw other students into the process of learning and constructing understanding in the group when community has been established. Teaching presence for students is a meaningful part of relationship-based education.

The interaction between individuals and the group engaging in learning tasks that have specific goals, guidelines, and expectations is extremely nuanced. Applying Activity Theory to the analysis of the data in this study reveals several implications for the design of the discussion activity and the roles of participant as these relate to the way teaching presence and learning unfold, including intentional goals, intentional design, and intentional presence. Pinpointing these implications was possible through incorporating key features of Activity Theory (Wertsch, 1979) and the expanded model of Activity Theory (Cole & Engeström, 1993) in the analysis. Conducting analysis of the data at both the individual and group level was a significant way that Activity Theory contributed to the findings. This study points to the possibilities for using Activity Theory in future research to bring deeper understanding to the ways in which relationship-based online learning experiences can be designed to promote the social construction of knowledge.

Additional research is needed to contribute to a more comprehensive understanding of the applicability of the reconceptualization of teaching presence beyond this case study. Does teaching presence on the part of students contribute to meaningful and productive learning within other types of learning contexts (e.g., hybrid, synchronous remote, in-person) or other types of learning activities? What types of content areas are conducive to teaching presence on the part of students as part socially constructed learning? This study only begins to scratch the surface of the meaning of teaching presence as related to the social construction of knowledge and the

possibilities for Activity Theory as a framework to understand the nuances of learning interactions that include teaching presence.

Discussion Summary

The findings that have been discussed here allow for a new view of the construct of teaching presence within the Community of Inquiry model, both conceptually and in application. The research question itself brings attention to student and instructor roles individually and how individuals contribute to dynamics within small groups. The question brings forward a new perspective on the conceptualization of teaching presence as a component of the CoI model by expanding it to include students. Students can engage in teaching presence and evidence from this study indicates that this co-occurs with social construction of knowledge in small groups and longer discussion threads. Instructors can be intentional in aligning course design with goals. Instructors can plan to intentionally model early in the course and shift to a more facilitative role over time to promote the development of community, teaching presence, and social construction of knowledge.

CHAPTER SIX

CONCLUSION

Findings from the current study point to five new insights regarding the influence of teaching presence on social construction of knowledge:

1. Teaching presence on the part of students is possible.
2. Teaching presence on the part of students is beneficial for small groups participating in discussions.
3. Instructor presence is important for promoting teaching presence on the part of students and supporting social construction of knowledge.
4. The design of the discussion prompt can promote socially constructed learning within groups of students.
5. Existing models of teaching and learning can be challenged to recognize the assets of learners. These findings have several implications for teaching practice, research, and the field of child development. The study has some limitations which are considered next, followed by a discussion of implications.

Limitations

This study has several limitations. These limitations include: the sample size and data set selection for the case study, including the diversity of the sample; the researcher as the instructor for the course in the case study; and the use of existing models and codes.

Case Study Sample and Data Set

The goal of this case study was to identify occurrences of teaching presence in online discussions, and then describe and explain teaching presence as it relates to the social construction of knowledge in small groups. The study does not seek to prove causality or a correlation. The 27 participants in this study (i.e., 26 students and one instructor) produced a data set consisting of 334 messages. This data results in findings that describe patterns of teaching presence for individuals and point to explanations for how these relate to social construction of knowledge for groups. The fact that similar patterns of teaching presence and social construction of knowledge are evident in both sections indicates that there is reliability in the findings. However, the sample size and data set in this study are too small to generalize beyond this case. Analyzing online discussion responses from multiple courses with different instructors who work from a social constructivist philosophy of teaching and learning is needed to verify the influence of the contributions of individuals to the dynamic of group learning over time.

While there was a rationale for the three modules that were selected to be included in the data set in the methodology, it is possible that the findings could have been more strongly confirmed or different patterns may have emerged if data from additional or different modules had been included. For example, including in the data set all of the modules that incorporate a playground prompt may have allowed for deeper understanding of the changing role of the instructor and students over time by controlling for prompt type. Similarly, choosing a consecutive number of modules may have allowed for a more detailed understanding of change over time.

There were three students who did not consent to participate in the study. While there was a high overall participation rate with 26 out of 29 possible participants consenting to the study, the three who did not consent were all students who identify as Black, Indigenous, or People of Color (i.e., BIPOC). This does not appear to skew the findings on teaching presence for students given that out of the 9 students identifying as BIPOC who did consent to participate in the study seven had messages with evidence of teaching presence. This is comparable to 14 out of the 17 students identifying as White having messages with evidence of teaching presence. This limitation is a concern for research more generally in terms of who is represented in research literature as data and findings often guide economic and policy decision making.

Finally, as dialogue among groups of people is shaped by the unique personal experiences of the individual participants, a larger sample and data set could offer stronger insights about the concepts of social construction of knowledge and teaching presence relative to cultural and linguistic practices of individuals. This study demonstrates that indicators of social, cognitive, and teaching presence and social construction can be identified within messages from students and instructors participating in an online course. However, there is a need to more explicitly explore how teaching presence and the social construction process can be carried out in online discussions by instructors and students from diverse cultural and linguistic backgrounds.

Researcher/Instructor Role

My role as both the instructor in this course and researcher in the study is possibly a limitation. I contributed as a participant to the discussions included in the data set. While teaching the course, I was aware that a goal I have is to support social construction of knowledge. Having read the CoI and IAM literature at the point that I taught this course, I was

aware of these constructs, but I did not consciously approach my teaching differently from how I typically do. In online courses I reply to messages much more frequently early in the course and scale back as the course carries on allowing students to take over more responsibility for guiding and facilitating the discussion. I see my role as supporting students in seeing new perspectives by pushing or nudging them to think outside their own experiences and to respond to the thinking of other participants.

Even with an awareness of potentially conflicting roles, it is impossible to be entirely free of bias. To address and minimize this limitation, throughout the coding process I engaged in reflexivity, both through carefully keeping notes and through engaging in conversations with the second coder. We achieved statistical intercoder reliability which supports validity overall. The question remains as to whether the same pattern of data would emerge from online discussions including a different instructor who embraces a social constructivist approach to learning. Thus, it is important for future research on teaching presence and the social construction process to verify the findings of the current study.

Existing Models and Codes

The IAM and CoI models provided validated constructs that were available to use in the coding process. While this allowed for individual and group data to be analyzed and compared, deductive coding exclusively may have limited the perspective on ways that individuals contribute to the learning of the group. The data in this case study was analyzed to search for existing constructs rather than analyzed to search for new constructs appearing as themes within the data. For example, the different types of stories that participants share in their messages could be examined in a more nuanced way through inductive coding to identify themes and

trends associated with teaching presence. A combination of deductive and inductive coding may have offered a more complete picture of the wide range of ways that individuals interact and contribute within group discussions.

In addition, the expansion of the teaching presence construct reconceptualizes the CoI model in a way that more fully recognizes the contributions of learners. This is an important contribution, but there are likely additional ways that the educational models in this study could be adjusted to acknowledge and value an even broader range of assets that students contribute to the online discussions studied.

Implications

Examining the dynamics of the social construction of knowledge through online teaching and learning is possible because Activity Theory was used the theoretical framework. This study's findings represent a beginning to understanding the contributions of individual participants in relationship to the learning of the group. With the limitations of this study in mind, there are implications for the findings for teaching practice in online higher education contexts, including the design of discussion activities and the presence of the instructor. In addition, there are implications for research design and directions for future research on the social construction process and teaching presence in online contexts. Finally, there are implications from the findings for the field of child development professionals more broadly.

Implications for Teaching Practice

This case study shows that the design of the discussion activity can support social construction of knowledge when an instructor is intentional about carefully planning and organizing the discussion. Explicit guidelines for participating in the discussions, rubric criteria,

and the structure of the discussion prompt are elements of the design of the discussion that require careful planning. The instructor's intentional intensity of presence during the discussions relative to the needs of the students serves to support and deepen learning. Inviting and encouraging teaching presence on the part of students does not mean the course involves no goals or structure, or that the instructor bears no responsibility for the learning that occurs in the discussions. Rather, the design of the discussion and the continuous, active presence of the instructor through social, cognitive, and teaching presence embraces the fact that all participants, instructor and students, have important, ongoing roles to play as they make contributions to the learning of the group within online learning activities.

Design and Organization. One of the categories of teaching presence that was not measured is the Design and Organization category. This is because the design and organization of course activities are largely the responsibility of the instructor before the course begins. Instructors can intentionally design participation guidelines that require interaction among students when they are aware of and set out to promote the social construction process. Criteria in rubrics designed for evaluating discussion participation can incorporate expectations for responses that include furthering the discussion through offering insights or providing new perspectives. These types of criteria make visible the expectations that students will play a role in facilitating the discussion and each other's learning. The structure of the discussion prompt can also support social construction of knowledge and teaching presence when it is open-ended and allows students to draw on their experiences and knowledge as related to the content of focus.

Module content is collected and created in advance of the course beginning. One element in this course is video introductions for each module created by the instructor. These short 3–5-

minute videos feature the instructor on camera giving an overview of the content in the module. For this particular human development course, the introductions often include an analogy or a story from the instructor related to the content and encouragement for students to share their own examples in the discussion. This type of content supports relationships between the instructor and students by allowing students to see the instructor as a real person, enhancing the feeling of telepresence. The modeling and encouragement to share personal or professional examples in these videos reinforce the expectations for the discussion activity found in the directions for the discussion and in the rubric.

Another aspect of the design of the discussion activity that supports social construction of knowledge is the grouping of students. Organizing students into small groups for online discussion allows for greater depth to the discussion as students can manageably read messages from 4-5 peers and respond thoughtfully. The depth in the discussion within small groups along with the exchange of personal stories support building relationships. Instructors can align all of these design elements with the goals and objectives of the course to more intentionally promote social construction of knowledge within online discussions.

Instructor Presence. The role that the instructor plays in the online discussion can promote teaching presence and social construction of knowledge. Modeling for students early in the course through greater intensity of presence within the discussions can help establish community through promoting cultural practices. Community-promoting cultural practices can be established in different ways to fit the instructor's teaching style. For example, the instructor might begin response messages with a greeting that includes the name or names of the individuals for whom a response message is directed. Or the instructor might encourage the use

of fictional storytelling (e.g., creating a fictional case) as a routine way to explore and explain a concept.

In this particular course, the instructor created and promoted a cultural practice of sharing personal examples or stories. Through sharing stories as a former early childhood classroom teacher and as a parent, the instructor as a participant in the discussions modeled self-disclosure and helped show the value in connecting theoretical concepts to real life and professional practice. Efforts on the part of students to share these types of personal examples were encouraged through expressions of appreciation from the instructor in response to these messages. Students also began to acknowledge contributions from each other in their responses (e.g., “Thank you for sharing this example”) over time.

In this course, the instructor created and posted weekly video announcements in addition to the module introduction videos (created prior to the beginning of the course). These brief videos, recorded informally using the embedded video application in the Blackboard Learning Management System, included a short review of the discussion, a preview of the discussion coming up in the next module, and any other announcements about the course (e.g., due date for an assignment coming up; information about student support services; how to access readings). In each of these videos the instructor expressed appreciation for the participation of the students in the discussion and an invitation to reach out with questions or concerns, either through the open “Ask the Class” discussion forum, or through email. Similar to the module introduction videos, these video summaries with announcements that bring in references to the previous and upcoming discussions also support a sense of telepresence. Other examples of this kind of module summary include the use of a course blog or an audio recording.

In this instructor's experience, in the early weeks of a course, there are students who reach out via email to the instructor to check in about how the instructor thinks they are doing in the discussions. These types of emails indicate to the instructor that the student is not familiar with the kind of interaction happening in the discussions. The sharing of different perspectives and negotiation among participants may challenge the student's expectations for the instructor based on their previous learning experiences. Students earn points for participating in the discussion which are visible to the students in the online gradebook each week so that they can see their progress. However, some students express a sense of uncertainty as the instructor and other students ask questions or offer different perspectives, leaving them wondering if what they posted is "right". In response to these types of emails, the instructor reassures students that the process of socially constructing knowledge involves uncertainty and openness to new ways of thinking, and that this is what is expected and wanted in the discussions.

Establishing community recognizes the importance of social presence within the educational experience. Relationships among students promotes motivation to respond to each other and a sense of safety that allows for self-disclosure, both of which allow for a broader range of perspectives within discussions. When the instructor recognizes that community is supporting the depth of the discussion, they can shift to a more facilitative role which allows students to take over more responsibility for teaching presence and social construction of knowledge. Throughout a course, an instructor who is committed to social construction of knowledge carefully reads the needs of individuals and the group in order to be responsive with the kind of presence that is needed in the moment.

Implications for Research

This study involves two sections of an online social science course with data from 27 participants. Findings from this study represent a start to understanding what teaching presence on the part of individual students might mean for learning dynamics in small groups in online discussions. The research design used in the current study could be used in future studies to better understand the ways individual contributions relate to group learning processes. There are several possibilities for future research on the dynamics of teaching and learning based on the findings for this study.

Activity Theory Informed Research Design. This study marks an achievement for social science research attempting to understand the nature of individuals in relation to the group they are working with. The seminal work of Russian psychologists Vygotsky (1978) and Leont'ev (1979) made this research possible. The use of Activity Theory in the current study demonstrates that the online discussion activity can be analyzed on various levels (Wertsch, 1979). Using the constructs of presence in the Community of Inquiry model (Garrison et al., 2003) and the phases of the construction of understanding from the Interaction Analysis Model (Gunarwardena et al., 1997) opened the way to a comparative analysis of individual and group level data. Being able to examine the interaction of individuals in relation to the group resulted in findings that point to the impact that individual students can have on the learning of the group when engaging in teaching presence. The multi-level research design and analysis in this study provides a template for future studies that aim to examine individuals in relation to the group, and the power and potential of Activity Theory as a framework to support such work.

Questions for Future Research. Given that Activity Theory provides a framework that allows for group and individual levels of analysis of change over time, several questions emerge. The following questions are possibilities for future research which could broaden and deepen our understanding of teaching presence and the process of social construction of knowledge.

The first question is, can these findings be replicated with for a larger data set or a larger sample size? This could offer validity for the findings of this study given the limited sample size. A second question that emerged during the data analysis is whether higher phases of social construction as measured by the IAM are related to teaching presence or the length of the thread (i.e., total number of messages in a thread). A larger data set or sample size could allow for an examination of this question. Additional directions for future research include studying teaching presence as related to cognitive presence, examining coursework within different domains of study, incorporating additional research methods into the research design, focusing on the design of the discussion prompt, and application of an expanded IAM coding framework to future data sets. Each of these areas are discussed below.

Teaching Presence and Cognitive Presence. This study describes and explains teaching presence for individual students and how this relates to the process of socially constructed learning in small groups. Understanding more about what this means for students' cognitive presence could further add to the value of teaching presence for students and/or the process of socially constructed learning. In this study, the third level of cognitive presence, Integration, was evident in 90% of the messages in the data set. Thus, studying the connection between teaching presence for students or socially constructed learning as it relates to cognitive presence would require a more fine-grained measure than the Practical Inquiry Model (Garrison et al., 1999) that

makes up the four levels of cognitive presence within the CoI model. Establishing whether there is a relationship between teaching presence or socially constructed learning and cognitive presence would deepen our understanding of both concepts and have implications for course design.

Different Domains of Study. What patterns of teaching presence for the instructor and students might emerge in other social science courses or in courses within other fields of study? Goals within foundational knowledge courses versus practice courses in social sciences vary. Replicating this study within a practice focused course could expand our understanding of how different goals and expected outcomes might influence patterns of teaching presence for individuals and the social construction process in small groups. Another possibility would be to incorporate a longitudinal design and follow groups of students from a foundational knowledge course through a practice focused course to examine differences in teaching presence and learning dynamics within courses that have different types of goals.

Stepping outside of the social sciences, are the goals of different areas of study aligned with the process goal of shared responsibility for teaching presence among students and instructor as a means of socially constructing knowledge? For example, foundational knowledge courses in a nursing program might emphasize learning facts, which might seem to leave little room for socially constructed learning. Can the course design allow for and promote teaching presence in ways that align with the goals of courses like this? Examining the applicability of teaching presence for students as related to different domains of study would expand our understanding of the teaching presence construct.

Additional Methods. Given the findings that teaching presence on the part of students is possible and beneficial for the social construction process in groups, it would be useful to understand students' perspectives. What insights might be gained from asking student participants to reflect on a transcript of an online discussion? A grounded theory methodology could be used to construct theories around the meaning of teaching presence and socially constructed learning for students. Using interviewing as a data collection method, talking with students who frequently engage in teaching presence as well as those who don't, could provide a more robust description and explanation of what promotes teaching presence and the social construction process in small groups. Conducting interviews with students before, during, or after participating in a course could offer insights into what this means for their learning process and the role of the instructor. In addition, the perspectives from students who are BIPOC about the reconceptualized teaching presence construct that emerged from this study could uncover additional ways that the construct and perhaps the CoI model as a whole could be expanded to acknowledge Community Cultural Wealth (Yosso, 2005) and Funds of Knowledge (Moll et al., 1992) more fully.

The Discussion Prompt. In the design of the current study, the three modules were chosen at the beginning, middle, and end of the course to examine possible changes in the development of teaching presence over time. The different prompt structures in this study resulted in different patterns of teaching presence and socially constructed learning. A study design that includes each type of discussion prompt outlined by Andrews (1980) (i.e., playground, brainstorm, and focal) and a role-playing prompt (Darabi et al., 2011) could support understanding the way that the prompt as a design element influences teaching presence and

learning dynamics. A study examining how different types of prompts might be used intentionally to meet different curricular goals could contribute a great deal to implications for the design of online courses. It would also add to the body of literature already examining how different types of prompts are implicated in varying outcomes for student learning and engagement.

Expanded IAM Coding Framework. The intercoder reliability process resulted in expanding the IAM model (see Appendix C). A significant discovery during the coding process was recognizing that each message must be coded within the context of the thread because evidence for whether a message represented internal versus social construction was contingent upon the content of previous messages. In addition, the two coders developed clear definitions and examples for the five phases of IAM to guide the coding process. This is a contribution to future research seeking to explore and explain the social construction of knowledge in online learning contexts. However, the expanded framework has only been applied within this study. What additional insights about the social construction of knowledge might the expanded IAM coding framework offer? Future research applying the expanded IAM coding framework could uncover further implications for the design of online learning related to social construction of knowledge.

Implications for the Field of Child Development

As institutions of higher education increasingly expand online course offerings, challenging existing models of teaching and learning and embracing teaching as scholarly work that should be valued is more important now than ever. Research that aims to understand relationship-based teaching, specifically in online contexts, makes a needed contribution to the

academy, particularly for applied child development focused programs. Relationship-based learning experiences provide new and continuing child development professionals a foundation for how to conceptualize interactions with children and families in meaningful and productive ways.

Challenging Existing Models. Challenging existing models of teaching and learning can allow for a reconceptualization of educational experiences that recognize and build upon the existing resources and experiences of learners. The expansion of the conceptualization of teaching presence to include students is a major contribution of this study to the body of literature on the Community of Inquiry model and for future research. The existing indicators for teaching presence narrowly defined injecting knowledge into the discussion as limited to knowledge with reference to literature or web resources. This overlooks assets that students bring to discussions that the dominant culture may not recognize as scholarly, but as shown in this case study, can provide valuable insights into non-dominant cultural experiences and practices.

The Scholarship of Teaching. The contribution that this study makes in offering insights into course design and the importance of instructor presence is valuable for higher education faculty. Examining one's own teaching as research is not often undertaken in higher education, even though most faculty teach courses. In *Scholarship Reconsidered: Priorities for the Professoriate*, Boyer (1990) asserts that the emphasis within the academy on research and publication as the primary means of achieving higher status comes at a cost to students as teaching is viewed as less important or valuable. The Scholarship of Teaching and The Scholarship of Application (Boyer, 1990) are represented by this study. The study validates the importance of examining teaching as research and the findings can be applied by higher

education faculty to design and instruction within online courses. Raising awareness of the value of research on teaching broadens the scope of scholarship in higher education that can potentially influence its effectiveness.

Relationship Based Education. This study and the design of the course itself both attend to an awareness of individuals and the group. Data in the study make visible the impact that the perspectives of individuals have on the learning of the group. The value of relationships as central to learning and development is clear in the findings. The development of community and relationships among participants in learning activities impact the social construction of knowledge.

Students in this case study were all in graduate programs aimed at preparing them to be or expanding their identity as professionals in the field of child development (e.g., social work, child life specialists, educators, infant mental health specialists, etc.). Experiences within courses in higher education that emphasize learning as a social process by recognizing that everyone has something of value to offer are essential for child development professionals. The effectiveness of professionals working with children and families depends on this strengths-based stance. Having first-hand experience with relationship-based learning provides the opportunity for a parallel process for applying this in their own professional practice. If we hope to support child development professionals in drawing on Funds of Knowledge (Moll et al., 1992) and Community Cultural Wealth (Yosso, 2005) with the children and families they work with professionally, then it is beneficial to have experiences within their preparation courses that model that this is possible.

Conclusion

The findings from this study show that students can engage in teaching presence in online discussions and that this contributes positively to the social construction of knowledge for groups of learners. Implications for teaching practice, research, and the field of child development more broadly reveal the wide range of ways and contexts in which this study can be applied. Future research that explores teaching presence for students in greater depth, or that examines design aspects such as the structure of discussion prompts more closely would build on the contributions made by this study. Relationship-based learning can happen in online discussions when the activity is designed with social constructivist learning in mind.

APPENDIX A

CoI CODING INDICATORS AND EXAMPLES

COGNITIVE PRESENCE			
Category	**Indicator**	**Definitions**	**Examples**
Triggering Event (TE)	Recognize the problem	Presenting background information that culminates in a question	In education, there are desired goals although successful achievement for some might be challenging to measure (i.e., critical thinking). Therefore, should the learner-centered model be implemented at the discretion of an instructor?
	Sense of puzzlement	Asking questions. Messages that take discussion in a new direction	
Exploration (EX)	Divergence-within the online community	Unsubstantiated contradiction of previous ideas	First, I think resource barriers or at least spending limits are a good thing…Second, I think that PD needs to be compulsory… The first thing that comes to my mind is…. I have a similar experience in my… Would you think of applying…? Moodle was implemented in our division three years ago. In the last year… I was reading an article about .... and it says that...
	Divergence-within a single message	Many different ideas/themes presented in one message	
	Information exchange	Personal narratives / descriptions / facts (not used as evidence to support a conclusion)	
	Suggestions for considerations	Author explicitly characterizes message as exploration	
	Brainstorming	Adds to established points but does not systematically defend/justify/develop situation	
	Leaps to conclusions	Offers unsupported opinions	
Integration (INT)	Convergence-among group members	Reference to previous message followed by substantiated agreement. Building on, adding to others' ideas	I'm assuming that you are referring to transformational learning as defined similarly by both Brookfield (2005) and Mezirow (1994). Although time and money help make 'transformation' possible, appropriate culture and leadership are the more critical ingredients (Fullan, 2006; Fullan, 2005; Fullan 2001; Moss-Kanter, 2001; Senge, 1996). You can throw as much time and money at the people of an organization as you like but if the necessary culture and leadership are absent, change of the transformational variety is impossible let alone sustainable.
	Convergence-within a single message	Justified, developed, defensible, yet tentative hypotheses	
	Connecting ideas, synthesis	Integrating information from various sources-text book, article, personal experience	
	Creating Solutions	Explicit characterization of message as a solution by participant	
Resolution (RES)	Vicarious application to real world testing solutions	Providing examples of how problems were solved	I have noticed that by editing writing together on a projector, the students are engaged and involved in the process. We had a problem at school about students'… To solve this problem, we developed… And it worked, the students…
	Defending solutions	Defending why a problem was solved in a specific manner	

SOCIAL PRESENCE			
Categories	**Indicator**	**Definitions**	**Examples**
Affective (AF)	Expressing emotions	Conventional expression of emotion	This discussion has been great, I've enjoyed it tremendously…
	Use of Humor	Teasing, cajoling, irony, understatements, sarcasm	In this day and age does not that seem a bit arcane? I smell change in the wind
	Self-Disclosure	Presents details of life outside of class, or express vulnerability	For me as a teacher in elementary school... My kid was also used to ....
	Use of unconventional expressions to express emotion	Unconventional expression of emotion, includes repetitious, punctuation, conspicuous capitalization, emoticons	A HUGE word of THANKS Good stuff John :) You all ROCK!!!!! LOL
Open Communication (OC)	Continuing a thread	Replying the questions, responding postings	In response to your question…
	Quoting from others' messages	Using software features to quote or cut and pasting selections of others' messages	What I am most curious about, is your statement that "... there are...".
	Referring explicitly to others' messages	Direct references to contents of others' posts	You mentioned that peer editing and using blackboard...
	Asking questions	Students ask questions of other students or the moderator	Can anyone show me how to put a survey in D2L?
	Complimenting, expressing appreciation	Complimenting others or contents of others' messages	Kevin, you have some excellent ideas here
	Expressing agreement/ disagreement	Expressing agreement or disagreement with others or content of others' messages	I totally agree with you that… I disagree the idea of Mary about….
Group Cohesion (GC)	Vocatives	Addressing or referring to the participants by name	I think Sharon's idea seems.... Robert, do you think...
	Addresses or refers to the group using inclusive pronouns	Addresses the group as we, us, our, group	I have gained from reading our text... I guess most of us...
	Phatic, salutations	Communication that serves a purely social function; greetings, closures	Hello everyone/ Hi Susan/ Take care

TEACHING PRESENCE		
Categories	**Indicators**	**Examples**
Design and Organization (DO)	Setting curriculum (including assessment)	This week we will be discussing….
	Designing methods	Reflect on this week's readings and your plans for evaluation….
	Establishing time parameters	Please post a message by Friday
	Utilizing medium effectively	Try to keep issues that others have raised when you post
	Establishing netiquette	Keep your messages short
	Making macro-level comments about course content	This discussion will also help you about your projects to explore…
Facilitating Discourse (FD)	Identifying areas of agreement/disagreement	Joe and Mary have provided a compelling counterexample to your argument. Would you care to respond?
	Seeking to reach consensus	You comment is congruent with Joanne's comment that …...
	Encouraging, acknowledging, or reinforcing student contributions	You have raised an important issue… Great summary of the points...
	Setting climate for learning	Don't feel self-conscious about thinking out loud on the forum, this is the place to try out ideas…
	Drawing in participants, prompting discussion	Anyone got any ideas about… I'd enjoy hearing your thoughts…
	Assessing the efficacy of the process	It sounds like you are moving right along. This has been a great discussion …
Direct Instruction (DI)	Present content/questions	Garrison & Vaughan state that "…." So, what do you think in your organization….?
	Focus the discussion on specific issues	I would suggest you think from the perspective of…
	Summarize the discussion	It seems that most of us have … David's and Carol's suggestions for this… We can also….
	Confirm understanding through assessment and explanatory feedback	Your interpretation is correct. Staff is required….
	Diagnose misconceptions	You are right … but there is … so you should think about…
	Inject knowledge from diverse sources, e.g. (textbook, articles, internet, personal experience (includes pointers to resources)	The literature indicates that … Rogers, Everett M. (2003). Diffusion…… http://www.school……
	Responding to technical problems	Adding videos to your postings can be done…

APPENDIX B

CoI CODING NOTES

1. Code at message level
2. Code each presence in any one message
3. Code the main point for each presence
4. Note secondary category in notes for later use
5. Do not attempt to code at indicator level; these were only intended to help code categories
6. Code to highest level, especially with CP
7. Negotiate to agreement
8. Calculate reliabilities during training, if necessary
9. Conduct pilot coding until reaching an acceptable reliability
10. Must get written consent to access transcripts
11. The nature of the task will shape the nature of the discussion
12. Code one presence at a time
13. The key is to code consistently; be clear and consistent

*Personal Communication with D. R. Garrison on 2/18/21

APPENDIX C

IAM CODING INDICATORS AND EXAMPLES

	Category	Indicators	Definitions	Examples
Ph I	**Sharing and Comparing of Information** Internal / Individual Construction	A. A statement of observation or opinion B. A statement of agreement from one or more participants C. Corroborating examples provided by one or more participants D. Asking and answering questions to clarify details of statements E. Definition, description, or identification of a problem	*Initial post likely to be Ph I or Ph II **unless** there is a direct reference to another participant's idea or post (from same discussion or previous one). Basic agreement without adding anything new. Asking questions to gain clarification.	"I agree with your point. I have seen this in my work with children." "What do you mean?"; "Can you say more about this?" "Yes- exactly! You totally got what I was trying to say!"
Ph II	**The discovery and exploration of dissonance or inconsistency among ideas, concepts, or statements** Internal / Individual Construction	A. Identifying and stating areas of disagreement B. Asking and answering questions to clarify the source and extent of disagreement C. Restating the participant's position and possibly advancing arguments or considerations in its support by references to the participant's experience, literature, formal data collected, or proposal of relevant metaphor or analogy to illustrate point of view	Asking questions to understand disagreements. Ph II is an internal process of knowledge construction within an individual that does not refer to or draw on ideas from other participants. Ph II C (restating position with references to support point of view) is more about internal negotiation with self rather than incorporating ideas/perspectives of others in the group. Focus is on backing up your own idea by adding beyond simply giving information.	"When you say parents should communicate with teachers, what does that mean for the responsibility teachers have regarding communication?" "Each child has their own cues for how they act then they are tired...So for me following an infant's cues is the easiest way for a child to adapt to a new environment and fall asleep in a new space. And I always like to ask the parents what their child's cues are so I can look out for them too...Recently in our infant room we had a 13month old child…"
Ph III	**Negotiation of meaning / co-construction of knowledge** Social Construction	A. Negotiation or clarification of terms B. Negotiation of the relative weight to be assigned to types of argument C. Identification of areas of agreement or overlap among conflicting concepts D. Proposal and negotiation of new statements embodying compromise, co-construction E. Proposal of integrating or accommodating metaphors or analogies	Giving suggestions to others that represent negotiation or compromise (co-construction). Proposing, identifying, or weighing different ideas (negotiation). Asking questions to build on or extend thinking; to further the discussion beyond just asking to better understand the meaning behind the other person's post. Integrating ideas from the group/other person, but short of a summary of agreement (Ph V).	"One other consideration…"; "Something else that comes to mind…" "Do cultural values themselves change, which prompts changes in practices, or do cultural values remain constant and the way these values come through in parental practices change as the social world and technology change?" "It's true that some mothers don't produce enough milk which interferes with their ability to breastfeed, but SES can also be a factor, especially for working mothers."

			Proposal for agreement that adds onto or builds on other ideas.	
Ph IV	**Testing and modification of proposed synthesis or co-construction** Social Construction	A. Testing proposed synthesis against "received fact" as shared by the participants or their culture B. Testing against cognitive schema C. Testing against personal experience D. Testing against formal data collected E. Testing against contradictory testimony in literature **"Testing" might be thought about as trying out an idea or checking it in comparison to previous experience or knowledge.	Considering taking others' ideas and integrating them with your own. Indication that you are considering changing your own point of view through checking negotiated idea against previous knowledge or understanding (cultural norms, experiences, literature). Defending your own idea in response to what other participants have added by testing it against something that is given as an example or named. "Received fact" and "cognitive schema" refer to personal, cultural, or social norms or beliefs that might be challenged by incorporating new perspectives. (Can think about assimilation and accommodation within cognitive schema for this process of testing negotiated meaning against prior knowledge/ideas).	"As you said, our understanding of things change, along with their cultural significance. Thinking about breastfeeding again, I know that my grandmother saw formula as being best because it was this new thing that had been created by science." "I totally understand where you are coming from because I grew up in a household similar to yours and we grew up ignoring our body signs of being full and hungry because of our socioeconomic status. Our parents fear of going hungry and not having does have an impact on childrearing and the outcomes they are trying to mitigate." "I'm thinking about your question regarding systemic barriers...and remembering reading in Rogoff (2003) about how traditional US education environments are about developing skills in ways that are divorced from real life. "
Ph V	**Agreement statement(s)/ applications of newly constructed meaning** Social Construction with Internal Change	A. Summarization of agreement(s) B. Application of new knowledge C. Metacognitive statements by participants illustrating their understanding that their knowledge or way of thinking (cognitive schema) have changed as a result of the conference interaction	A vicarious application or clear statement that thinking has changed are evidence of Ph V. A statement of a change in thinking and includes self reflection or self language about changing thinking. Summary of agreement should be more explicit and elaborate than just a statement of agreement. This would include a more substantial summary that might include using names of others connected to the integration of ideas and will come across as more "meta".	"I can see how this would apply to my work…" "Even as I write this, I feel the answer is so obvious and frustrating it didn't immediately occur to me...I am really interested in your idea about dual language programs and it's something I may be able to look into for some of the kids I work with at my field placement." "A couple things stand out as I read about practices you discuss...First is the role of history as Laurie points out in her post... The second is that there are dominant cultural beliefs that shape our practices. Audrey's discussion of infant napping illustrates the idea...

				Eva's post gets at what is now a dominant belief... So there is a sense of both continuity and change."

IAM Coding Notes:

- Code messages within the context of the small group or thread. Coding is dependent upon knowing whether a participant is asserting their own initial thoughts or whether the message is contingent upon other participant(s)' thoughts and ideas.
- Initial posts are unlikely to be Ph IV or V unless there is a direct reference to another participant's idea or post (from the same or even previous discussion) indicating testing in light of another person's idea.
- The prompt may serve the purpose of Ph I- E. Definition, description, or identification of a problem.
- Code each message to the highest phase evident.
    - If post includes evidence of negotiation and also testing against personal experience, code it as Ph IV
    - Code Ph V when there is a summary of agreement, even if the post also includes additional negotiation (Ph III) in another place.

APPENDIX D

CODING AGREEMENTS

These are the agreed upon protocols for coding through negotiation in coding meetings:

General:
- Code each whole message (rather than an excerpt) for IAM, SP, CP, and TP.
- Include an excerpt or note in memos about rationale when deciding between two codes.

Social Presence:
- Do not code GC for greeting/salutation (i.e. "Hi Mary") as this skews SP codes to GC because most students do this in their responses to peers.
- Code AF if there is a personal story reflects self-disclosure that is vulnerable/personal to the individual.
- Code OC if the post is responding to a question as this is continuing the thread.
- Code each message for what seems most prominent in terms of SP, and if giving equal weight on two codes go with the higher level code.
- Code GC if post includes "we" as inclusive of other people in the course, but not if "we" is being used as a larger social/cultural collective.
- AF category of "expressing emotions" is about the process of discussion or group rather than feelings about the content.
- Don't code GC if you can swap out "we" or "us" with a general collective pronoun (one, a person, people) or "me", as this is too general. Do code GC if the participant names other participants within their post.

Cognitive Presence:
- TE code applies to the prompt, so frequency within messages may be low.
- Code INT if sharing a personal story that connects ideas or creates an example of a solution.
- Code RES only if the message includes a strongly defended solution or a story that exemplifies a solution with intent to convince the group about the idea.
- Code RES if a personal story includes a connection to how ideas in the discussion might apply in the real world or indication that the person is viewing the story differently in light of new ideas within the discussion (indicating a change in thinking).
- Don't code RES if sharing what someone else posted or shared that represents an application or example of solution (as in directing a participant to someone else's post or example) as the RES code belongs to the owner of the example. If sharing someone else's application code INT.
- Code each message for CP to the highest level.

Teaching Presence:
- DO code will not apply to student posts as it is about design and organization that happens in advance of the start of the course.
- Code DI when a message includes a specific reference or quote from a reading (but not if references are listed at the end of a post without direct reference to one within the post).
- Code DI when asserting something with authority, including summarizing the discussion.

- Code DI when presenting questions that are getting at something deeper than just social presence (OC asking questions) and getting at the content.
- Code DI if injecting knowledge with authority as a cultural insider with clear intention to teach others in the course about non-dominant cultural experience relevant to the content. Providing knowledge of history or systems that offer a perspective to the content to further thinking.
- Code FD if message serves to draw in participants as a group rather than directed only to a single individual.
- Code FD if there is evidence of actively encouraging or engaging others in moving discussion forward toward consensus.
- Code each message for TP (including adding a code of "No TP" if there is no evidence) for what seems most prominent (DI or FD if evidence of both). If giving equal weight to both go with DI as the higher level.
- Code FD if there are questions with a goal of facilitating more discussion (open-ended questions) rather than DI for present questions or focus discussion (to begin the discussion or more specific questions to create a focus).
- If a post includes evidence of FD but also includes summarizing the discussion, this bumps the code up to DI (for summarizing) because it is higher level (if both FD and DI seem to be evident evenly).
- Can think about FD categories of identifying agreement/disagreement, seeking to reach consensus, and drawing in participants/prompting discussion as with more than one person (volleyball) and DI as with an individual (tennis).

IAM Phases:

- Code each message to the highest phase evident.
    - If post includes evidence of negotiation and also testing against personal experience, code it as Ph IV
    - Code Ph V when there is a summary of agreement, even if post also include additional negotiation (Ph III) in another place.
- Initial posts are unlikely to be Ph IV or V unless there is a direct reference to another participant's idea or post (from the same or even previous discussion) indicating testing in light of another person's idea.
- Ph II C (restating position with references to support point of view) is more about internal negotiation with self rather than incorporating ideas/perspectives of others in the group.
- Ph II is more about trying to back up your own idea whereas Ph III is about integrating ideas and trying to fit perspectives together (or changing your own stance).
- Ph II can include citing literature if you are backing up or restating your own stance/position (C).
- Ph II includes elaborating beyond just giving information. It is adding on to back up your own ideas.
- Ph II is an internal process within the individual.
- Ph III is giving suggestions to others and represents negotiation or compromise (co-construction).

- Asking Questions: Ph II could be asking questions to gain clarification (i.e. “What do you mean?”; “Can you say more about this?”) whereas Ph III involves asking questions to build on or extend thinking; to further the discussion beyond just asking to better understand the meaning behind the other person’s post.
- Ph III involves integrating ideas from the group/other person, but short of a summary of agreement (Ph V). More of a proposal for agreement (i.e. “One other consideration…”; “Something else that comes to mind…”) that adds onto other ideas.
- Code Ph III for Mary’s posts if she is trying to get students to test ideas through asking questions or sharing an example (rather than Ph IV).
- Ph III includes building on or adding to ideas.
- Ph IV includes evidence of considering changing your own perspective or integrating aspects of others’ ideas whereas Ph III is proposing, identifying, or weighing different ideas (negotiation).
- Ph IV involves considering taking other ideas and integrating them with your own or statement that you are considering changing your own point of view.
- Ph IV could also be defending your own idea (in response to what other participants have added) by testing it against something that is given as an example or named.
- Code Ph IV testing against personal experience if the example shared is in response to another participant.
- For Ph IV, “received fact” and “cognitive schema” refer to personal, cultural, or social norms or beliefs that might be challenged by incorporating new perspectives. (Can think about assimilation and accommodation within cognitive schema for this process of testing negotiated meaning against prior knowledge/ideas).
- For Ph V a longer discussion may be needed. However, a vicarious application (“I can see how this would apply to my work…”) or clear statement that thinking has changed are evidence of Ph V.
- Ph V can be a statement of a change in thinking and includes self-reflection or self-language about changing thinking.
- Ph V summary of agreement should be more explicit and elaborate than just a statement of agreement. This would include a more substantial summary that might include using names of others connected to the integration of ideas and will come across as more “meta”.

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