# Boston College Lynch School of Education and Human Development

Department of Educational Leadership & Higher Education

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## DESIGNING COLLABORATIVE LEARNING IN AN ONLINE LEARNING ENVIRONMENT: A CASE STUDY

Dissertation

by

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## Designing Collaborative Learning in an Online Learning Environment:

A Case Study

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### ABSTRACT

This qualitative research study examined the design of collaborative learning experiences in an online graduate course in educational leadership. Based on principles of design-based research, this single case study analyzed the design process among the faculty member and learning design team who created the course. Data were also gathered from the first time the course was completed by students. Content analysis was the primary method to analyze data sources that included design documentation, interviews with faculty and the learning design team, images of course modules in the university Learning Management System, transcripts of synchronous learning exchanges among students and the faculty, team-based assignment submissions, and a survey of students.

Findings revealed that the design of collaborative learning experiences was dependent on the nature of the learning goals. The instructor oriented students toward the collaborative culture of the online course and employed numerous learning supports and facilitation strategies to aid them. Collaborative learning design was rooted in the learning sciences, social interdependence theory, and the conceptualization of the virtual classroom as a space for play and creativity. Student collaboration involved synthesis of readings, team-based design exercises, and supporting each other in making progress towards program-level goals. Students regularly engaged in metacognitive activity to reflect on their learning individually and as a collective. Students found the learning supports valuable and collaborative learning experiences challenging but affirming of their identities as graduate students. This study contributes to theory about designing and facilitating online collaborative learning in graduate programs and offers design considerations to guide future efforts in learning design.

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Chapter 1: Overview of the Study

Whether full time, or as part of a campus-based degree program, students are choosing online courses for many reasons: their convenience, an expanded choice of topics, and flexibility in completing the course work. Institutions are also increasing their online offerings to boost enrollment and increase tuition revenue at a lower cost of instructional delivery (McPherson & Bacow, 2015). Since the early 2000s, online education has significantly increased college access and curricular options. A third of college students took at least one distance education course in 2016, and one-sixth were exclusively enrolled in distance education courses (Seaman et al., 2018). In the late 2010s, an estimated 40% of faculty were teaching online courses—more than ever before (Jaschik & Lederman, 2018; Meyer, 2014). These trends were heightened during the COVID-19 pandemic when over 85% of institutions suddenly shifted into online learning, then slowly returned to face-to-face learning (Greenhow et al., 2022). However, many institutions retained online learning options for students and have not returned to pre-pandemic levels of online learning. According to one survey, 34% of faculty engaged in online teaching modalities in 2019; 71% during the pandemic onset in 2020; and down to 46% in 2022 (Bay View Analytics & Online Learning Consortium, 2022).

Coinciding with this expansion of digital learning, many faculty, students, and other stakeholders are constantly evaluating the quality of online education, often contrasting it with face-to-face teaching and learning (Chiasson et al., 2015; Ossiannilsson et al., 2015). The success of planned interactions among faculty and students is key to the quality of digital learning, which typically relies on asynchronous interactions (Pilotti et al., 2017). Despite the prevalence of the asynchronous or majority-asynchronous course format (Garrett et al., 2019), and the geographic spread of students, they are not forced into being isolated learners. The "independent study" mode of online education (i.e., all student learning is self-directed) is not the only model

(Anderson, 2004). In face-to-face classrooms, group-based learning supports the development of interpersonal skills, critical inquiry, design, communication, and self-management of learning (Barkley et al., 2014; Caplow & Kardash, 1995; Terenzini et al., 2001). Online learning environments are no different.

Certainly, there is more to online education than group learning activities—for example, engaging learning resources, a clear sequence of the content, and instructor presence—but collaboration is crucial to making optimal use of the digital medium, and students value it (Ku et al., 2013). It is also one of the most challenging elements of online education to design (Witney & Smallbone, 2011). While it is not possible nor desirable to precisely script student interactions, faculty and instructional designers can create conditions conducive to productive student interactions. Once learning activities are underway, faculty can still act by adapting or modifying learning activities to meet student needs. Additionally, recent advances in technology also merit continual investigation into ways instructors incorporate technology into pedagogy (Jeong & Hmelo-Silver, 2016; Koehler et al., 2013). To advance a theory of action for designing collaborative learning experiences, this area of research would also benefit from contextually rich case studies of online collaborative learning *in situ* (Barab et al., 2001; McPherson & Bacow, 2015).

#### Focus of the Study

This research examines the conditions necessary for productive collaborative learning interactions among an instructor and graduate students in an online course. The study first investigates how collaborative learning activities and discussions are designed to fit within the larger context of the online learning environment, how they are enacted, and what students think of them. This online course will be part of a graduate program in a professional graduate school, and it will include both synchronous (i.e., concurrent) and asynchronous (i.e., not concurrent) interactions, also known as "bichronous learning" (Martin et al., 2023). An intended outcome of this study is a theory-driven design framework to inform future design of collaborative learning activities in online learning environments (Czerkawski & Lyman, 2016; Reigeluth, 1999).

#### Significance of the Study

This study makes four primary contributions to the field, responding to Meyer's (2014) call for future research in which "Instructors and designers...move beyond 'Does it work?' to why it works and when it does not work" (p. 99). First, this study provides an example of collaborative learning in an online setting, which could inform how it differs from classroom settings (Roberts, 2004). By doing so, it also expands common views of online learning (particularly asynchronous formats) as individualistic (McPherson & Bacow, 2015). Second, a goal of the study is to produce a design framework that will assist in designing future online collaborative learning activities. Design Frameworks tend to provide either a process or conceptual guidance to address certain ideas in instructional design. Sometimes they offer a mix of both (Lee & Jang, 2014). The starting point for this study is the E-Learning Engagement Design (ELED) framework, which provides an adaptable, wide perspective on incorporating collaborative learning into online course design (Czerkawski & Lyman, 2016). Third, this study enhances the field's understanding of teaching in online learning environments. Fourth, it adds to the research literature on student experiences in online education.

#### **Research Questions**

The purpose of this study is to research conditions for collaborative learning activities in online learning environments. The research questions are:

**RQ1**: What conditions do instructors create for students to engage in

collaborative learning activities?

RQ1.1: What is the instructors' rationale for such strategies? Why do they think that these are "collaborative learning" activities?RQ1.2: How do online learning technologies support or discourage the completion of these collaborative learning activities?

**RQ1.3:** How do instructors monitor and adapt conditions for collaborative learning activities?

**RQ2:** How do students engage in collaborative learning activities?

**RQ3:** What are students' perceptions of collaborative learning activities?

## **Theoretical Rationale**

Research on the broad construct of student engagement in online learning environments encompasses what to expect in studying collaborative learning. Meyer (2014) reviewed multiple theories of learning that have guided research on student engagement in online settings: the Community of Inquiry (COI) Model, constructivism, experiential learning, authentic, transformative, active learning, cognitive engagement, and transactional distance learning theories. Meyer concluded that all these theories are similar in how they emphasize student activity as central to online learning, as opposed to passive receipt of knowledge. Of these theories, the COI Model is the most researched theoretical framework for understanding online learning (Meyer, 2014).

The COI Model contains four elements that encapsulate important learning conditions for collaboration: Social Presence, Teaching Presence, Cognitive Presence, and Learning Presence (Garrison, 2009; Shea et al., 2012). Social presence is "the ability of participants to identify with

the community (e.g., course of study), communicate purposefully in a trusting environment, and develop inter-personal relationships by way of projecting their individual personalities" (Garrison, 2009). Teaching Presence is "the design, facilitation, and direction of cognitive and social processes for the purpose of realizing personally meaningful and educationally worthwhile learning outcomes" (Anderson et al., 2001, p. 5). Cognitive Presence is "the extent to which learners are able to construct and confirm meaning through sustained reflection and discourse" (Anderson et al., 2001, p. 5). Learning Presence is comprised of the "meta-cognitive, motivational, and behavioral traits and activities that are under the control of successful online learners and which past research indicates may be fostered in online environments" (Shea et al., 2012, p. 90). The instructor selects content, takes a lead role in setting the climate, and supports student discourse to establish each type of presence in the COI model. Instructor enactment of these practices, organizing and setting goals for collaborative learning activities, and the student and faculty perceptions of these activities (Williams & Sheridan, 2010) explain how collaborative learning can be designed and experienced in online learning environments.

#### **Research Design**

To answer the study's research questions, this dissertation adopts a design-based research (DBR) method (Barab & Squire, 2004; Brown, 1992; Cobb et al., 2003) that will examine the nature of collaborative learning activities. The DBR method has four main characteristics: (1) it produces theories of teaching and learning; (2) it takes place in naturalistic settings; (3) it is "interventionist," involving the researcher in design and adjustments of learning activities, and (4) it is iterative (Barab & Squire, 2004, pp. 2-3). In contrast to evaluation research or case studies, DBR incorporates design interventions, allowing the researcher to adjust conditions while they study learning to help generate theory. DBR requires a close look at context. DBR

"moves beyond simply observing and actually involves systematically engineering these contexts in ways that allow us to improve and generate evidence-based claims about learning" (Barab & Squire, 2004, p. 2). DBR shares many characteristics with case study designs, which are "both a process of inquiry about the case and the product of that inquiry" (Stake, 1995, p. 126), albeit with greater emphasis on intervention occurring over multiple, iterative stages to improve the design of teaching and learning activities while they are being researched (Barab & Squire, 2004).

By studying specific learning contexts, this study contributes to ideas about best practices for collaborative learning activities in other digital learning contexts (Anderson & Shattuck, 2012). The field of instructional design is theory-driven and draws on general principles for developing course content, instructional methods, and assessments. The utility of online learning technologies is most effectively judged by the purposes and contexts for which they are used. While a large-scale survey could collect data on *what* collaborative learning activities are common to online learning or student perceptions of them (Ku et al., 2013), a design-based research study gathers information about the *rationale* for collaborative learning activities and *how* they worked. Analogous to an *intrinsic case study* design (Stake, 1995), this dissertation contributes to a better understanding of a problem of practice—optimizing collaborative learning in digital learning environments—and approaches to resolving that problem.

An online course in a professional graduate program was selected for designing and researching collaborative learning. Graduate education in a professional field was an appropriate site for this research because students often participate in team-based learning involving use cases, research, or problem-based learning. I partnered with the instructor and their primary Learning Designer to select and plan collaborative learning activities. My primary role was a researcher-observer of the interactions between the instructor and lead Learning Designer. However, I also participated in course design when there was an opportunity to contribute without undermining the lead Learning Designer's oversight of the course development process. In Chapter 3, I elaborate on the nature of my positionality as a researcher and participant in the design process.

Data included observation notes from course design meetings, course materials, student assignment submissions, transcripts of recorded class-wide meetings, students' mid-semester course feedback, interviews with the instructor and lead learning designer, and surveys of students.

Qualitative data were imported into NVivo software for analysis. Each piece of data was classified according to type, module in the Learning Management System, and creator (e.g., Module 4 team 2 retrospective) (Saldaña, 2015). In addition to course submissions, I recorded and transcribed interviews using speech-to-text software to first create the transcripts, then rewatched the video files and edited the transcripts. I added my field notes to my NVivo project file for analysis. Student survey data were imported into Microsoft Excel for analysis. To maintain participant confidentiality, I redacted any identifying information and replaced actual names with pseudonyms.

Data analysis began while data were still being collected so that actionable feedback could be provided to the instructor, and the design of collaborative learning activities could be adjusted to meet learning goals. The DBR method differs from many other qualitative research methods in that it includes iterative cycles of learning design and collaboration between the researcher and instructor to modify learning activities throughout the duration of the project (Barab & Squire, 2004). One challenge of using the DBR method for the dissertation is the time it requires to complete iterative cycles of design and development (Herrington et al., 2007). This study was constrained to iterative cycles of course design and revision of multiple collaborative activities throughout the teaching of the course during one instructional period, rather than the typical cycle of a course taught during multiple academic terms and years (Barab et al., 2000). The instructor shared feedback with the researcher and lead Learning Designer about how the design of collaborative learning activities was being implemented and consulted with us about revisions to improve their use. At the end of the course, I provided technology recommendation to address an unresolved design issue. The results of the study were provided to the faculty to consider in making future revisions to the course.

#### Limitations of the Study

While DBR produces useful theory, it may be difficult to apply the anticipated design framework to other types of learning environments outside graduate programs, or even programs that are not in the social sciences. However, the study's results are intended to be generalizable to theory about teaching and learning in online environments (Eisenhardt & Graebner, 2007). Access to student learning interactions outside of the Learning Management System or classwide virtual meetings posed another limitation to this study by constraining the data available for analysis. Another limitation is that this study does not investigate the relationship between teaching and formal assessment of learning outcomes, which would strengthen claims about effective design principles. The purpose of this study is to study the link among course design, teaching practices, and collaborative student learning, but not the outcomes of collaborative learning. One other limitation is that this study focuses on collaborative learning activities but no other important features of online courses, such as the representations of course content, individual student course requirements, or accessibility for students with disabilities.

## **Overview of the Study**

This chapter provided a summary of the proposed research study. Chapter 2 reviews the research literature that supports the need for this proposed study and its design. Chapter 3 elaborates on the research design and why it is well-suited to provide data to answer the study's research questions. Chapter 4 presents research findings based on data analysis. Chapter 5 summarizes the findings and offers a discussion of them in relation to the study's theoretical rationale and relevant literature. Chapter 5 concludes with recommendations for policy, practice, and further research.

**Chapter 2: Literature Review** 

The results of a recent survey of chief online officers across a variety of institutions showed that online students, on average, spent half their time independently engaging with course materials and the other half interacting with faculty and other students (Garrett et al., 2019). Therefore, it is reasonable call online learning environments socialized learning communities where "knowledge emerges through the network of interactions and is distributed among humans and tools that interact" (Lowyck & Pöysä, 2001, p. 509). Face-to-face classrooms fit a similar description, but unique to online education is the challenge for online programs to scale up enrollments while maintaining a sense of personalization for students (Ossiannilsson et al., 2015). Additional challenges are that faculty sometimes transfer their course preparations from a face-to-face format to online without modification and that students are not always wellprepared or experienced in productive behaviors for learning online (Osborne et al., 2009). While there has been evidence that collaborative learning works in traditional classroom contexts and in graduate education (Caplow & Kardash, 1995; Terenzini et al., 2001), there remains a need for more, rich descriptive data of online instruction, particularly collaborative learning experiences (McPherson & Bacow, 2015; Osborne et al., 2009). To date, online student engagement at the individual level has received more attention in the literature than how students engage in small groups (Garrett et al., 2019).

This review of literature begins by defining the construct of collaborative learning in online learning environments and its documented benefits. Next, I review key findings from research on collaborative learning in online contexts, including insights into the faculty's role in mediating these kinds of activities, challenges they often encounter, and the role of online learning technologies. I then present the theoretical framework for this study's approach to researching the topic. I end with a discussion of design approaches to collaborative learning in online education and the main features of the DBR method.

#### **Defining Student Engagement and Collaborative Learning**

There are many different approaches to group learning, such as small-group learning, collaborative learning, cooperative learning, problem-based learning, team-based learning, peer instruction, peer tutoring, and team learning (Davidson & Major, 2014). One critique of the field is that definitions of these small-group based learning activities are slippery and inconsistent (Cherney et al., 2018). Returning to the broad construct of student engagement and theories of learning can help illuminate the differences among these terms and solidify their meaning. In an expansive review of this literature, Meyer (2014) curated the most commonly referenced theories and explanations for what works in online learning. Student engagement means involvement and activity in a course. Starting with the idea of three kinds of "interactions" in Moore (1989)—student-student, student-content, student-teacher interactions—scholars in this field soon discovered that this conceptualization was limited without consideration of pedagogy and the educational purpose of learning activities.

The instructor's role has been a defining factor for some distinctions between collaborative and cooperative learning, two common forms of group-based learning (Davidson & Major, 2014). Cooperative learning is typically viewed as division of labor with students working independently and the instructor heavily involved in providing guidance whereas the teacher is less involved and students more codependent in collaborative learning. It is more often practiced in the humanities and social sciences, while cooperative learning more common to the STEM fields. Collaborative learning's prevalence in these areas has resonates with philosophies of science that originated in the social sciences: it is rooted in interpretivist views of reality and constructivist views of knowledge creation (Bruffee, 1973, 1984). Its emphasis is not only on group work, but groups working together with the instructor to develop knowledge, shifting pedagogical authority in the learning environment (Davidson & Major, 2014).

Collaborative learning activities and discussions are the focus of the current study, but it does not exclude other specific types of group-based approaches. There are five attributes common to the small-group approaches, which are relevant to the research questions:

- 1. A common task or learning activity suitable for group work.
- 2. *Small-group interaction focused on the learning activity.*
- 3. Cooperative, mutually helpful behavior among students as they strive together to accomplish the learning task.
- 4. Individual accountability and responsibility.
- 5. Interdependence in working together (Davidson & Major, 2014, p. 29).

This study adhered to an inclusive definition of collaborative learning used by Cherney et al. (2018, p. 100) in their review of research on the topic: "...the interdependent contributions of group members toward a goal. Collaboration, in its present conceptualization, can involve either group discussions or group projects in online courses." The rationale for this inclusive definition

in a DBR study is also pragmatic based on two parallel observations by Meyer (2014):

- "No clear divisions among these learning approaches are necessary, so an instructor can creatively combine them in ways that increase student engagement in their online courses." (p. 46)
- 2. "So far, many of the studies investigate one method for producing student engagement, and therefore, the field of online learning needs more studies that compare methods of student engagement and clearly specify if differences for various students, learning goals, and disciplines exist. By studying multiple methods at the same time, instructors will gain a sense of which methods may work best in which situations." (p. 64)

This study adopted a holistic view of how instructors use multiple methods to create learning

conditions to support collaborative learning instead of narrowing on a single project or

discussion activity.

## **Benefits of Collaborative Learning**

Collaborative learning benefits students in many ways, particularly graduate students (McPherson & Bacow, 2015). To the extent that instructors do hand over control of the learning activity to students, collaborative learning empowers graduate students to engage in self-directed learning, which is essential to developing research skills and interdisciplinary knowledge. Students view these activities as relevant to their professional goals and helpful examples when job seeking after graduation (Jones, 2014). Evidence has shown that it increases emotional engagement, self-efficacy to complete tasks, and an appreciation for the subject matter. For faculty, it helps them meet course learning goals by supporting student motivation, which increases time on task and knowledge development, thinking skills, social skills, and course satisfaction (Chen et al., 2018; Lowyck & Pöysä, 2001).

Small group discussions generally provoke less anxiety in students than large group discussions, but one caveat is that students of differing social identities do not always experience this discussions equitably (Eddy et al., 2015). An implication of this research finding is that instructors should adapt collaborative learning experiences to be equitable for all students. Even though students sometimes appear self-sufficient in group learning activities, the instructor fulfills a crucial role in designing, monitoring, and assessing these activities. For the benefits of collaborative learning to be realized, planned interactions need to be integrated well into the course and integral to engagement and successful participation (Moallem, 2003).

## How Student Social Identities Mediate Collaborative Learning

Instructors may also consider the social diversity of the students in their course as the plan and enact equitable teaching strategies to be inclusive of all students (Artze-Vega & Delgado, 2019; Tanner, 2013). Age, race, gender, and nationality are some of the identity

characteristics that have been researched. Massive Open Online Courses (MOOCs) have provided large numbers in subgroups of students and experimental conditions for researchers to conduct quantitative analysis of discussion response patterns among students. One study found that fabricated postings by students with names representing a white male identity were nearly twice as likely to receive a response from an instructor as students from other social identity groups (Baker et al., 2018). Another study found that female students were the most likely to initiate interaction with other students (Bettinger et al., 2016). Like in-person and social network settings, there is evidence of homophily in student interactions in online discussions. For example, students of the same gender identity responding to each other more frequently than other students.

Facilitation of discussion among students of differing backgrounds is inherent in the routine instructional tasks involved in collaborative learning activities. Increases in student interaction are associated with better course grades for students (Bettinger et al., 2016), so it is necessary to promote participation among all students and to actively encourage interaction among students of diverse backgrounds, otherwise they will tend to interact with other students who are most similar to them. While entire case studies could be devoted to how specific social identities mediate online student collaboration, the research questions and methods of this study (Chapter 3) are not directed towards that type of investigation. However, it will be noted whether and how student diversity is incorporated into the design and implementation of collaborative learning experiences in the case.

### The Instructor's Role in Collaborative Learning

To understand the role of instructors in collaborative learning, a useful starting point is the literature on transitions from teaching a course face-to-face to online. In these situations, faculty often work with instructional designers to redesign the course and select learning technologies. If the online version is taught asynchronously, more adaptation is likely necessary than if it is mostly taught synchronously (Chiasson et al., 2015). Faculty must make explicit the instruction that they would typically provide in person. They may fear their role is becoming obsolete—that students can complete courses on their own provided the right information and learning technologies—but *teaching* is still required in online settings (Wingo et al., 2017). Meyer (2014) provides a useful test of rigor for instructors to consider when choosing collaborative learning activities:

...instructors should not choose active or collaborative learning solely because it engages; they also need to have a clear educational purpose for its use. If the analogy "interaction for interaction's sake" is applicable to engagement, instructors may need to pursue engagement, not for engagement's sake, but for the sake of student learning. In other words, engagement strategies need to fulfill an education goal that is tied to the course's learning objectives and is communicated to students. (p. 70)

If the collaborative learning activity or discussion is justified, then there are many instructional tasks that follow, beginning with communicating the learning goal to students. McLoughlin (2002) provides a useful organization of the teaching tasks required in creating collaborative learning environments (Table 1). Each task is described in more detail below.

*Orient students to collaborative learning*. Student must be informed of the educational purpose for collaborative learning activities to sustain motivation and "buy into" the interdependence of group work. It is also important to provide norms and expectations for communication, which is often provided in course orientations. If students are new to online learning, they need to be socialized into online learning communities more generally (Meyer, 2014). Students may prefer to work alone or have more freedom in choosing topics or approaches to their assignments. For some disciplines, students and faculty may encounter challenges to using constructivist approaches to an apparently objective discipline (e.g., nursing

in Holly et al., 2008). Orienting students to the activity or discussion and possibly to online learning entirely are part of the large investment in time and resources it takes to use group learning. Faculty often avoid these kinds of activities because it means not covering additional course content instead (Osborne et al., 2009). When instructors support social processes in online learning, social talk among students is not always necessary. There are mixed findings in this area (Meyer, 2014). Students may benefit from social talk at the beginning of a course, but not require it once the course is well underway or may have already built rapport in a cohort model with prior shared experiences.

### Table 1

Instructor Actions to Create a Collaborative Learning Environme
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Task	Actions
Orient students to collaborative learning	Students were informed about learning outcomes and social processes
Plan for cooperation	Instructor names groups, assigns roles, and provides resources
Create learning support	Define the task and provide scaffolding to ensure task completion
Monitor learning	Systematic observation and data collection on the interactions of groups
Evaluate collaboration	Group processes and learning outcomes are assessed
Allow self-assessment	Participants provide feedback on the task and experience

Note. Adapted from McLoughlin (2002).

*Plan for cooperation.* While there is no one size-fits-all approach, group size is important to the nature of the activity. Smaller groups lead to better participation rates and more in-depth posts (Chen et al., 2018). Selecting groups randomly is not always as effective as purposefully selecting groups based on student backgrounds and interests. Defining group roles adds structure to an activity may support student leadership within their groups (Cherney et al., 2018).

*Create learning support.* Provided enough structure and clear directions, students will succeed in meeting the learning goals for a collaborative learning activity (Faja, 2013). The challenge is that faculty and students often differ in their views of online learning experiences (Osborne et al., 2009), so they may differ in their views of what learning supports are necessary. In providing resources, there is a fine line instructors must walk between being involved—teaching, modeling or explaining content—and stepping back to allow students to self-direct their learning (Garrison & Cleveland-Innes, 2005; van Leeuwen & Janssen, 2019).

*Monitor learning*. In this literature, instructors are advised to systematically track on student engagement behaviors and interactive processes. The speed in which students initiate collaboration is important because these types of activities take time. *Social loafing* and *free riding* are two counterproductive group member behaviors, in which a student is mostly inactive while other members complete the work. *Social presence* can be achieved through interpersonal connections, based on visuals (e.g., video conferencing instead of text-only communication) or emotional expression (e.g., emoticons). Instructors should offer students feedback on their planning processes, strategies to approach their work, their relationships, or whether collaboration is working (van Leeuwen & Janssen, 2019). It is just as important for instructors to spend time preparing and scaffolding discussions as being active in them (Andresen, 2009).

*Evaluate collaboration and allow self-assessment*. Once group work is submitted, the opportunities for faculty to assess and for students reflect, self-assess, and provide feedback can be easily missed (Jones, 2014). Collaborative learning outcomes are challenging to assess fairly (Osborne et al., 2009), but criteria for group success can be articulated in accordance with the learning goals. There are widely available assessment rubrics for students to evaluate group

processes and their own participation. Lastly, student feedback can inform revisions of the collaborative task or discussion for the next use by the instructor.

## **Online Learning Technologies**

In their teaching, faculty must consider the interrelationships among technology, content and pedagogy (Koehler et al., 2013). Orienting students to the task matters more than the exact technology (Andresen, 2009), but faculty are concerned about student's technical skills to use learning technology effectively (Wingo et al., 2017), so the appropriate resources should be provided for students to learn how to use the technology. Technology affords learners opportunities to engage in joint tasks by facilitating communication, serving as a central location to share resources, co-create documents or other products of learning, monitor their learning, and find groups and communities to connect with (Jeong & Hmelo-Silver, 2016). Instructors continually orchestrate student engagement with technologies and resources, directing them towards a pedagogical purpose.

Instructors typically use a university's learning management system (e.g., Canvas, Blackboard) as the primary learning technology for students. LMSs typically contain three kinds of pages or resources: *procedural* (e.g., course management, like syllabus or calendar), *content* (e.g., readings), and *social* (e.g., discussions) (Henrie et al., 2015). In an online learning environment, LMS features are analogous to physical conditions. Koszalka and Ganesan (2004) list the common features of LMSs:

- 1. Tips: Tool for creating and displaying short suggestions for success
- 2. Online help: Information resources to provide course operation and navigation support
- 3. **Student presentation area:** Allows students to create a showcase of information about themselves or their individual course work
- 4. Grade books: Automates grading/feedback
- 5. **Content delivery space:** Posting/retrieving space for course content, resources, and instructions
- 6. Quizzing: Tools for testing recall and retention of courses information

- 7. Shared Group workspace: Tools to allow student groups to share team-based activity work
- 8. Email: One-to-one or one-to-many text-based electronic communication
- 9. **Discussion boards:** Public electronic forum for discussions with all participants or private groups
- 10. **Shared whiteboards:** Same-time (text/graphic) sharing of online material during social interchanges
- 11. Chat rooms: Same-time (live) text conversation among many
- 12. Audio/video conferencing: Same-time (live) audio and/or video-enhanced conversations

Each of these technological tools can be used to support collaborative learning, and some may be sites where collaborations are facilitated, and joint work products are produced. These LMS components are what course design must fit into. In themselves, they do not provide qualitative evidence of learning conditions that are supportive of collaborative learning.

Online discussions have been the bedrock of much research on online learning and student engagement. Computer-supported collaborative learning (CSCL) has emerged as a robust field, innovating discourse analysis techniques and advances in educational technology (Chen et al., 2018). Some key findings are that discussions tend to be better suited for conceptual discussion than problem solving (Andresen, 2009) and that early posters, the questions framed, and clear goals for the activity determine much of the activity's success (Zhu, 2006). CSCL goes beyond discussion boards, for example, with research on group awareness and visual representation tools intended to facilitate group processes and assessment (Chen et al., 2018; Witney & Smallbone, 2011). Some scholars have been critical of CSCL, however, claiming it is more of a pedagogical approach than a theoretical framework, offering tools and methods for research, but no unifying conceptualization of collaborative learning (Cherney et al., 2018). Next, I elaborate on the meaning of design frameworks and learning conditions in this case study to address these theoretical concerns. A strong theoretical basis for the study will provide a more robust analysis of learning technology use in the case.

#### **Design Frameworks & Learning Conditions**

Two essential dimensions of online learning, teaching, and design are the foundation for this case: learning conditions and design frameworks. This study is about both process and a set of design principles for online collaborative learning. Learning conditions are aspects of the learning environment that indicate possibilities and realizations for collaborative learning and coconstruction of knowledge. The next section presents the Community of Inquiry Framework to operationalize online learning conditions for collaborative learning. First, I describe the idea of design frameworks in more detail.

Design frameworks usually provide either a process or list of concepts to guide course development; sometimes they offer both (Lee & Jang, 2014). Conceptual tools present variables and theoretical or research-based relationships among them. Procedural tools provide discrete tasks and visualizations of a structure to follow. Historically, the nature of these models has evolved over time. Lee and Jang (2014) trace four generations of model types: (1) linear, behavioral models; (2) systems-oriented design; (3) iterative technology-based models; and (4) models rooted in constructivist learning. This evolution marks a shift from an emphasis on the instructor to self-regulatory behaviors of students and complex relationships among student, subject matter, instructor, and context (Lowyck & Pöysä, 2001; Schwab, 1983). While this study contributes to theories of learning and teaching, it does not start from a blank canvas for a design framework. Design frameworks serve as a tool for faculty members and designers to intentionally create learning conditions that support collaborative learning. This study adopts the E-Learning Engagement Design (ELED) Framework (Czerkawski & Lyman, 2016) as a starting point for creating collaborative learning experiences in the case.

### **Design Approaches to Online Collaborative Learning: The ELED Framework**

Synthesizing research on student engagement and online learning, Czerkawski and Lyman (2016) created the E-Learning Engagement Design (ELED) Framework (Figure 1) as a procedural tool to guide designers and instructors in the creation of online collaborative learning experiences. It is general and open-ended, making it flexible in its application to design projects.

## Figure 1





The advantages of the framework are that it provides a recommended order of design tasks for planning online learning experiences and it is an organizational scheme more than a fixed, rigid system. Some disadvantages are that it depends on research drawing on National Survey on Student Engagement data, which tends to be biased towards on-campus students but captures important features of online learning, including academic challenge, learning with peers, and experiences with faculty. There are no follow-up studies that provide empirical data to support or refute the framework. Research must not only document what happens in online collaborative learning, but also why their learning activities follow a certain design. The adage, "Interaction is not enough," (Garrison & Cleveland-Innes, 2005, p. 133) applies not only to student experiences, but also to pedagogy and instructional design. Design is defined as the "systematic choices and use of procedures, methods, prescriptions and devices in order to bring about effective, efficient and productive learning" (Lowyck & Pöysä, 2001, p. 507). Practical design includes consideration of cost, training requirements, and technical support (Meyer, 2014). Such design is demanding, and students often resist the workload involved in constructivist pedagogies, but research has documented that faculty value collaboration with other educational professionals in designing online courses that are student-centered (Meyer, 2014; Wingo et al., 2017).

Instructional design principles can provide a pathway to meet educational goals for collaborative learning activities or discussions. Brindley et al. (2009, pp. 10-11) offer ten specific instructional design principles to support group learning:

- 1. Transparent expectations
- 2. Clear instructions
- 3. Appropriateness of task for group work
- 4. Relevance to other contexts
- 5. Motivation for participation embedded in course design
- 6. Readiness of learners for group work
- 7. Timing of group formation
- 8. Respect for the autonomy of learners
- 9. Monitoring and feedback
- 10. Sufficient time for the task

Combined with the list of observable teaching actions from (McLoughlin, 2002), these

specific design principles, while not exhaustive, will enable this study to provide a rich description of online collaborative learning in accordance with the design-based research method. The distinction between teaching and design can be blurry. The combination of these two lists provides a more complete starting point for an analytical scheme to conduct a content

analysis of instructional materials. Chapter 3 (p. 47) provides an explanation of how this literature supports the methods of this study and how this combined list will be used for data analysis. The findings of this research offer a contribution to the field by confirming and possibly expanding this list.

Educational research and the field of instructional design provide design frameworks to plan robust collaborative learning experiences. The research literature also offers theory to explain the learning conditions that shape how these experiences turn out for students and the instructor. The next section presents the theoretical framework adopted in this case study for conceptualizing and operationalizing *learning conditions*.

## A Theoretical Approach to Studying Collaborative Learning Conditions

One of the intended contributions of this research study is to form "a clearer articulation of theory in this line of research would facilitate more focused knowledge building regarding online course groups" (Cherney et al., 2018, p. 112). Drawing on recommendations from collaborative learning practices and active learning in general, this study primarily draws on the Community of Inquiry (COI) Model, which defines four important, intersecting aspects of online learning environments (Figure 2): social, teaching, cognitive, and learning presence (Garrison, 2009; Garrison & Arbaugh, 2007; Shea et al., 2012).

*Teaching Presence* is "the design, facilitation, and direction of cognitive and social processes for the purpose of realizing personally meaningful and educationally worthwhile learning outcomes" (Anderson et al., 2001, p. 5). The COI Model operationalizes teaching presence as the design and organization of the course, active facilitation of learning, and direct instruction. In validating the COI survey instrument, Teaching Presence was the weakest factor in the Model (Arbaugh et al., 2008). One reason may be the narrow definition of Teaching

Presence—therefore, this study expands the definition by drawing on other literature on online learning reviewed in the previous section of this chapter (McLoughlin, 2002). A more nuanced definition of Teaching Presence will cast the net wider for data that can help answer the first research question, "What conditions do instructors create for students to engage in collaborative learning activities?"

## Figure 2

Proposed Community of Inquiry Model from Shea et al. (2012)



Suggestion for a Revised CoI Model

*Social Presence* is defined as the "ability of participants to identify with the community, ...communicate purposefully...and develop interpersonal relationships..." (Garrison, 2009, p. 352). Social presence has changed since the COI was first conceptualized. At first it was viewed as any kind of socialization among students, which usually started out as a way for them to get to know each other and then shifted to socially interacting mainly for the purpose of completing academic work. Socializing was later de-emphasized, and the latter, interacting around a learning purpose, came to define this aspect (Garrison, 2012; Meyer, 2014). Social Presence is operationalized as affective expression, open communication, and group cohesion (Arbaugh et

al., 2008). This part of the COI Model offers a high-level student view of social processes and interrelationships within an online course, and it is helpful to understanding student perceptions of collaborative learning activities (Research Question #3).

*Cognitive presence* is conceptualized in four stages of critical inquiry: Triggering Event, Exploration, Integration, and Resolution (Garrison et al., 2001). Students begin with a triggering event—an issue or intellectual problem to address—followed by a process of exploring that event. When students explore the event, they shift from an individual worldview to a social exchange of ideas about the topic. The third phase is integration, in which students collectively construct meaning from the exploratory phase. The fourth and final phase is resolution of the intellectual problem or issue, when students reach consensus or submit a group learning product. The pedagogical approach to a collaborative learning activity (e.g., selecting a structured debate versus leaving it an open-ended discussion) contributes to the level of cognitive presence achieved by students (Richardson & Ice, 2010).

*Learning Presence* is a later development in the model, proposed by a group of researchers separate from the scholars who originally conceived the COI Model. Using factor analysis, and the rationale that much of online learning is self-directed (Lowyck & Pöysä, 2001), Shea et al. (2012) propose learning presence is comprised of the "meta-cognitive, motivational, and behavioral traits and activities that are under the control of successful online learning and which past research indicates may be fostered in online environments" (p. 90). Learning Presence is operationalized as student forethought and planning, monitoring their learning, and using certain learning strategies. Learning Presence counterbalances the other factors in the model that focus on student *perceptions* by considering student learning *behaviors*. Although *Learning Presence* and similar proposed additional COI dimensions have been questioned by the
original developers of the model and lack comparable empirical support (Kozan & Caskurlu, 2018), the *Learning Presence* code scheme is likely to provide analysis to answer the second research question about how students are engaging in collaborative learning in this case.

Research on collaborative learning and the COI Model lacks evidence of how these approaches to online education affect learning outcomes because they offer a better description of learning processes than results (Castellanos-Reyes, 2020; Cherney et al., 2018; Meyer, 2014). The more advanced stages of cognitive presence in the COI Model themselves may be considered a desirable goal along with increased levels of student engagement in online courses using collaborative learning, but there remains a demand by stakeholders to see evidence of impacts on valued individual cognitive outcomes or educational achievements such as retention or completion (Boston et al., 2009). Experimental or quasi-experimental research could establish a stronger link between learning conditions and educational outcomes for students (Cherney et al., 2018), but the focus of this study is on the learning conditions themselves and how they are experienced by students.

#### **Design-Based Research Method**

In response to the call for in-depth qualitative research on online learning environments, this dissertation will adopt a design-based research (DBR) study method (Barab & Squire, 2004; Brown, 1992; Cobb et al., 2003) that will examine the nature of collaborative learning activities. The DBR method has four main characteristics: (1) it produces theories of teaching and learning; (2) it takes place in naturalistic settings; (3) it is "interventionist," involving some kind of design, and (4) it is iterative (Barab & Squire, 2004, pp. 2-3). In contrast to evaluation research or case studies, DBR incorporates design interventions, allowing the researcher to adjust conditions as they study learning to help generate theory. DBR requires a close look at context. DBR "moves beyond simply observing and actually involves systematically engineering these contexts in ways that allow us to improve and generate evidence-based claims about learning" (Barab & Squire, 2004, p. 2).

Amiel and Reeves (2008, p. 34) offer a framework for designing stages of DBR involving educational technology in contrast to predictive research:

- 1. Analysis of practical problems by researchers and practitioners in collaboration
- 2. Development of solutions informed by existing design principles and technological innovations
- 3. Iterative cycles of testing and refinement of solutions in practice
- 4. Reflection to produce "design principles" and enhance solution implementation

Coinciding with all stages is a continuous process of refining problems, solutions, methods, and design principles. This orientation towards the research and design is intended for flexibility and pragmatism. It was adopted in the researcher's collaboration with the instructor in designing the sample course for data. Design principles identified in this literature review served as a starting point for course design and will be analyzed in Chapter 4 and discussed in Chapter 5.

By studying a specific learning context, this study contributes to ideas about best practices for collaborative learning activities in other digital learning contexts (Anderson & Shattuck, 2012). The field of instructional design is theory-driven and draws on general principles for developing course content, instructional methods, and assessments. It is systemic and purposeful, like DBR (Wang & Hannafin, 2005). The utility of online learning technologies is most effectively judged by the purposes and contexts for which they are used. While a largescale survey could collect data on *what* collaborative learning activities are common to online learning, a case study gathers information about the *rationale* for collaborative learning activities and *how* they worked, "document[ing] and connect[ing] processes of enactment to outcomes of interest" (Design-Based Research Collective, 2003, p. 5). Lastly, DBR is especially useful for studying instructional technology, which is often intended to support specific types of learning activities (Herrington et al., 2007; Reeves et al., 2005).

## **Limitations to Design-Based Research**

Some limitations to DBR are that researchers struggle to balance logistics and details of methods with study conceptualization, the applicability and feasibility of interventions may be limited, and data collected may not be useful beyond the bounds of the specific research project (Wang & Hannafin, 2005). Dede (2004) presented a thorough critique of the limitations of DBR as an immature methodology, claiming that DBR studies are often "under-conceptualized and over-methodologized," wherein the research questions are answerable by common sense before collecting any data. These challenges remain today. Even when a DBR study is successful, it can be difficult to distinguish a design framework from conditions for its successful implementation. The conceptual distinction in this chapter between these two constructs is intended to keep the two separate. Reviewing a decade of DBR studies, scholars evaluated whether the method has lived up to its promise to advance learning theory, questioning whether rich descriptions offer enough compared to effect sizes or provide compelling evidence to guide future course development (Anderson & Shattuck, 2012; Cherney et al., 2018).

Despite its limitations, Design-Based Research is a suitable method for this investigation. A goal of this research is to provide a strong conceptual foundation for stating the research questions and developing methods to provide data to answer those questions. Learning conditions and a design framework are distinguished. Learning conditions are considered a set of constructs, including Teaching Presence, Social Presence, Cognitive Presence, and Learning Presence (Garrison et al., 2001; Shea et al., 2012). A design framework is "not…an instructional design model, but rather as a procedural framework that applies many of the common steps of instructional design models to the question of how to incorporate best practices for student engagement in online learning" (Czerkawski & Lyman, 2016, p. 533). Lastly, better understanding the processes of online teaching and learning can be a necessary step before staking validity in experimental research that produces effect sizes of collaborative learning "treatments."

## **Summary**

Student engagement has always been a popular topic in higher education research and policy and continues to be an object of inquiry in online education research. Through the medium of learning technologies, collaborative learning activities and discussions afford instructors the opportunity to engage students, moving beyond individual cognition to group learning. While many different approaches to group learning, collaborative learning broadly defined, with an emphasis on student agency in knowledge construction, deserves further empirical study. A systemic view of a learning environment and the multiple avenues of groupbased learning should guide new research in this area. Even as students are self-directed in much of their learning online, instructors still serve a vital role in setting up and monitoring group learning activities. Advances in learning technologies have made the teaching and student tasks involved in collaborative learning easier to complete.

An empirical study of teaching and learning in online contexts requires a twofold approach of theory and design. The benefits of collaborative learning are well-documented, and practical guides for teaching online are ubiquitous. However, the complex, time-intensive process of planning collaborative activities, and setting conditions for the overall learning environment, deserve further study. There is an opportunity to refine theory to guide future development of online learning experiences and establish stronger connections to valued learning outcomes. The DBR method is a systematic, practical approach to meet these research goals.

Chapter 3: Research Design

This chapter outlines the research methods and methodology that I adopted to answer my research questions. First, I restate my research questions and operationalize key constructs, then I describe the research design that answers those questions and the underlying research paradigm. Next, I describe my positionality as a researcher and designer, sampling procedures, data sources, and instruments. I conclude with an explanation of data collection procedures, methods, and the data analysis plan.

#### **Research Questions**

The purpose of this study was to identify conditions in an online course within a professional school of graduate education that impact collaborative learning activities and how students and instructors experienced them. It was not an investigation of cause-and-effect relationships between instruction and learning outcomes. The Community of Inquiry (COI) Model was used to conceptualize learning conditions. It includes four intersecting aspects of online learning environments: social, teaching, cognitive, and learning presence (Garrison, 2009; Garrison & Arbaugh, 2007; Shea et al., 2012). This was a case study of learning conditions and course design guided by the following research questions:

**RQ1:** What conditions do instructors create for students to engage in collaborative learning activities?

RQ1.1: What is the instructors' rationale for such strategies? Why do they think that these are "collaborative learning" activities?RQ1.2: How do online learning technologies support or discourage the completion of these collaborative learning activities?RQ1.3: How do instructors monitor and adapt conditions for collaborative

learning activities?

RQ2: How do students engage in collaborative learning activities?

RQ3: What are students' perceptions of collaborative learning activities?

Learning occurs individually in numerous ways, such as when students complete course readings, listen to instructor explanations, or complete individual assignments. In contrast to researching individual cognition in online courses, this study analyzed interactions among students and how an instructor prepared them to learn with and from one another in planned collaborative learning activities (RQ1). Learning environments are dense, complex social structures, so in studying conditions for learning, there were three sub-research questions for RQ1 to focus this inquiry in three key areas. For a comprehensive look at the design of collaborative learning activities, it is important to analyze the instructor's reasoning behind the design and use of collaborative learning activities (RQ1.1), the choice of learning technologies (RQ1.2), and how instructors monitor and adapt learning activities throughout their implementation (RQ1.3). To investigate only the instructor's intention for collaborative learning activities would fall short of providing a well-rounded view of how students participate in them (RQ2) and what they think of those activities (RQ3), including their reports of what they learned from their interactions and how the activities could be improved. Learning conditions often exist that learning theory suggests are productive, but not fully understood or documented in detail (Design-Based Research Collective, 2003). This research study partly fills a gap in knowledge about how collaborative learning occurs in online learning environments.

## **Key Constructs and Definitions**

The following constructs and terms are central to the research questions: *collaborative learning activities*, *learning conditions*, *collaborative learning pedagogy*, and *online learning technologies*.

- *Collaborative learning activities*: Learning experiences that require students to work in small groups towards a common goal with the instructor acting in a facilitator role. Students are interdependent and must cooperate and meet individual responsibilities to carry out learning tasks (Davidson & Major, 2014; Jones, 2014)
- *Learning conditions*: The teaching, social, cognitive, and self-regulatory learning behaviors of teachers and students.
- *Collaborative learning pedagogy*: The instructor's design and rationale for collaborative learning activities and the instructor's implementation or modification of these activities during the course.
- *Online learning technologies*: The Learning Management System, apps, platforms, or other electronic resources used for the creation, organization, process, or evaluation of collaborative learning activities.

# **Research Design**

This study used the design-based research (DBR) study method, an approach to formative research that implements a learning design in a naturalistic setting and allows for iterative development to improve its use (Collins et al., 2004). Data were collected to evaluate the design and inform theory development (Barab & Squire, 2004; Brown, 1992; Cobb et al., 2003). To select a learning design, a learning designer at the research site partnered with the course instructor to analyze the "practical problem" of designing collaborative learning experiences in an online course and develop activities and discussions according to existing design principles and learning technologies available (Amiel & Reeves, 2008). Brindley et al.'s (2009) design principles and McLoughlin's (2002) teaching actions (pp. 17, 23) were shared with the instructor and learning designer as a starting point for design of collaborative learning activities. As the

basis for content analysis, they will be discussed in Chapter 5 based on research findings (Chapter 4). The DBR method requires study of design implementation, which is never fully anticipated, to compare design intentions with real world use (Collins et al., 2004). The primary outcome of this research was a new perspective on a theory-driven design framework for online collaborative learning (Czerkawski & Lyman, 2016).

DBR shares some key principles with the Participatory Action Research (PAR) method but differs in a few ways (Fishman et al., 2013). PAR follows a general pattern of reflection and community engagement to generate collective action to improve processes and intergroup relations, with particular attention to power dynamics between researcher and participants (Baum et al., 2006). While DBR also encourages active partnership and knowledge co-construction among researchers and participants, the purpose of this study was to generate knowledge about design thinking for online collaborative learning activities, rather than improving the design process at the site of this case study. In this case, the research questions and methods were predetermined by the researcher instead of jointly created with the participants.

One of DBR's key principles is the iterative nature of the design of the educational intervention, with each iteration occurring by semester (Barab et al., 2000), which is not to say modifications are disallowed while the course is taught by the instructor. While it is a challenge to align the DBR method with the timeline for a dissertation, it is still feasible (Herrington et al., 2007). The scope of this study was constrained to the first iteration of an online course, including the design and implementation phases. Results could inform the re-design of the course for the future, but data collection concluded before the course was taught a second time. This narrow scope was a limitation of the study.

# **Research Paradigm**

The research paradigm underlying this study was aligned with the DBR method. A research paradigm presents the researcher's view of the world and what it means to produce new knowledge through inquiry. Its major elements are ontology (the nature of reality), epistemology (the nature of knowing), and axiology (a philosophical approach to values) (Guba & Lincoln, 1994; Toma, 2006).

I took an interpretivist approach to research, in contrast to positivist, critical theory, or deconstructivist approaches identified by Lather (2006). The interpretivist research paradigm consists of an ontology that reality is subjective and constructed, and that there is no one objective truth to be discovered through research. Instead, realities are locally constructed (Guba & Lincoln, 1994). In contrast with predicting outcomes, the goal of interpretivist research is to increase understanding of the research topic.

Researchers continually face the epistemological question, "How do I know what I know?" In the interpretivist paradigm, the researcher and the participants are "interactively linked" with the findings mediated by the researcher's values, or axiology (Guba & Lincoln, 1994, p. 63). Using the analogies of a community picnic and group problem-solving board games, Lather (2006) characterizes interpretivist research as cooperative and interactive, with decisions relying on exchanges among researchers and participants in the research. This characteristic aligned with the iterative, collaborative relationship between the researcher, learning designer, and instructor, and I depended on their perspectives to inform my findings. This approach mandated the use of dialogue through interview protocols instead of reliance on silent observations of collaborative learning activities (Guba & Lincoln, 1994).

All three elements—ontology, epistemology, and axiology—are interconnected. As Guba and Lincoln (1994) stated, "what can be known is inextricably intertwined with the interaction between a *particular* investigator and a *particular* object or group" (p. 63). As a researcher, I value both the utility of the findings for others (i.e., the reason for producing a design framework as one outcome of this study) and the "interpretive validity" of the findings, in an attempt to provide "conceptual completeness" to collaborative learning in online graduate programs (Toma, 2006, p. 10). When learning technologies are an integral part of a research study, it is important to consider the values underlying the selection and use of those tools and processes (Amiel & Reeves, 2008).

## **Researcher Positionality and Design Purview**

My research paradigm directed how I positioned myself in the dual role of researcher and learning designer in this case. The data I gathered were co-generated by the instructor, learning designer, and I. As the researcher, I depended on the instructor and learning designer to be transparent with their decision making, providing rationales for their design choices and expectations for how students would experience collaborative learning activities in the course. I could not be the sole learning designer assigned to the course because of the conflict of interest that would have arisen from attempting to fulfill my compensated job responsibilities as an employee of the research site and collect data to meet dissertation requirements to attain a doctoral degree at the same institution. At the same time, I had to use a case from my professional context to gain access to a case of course design and implementation and all its data. The instructor would also have been skeptical of my credibility if I were the only learning designer on the course. The instructor would likely have found it difficult to trust that my recommendations were in the best interest of the course and not my dissertation. My primary role was to elicit design thinking from the instructor and learning designer during their collaboration through meetings, emails, and other asynchronous interactions, such as comments and edits in shared documentation. I directly elicited thinking through interviews with the instructor and learning designer. I also asked questions in meetings to prompt them to elaborate on their design choices. My secondary role as a learning designer was to make recommendations for collaborative learning experiences based on best practices and experience. Mostly, I deferred to the assigned learning designer who led those conversations and would sometimes invite me to contribute when it was appropriate and beneficial to the project.

As a person who identifies as a cis, heterosexual white male, I recognize the complexities of my social identity and its bearing on the research process. Voices of individuals with similar identities have outweighed researchers and participants from marginalized identities (Milner IV, 2007). To counteract the potential danger of Whiteness to overlook color, this study will be neither color- nor culture-blind to students, the instructor, or the learning designer (Chapter 2 briefly discusses the importance of acknowledging the interplay of social identities and teaching and learning in online spaces). My disclosure of reflexivity is not intended to assert my claims are more truthful or that I have transcended pitfalls of my positionality (Pillow, 2003). Instead, I adopt an *interruptive reflexivity* that invites interrogation of mini-truths within the case study findings, and offers multiple interpretations to prevent sole privilege of my own perspective (Pillow, 2003). Procedures to enhance the credibility of this research study, discussed later in this chapter, involved input from research participants and outside peer review to include multiple perspectives in the final research findings.

In summary, my role for the first phase of the research was to document the design stage of the course by observing, asking questions, and possibly contributing design ideas. In the

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second stage, while the course was being taught, I worked with the instructor to gather student survey data and share results of ongoing analysis for their consideration to make modifications to the course. Finally, I collected some retrospective data from the instructor shortly after the course ended.

# **Case Selection**

# **Sampling Method**

This study used a purposive sampling method to identify a faculty member, learning designer, and online course design project appropriate to the research purpose and methods. In contrast to convenience sampling, the researcher made a sound judgment of participant characteristics, knowledge, and experience that signal potential for an information-rich case study (Etikan et al., 2016). The success of data collection depended on trust among the design team and a willingness to invest time and resources in collaborative learning experiences. The instructor had to show willingness to jointly design collaborative learning experiences with the learning designer. The learning designer also had to be willing for a colleague to closely observe their work and bear some influence on project outcomes. Demographic information about faculty and the course roster of students were gathered for contextual information about the case.

I worked with the Director of Learning Design at the research site to identify potential projects in which the instructor and learning designer would be amenable to participation in this research and my involvement as a researcher and learning designer. The course was at the graduate level in a school of education and required regular collaborative learning activities among students. The research site's school of education had a wide range of online courses and programs in development for the first time from which to choose.

Although sample selection was driven by the permission and openness of the instructor and learning designer, the course also met certain sample selection criteria. An online course was selected to provide an information rich case to represent the variety of collaborative learning activities that students experience in a program (Patton, 1990). The course was selected using the following criteria:

- The course required planned, frequent collaborative learning activities as outlined in the course site on the LMS and/or in the syllabus.
- The instructor was either creating new collaborative learning activities or making significant changes to previously used ones.
- Collaborative learning activities required the use of computer-supported learning technology.

Synchronous sessions are often a place where instructors incorporate collaborative learning activities. Whether the online course was fully asynchronous or bichronous (Martin et al., 2023) was not a factor in case selection, but transcripts of class-wide meetings were collected for data analysis. As Chapter 2 delineated, this study adopted an expansive definition of collaborative learning to provide a well-rounded perspective of collaborative learning experiences distributed across the entirety of a course.

## Rationale

In research on collaborative learning in online education, studies using samples from graduate education have most often focused on examples from schools of education and convenience samples in courses within programs on Instructional Design (Cherney et al., 2018). One advantage of sampling from this population is that faculty in schools of education are familiar with the language and culture of instructional design, which is beneficial to a study that depends on rich descriptions of design thinking. Instructors familiar with learning theories have reasoning and language available to describe and justify their plans for collaborative learning activities. Graduate online courses are a suitable site for studying collaborative learning because graduate students often participate in group-based assignments or participate on teams in their professional roles (Caplow & Kardash, 1995; Jones, 2014). Most professional environments require collaboration among employees fulfilling complementary roles, so these experiences are directly tied to post-graduation outcomes. Student collaboration is also an important element in the nationally-referenced Open SUNY Course Quality Review Rubric (OSCQR), specifically in Standard #42: "Course offers opportunities for learner to learner interaction and constructive collaboration" (Open SUNY and Online Learning Consortium, 2017). Lastly, collaborative learning may be a design principle in online program design (Moallem, 2003), so it is important to understand how courses can embody this design principle.

# **Data Sources and Preparation for Analysis**

Data included observation notes from course design meetings, course materials (e.g., screenshots of LMS content), student assignment submissions, transcripts of recorded class-wide meetings and researcher field notes pertaining to them, students' mid-semester course feedback, interviews with the instructor and lead learning designer, and surveys of students. Meeting room chats from synchronous class meetings were also recorded for analysis. The next section in this chapter describes data gathering procedures and the analysis plan in more detail.

The focus of this case study was on collaborative learning aspects of courses—not individual learning activities or other instructional tasks involved in teaching online. However, collaborative learning experiences are shaped by student experiences in other parts of the course. For example, grading policies on participation in the course may influence student approaches to both collaborative and individual learning tasks. Therefore, the study's approach to data analysis was inclusive of evidence relevant to the design and experience of collaborative learning even if it fell outside of pre-designed collaborative learning activities. One caveat is that I did not have access to all student interactions. Most student collaboration that occurred outside the LMS or synchronous class meetings were inaccessible because my presence without the instructor would have been disruptive and prohibitive to their internal group processes. A single breakout session in a virtual class meeting was observed and transcribed, but it would have been burdensome and intrusive on students to record all breakout sessions.

I recorded and transcribed interviews with the instructor and learning designer using speech-to-text software to first create the transcripts, then listen to the audio files and edit the transcripts to improve accuracy. Synchronous class meetings were recorded and transcribed with speech-to-text software. I used the video recording to ensure consistency in de-identifying and re-labeling students with their preferred or assigned pseudonym and so on to identify the speaker, and I redacted any identifying information about students in the text. I did not include student speech or assignment submissions in the analysis if they did not consent to participation in the study. Video and audio files of class-wide meetings were not stored by the researcher after the research process was completed to protect student confidentiality.

Qualitative data were imported into NVivo software for analysis. Each piece of data was classified according to type, module in the Learning Management System, and creator (e.g., Module 4 team 2 retrospective) (Saldaña, 2015). Student survey data were imported into Microsoft Excel for analysis. To prepare files for Social Network Analysis, transcripts of classwide meetings and asynchronous discussions were coded for relation, directionality, and degree to analyze dialogic ties among the instructor and students (Wagner & González-Howard, 2018; the Social Network Analysis method is described in the next section).

#### **Data Gathering Procedures and Analysis Plan**

This section explains the content analysis, discourse analysis, survey, observation, and interview methods that were implemented to gather data. Data were collected from the start of the course design phase through the first semester it was taught and concluded shortly thereafter with a final instructor interview. Table 2 (p. 47) shows the alignment among each method and research question. Three primary outcomes of this research were (1) contribution to theory about learning conditions for collaborative learning online, (2) design framework that offers a process and conceptualization of designing online collaborative learning activities, and (3) a design narrative that provides a historical account of design thinking and decisions (Appendix G).

Before discussing each method in detail, I present the overall data analysis plan. I began analysis by completing *structural coding*, identifying sections of the data corpus that aligned with my research questions: collaborative learning design (RQ1), observed student experience (RQ2), and student perspectives on collaborative learning in the course (Saldaña, 2015). These sections ranged from phrases to entire sentences and paragraphs, or even full assignment pages from the LMS. Sometimes codes for students *doing* collaborative learning and *reflecting* on it overlapped when their perspectives included descriptions of actions they were taking to engage in that collaboration. In some cases, comments from the instructor about students' views on their learning in the course were also coded for student perspectives on collaborative learning when the instructor referred to feedback they heard from students. In this first stage of reviewing the data corpus in NVivo, I applied other initial descriptive and analytical codes, such as recurring instructor metaphors for learning design in the course. I also wrote analytic memos to "reflect on and write about emergent patterns, categories, themes, concepts, and assertions" (Saldaña, 2015, p. 48)

In my second stage of coding, I used an *eclectic coding* method. First, I applied *provisional* and *process coding* (Saldaña, 2015) based on a codebook that combined schemes from the literature and what is known about design and facilitation of collaborative learning (Brindley et al., 2009; McLoughlin, 2002; Shea et al., 2012), but also taking note of other things that the instructor was doing to facilitate collaborative learning activities. After preliminary analysis, two additional coding methods were applied to review again the entire data corpus, which will be discussed in Chapter 4.

My selection of themes was guided by the crystallization of data among different sources, particularly where course content, communications, my field notes, surveys, and interviews were aligned. In Chapter 5, themes derived from data analysis are contrasted with the COI Model (Garrison & Arbaugh, 2007; Shea et al., 2012) to inform a theory of online collaborative learning design and activity that may be generalizable to other contexts (Eisenhardt & Graebner, 2007). Stake (1995) referred to this type of generalization as a *petite generalization*. Table 3 (p. 48) shows the alignment of methods with each construct from the COI Model to contribute to theory about learning conditions for collaboration. In Chapter 5, I also discuss the implications of my findings for a design framework for collaborative learning activities in graduate education (Lee & Jang, 2014). I also constructed a design narrative (Appendix G) that offers an account of the sequence of events representing the evolution of the design over time (Hoadley, 2002; Joseph, 2004).

# **Content Analysis**

Content analysis is "a research method for the subjective interpretation of the content of text data through the systematic classification process of coding and identifying themes or patterns" (Hsieh & Shannon, 2005, p. 1278). Content analysis provided evidence of each

learning condition in a majority-asynchronous online learning environment. A *directed* content analysis method (Hsieh & Shannon, 2005) was used to code for key design features and teaching actions associated with online collaborative learning from the literature in the context of this case (Brindley et al., 2009; McLoughlin, 2002). Concepts, metaphors, and processes were considered in second-cycle coding to complement these provisional codes (Saldaña, 2015).

**Instructor's Design of Collaborative Learning.** I applied a content analysis method to understand course design and the conditions the instructor set for collaborative learning (RQ1 and sub-questions 1-3). Course materials, such as the syllabus, assignment directions, and instructor communications were analyzed for the organization and goals of collaborative learning activities. Following the DBR method, the learning designer and instructor jointly selected a design for the collaborative learning activities. Aligned with design principles and teaching tasks identified by Brindley et al. (2009) and McLoughlin (2002), course materials were analyzed for their stated goals, directions, appropriateness for group work, prescribed roles, and relevance to other contexts. Content analysis of course materials and instructor communication provided insight into *Teaching Presence* from the COI Model of Inquiry (Anderson et al., 2001).

**Student Collaboration.** Collaborative exchanges among students were recorded, transcribed, and analyzed for their content and evidence of self-regulatory learning behaviors. There are many content analysis coding schemes available from the computer-supported collaborative learning literature (CSCL) (De Wever et al., 2006). A representative coding scheme was provided by Gunawardena et al. (1997) in their study of online debate activities.

# Table 2

# Alignment Among Research Methods and Research Questions

<b>Research Question</b>	Content Analysis	Discourse Analysis	Interview	Survey	Observation	Learning Analytics
1: What conditions do instructors create for students to engage in collaborative learning activities?	Х		Х	Х	Х	
<b>1.1:</b> What is the instructors' rationale for such strategies? Why do they think that these are "collaborative learning" activities?	Х		Х			
<b>1.2:</b> How do online learning technologies support or discourage the completion of these collaborative learning activities?	Х		Х		Х	Х
<b>1.3:</b> How do instructors monitor and adapt conditions for collaborative learning activities?	Х	Х	Х		Х	
<b>2:</b> How do students engage in collaborative learning activities?	Х	Х			Х	Х
<b>3:</b> What are students' perceptions of collaborative learning activities?				Х		

This scheme is organized into five phases of knowledge construction:

- 1. Sharing/Comparing of Information
- 2. The Discovery and Exploration of Dissonance or Inconsistency Among Ideas, Concepts, or Statements
- 3. Negotiation of Meaning/Co-Construction of Knowledge
- 4. Testing and Modification of Proposed Synthesis or Co-Construction
- 5. Agreement Statement(s)/Applications of Newly-Constructed Meaning

These phases chart where students begin and end in a discussion as an episode of collaborative learning (RQ2). For more detail, the codes within each phase are listed in Appendix A. This framework responds to previous teacher-centered frameworks with a student-centered approach, focuses on interaction and the overall pattern of collaboration, and is straightforward and adaptable (Lally, 2000; Marra et al., 2004).

The coding scheme proposed by Shea et al. (2012) was also used to analyze transcripts of student interactions and support a comparison of results with the other dimensions in the COI Model as part of the discussion of findings for Research Question #2. Codes and categories derived from the Gunawardena et al. (1997) framework were compared to the Cognitive Presence and Learning Presence dimensions of the COI Model (Garrison et al., 2001) so that COI survey results could be triangulated with content analysis methods. Learning Presence codes (Appendix B) capture observable metacognitive learning behaviors while the Gunawardena et al. (1997) framework targets the observable cognitive behaviors of students. These schemes are directly relevant to Cognitive and Learning Presence, but their relation to Social Presence is conceptually unclear and were investigated during analysis.

# **Discourse Analysis**

In addition to the content analysis method, discourse analysis was applied to understand patterns in student engagement with collaborative learning activities (RQ2). Social Network Analysis (SNA) was considered to map patterns of student participation in collaboration,

# Table 3

# Alignment Among Research Methods and Learning Conditions

Learning Condition	Definition	Content Analysis	Discourse Analysis	Interview	Survey	Observation	Learning Analytics
Teaching Presence	Design, facilitation, and direction of cognitive and social processes to achieve learning outcomes	Х	Х	Х	Х	Х	
Social Presence	Identification with the community and communicating purposefully to develop interpersonal relationships	Х	Х		Х	Х	
Cognitive Presence	Critical thinking and practical inquiry in four stages: Triggering Event, Exploration, Integration, and Resolution	Х			Х	Х	
Learning Presence	Meta-cognitive, motivational, and behavioral traits and activities that are under the control of successful online learners	Х				Х	Х

for example, who participates in the process at which rates (Wagner & González-Howard, 2018). SNA is appropriate to analyzing student discourse because of its theoretical ties to social interaction and offers a different type of data*: relational data*, which complements the categorical learning strategies in the Learning Presence framework: Forethought and Planning, Monitoring, and Strategy Use (Shea et al., 2012) and learning behaviors in Gunawardena et al. (1997).

Relational data provided insight into the roles that the instructor and students enacted in collaborative learning activities: "These network connections become denser and interconnected when group collaboration is dynamic and opportunistic, rather than fixed, or when the instructor participates with the group" (Cherney et al., 2018, p. 107). A speaker's turn and directionality form a *dialogic tie*. Dialogic ties can be summarized across a conversation and analyzed for the *degree* or frequency of the tie in the discourse network, revealing who is most active in the collaboration and the degree of reciprocity among speakers. Data may then be tabulated in an adjacency matrix to display dialogic ties among the whole group or "network." The network could then be analyzed for the position of speakers, such as (RQ1.3) the role of the instructor as a facilitator or when the instructor is dominating discussion (Shea et al., 2010); or (RQ2) when students are in a good position to exchange ideas meaningfully (Zhu, 2006). SNA results inform discussion of theory about Teaching and Social Presence (Chapter 5).

# Interviews

In addition to content and discourse analysis methods, the instructor was interviewed about their design and rationale for collaborative learning activities in their online course (RQ1 and sub-questions 1-3). The instructor was interviewed at three time points:

- The <u>beginning</u> of the design phase to gather their perspective on collaborative learning in their teaching practice.
- 2. The <u>end</u> of the course design phase to provide a retrospective viewpoint on decisions made during design of the course.
- <u>After</u> the course has been taught to evaluate how collaborative learning activities went during their course.

Interviewing at these points in time revealed any changes in the instructor's thinking about using collaborative learning activities over time. These points also align with the commonly used instructional design model, ADDIE: analysis, design, development, implementation, and evaluation (Shelton & Saltsman, 2006). Instructor interview questions are listed in Appendix C and align with the organization of teaching tasks related to creating collaborative learning environments provided by (McLoughlin, 2002) as cited in Chapter 2 (see Table 1). Results were most relevant to the Teaching Presence dimension of the COI model.

In addition, the lead Learning Designer was interviewed because their approach to collaborative learning influenced the resulting course design. As co-creators of online learning experiences, the Designer provided evidence that will help answer Research Question #1 and its sub-questions. The faculty member and course were the primary focus of this study; the Learning Designer provided important context and background for understanding the design of collaborative learning activities in this case and was a key player in the Design Narrative (Appendix G). Learning Designer interview questions are listed in Appendix D.

# Surveys

Student surveys were administered to gather data about learning conditions and student perceptions of collaborative learning experiences (Arbaugh et al., 2008; Ku et al., 2013). Student

perceptions of the learning environment (RQ3) were assessed by the COI Instrument (Appendix E) at the end of the course. The survey consists of 34 items that provide a measure of three scales: Teaching Presence, Social Presence, and Cognitive Presence. Reliabilities for each of these scales has been established above 0.90 (Cronbach's alpha; Arbaugh et al., 2008). These data on Social and Cognitive Presence complemented findings from the discourse and content analysis of student collaboration. Data related to Teaching Presence provided another perspective to complement findings from the instructor interview, observations of instruction, and content analysis of course materials and communications. Students responded using a 5-point Likert scale ranging from "Strongly Disagree" to "Strongly Agree."

Students were also surveyed at the end of the course on their experiences in these collaborative learning activities by completing a perception survey from Ku et al. (2013). This survey contains questions in three categories: Team Dynamics, Team Acquaintance, and Instructor Support (Appendix F). Students responded using a 5-point Likert scale ranging from "Strongly Disagree" to "Strongly Agree." In addition, student reflections on their experiences in a collaborative learning-based team project, collected multiple times throughout the course, provided data about their perceptions. They also submitted an end-of-course reflection about their learning in the course. From the perception survey, Team Dynamics was compared to Cognitive Presence (COI Survey) and Learning Presence (Content Analysis) results; Team Acquaintance was compared to survey, content and discourse analysis results for Social Presence. Instructor Support was compared to Teaching Presence survey, interview, discourse, and content analysis findings.

To align with a qualitative case study methodology, survey data were analyzed like codes of transcript data for the presence of difference dimensions of the COI model (i.e., Teaching, Social, and Cognitive Presence) and Team Dynamics, Team Acquaintance, and Instructor Support from the Student Perceptions survey. Based on Likert scale responses, percentage of respondents agreeing or strongly agreeing with each statement indicated the presence of an overall category, granted most statements show strong agreement within that category. The unit of analysis was learning conditions within the learning environment, and the two survey measures target class- or group-wide variables, so only an aggregate analysis of responses was completed. "Lumping" Likert response data into two categories was methodologically sounder than treating the scale as continuous, equally spaced points on a spectrum of agreement (Gardner & Martin, 2007).

## **Observations and Field Notes**

Researcher observations and field notes from design meetings and class-wide synchronous meetings provided confirmatory evidence for findings from these four methods (i.e., content analysis, discourse analysis, interviews, and surveys) to answer research questions about the learning conditions (RQ1), learning technologies (RQ1.2), instructor modification of activities (RQ1.3), and student engagement in collaborative learning (RQ2). Observations provided thick descriptions and a rich understanding of the case's context (Geertz, 1973).

Transcripts from synchronous class meetings were used for content and social network analysis, but I also attended class-wide meetings to record field notes that informed analytic memos during the coding process and interpretation of findings. Design meetings were not recorded nor transcribed because much of the meeting content was irrelevant to the research topic and recording these meetings would have presented a formality that would discourage the creative design process.

# **Learning Analytics**

Learning analytics were reviewed to determine if they could provide supplementary data on student behavior in collaborative learning (RQ2) or possibly the benefits or hindrances of the learning technologies (RQ1.2), particularly the LMS platform. Learning analytics were considered for insight into student behaviors in addition to observations and to complement measures of student perceptions from surveys.

## **Research Pilot**

To improve the interview protocols, I collected feedback from an instructor and a learning designer from an institution of higher education different than the research site. I asked them about the clarity of the questions and suggestions for additional questions. I incorporated their feedback before using the protocols with the learning designers and instructor in the case. Student surveys were derived from reliable, valid research instruments (Arbaugh et al., 2008; Ku et al., 2013) and were not piloted. Observations and learning analytics were supplementary to these other methods and were not piloted.

#### **Trustworthiness and Design-Based Research**

The involvement of the researcher in the design, selection of evidence, and observations entailed in DBR presents a challenge to the trustworthiness of its resultant claims about theory and phenomena (Barab & Squire, 2004). This challenge is no different from many other forms of qualitative research, which recognizes the research as an instrument of data collection (Anderson & Shattuck, 2012; Pezalla et al., 2012). DBR encourages the active intervention of the researcher as a method of examining theoretical issues and exploring learning (Barab & Squire, 2004).

As a starting point, Barab and Squire (2004) point to consequential validity (Messick, 1995), i.e., the effect of the design on the local context, or its usefulness, as a credit to its

trustworthiness. However, they argue the researcher must speak to theory beyond the local context as well. Replicability is unlikely because of how unique sociocultural contexts are, but this can be addressed with better descriptions of the research as addendum to the formal research report, such as the use of design narratives that describe the evolution of a design over time (Hoadley, 2002). The challenge to using this historical method is to balance complexity of critical events with the global relevance of what they could mean for other contexts (Barab & Squire, 2004).

This case study adopted the following methods from Lincoln and Guba (1986, p. 77) and Onwuegbuzie and Leech (2007, pp. 239-246) to address concerns about credibility and research validity and to bolster theoretical claims:

- *Prolonged engagement* with the primary participant, the instructor of record, to establish salient features of the case and adequately represent their "voice"
- *Persistent observation* of those developing salient features to add depth to the analysis
- *Triangulation* among different methods and sources of data (Onwuegbuzie & Leech, 2007)
- Peer debriefing sharing findings with a disinterested colleague to develop working hypotheses
- *Member checks* sharing research findings with participants, the instructor and learning designer, to assess the merit of my reconstructions of design events
- Weighting evidence based on the quality of data

There are many more strategies to address trustworthiness, but these were the most appropriate to the research topic and project resources. Altogether, these steps improved the credibility of the case study's research findings.

# Formats for Reporting the Data

Results are organized in Chapter 4 by each of the major research questions:

**RQ1**: What conditions do instructors create for students to engage in collaborative learning activities?

RQ2: How do students engage in collaborative learning activities?

**RQ3:** What are students' perceptions of collaborative learning activities? Embedded in the results are several areas important to address in design experiment reporting (Collins et al., 2004). In Chapter 4, the goals and design features for collaborative learning in the case are described, along with the educational setting where the design was implemented. Each phase of design is summarized. Chapter 4 also reports the outcomes of the design in terms of learning conditions and observable student engagement with collaborative learning activities. Codes, categories, and themes will be woven into the presentation of findings in Chapter 4. Survey results are summarized in terms of collective student agreement with survey categories. Observation data is not summarized because its primary utility was to write analytic memos to support coding and theorizing. Instead, it is interweaved in the reporting of results from other data analyses. **Chapter 4: Findings** 

Chapter 4 begins with a detailed description of the course design as the case: its context in the larger graduate program and university; the timeline for its design and launch; the design processes used by the faculty and learning design team; and the final structure of the course. I provide a summary of data collected throughout my prolonged engagement with the course design and launch. The remaining sections of the chapter discuss findings related to each research question. Each section begins with a summary of analytical methods that informed each finding. In some cases, these summaries explain new analytical approaches that were added based on preliminary findings to further explore the data. Discussion of these findings and their implications for theory, research, and practice are presented in Chapter 5.

#### The Case

## **Research Site, Program, and Course**

This study used a purposive sampling method to identify a faculty member, learning designer, and online course design project aligned with the research purpose and methods. The research site was a private Research I university in the Northeast. It enrolled over 2,500 graduate students in the 2021-22 academic year. The university was founded by a religious order that emphasizes whole-person formation and improving the human condition through education. At the time of the study, I was employed as a Learning Designer in a university-wide group ("Center") that consulted with faculty on creating or innovating digital learning experiences.

I chose to sample a course from an online graduate program in the school of education because of the probability that collaborative learning would be integral to the course and the likelihood that the faculty would draw on educational research and parlance to articulate their pedagogy, the course design, and experience teaching the course. Over 900 graduate students representing over 30 countries were enrolled in the school of education in Fall 2022. The school offers 30 different graduate degree programs, many of them online or in hybrid formats.

To select a course design project within the school of education, I consulted with the Director of Learning Design in my Center to identify a course design project led by a faculty member who would be appropriate to invite to the research study. Together we also considered these additional case selection criteria:

- The course required planned, frequent collaborative learning activities as outlined in the course site on the LMS and/or in the syllabus.
- The instructor was either creating new collaborative learning activities or making significant changes to previously used ones.
- Collaborative learning activities required the use of computer-supported learning technology.

These criteria ensured an information-rich case to study the design and experience of collaborative learning activities.

In the summer of 2021, the Director and I chose a course design project from a program on educational leadership. The faculty member declined my invitation to participate in the research study, so I consulted with the Director again, and we chose a course in a different graduate program related to educational leadership. I sent the faculty member a copy of the dissertation proposal and a research participation consent form containing a summary of the study, then met with him to discuss his potential participation and answer any questions. The faculty member, Professor Skye (pseudonym), consented to participation throughout his design process with my Center and the first time that he would teach the course. Prof. Skye had 20 years of experience teaching in higher education and 15 of those years teaching in online modalities.

Prof. Skye built the course as part of a low-residency, cohort-based graduate program in educational leadership. In this program, cohorts complete bichronous or asynchronous courses in Fall and Spring semesters, and they complete online courses and in-person residencies each summer for three years. Students are mid-level professionals or executives in their field. They started this course after their first 15 months in the 36-month program and completed it at the halfway point, 18 months. The program culminates in a data-informed capstone project that prepares these students to lead their institutions into a future of change and uncertainty in their educational sector. The program also emphasizes a global focus, branching beyond the United States. A few international students who were focused on educational leadership challenges in their respective countries were part of the cohort. Students started making progress towards the capstone project with the very first course they completed and continued to reach milestones throughout their first year in the program.

This was a new course for a new degree program, but Prof. Skye had taught previously a version of the course at another institution. This was the first time the course was being delivered in mixed asynchronous and synchronous modalities. Prof. Skye also had to incorporate program-specific milestones into the course so that students could continue making progress towards their capstone project. The most important milestone in this course was the formation of their capstone teams: groups of 3-5 students who would support each other throughout the remainder of the program.

# **Design Process and Timeline**

Prof. Skye began his design collaboration with the Center in September 2021, and it concluded in May 2022. A synopsis is provided in this section, but Appendix G (Design Narrative) provides additional detail about the design process and major decisions during those 9 months.

In the fall of 2021, Prof. Skye met several times a month with a learning designer and media producer to map out course content and develop original multimedia content. During the

first month of development, he simultaneously completed an asynchronous, faculty cohort-based learning experience about principles of online course design. During this experience, Prof. Skye would review content on the Learning Management System (Canvas) and contribute to asynchronous discussion activities with other faculty who were also developing online courses with the Center for the first time. In these discussion posts and replies, faculty would share highlights from their ideation about the course design and planned next steps. In his posts, Prof. Skye often shared about his past and ongoing design activity with the Learning Designer and Media Producer. The Learning Designer and Media Producer had access to the course but were not expected to contribute or interact in Canvas. Instead, they had the option to use it as the basis for discussions during their design meetings with the faculty member.

In January 2022, there was a change in assignment of learning designer to the project because of unanticipated time constraints for the original learning designer. The new learning designer, Charlotte (pseudonym), joined at a moment of transition for course design: moving from high-level course mapping to building out course content and assignment directions in Canvas. Charlotte also supported Prof. Skye in curating appropriate learning technologies to support student learning in the course. Charlotte researched the platform, Edublogs, as a possible tool for students to use for sharing their writings with Prof. Skye and each other. In design meetings, she presented its capabilities and limitations according to Prof. Skye's plans for related course assignments. In February 2022, a graduate assistant from the school of education joined the team to support Prof. Skye in the design of course assignments.

From March through May of 2022, the Learning Designer built the Canvas site, incorporating feedback from Prof. Skye and his graduate assistant. Charlotte recommended that Prof. Skye include periodic self-reflection for students throughout the design project to gauge their progress and plan future steps. This learning design idea evolved into "team retrospectives" that students completed in their groups every few weeks. They identified strengths, areas for improvement, and next steps. Prof. Skye produced some original course content with the media producer. At the end of the design cycle in May 2022, Charlotte provided Prof. Skye feedback on the course design based on a commonly used rubric for online course quality.

From June to August 2022, Prof. Skye continued making minor revisions and improvements to the course Canvas site and syllabus. Prior to the course launch in August 2022, he had to swap out a series of individual assignments with new tasks for students related to their program capstone project to ensure that they would stay on schedule with their program-wide capstone project milestones. This new series of assignment featured team-based learning, which will be discussed in findings sections throughout this chapter.

## **Course Structure and Flow**

Students completed the course between August and December 2022. Of 18 students in the course/cohort, 13 consented to participate in this study, allowing their participation in class meetings and assignment submissions to be analyzed. Two entire student teams (n=3, n=4), who worked together throughout most of the semester, consented for their observable interactions and assignment submissions to be included in analysis. Pseudonyms are used for students in this reporting and interpretation of findings.

There were four strands of collaborative learning experiences: (1) an end-of-course (EOC) team-based design project culminating in a live presentation to the class; (2) progress towards the program capstone project with support from the same team of students; (3) wholeclass synchronous discussions of course content; and (4) shared reflections about course learning
experiences and personal development in the program at large. Subsequent sections elaborate on the design and experience of these collaborative learning activities.

The course was broken down into four main parts, summarized in Table 4. Students began the course by immersing themselves in information about the course goals and assignments (Course Orientation and Week 1). In the first synchronous class meeting, the professor elaborated on intended learning experiences for students and the scaffolded timeline to complete the end of course project. For the next nine weeks (Part 2), they moved into a waltz-like pattern of modalities: 1-2-3, 1-2-3, using (1) individual asynchronous weeks to write and reflect about their program capstone project; (2) team-based meetings to work on the EOC and capstone projects; and (3) whole-class discussions about the course content. In practice, team weeks and whole-class weeks functioned similarly: students would begin as a whole class then divide into their teams to work towards team-based assignments. The difference was that whole-class meetings first included a 30- to 45-minute discussion about the readings and other learning resources from the previous three weeks before breaking out into teams.

In the next three weeks of the course (Part 3), course readings and other learning resources tapered off while students focused on completing their EOC projects. The first team session was like the team-based synchronous meetings in Weeks 2-10. The second team meeting, in Week 12, was dedicated to practicing their EOC project presentations, which they delivered to each other as a whole class in Week 13. In Week 14 (Part 4), students individually reflected on their learning in the course and their standing with the program capstone project.

#### Table 4

Course Structure and Pattern

Part	Description	Task or Pattern	Synchrony
1 (prior to term and Week 1)	Course orientation and overview	Review course expectations and requirements	Asynchronous orientation First synchronous class-wide meeting
2 (Weeks 2-10)	Three weeks of course content under one topic or theme	Work individually Meet in teams Meet as a whole class	Asynch. Synch. Synch.
3 (Weeks 11-13)	End-of-course project	Team work towards end-of course project (2 weeks) Whole-class presentations	Synch.
4 (Week 14)	Reflection	Individual reflection on program capstone project and course learning	Asynch.

Table 5 summarizes sources of data collected from the course design and launch phases. Design phase sources varied from instructor reflections in interviews and his faculty-cohortbased learning experience (i.e., principles of online course design) to field notes from my observations of design meetings. Learning designers were also interviewed for their general views on collaborative learning in online environments and their perspectives on this particular course design.

Data sources from the Launch phase consisted mainly of screen shots of the course Canvas site and transcripts of synchronous class sessions. Each week of the course was set up as a module on Canvas containing an overview page, a page with multimedia learning resources, assignment pages, and a page with information about that week's synchronous class meeting or optional office hours if an asynchronous week. Chat transcripts were captured for all but one synchronous session. One small group team meeting near the beginning of the course was observed and transcribed. Combined with copies of student submissions, these were the primary

sources of information about the ways students engaged in collaborative learning.

#### Table 5

#### Summary of Data Sources

Design Phase	Launch Phase		
1. Observation notes from design meetings	1. Canvas site a Screen cantures of each page within		
<ol> <li>Design documents from a Google Shared Drive</li> </ol>	each module <sup>1</sup> b. Syllabus		
<ol> <li>Faculty contributions to a cohort-based professional learning course offered by the Center to first-time designers</li> </ol>	<ul> <li>c. Announcements (also sent via school email to students) (n=19)</li> <li>d. Course welcome and module introductory videos (n=12)</li> </ul>		
<ul> <li>4. Email correspondence among faculty and learning design team</li> </ul>	<ol> <li>Collaborative learning-based assignments (e.g., reflections and final presentations)</li> <li>Team-based reflection documents, virtual</li> </ol>		
<ul><li>5. Faculty interviews 1 &amp; 2 (out of 3) at the beginning and end</li></ul>	whiteboards, and final presentation slide decks for two teams		
of design phase 6. Learning designer interviews	<ol> <li>Transcriptions of weekly whole- and team- based Zoom meetings (n=10)</li> <li>Chat transcripts from synchronous class meetings (n=8)</li> </ol>		
	<ul><li>6. Anonymous mid-semester student feedback on their learning experiences</li></ul>		
	<ol> <li>Faculty interview 3 of 3 – retrospective on course launch</li> </ol>		
	8. Surveys of students (n=6)		

All students were asked by the instructor to provide perspectives on their course learning

experiences in anonymous mid-semester feedback, individual reflections, and team-based "retrospectives." Students who consented to study participation (n=13) were surveyed at the end

of the course about their collaborative learning experiences. At the end of the survey, they also

responded to optional, open-ended, self-identifying demographic questions. Six students

<sup>&</sup>lt;sup>1</sup> For ease of analysis, I did not gather multiple versions of the course design in the LMS. The focus of this study was on finalized design features as students experienced them. Collecting iterations of designs would be more appropriate for research studies focused on the evolution of a course design over time and perhaps over different academic terms.

completed the survey and five provided their demographic information. In January 2023, Prof. Skye completed a retrospective interview on the course launch and shared some planned course revisions for the next time it was being offered in Spring 2023.

As noted in Chapter 3, learning analytics were explored as a possible source of data. After review, available learning analytics were deemed incompatible with the data analysis plan. Analytics provided by the LMS were individualistic and irrelevant to team-based learning processes. Analytics provided by the whiteboard app, Miro, are offered at the institutional level and not for a single course. Implications of this result for future research on online collaborative learning are discussed in Chapter 5.

The remainder of the chapter presents findings related to each research question. I begin each section with a restatement of the research question and a summary of analysis. In alignment with a case study methodology, findings are related to the *how* and *why* of collaborative learning design and experience in the case. As discussed in Chapter 3, the first step of *first cycle coding* was *structural coding* (Saldaña, 2015), marking passages and sentences relevant to each of the three top-level research questions. Codes for student experience of collaborative learning (RQ2) sometimes overlapped with coding for student perspectives on collaborative learning (RQ3) when students described events of their experience while simultaneously reflecting on it. After restating the research question in each section, I summarize the remainder of first cycle coding that occurred then describe new analytical schemes adopted to conduct second cycle coding after reviewing the entire data corpus (Saldaña, 2015).

## Findings Related to Research Question 1: What Conditions Do Instructors Create for Students to Engage in Collaborative Learning Activities?

Conditions were conceptualized as elements of teacher, social, cognitive, and learning presence in the Community of Inquiry Model (Garrison & Arbaugh, 2007; Shea et al., 2012; see Chapter 2 for an extended commentary). Table 6 provides a description of each presence. I used content analysis methods to analyze course materials and Prof. Skye's commentary on course design. In first cycle coding, I used *provisional coding* based on identified elements of online collaborative learning from the literature (Brindley et al., 2009; McLoughlin, 2002; see Chapter 3 for additional explanation of the approach to analysis). In second cycle coding, I returned to the data corpus with *eclectic coding*, searching for processes, concepts, and metaphors evident in the design and facilitation of collaborative learning.

#### Table 6

Presence	Definition	Source
Teaching	"the design, facilitation, and direction of cognitive and social processes for the purpose of realizing personally meaningful and educationally worthwhile learning outcomes"	Anderson et al. (2001, p. 5)
Social	"the ability of participants to identify with the community (e.g., course of study), communicate purposefully in a trusting environment, and develop inter-personal relationships by way of projecting their individual personalities"	Garrison (2009, p. 352).
Cognitive	"the extent to which learners are able to construct and confirm meaning through sustained reflection and discourse"	Anderson et al. (2001, p. 5)
Learning	"meta-cognitive, motivational, and behavioral traits and activities that are under the control of successful online learners and which past research indicates may be fostered in online environments"	Shea et al. (2012, p. 90)

#### Definitions of Different Presences in the COI Model

Prof. Skye strived to create a course experience that was interdependent at nearly every level. Students would spend most of their scheduled synchronous time working in teams on a complex design thinking project steeped in creative problem solving. This was also a pivotal semester for their program capstone projects: they completed structured writing assignments to sketch their ideas and interests, moving towards a concrete data-informed project to complete during the remainder of the program. Prof. Skye intentionally paced collaborative discussion about course readings and resources every few weeks, rather than requiring it weekly. He also created a forum during some synchronous class meetings for students to engage in shared reflection about their EOC and capstone projects as well as their overall well-being as busy professionals juggling graduate school with other responsibilities.

#### Finding 1: The Nature of Collaborative Tasks Was Driven by Course Learning Goals

From early design meetings, Prof. Skye indicated that the course goals would extend beyond conceptual understanding of the course topic to transformative learning characterized by a change in student mindsets about the way they approach leadership and managing change. In an interview, he stated, "…so where I see collaborative learning coming into play is that what it really does is create the habits of minds and dispositions…that I think carry on past a course." That goal was directly presented to students on the Canvas homepage:

> Innovators need to be someone new to create something new. The class is designed to see problems and solutions as an ongoing conversation and a continuous loop: understanding the present and envisioning the future in a continuous cycle of observing (immerse yourself in the real world during the week), reflecting (come together as teams and as a class to discuss and share ideas), and making (give concrete form to the ideas you generate).

His approach to lifelong learning informed the selection of course content and the design of student assignments to be collaborative. In interviews, he emphasized that these collaborative experiences are instrumental to "collective leadership," critical to success not only in the course

and program, but also to lead in a "kind of environment marked by volatility, uncertainty, complexity, and ambiguity."

To facilitate that level of student formation and leadership development, Prof. Skye incorporated design thinking processes into collaborative learning assignments. For the purposes of the course, he defined at as a process of creative problem-solving that leads to innovation. Students would begin by scanning the horizon for examples of innovation then focus on a problem of practice to investigate. They would spend time immersing themselves in the ways other people encounter that problem before moving into a prototype stage, formulating a solution. He viewed these processes as more than a series of steps. He valued their potential to spur development of students' identities as leaders and change their mindset towards problem solving. He was transparent about these goals—one of the first readings in the course presented that definition of design thinking to students.

An important concept undergirding design thinking was strategic foresight, which is making institutional change not based on the past, but by imagining possible futures and considering potential actions that address those possibilities in the present. Strategic foresight bridged the learning goal of individual transformation to the goal of developing organizational leaders who could bring others into the future well-prepared and ready to make positive social change. It was representative of real-world challenges that these educational leaders would face that the professor emphasized in an interview:

> And I think, you know, we use the word team. But really another way to think about what we're doing is we're interdependent. The work that we do is always, in some ways connected to someone else's work. It's a part of some kind of collective...even if we think we're working independently, we're not. We're part of a bigger, you know, these leaders...are in the program, are part of a bigger system. And so it's just creating authentic learning experiences for them that they can recognize, focused on problems of practice.

This approach to education *as formation* aligned with the values of the university, stopping not at individual development for its own sake, but for the greater good of the world. He illustrated this to students in a module introduction video:

Now great ideas do not come from working in isolation but in creating community. Since we touch on Jesuit education this week. Let me share a Latin phrase *cura apostolica* - our care for the work - that is intricately related to the better known idea of *cura personalis* - care for the whole person. They complement each other. Together they remind us that we are not in this alone, we are in this together. Community and personal creativity thrive together. You belong to a team, a cohort and a program with faculty writing coaches and mentors who together will care for the work that you are doing and care for each other as whole people during this process as we do our work together.

Design thinking in the course must be considered in the larger context of the program, in which social justice and global change are two major themes. The capstone project shares the same spirit and purpose as the EOC design project. Through their collaborative interactions in this course, students and Prof. Skye lived out both of those concepts: caring for the work of each other and caring for the whole person. This assertion is supported by findings under Research Questions 2 and 3 on how students experienced collaboration and their perspectives on it.

Design thinking projects warranted teamwork because students were engaging with complex problems and ambiguous situations in their roles as leaders. They had to clearly define the problem and research examples of innovation in the field that could inform their own proposed solution, which could range from procedural and policy reform to financial strategy to organizational change. Throughout the semester, students completed design exercises that culminated in a final presentation to make a pitch for innovation in the educational system. The nature of course goals—transformative change as leaders—guided the selection of a design thinking project that involved gathering diverse perspectives on an issue, which required student collaboration. In the course welcome video, Prof. Skye identified students as a "key learning resource" for each other.

## Finding 2: Orienting Students toward Collaborative Learning Was a Featured Design Element

Prof. Skye used multiple strategies to orient students towards design-based collaboration in the course. He justified the merits of a drawn-out design thinking process; communicated that individual performance mattered but teamwork was more important; called attention to ideas of creativity and play in a collaborative context; emphasized the importance of mental health; and provided directions to guide student collaborative discussions.

Admitting that he was asking students to engage in a semester-long design thinking practices that would likely appear unnatural to them, Prof. Skye oriented students towards the demands of that type of collaboration. In the Week 4 class meeting, he told students, "The thing with our brains is we're solution finding machines, but the process is really about how can I integrate kind of what we're learning with what we're doing as a team." In the design process, he filtered out a lot of the jargon or extraneous concepts associated with agile thinking but retained its real-world relevance as one tool set among many that offers useful practices and strategies to tackle educational challenges. Students still vocally bristled at some of the ideas presented related to innovation, but he would redirect the criticism to have students consider the value of strategic foresight and leading organizations for the future. He would also point to evidence that their area of educational leadership was indeed facing volatility and had an urgent need for creative problem solving. Students valued the final product, which was a templated presentation slide deck provided by Prof. Skye. Near the end of the course, when he directed students' attention to the template, he noted that the format represented "the authenticity of needing to be able to communicate ideas powerfully, but in a short amount of time."

The primary strategy to orient students towards collaboration was to invoke the ideas of creativity and play in a learning space and prepare them for the emotional experience of the course. In the first synchronous class meeting, Prof. Skye polled students about what resonated for them from the following quote:

To build these skills [of creativity], we must encourage risk taking and originality, and give people the autonomy to decide how they learn and create. We must offer them the time they need for personal reflection, daydreaming, and inner exploration. We must make tasks more meaningful and relevant to their personal goals and help people find and develop their unique purpose and identity. To foster creativity, it is important to build people's confidence and competence to learn new information and deal with adversity; make tasks conducive to flow by engaging them in the appropriate level of challenge; and help them develop supportive, positive social relationships. – Scott Barry Kaufman and Carolyn Gregory in Wired To Create

He repeated this quote on Canvas and called back to it in a Week 11 announcement to students.

In the Week 1 synchronous class meeting, students latched on to the word autonomy, which is an

important feature of the course design, discussed in the next finding. In his view, the quote was

effective in establishing "the emotional center for students and what they were experiencing."

From early design meetings, he anticipated possible challenges students would face by engaging

in collaborative design thinking. Following up in Week 2 after that first synchronous class

meeting, he reiterated the range of emotions students would experience:

Now remember, I really want this class to emphasize creativity and that means learning to embrace and enjoy the creative process and all of its peaks and valleys. If you follow it, it will yield significant and substantial personal and publicly recognized results and reward. Research highlights this paradox - those who are obsessed with the final product too early report higher stress and lower interest motivation, and they don't produce as creative work, but if you can look to enjoy the act of creating you feel the freedom to follow a process people tend to produce a more creative result. So, I encourage you to embrace the peaks and valleys and know that it's normal. We will all go at our own pace, but we all make progress.

He correctly anticipated that students would want to accelerate towards the solution and that final presentation. Throughout the semester he answered many student questions about where they

were in the process and the reasons for how he paced the design exercises—creativity requires time to develop. This quote also blends the EOC project with the capstone project in terms of the creative process. Throughout the semester, he repeatedly referred to the differentiation in progress students would make towards the program capstone project, which the written assignments would help them understand how far along they were in identifying a project focus and planning for it. By contrast, students would have jointly completed a similar, more basic design project during this course.

To reinforce collaboration, Prof. Skye made sure to communicate to students that their individual effort mattered, but collaboration was more important to their long-term success in the course and the program. In an interview, he used a baseball analogy to characterize that message:

Yeah, I'm keeping stats on all of you, I'm going to know your batting average. I'm going to know all your stats and how you perform it as an individual. It matters, but you need to succeed as a team. And...both are going to be valued in this environment. This is not a choice, forced choice between the two.

In his retrospective on how students experienced the course, Prof. Skye observed that students "shifted from thinking about this group as something that is perhaps has all of the potential downsides of group work" to recognizing they were producing something greater than they could do individually. In Prof. Skye's words, he "stewarded" the process to account for "any discomfort." One tactic was to present metaphors of expectations for collaboration then having students actually experience it, then repeat it throughout the course.

In addition to an emphasis on creativity, Prof. Skye communicated his vision for student engagement with the course as "play." In the first module introduction video, he explained how this approach to learning contrasts with traditional student engagement:

> You're going out to play. I hope you all bring a spirit of play to the class, so rather than assignments or readings as ticking off a set of boxes, as a way to experiment with some ideas to be creative, to take some risks, to see how this scenario unfolds. I want this course to be different in the sense that it's inviting you to

create something of lasting value through the design project exercises and the program capstone exercises as well. Playful means I want you to have fun. But just like things like a sport or hobby that you immerse yourself in, there'll be times it's challenging and engaging but in a way that you can bring your whole self to this process - your hands, your heart, and your head to this process. There's a structure with play but play also can unfold in many different ways, and you are an important part of how that unfolds. And I can't wait to see what happens.

Prof. Skye defined play as the ideal mode of student engagement with the course learning resources and assignments, in which students would take ownership of their learning, challenging themselves by taking risks and immersing themselves in the ideas and tasks of the course. Students could select any problem of practice for their design projects and formulate any solution for it if they adhered to the structure of the learning experience, completing each design exercise along the way. Students having fun was evident in the final design project presentations, when one group incorporated references to the popular streaming series, *Ted Lasso*, as a way to present their educational innovation. Students also appeared to have fun using the Zoom chat feature, using emojis and making jokes to engage with the course topics.

At the same time, he emphasized to students the importance of individual mental health to allow connections and ideas to come to them. A series of individual assignments allowed students the opportunity to do something to take care of their well-being to support their learning. He referred to research on creative processes and the importance of "incubation," which is to calm the mind and allow ideas to come to them. He emphasized wellness as a prerequisite for engaging in intellectually demanding collaborative work. This was one example of how individuality was critical to team experiences.

Prof. Skye oriented students to collaborative discussions with specific guidance on how to listen and respond to each other as individuals. To prepare for collaborative discussions about course content, he prompted students to: Think ahead of the contribution you want to make to your colleagues' learning in our discussion and come to class on Friday prepared to share your observations, insights, and questions so far and their practical relevance to the complex problems that you face in leadership.

Instead of students reading with only their personal relevance in mind, they were given a head start on making connections with other students. He also oriented them to conversations about their capstone projects:

their capstone projects:

And so, I would encourage the group rather than to be in the place of giving advice, when somebody's sharing, ask questions, draw them out...be a great listener that they find themselves discovering insights by the questions you're asking. And so, when people are sharing, really try to put on that question hat as opposed to the advice giver. Of course, hold that advice, give it at the end, if you have some, a real gem, but try and let that person be their own advice giver in that process.

This quote illustrates the importance of balancing individual autonomy with team input, allowing

students to direct their own capstone experience and leverage colleagues' feedback.

#### Finding 3: Learning Supports Were Balanced with Respect for Student Autonomy

Along with orienting students to collaborative learning, Prof. Skye provided them multiple learning supports as a foundation for their teamwork. He provided detailed agendas and directions during the large amount of class meeting time devoted to team-based activities. He invited an expert in design thinking to speak to the class and answer their questions about the process. He used the metaphor of an architect to describe the design of learning supports:

> An architect thinks about what kind of interactions do I want to see in the space? And then they design the space. They don't say, I want to build a building. Well, how big should it be? You know, what kind of materials should be used? They begin with the questions of the interactions and then they create the structure.

Part of that structure was recurring team retrospectives, in which teams would reflect on the previous three weeks and note their accomplishments, areas for growth, and what to do next. He also provided feedback to teams throughout their development of their design project.

However, he balanced the structure and supports for collaborative learning with respect for student autonomy. He gave them space to "play" and consider "the many different doors they could have gone down." This space was important for the relevance of design thinking to realworld contexts, as he stated:

> And so, it's just creating authentic learning experiences for them that they can recognize, focused on problems of practice and then exercise a fair bit of autonomy in directing their own learning in the process. But it's scaffolded in a way that there's support, but it's, you know, it's invisible. I mean, you feel like you're making a lot of choices and the students will be. But it is ideally scaffolded in a way that you know, it's supporting.

Students embraced the term *autonomy* in the opening week to the course, responding the quote on creativity, but later expressed their consternation about thinking about problems in an unfamiliar way. Findings on how students perceived collaborative learning activities are elaborated under Research Question 3, but to extend the metaphor of learning space architecture, students indicated they felt lost in the woods with the process. They took refuge in knowing that they were not alone, so some students embraced the opportunity to wander in that space, while others expressed anxiety about moving towards their program goals and stop "circling the runway." This idea of the learning space being bounded but open enough for autonomy was encapsulated by the professor's comment to students, "one of my favorite ways to think about teaching is just teaching is about putting students in a situation they can only escape by learning." The EOC design project and capstone written assignments were scaffolded throughout the course, providing sufficient learning supports. In student reflections at the end of the course, they confirmed a sense of accomplishment despite moments of feeling lost along the way.

## Findings Related to Research Question 1.1: What is the Instructors' Rationale for Such Strategies? Why Do They Think that These Are "Collaborative Learning" Activities?

The primary sources for understanding the instructor's rationale for collaborative learning in the course were interviews throughout the design process and notes from my observations of design meetings. There were times throughout the course being taught that he highlighted for students the reasons for certain learning design features. Findings in this section are derived from second cycle coding of concepts and metaphors (Saldaña, 2015).

#### Finding 1: Collaborative Learning Design Was Rooted in the Learning Sciences

Drawing from research on learning and memory, Prof. Skye designed collaborative learning experiences to be memorable in four ways: tasks are novel, involve repetition, powerful associations are formed, and the experience leaves an emotional trace. As described earlier in this chapter, design thinking processes were novel to students. The weekly pattern of the course, described in the earlier section about the course structure, involved repetition for students. Three times over nine weeks, they followed the same pattern of individual, team, and whole class conversation over three weeks. The principle of interleaving (Darby & Lang, 2019) guided the design of collaborative discussions to occur every three weeks to make connections across topics and sources. Powerful associations were most apparent in the program residency experiences, which students often referred to in collaborative discussions. Within this course, students created powerful associations by spending most of their synchronous time in teams with prolonged engagement on one project. In their reflections, students shared some of the emotions that resulted from engaging in collaboration throughout the course.

#### Finding 2: Collaborative Learning Design Was Shaped by Social Interdependence Theory

Prof. Skye studied social interdependence theory (Johnson & Johnson, 2002; Rusbult & Van Lange, 2008) in a different personal context. He applied its ideas to this collaborative learning design. He argued that its tenets necessitated collaborative learning:

You need to make sure that that people understand the way you've constructed collaborative learning is about social interdependence. We're going to accomplish something together. We're going to be mutually accountable to one another. And we're each going to bring something to the table that we couldn't have created had we just done these things independently.

This view of collaborative learning reinforced the design of the EOC and capstone projects to be action-oriented, leading to change in the real-world because of collective effort, not limited to individual or group-level academic achievements.

Prof. Skye referred to research that supports a benefit of collaborative learning: "a greater sense of relatedness to one another, but also the integration of more diverse perspectives." His viewpoint echoed those two ideas of *cura personalis* and *cura apostolica* – caring not only for the whole person, but also for the work being accomplished by each other, which is strengthened by a diversity of viewpoints. To realize this vision, he empathized with students who have had negative team-based learning experiences usually in the form of a free-rider effect, in which some members may contribute very little or not at all to the group's work while still receiving its benefits. Social interdependence theory permeated his approach to collaborative learning:

for interdependence to occur, there needs to be a shared goal, a kind of mutual accountability, responsibility. And in partial knowledge, everyone brings something different. And I think that can be exciting in one sense, but also it can be a weight. So a weight other people are going to depend upon me to be successful. And I owe it to them like I owe it to my classmates, that I bring my best self to this class, and I bring my "A" game. And that's a personal knowledge. But a shared multiplayer on an assignment or something...mutual accountability, which means you're trying to avoid the free rider effect, which is like, oh, I loved your work. These other people are going to do fantastic work. I will come up at the end and do the presentation with you. You kind of want it. You almost have to create that environment, frankly.

To form teams early in the semester, Prof. Skye walked students through an activity in which he read aloud six criteria for students to consider in nominating classmates they wanted on their team: colleagues who provide a sense of purpose, offer perspective, share knowledge, give valuable feedback, support motivation, and check on progress. This early step built in those relational qualities and admiration for each other's work that teams would need to carry out team-based projects in socially interdependent ways.

## Finding 3: Collaborative Learning Experiences Make Learning Spaces Conducive to Creativity and Play

Creativity and play were not only a way to frame the collaborative learning experience to orient students to the course, but also inherently a rationale for the design. This was most evident in the recurring metaphor, *spark*, invoked by Prof. Skye in a module introduction video: "Education isn't just about filling a pail. It's about lighting a spark." Distributed across Canvas in announcements, module introduction videos, assignment descriptions, and feedback to students, Prof. Skye expressed his desire for students' learning experiences would spark new thinking. *Spark* was a verb to capture the new combination of ideas students would glean from being exposed to a diverse array of readings, podcasts, videos, and other students' perspectives during class meetings. For example, this was evident in instructions to prepare students for collaborative discussion:

Spark a connection that only you can make. Your connection to something else, maybe a leadership experience that you're having, a challenge you're facing, a deeply held belief or point of view about the future of [our education sector] or about its mission or purpose. Read or listen to the readings and when sparks fly, make note of that and come ready to contribute the sparks that come to mind as you do the readings and complete those as we engage in our class discussion.

This type of collaborative exchange was described by Prof. Skye as "unique and sacred" to higher education. He described a learning space where "students are communicating with each

other, learning from each other and having thoughts that you couldn't have in any other context." The combination of learning tasks, resources, and the cohort of students are what make the learning context unique.

The existence of this space was vital for not only its own existence, but for making new connections that could help make socially just change in the world, echoing the design choices for the EOC and capstone projects. The course welcome video directly stated, "the emphasis of the [design project] is on play and creativity." Shortly after the class reflected on being lost together in this collaborative space, he advised to students, "we are not going to solve tomorrow's problems with today's solutions. And so, creativity and realizing that spark, I think is, is important." Only through collaboration could students be exposed to ideas and different perspectives that could *spark* new combinations of thought and lead to innovation.

Prof. Skye used two metaphors during the course design phase to capture this approach of creativity and play: the orchestra and improvisational acting. In interviews, he described the effect of collaboration inserting the faculty member "in the orchestra, but not always at its center. It's a dynamic center. In other words, we all we all in collaborative learning, everybody maybe takes a turn in their own right, coming in and bringing those perspectives." This echoed his belief that without collaborative learning, so much is lost in the learning experience: "that's impoverishing the learning environment because I am its sole fount—the fount of learning is springing up everywhere." Shifting from music to acting, he likened course interactions to improvisational acting:

everyone is the follower, everyone is the leader, and we're all coming off each other but there's a there's a coherence to it, right? You're doing it in a way that you're not quite sure where it's going to go, but the story is there. And so, I think the first day of class, I would want students to be intrigued with each other and then be explicit and show them pedagogically here's what here's how the course is going to go and here's how you will have to collaborate with each other. The class was designed to be a result of student participation and where they would take it. Prof. Skye has told students in numerous courses that he hopes to be "as surprised as they are in terms of the outcomes they produce." In a module introduction video, he informed students of this expectation that they would be co-creators of the course learning experience as an act of play: "There's a structure with play but play also can unfold in many different ways, and you are an important part of how that unfolds. And I can't wait to see what happens." One example of how this came to fruition was midway through the course, when a student team proposed the idea to Prof. Skye that different teams share out their strengths and challenges during the next synchronous class meeting so that they could learn from each other. This was not part of the original course design, but Prof. Skye incorporated the suggestion.

## Findings Related to Research Question 1.2: How Do Online Learning Technologies Support or Discourage the Completion of These Collaborative Learning Activities?

Analysis of learning technology was based on comments by Prof. Skye and observations of its use by students and their feedback. The learning technologies included the LMS (Canvas) as an online course site to distribute content, assignment directions, and class meeting information; a shared group workspace (Google Drive), a shared whiteboarding app (Miro); and virtual meeting software (Zoom). Students also referred to their use of a communication channel, Slack, throughout their program experience, but it was not part of the formal course design nor a data source in this study.

#### Finding 1: Learning Technology was Intended as a Thinking Tool, Not an Object of

#### Learning

Prof. Skye desired for students to focus on the intellectual labor of the assignments without being hampered by requirements of learning a new technology or encountering issues as new users. In an interview, he stated:

Technology should be in the background, not the foreground of the experience. And as soon as it's not working—and it just has to not work for one student...reliability is number one in my book because no matter how amazing something is and how much I enjoy using it and how quickly I can pick up something, it's you have to build in to make sure everybody has the same minimum viable competency of that technology to use effectively.

The second learning designer, Charlotte, observed that the course learning goals were formative in nature and did not warrant extensive engagement with novel learning technologies. By contrast, a methods course related to their capstone project that requires certain analysis software could justify placement of technology in the foreground of the course.

During the design phase, Edublogs, a web publishing platform for education, was considered for written assignments so that the instructor could provide feedback and other students could read each other's work. Prof. Skye and Charlotte explored its uses and limitations, ultimately deciding to use Google Drive instead to focus the task on the writing and not the platform. Students also had the low-tech option to use pen and paper and upload an image of their work. Using Google Drive created more of a burden for Prof. Skye to spend time copying and moving files to shared folders, so for future course revision he is considering different platforms to improve that process and generate a more automated workflow.

Zoom functioned well for whole-class and team meetings using its main features and the breakout room function. It was also used to facilitate conversations with students and guest speakers twice during the semester. Prof. Skye stored recordings of the virtual class meetings on Canvas for any absent students to watch them or for any student to rewatch them. Other than typical spotty Internet connections disrupting the faculty or student connections at times, it served its purpose and worked well in Prof. Skye's opinion.

The shared whiteboard app, Miro, also worked as intended. Prof. Skye noted the benefit of using a single link to each team's Miro whiteboard throughout the semester so that they could complete different steps of the design thinking process while retaining a record of previously completed steps. There were a few student comments about the challenges of keeping it organized and maintaining coherence. For example, one team asked itself in a retrospective: "How can we organize our Miro board better so that we know where we left off and what our next steps are?" Prof. Skye and Charlotte offered learning supports to students to gain proficiency with Miro through a practice run in the orientation module and by providing templates to avoid starting from a blank canvas for most exercises. Prof. Skye shared two reasons for these supports with students: (1) to reduce cognitive load with some starter ideas and (2) to take advantage of research findings related to design thinking and strategic foresight. With these supports, students engaged in creative problem solving during a few exercises throughout the semester leading up to their final presentations.

#### Finding 2: Learning Technology Offered Multiple Channels for Student Collaboration

I did not have access to all channels of student collaboration, but their mere existence is a significant finding. Students had the options of email, Canvas, and likely each other's contact information for communication. During synchronous class meetings, they made use of the Zoom chat feature to contribute original comments or respond to verbal comments by whoever was speaking in the meeting. They also made frequent use of emojis to convey emotions, crack inside jokes, or illustrate a point. Before the course started, students had been engaging each other in an

instant messaging backchannel, Slack. Midway through the semester, one student indicated she missed other members of the cohort, noting the Slack channel was quiet. In response to student feedback that they wanted more discussion of course readings, Prof. Skye decided to incorporate Slack into future versions of the course, giving students autonomy in how they would conduct asynchronous discussion about course content without his monitoring, simply prompting them to engage in collaborative backchannel discussions. The use of different channels for student collaboration supported Prof. Skye's assertion that some students engage best in whole-class format and others in small group settings.

# Findings Related to Research Question 1.3: How Do Instructors Monitor and Adapt Conditions for Collaborative Learning Activities?

I found many instances of Prof. Skye facilitating collaborative learning through written communication, module introduction videos, oral communication during class meetings, and providing feedback to teams about their progress and disposition towards collaborative learning in the course. In first cycle coding, I used *provisional coding* based on identified elements of online collaborative learning from the literature (Brindley et al., 2009; McLoughlin, 2002). In second cycle coding, I returned to the data corpus with *eclectic coding*, searching for processes, concepts, and metaphors evident in the facilitation of collaborative learning (Saldaña, 2015).

#### Finding 1: Prof. Skye Facilitated Collaboration by Being Present

This finding builds on the previous finding that learning supports were balanced with a respect for student autonomy. Prof. Skye actively facilitated collaborative reading discussions, calling on everyone to participate and monitoring the chat to call attention to student contributions through that channel. Near the end of collaborative reading discussions, Prof. Skye requested anyone who had not yet spoken to contribute. He would often call attention to a

specific learning resource from the previous three weeks to either build on a student comment or pivot the conversation toward a new direction. Prof. Skye also provided feedback to design teams based on what they had submitted for their team retrospectives every three weeks. He proposed strategies to teams to optimize their time together, such as more targeted reading of course learning resources or what to research next related to their problem and proposed solution.

The general pattern was that Prof. Skye allocated students space to collaborate while making himself available for consultation during synchronous team breakout sessions or virtual office hours. In interviews, he emphasized his intent was not to be a "helicopter instructor" hovering over their collaborative learning activities. He likened it to qualities of a good supervisor who provides support if requested, but otherwise gives space: "It's really clear upfront to them: you can come to me any time and they check in enough to know that you're present, but... [they] can make it happen without [you]."

To ensure a minimal amount of checking in, Prof. Skye used the mechanism of those intermittent team retrospectives to respond to high-level summaries of how teams were working together. In his final interview, Prof. Skye recollected the value of student reflections that guided him where to target his feedback to students about challenges to their course learning experience:

> it really helped me give all kinds of cool data about, look, I know exactly where you're coming from, so I kind of know what you're saying about the class behind closed doors, you know, so I could go into class and address your deeper concerns or your deeper anxieties, your deeper struggles. And learning this because it's difficult to learn things. And difficulty is healthy.

Prof. Skye gathered information to adapt learning conditions from three levels using the same structure for reflection: individual, team, and the entire class. He repeated feedback across different areas of the Canvas and Zoom experience: emailed announcements, module introduction videos, and in synchronous class meetings.

Class-wide reflections in Zoom clearly illustrated the instructional process of *being present*. Reflections provided the opportunity for students to share about their struggles and successes not only in the course, but also in the larger program. He articulated this approach in an interview before the course was launched:

My role in that situation is to listen, listen at a deeper level. Listen at what's going on. Where do they need help? And what's that next step that they need to take to unstick themselves or to hear somebody cheer them on or to fill in a gap of knowledge or revisit something, give them a resource. So, I'm the person that is primarily just checking in, but then listening to what problem are they trying to solve and then trying to be the person to help them solve it. So whether that problem be kind of a, you know, an emotional, you know, fear or a gap in knowledge or a group process...but I'll be I'll be hands off...I'm trying to be present and you get to be really good at this...in other words, they want to know you're present and involved and engaged, but they also want to be—this is back to agency and autonomy—they're also like, I spend most of my days being the chief executive at my job. When I show up here...it's great when that kind of respect is given to me. I know one of our students right now is managing a multimillion-dollar deficit—they know what they're doing. They can manage a team project. And so just letting them know that I have that deep respect for them.

Respect extended to the whole person from student identities as professionals to their identities as members of families and communities. In synchronous class meetings, students expressed their appreciation for "being seen" by Prof. Skye when sharing personal information that was relevant to their progress in the course.

*Being present* and a respect for autonomy took the place of formal team evaluation by the instructor. Individual, team, and whole-class self-assessment activities were the primary method for teams to improve their collaborations (e.g., on an assignment rubric was the criterion, "All team members contributed equally..."). In mid-semester feedback, students indicated that they appreciated the built-in time for team collaboration and the nature and quality of instructor feedback. Prof. Skye monitored learning conditions by gathering students' metacognitive observations and directly listening to their reflections during synchronous class meetings. He adapted learning conditions by tailoring his feedback to be responsive to their identified

successes, challenges, and plans for future assignments. However, students took ownership of organizing their team breakout sessions and managing how they worked together as teams.

# Finding 2: Prof. Skye Often Clarified Instructions for Teams to Engage in Creative Problem Solving

Establishing boundaries to the metaphors about being lost together in this process and having to "use learning to escape," Prof. Skye did not completely leave students on their own to figure out how all the pieces fit together. Instead, he spent time in class meetings explaining the connections among different components of the project and how the current stage would assist them in later stages. The EOC design project also had two separate, precursor assignments that involved some individual work before engaging in teams. Students were confused by that relation between those two assignments and the overall design project. Students also wondered about how each exercise in the design project would lead them to the final product, a brief presentation. For future course iterations, he integrated the precursor exercises into the main design project more seamlessly. During the course's first run in Fall 2022, Prof. Skye adapted learning conditions by clarifying the design thinking process and structure of assignments so that students could focus on their collaboration and create an innovation.

## Findings Related to Research Question 2: How Do Students Engage in Collaborative Learning Activities?

I observed collaborative learning during synchronous class meetings and an early breakout session for one team. Three collaborative discussions about course readings and other learning resources provided data for content analysis related to co-construction of knowledge (Gunawardena et al., 1997). A different scheme for content analysis (Shea et al., 2012) identified student metacognitive behaviors in six team retrospectives from two groups of students. My observations of synchronous class meetings and the retrospective interview with Prof. Skye also informed these findings.

Overall, data were more limited on how students were engaging in collaborative learning activities than I anticipated during the study design phase of this research. Most asynchronous activities prompted students to write individually. Given the interpersonal relationships and sometimes sensitive topics that students would share with each other, I refrained from observing small group sessions for the remainder of the semester. However, Chapter 5 proposes some ideas for future research on studying different team processes for collaboration in digital learning environments. Teams completed ideation and analysis for their design projects using the Miro whiteboard app, but the final product was not suitable for analysis because it did not trace contributions by each individual team member nor show development over time. The final presentations involved turn taking by participants, but there was limited time for taking questions for other students, so that single synchronous class session was excluded from analysis.

I explored the use of Social Network Analysis to understand the class as a network of interactions, potentially identifying a variety of roles or groupings of students and analyzing the structure of conversations (Dado & Bodemer, 2017; Wagner & González-Howard, 2018). The details of the case did not align with these methods because I did not gain comprehensive access to student interactions in small teams and there was a limited amount of class synchronous meetings. Teams formed by the instructor with student input controlled for most interactions among students, which would have skewed results from analyzing dialogic ties. Despite these limitations, I completed a basic analysis of turn taking and directionality, including simple matrices of Prof. Skye and the students for each session, accounting for absentees, that signaled some interaction trends. It also illustrated the frequent use of the chat feature in Zoom for

students engage with each other and Prof. Skye, either starting a side conversation or building on dialogue in the meeting room. Chapter 5 proposes some ideas for future research on cohort-based online learning that could utilize SNA methods more effectively than resulted in this study.

# Finding 1: Students Co-Constructed Knowledge about Educational Leadership and Innovation

In their collaborative reading discussions, students and Prof. Skye engaged in dialogue about current problems and trends in education and promising innovations on the margins of their field. Their conversational pattern was aligned with the coding scheme by Gunawardena et al. (1997) about online debates. Prof. Skye encouraged students to share controversial ideas and framed the first discussion as a "friendly debate" that may need a "devil's advocate, occasionally...to be critical thinkers [by] thinking in opposing points of view." Students shared information, often framing an educational challenge in the context of their individual institutions, states, or countries. They would compare each other's stories with the multimedia learning resources in the course, negotiating their understanding of the issues within their own contexts with higher level trends across institutions. Students would not so often disagree with each other but reframe the conversation to introduce new points for the class to consider. Matrices of turn taking and directionality revealed that students almost always referred to another classmate's previous comment, either building on it or using it to pivot towards a new discussion point. Most student contributions involved testing and modifying problem statements and innovations against personal experience, existing cognitive schema, or contradictory testimony from the literature in the course. Students would identify areas of consensus as they co-constructed knowledge in their dialogue.

A conversation about decision making processes and cultures at their institutions, states, and countries exemplified this discourse pattern. Students began by sharing about decision making at their institutions. Claude highlighted something that rang true for him from the readings: "And so this reading... was really helpful and seemed very much along with kind of my recent experience." They also identified areas of disagreement with the course content, raising points about stakeholders or types of institutions left out of the conversation among researchers and practitioners in the field. Julie proposed that institutions should "include all voices at the table." Sara then advanced the conversation from the institutional level to government involvement in education:

So I was just reflecting on would we educate someone for a specific position at a board or are we educating the human beings behind any decision making role at a council or at a board and on the responsibility that you would have when you're sitting on that table? So I was just thinking on those, the human factor, you know. Change won't happen at an institution if it doesn't start with a person innovating or thinking on that change.

Her comment moved the conversation from a discussion of educational challenges to potential solutions like clarifying decision making roles and responsibilities. Scott then brought everyone back to the readings to test proposed solutions:

But like thinking about all of the of the barriers that we put in place that keep people from engaging in getting involved in boards like that in governance, I think is like one of the things that I keep coming back to in the readings. It's like, oh, there's another barrier, oh, there's another barrier. ...talking about being nimble enough, but like, what does that mean? What does that look like? Do we have a model for that?

Abby then closed out this part of the conversation by threading together different comments by her classmates, leading her to conclude, "So the…system, as it were, is not effective for what we need it to be able to do in the future." Through this dialogue, students co-constructed knowledge about common educational problems and began considering qualities of effective innovation.

Team breakout sessions are where students continued that conversation to further explore innovations and propose one themselves as part of the EOC design project. In the single team meeting I observed early in the course, three students compared examples of innovations they gathered to find a common interest. One student proposed a convergence of their interests, "So I think if we were to find a commonality, it's saying bravery, it's in willingness to accept that while some things work, they don't work for all. So therefore, you need to push further." Another student responded,

> So, like, it's not just like what the innovation is, it's like how we are innovating. And so, I'm thinking about that as a commonality as well in the work in like what we are just talking about through all three of our projects. It's like the ways in which you go about change matters just as much as like the change itself.

This example contrasts class-wide synthesis of readings with team-based design thinking in which students built a shared understanding of innovation by defining it and identifying important features of innovation to present in their final proposals.

#### Finding 2: Metacognitive and Reflective Practices Were an Integral Part of Student

#### Collaboration

Three times during the semester, design teams would look back on their previous three weeks together and complete a structured metacognitive reflection: (1) something they had learned and any strengths of their team; (2) questions or areas for improvement; and (3) practical next steps for their EOC design project. In Prof. Skye's terms, students were working "on" the teams while they were working in teams. This practice embodied his goal for them to grow as "reflective practitioners." In the directions, he instructed students on the type of team environment that they should create:

> It is important that the retrospective is a honest but non-threatening space for introspection and adaptation. In order for retrospectives to be successful, there needs to be a supportive atmosphere that encourages all team members to

contribute. Retrospectives can be a positive, energizing experience for your team where people share feedback and work together to come up with solutions.

The samples of retrospectives from two teams showed that students were successful in creating this type of reflective, supportive space. A common team-identified strength was a comfort in their ability to confide to one another: "One of our best attributes is our ability to be where we are without fear of judgment." They also noted the strengths of bringing multiple perspectives together as a group and their ability to be transparent with one another. Retrospectives also allowed them to acknowledge areas where they could improve, such as one team noting,

We tend to get sidetracked in our discussions - and go off on tangents. Although they are great discussions, it can set us back time wise. So that's something we can work on (but it's a plus because it humanizes us and allows us to check in as friends).

In detailing their next moves, sometimes to address identified weaknesses, students selforganized their time and tasks, setting goals to optimize their team meetings or hold each other accountable. For example, one team recognized the need to "decide a method for choosing a solution or solutions."

More than serving as a catalyst for division of labor, these retrospectives prompted students to consider deeply the design thinking process itself. They discerned areas where they required further clarification to determine next steps. They also noted the need for "Probably less 'overthinking' and trust the process," revealing a change in how they approached their collaboration. These reflections helped students converge toward a shared understanding of the EOC design project and a unified presentation.

In addition to team retrospectives, there were a few opportunities for all students in the cohort to jointly reflect on their learning experiences and status of their collaboration. During two separate class meetings, one student, Abby, vocalized how she and perhaps others were emotionally and cognitively experiencing learning in the course:

[I] just would like to start off by affirming anyone else in our class who has that sense of being unsure and confused. I think that's the best part about our relationship that we have with each other, is having that moment of, "Do you understand what's going on?" "Not really. But like, let's try to figure it out." So I just I want to put that out there for, for anyone else who might be having those same feelings as myself. I would probably claim that. (Week 6)

But I also I don't know, I just felt disconnected from you all. So, you know, our chat was really light this week. I was like I was like, gosh, when was the last time we even, you know, kind of checked in. We didn't have anything on Slack, really. So I think it's just that point of not only the semester, but just kind of where we all are mentally. (Week 9)

Her comments displayed a strong connection among students in their course- and program-wide

learning experiences. Regarding their smaller teams, one student noted how he needed to do

more in support of their classmates making progress towards their program capstones:

One thing I am thinking about is that this is making me realize ways I need to step it up and actually think about how I can support my team a little bit more. And so, I really do appreciate this time to like just fiercely listen and think about, you know, what I can do to ensure that my teammates feel like they have the feedback they need and feel supported as we go through this journey together.

Another team noted the benefits of a newly formed group learning behavior: sharing resources and citations relevant to other's capstone project interests. Students took advantage of multiple opportunities to reflect on their learning behaviors and motivate each other to enhance their ongoing collaborations.

In Prof. Skye's view, these shared reflections directly supported future learning: "It sometimes just helps people to grow to name where they need to grow and that that's normal...that just normalizes growth." While they were growing as students, he believed the course also allowed them to grow as leaders, meeting those course goals of transformative change: "But the idea that they've developed this metacognitive muscle that they didn't have before and they understand its value in making wiser decisions, more prudent decisions was

really good." Students contributed to these metacognitive, reflective activities in accordance with the open, but structured learning space that Prof. Skye designed for these types of interactions.

# Findings Related to Research Question 3: What Are Students' Perceptions of Collaborative Learning Activities?

Of the 18 students who consented to the study (n=13), only 6 completed the surveys on collaborative learning experiences. While no one disagreed with any statement, affirming each dimension of the Community of Inquiry Framework and the Team Collaboration survey, the low response rate rendered results inconclusive in triangulating findings from content analysis. However, mid-semester student feedback, shared reflections during synchronous class meetings, and individual reflection at the end of the semester provided qualitative data about their perspectives on their collaborative learning. In second cycle coding, a dramaturgical coding analysis (Saldaña, 2015) encapsulated student perspectives on their course experience. A dramaturgical coding scheme analyzes participants' objectives, a conflict getting in the way of meeting their objectives, their attitudes and emotions during the conflict, the tactics or strategies they utilize to move past that conflict, and any subtext to their behaviors. This new coding scheme aligned with the instructor's metaphorical description of the course as, "a journey. I mean, they're a narrative and narratives have certain kind of characteristics. And I would say based on the student feedback...overall, students felt like they went on a journey, and it was somewhat of a transformative one." Metaphor coding identified prominent ways that students expressed their sense of conflict throughout their course learning experience.

# Finding: Students Were Conflicted over the Collaborative, Transformative Learning Goals for the Course but Testified to Their Growth as Leaders

In early course design meetings, Prof. Skye anticipated that students would have assumptions about what they would learn in this course and so designed the course to examine those assumptions together. He encouraged students to take risks, coming up with ideas and innovations that would stretch them. For example, Prof. Skye presented the idea of worthwhile goals from Michael Stanier, author of *How to Begin: Start Doing Something that Matters*. Worthwhile goals are simultaneously thrilling, daunting, and for the good of others. He designed the course to ask students to set these types of goals for both their EOC design projects and their capstone projects. To meet these goals, the cyclical course design and repetition in learning tasks prompted students to synthesize readings, multimedia, and their professional experiences to *spark* new ideas. In a synchronous class meeting, Prof. Skye named the type of collaboration and its difficulty:

And then I just wanted to highlight again similar to the program capstone project, this work is hard. ... Bloom's taxonomy: understanding, comprehension—those are the most basic. Application, and integration are next. Synthesis is highest, and really, creation is the most difficult thing. And the design exercises are really inviting you to think about creation. Like what kind of future can you create as a leader?

Doing so, he named the objective for student collaborative learning and its difficulty. In midsemester feedback, students confirmed that difficulty, stating that working at all these different levels was challenging, shifting from individual writing to team design projects to engaging with course resources.

There was little conflict in teams trusting each other to collaborate, and students felt they had sufficient time for teamwork. Rather, conflict arose in the design thinking processes that students had to use in order to create an innovation. Students were asked to reach solutions in a

different way than they do typically as educational leaders. In a team retrospective, students admitted, "This course is forcing us to think outside the box, and sometimes have tough conversations with ourselves about how we can be better." Mid-semester student feedback contained anonymous confessions that creativity skills were hard to develop. During a collaborative discussion in Week 6, Abby articulated the conflict:

> And so finally, when Nick has said up until now our careers feel comfortable because we've navigated, we've been elevated, we've been promoted, we've kind of moved up in the ranks to where we have a very strong hold of our what our role is and what we're tasked with doing and figuring out how to make it better, how to improve. But this capstone process is so drastically different that I just I feel turned around at times.

The pace of the process to reach their objective was the most common expression of conflict. One student, Jessica, used the metaphor of circling the runway to illustrate her challenge in

feeling stuck with the capstone project:

But I'm like circling the runway, like I can't land the freakin' plane like I need to commit. Scott's committed in a different way, so I feel like we're learning a lot from each other in where we are and just how we're festering on different challenges in our projects.

The runway became a motif for that class meeting session, with one student posting in the chat an emoji of a plane trying to land. Another student echoed Jessica's sentiment after discussing the anxiety of comparing oneself to other team members who may be farther along in their capstone project: "I'm like Jessica, I'm circling the runway. Like, I'm trying to figure out what do I... what is the one thing I'm thinking about? I can't. I'm struggling." In their mid-semester feedback, students similarly expressed struggles with the direction and focus of their EOC design projects, which served as a microcosm of their capstone projects.

Prof. Skye validated the runway metaphor and all the emotions students felt during the course learning experience. Prof. Skye anticipated that students would need to name the emotions that they would navigate in the process, allocating time in synchronous class meetings

for shared reflection. He made a deliberate point that the discomfort of their experience was for a purpose, using a contrasting metaphor about the day-in-and-out of being an educational leader:

I think sometimes when people get hopeless, it's because you feel like you're a trapped animal or your organization is trapped, you're trapped. And that all has happened, I think, in all of our careers. That's what burnout is all about. But I'm glad this can give the tools and I'm glad that's been re-energizing for you. (Week 6)

Also, it's a chance to get revitalized and figure out, you know, what gives you energy again because the institutions and our jobs demand so much of us every day. And sometimes that does require, you know, circling the runway. (Week 9)

Instead of pushing students towards a creative solution for their design projects or a fully

developed capstone project proposal, Prof. Skye encouraged students to embrace the internal

conflict of the process required to meet their objective and grow as leaders.

There was minimal evidence of interpersonal conflict. Nearly all team breakout sessions were unobserved, so it is possible that interpersonal conflicts arose and were perhaps addressed during those sessions. One exception was observed in a whole class meeting when Claude expressed his discomfort with the group format for the program capstone project because he was comparing himself negatively with group members:

Theo's thinking about lots of things, and I'm thinking about, like, little things, but Theo's working in an area that he's like been thinking about for a long time. And I'm like Jessica, I'm circling the runway. Like, I'm trying to figure out what do I... what is the one thing I'm thinking about? I can't. I'm struggling. And so, the comparison stuff is super difficult for me. And so, working in a group every day is anxiety producing actually for me.

Students were in different stages of completion related to establishing a focus for their program capstone projects. Some struggled with defining a problem of practice for their project focus and by association, struggled with confidence in knowing they were doing something meaningful or perhaps just felt far behind of where they should be. Based on Claude's comments, it was

apparent that some students were searching for a project with as powerful an impact as what they were observing from their colleagues.

The most apparent tactic students utilized to deal with this conflict was to confide in each other and collectively challenge themselves. For example, in team retrospectives, students set goals to "challenge ourselves to allow assignments to spark creativity and create space for deeper thinking" and to "re-think approach to readings. Readings are more designed to make us think instead." The context of the course within the larger cohort experience was the foundation for these supportive student relationships. One student, Stephanie, told Prof. Skye in a class meeting,

I like that we've had the time from the beginning of the program to now to build this family relationship that we all have, because it makes it that much easier now that we're in these groups working on something that's difficult, that we can be transparent, open, vulnerable.

After noting she was circling the runway, Jessica praised her teammates for normalizing her current condition like Prof. Skye did: "the support and the affirmation of the uncertainty is really where I'm getting a lot of strength from my team right now." After her comments, another classmate from another team echoed her teammates, stating,

I think it's okay to keep circling the runway. Like I don't see any problem with that. So when you're showing that way, I feel that frequently. I think my last writing assignment, it was like, nah this isn't going anywhere. So this is what I got right now, and I'll come back to it, and I'll find some new energies. I'll keep circling with you for a while. We're in no rush yet.

Within team breakout sessions and during whole class meetings, students normalized the conflict and reassured each other they were not alone in the process. In his retrospective interview, Prof. Skye characterized the class as "Truly, our cohorts are founded on creating communities of care...I think care is about it's about the classroom culture and students are part of that culture. I can't create that, you know...but I can participate in it." Students were living out those principles of *cura personalis* and *cura aposotlica*, caring for each other and their work, co-constructing the
collaborative learning environment by building on Prof. Skye's designs for their learning experiences.

Students did not stop at validating each other's emotions or creating an overall challenge for themselves; they found ways to motivate and challenge each other based on their individual tendencies. This characteristic of their collaboration resonated with the prompt that Prof. Skye used at the beginning of the course when students nominated team members: writing down names of cohort members who motivate them and check on their progress. One student reflected on her team's dynamic:

in our project we're working on, without me saying anything that feels like, I know this is a push for you, Nelly, like kudos for you for doing something out of your comfort zone. So I think supporting, like having had good conversations about that, but also being immersed in each other's writing and ideas and like our kind of struggle points. I think we've done a nice job at supporting each other through those, but also not letting people sit in what's too comfortable, while also like appreciating when people are pushing.

Students pushed each other through the conflict as a tactic to meet their objectives. They found ways to move each other into and out of the discomfort they encountered, a discomfort which might have manifested in different ways for each team member. For example, Nelly voiced her discomfort in the following way:

I appreciate that you asked us to do something that is hard, and that it's in some way intended to be difficult. And I'm like, feeling... stuck isn't the right word, but like a little bit like, unsure, I guess, about what is expected or how to do this. And I think part of it is I'm like, no, let me just get a problem and solve it in the way I'm used to solving it. And so, I appreciate...being asked to think about something and problem solving and design thinking in a different way than the way we just have traditionally solved the problem. But I don't and I guess I'm naming for myself that I feel a little ungrounded and not like in a horrific way, but then I'm like, Oh, I need to figure this out.

In the same virtual class meeting, another student, Sue, expressed discomfort with the framing of

design thinking that students were encountering in the course content:

I like the framework of creativity more than innovation. I think innovation has been co-opted by capitalism. And, or just ways in which we are trying to sell something and something shiny and get money for it. And so, I mean, I don't want to necessarily shy away from the framework of innovation, but it just feels like... there's a lack of authenticity that I worry about.

These examples illustrate that for some students, the creative problem-solving process in the

design thinking projects was unfamiliar but an engaging challenge. For other students, like Sue,

they questioned the application of design thinking to their sector of educational leadership.

The previous comments were taken from the middle of the semester, and there remained

variation in where students landed at the end of the course. Some students had completed an

essential part of their learning journey, embracing the demands of creative problem solving. In

their end-of-course individual reflections, some students confirmed their growth as leaders:

**Nick:** If I ever doubted the value of reflection in my work, I won't do so again. I gained some important insights in this class about my capstone project, my career goals, and my own leadership. Thank you for giving us the space to be creative and to be reflective.

**Nelly:** Creativity, before class I did not think much about how creativity is a key part of change, but if we cannot tap into the great well of human potential in ourselves, then how can we expect that of [others at our institutions]?

Other students persisted with the struggle, questioning the fit of design thinking as a creative

problem-solving process beyond the course to the culture of educational institutions and the

larger system. One student concluded:

how this [design thinking] will (or will not) survive [in our sector]...While I enjoyed our group project, and do believe that voice and commitment are needed to tackle the big problems we face in [our sector], when I think about change, and how slow change actually happens, I am not sure there will be enough true buy-in to have design thinking stick in a substantial way. I am concerned it will be a fad that does not last because it either will be too welcoming to outside voices, or too slow, resulting in having to disregard multiple perspectives, empathy and freedom to dream- and we retreat to the "traditional" voices, decision makers, and structures. This student questioned the reach of social interdependence into practice while valuing the incourse experience. In summary, students viewed their collaborative learning experiences to be supportive and re-energizing even if the underlying creative processes were confounding at times and *education as formation* often uncomfortable. **Chapter 5: Discussion** 

A goal of this study was to contribute to theory about collaborative learning experiences in online graduate education while offering some practical guidance for faculty and learning designers to design effective learning experiences. This chapter summarizes the findings of this single case study then discusses its implications for theory and practice. I divide the Interpretation of Findings section into three parts: The Authenticity of Collaborative Learning Experiences, Implications for Theory about Online Learning Environments, and A Design Framework for Collaborative Learning Experiences. The chapter concludes with a presentation of study limitations and recommendations for further research in this area of online teaching and learning.

#### **Summary of Findings**

My research questions framed my investigation of the design of collaborative learning in this case, student experience of those designs, and how they perceived their experiences. In the first synchronous class meeting, Prof. Skye shared his aspirations for the course learning experience with students:

> So this course, I hope at the end you're going to write this quote in my comment box, "Wow, Prof. Skye encouraged me to take risks, he gave me autonomy. He made sure that it was safe to fail. He ensured that I was challenged at times, but I was engaged in ways that developed positive and supportive relationships." ...And every one of the assignments that we've designed hopefully provides this nice balance between a little bit of wandering...but also some focus as well.

His comments resonate with the key findings of this study. Throughout the course design and launch phases, Prof. Skye created conditions for students to engage in creative problem solving to formulate innovations as educational leaders. Students collaborated in four main types of activities: (1) collaborative discussions about course content, (2) an end-of-course design project, (3) feedback on writings from their program capstone projects, and (4) shared reflections on their learning. Developing a new leadership mindset as a transformative course learning goal underscored all the collaborative learning features of their experience. Students engaged in teambased activities that emulated group processes for institutional change outside the learning environment.

Students spent much of their synchronous class time in their teams to wrestle with problems of practice and followed a deliberately measured pace to analyze a problem from multiple perspectives and create an innovative solution. This problem-solving approach that combined tools from design thinking and strategic foresight was unnatural to most students. It required Prof. Skye to repeatedly orient students to the nature of the collaboration and its underlying approach to creative thinking. His consistent message was that they would produce something greater as a team than as individuals. He provided them numerous learning supports and scaffolded design exercises to lead them to the final presentation. At the same time, he respected student autonomy, allocating space and flexibility for them to take their learning in a direction that aligned with their goals as students and developing leaders.

Prof. Skye's rationale for these collaborative learning activities was threefold. First, he used principles about how humans learn from the field of the learning sciences, making their experiences memorable. Social interdependence theory guided his approach to collaborative learning design and how he constructed their team efforts to reflect collective action for social change outside of the program. Finally, he imbued their learning experiences with a sense of creativity and play, preparing them for the emotional trajectory of their experience. He encouraged students to spark new connections of ideas and imagining possible futures.

Team collaboration was facilitated by the Learning Management system (Canvas), virtual meeting software (Zoom), and a shared whiteboarding app (Miro). These platforms were utilized as tools for students to think with as they deliberated on educational innovations. They also

offered multiple channels for students to collaborate and co-construct knowledge. Students engaged each other through Canvas discussions; Zoom meetings, breakout rooms, and the chat feature; Slack instant messaging; and email.

To show respect for student autonomy, Prof. Skye was active in *being present* while students engaged in their team collaborations. He allowed them to wander during the creative process but at key moments provided clarity on the shape of the learning journey within the course and what was to come in the program. Students used that space to co-construct knowledge about educational leadership and innovation, relying on their metacognitive insights to grow as students and leaders. They were conflicted about the cognitive processes underlying their collaborative efforts because of the dissonance between design thinking and their daily habits of mind as professionals, but by the end of the course, they appreciated the ways they had grown as leaders, built up their metacognitive muscles, and exercised their creativity.

#### **Interpretation of Findings**

In this section, I consider salient features of the case, implications for theory about online learning communities, and implications for practice.

#### The Authenticity of Collaborative Learning Experiences

The collaborative learning experiences analyzed in this study displayed two meanings of authenticity, which were salient features of the case. Activities were authentic in the sense they emulated real-world practices of creative problem solving in a sector of education facing volatility. It required students to practice strategic foresight to prepare for possible future realities when difficult decisions likely would be required of them as educational leaders. Students practiced design thinking skills in this course while working towards a larger program capstone project that would build on some of those creative, design-based practices. Prof. Skye curated different resources and design exercises to scaffold the process for students. Although this process caused some dissonance because it was outside of their typical experience, the goal was for them to bring back some of these elements to their professional practice. In this case the students did not need to be oriented to teamwork but to the design thinking processes underlying their collaboration.

For faculty and designers of other graduate learning experiences, they need to consider to what extent team-based learning should reflect the authenticity of collaborative processes in closely related professional fields. In this case, there was a tension between students' lived experiences solving problems as professionals and their engagement with design thinking as a creative problem-solving process in this course. This course, aligned with the overall graduate program experience, was designed by department faculty to expose students to a different approach to leadership with the goal of transforming them individually as educational leaders and also, by extension, the common practices of educational institutions where these leaders exert influence. By virtue of this program feature, faculty were disrupting the status quo of educational leadership. Designers and faculty in other graduate learning contexts should consider their aims in challenging prevalent norms that students adhere to in their professional practice. There may be a range of authentic practices to borrow from in the design of student assignments, including the status quo, but the array of authentic practices should be curated for their capacity to create innovation. Innovation implies change, so it is more likely that these practices may be new to students, causing tension. Program and course learning goals can provide guidance on the selection of authentic practices for students to enact in their learning experiences.

Collaborative learning experiences were also authentic in the sense that students appeared to bring their authentic, whole selves to the learning environment. While students were not directly surveyed about their agreement with this statement—that they indeed brought their whole selves to this learning context—the call to do so was an explicit part of the learning design. Their observable interactions were marked by candor and a wide range of emotions. In addition to providing support, students also challenged each other to make progress on their design projects and to continue growing as graduate students. This supports the theme of "being real" (Caskurlu et al., 2021) in online learning and its importance for creating learning environments that feel safe to students, merging findings from educational psychology, technology, and the learning science (Shea et al., 2022). It also supports the assertion that some synchrony may be critical to these relationships (Peterson et al., 2018). Students had 15 months of previous experience with each other, including two in-person residency experiences. The depth of student relationships in this case is critical to understanding their collaborative efforts. As Prof. Skye put it, "cooperation isn't just about finding the right formula or getting the right, you know, scaffolding and structure in place. It is a little bit about the, you know, the people, you know, kind of finding, developing these relationships." Chapter 4 includes a quote from a student expressing her appreciation for the relationship-building that occurred over the previous year, allowing them to engage in deeply interpersonal, challenging, and honest collaborative work.

These findings are supported by research that shows a sense of social interdependence can be supportive of stronger cognitively-demanding accomplishments, but these social aspects of collaboration may be taken for granted in research on online learning (Shea et al., 2022). This case provided an example of how shared goals and interdependence can lead to achievement, productivity, and motivation (Johnson & Johnson, 2009). To frame it another way, students displayed responsibility for their learning through self-regulation and generativity in their discussions by inviting responses and building social presence (Beth et al., 2015). Survey instruments are available for designers and researchers to study students' sense of social interdependence as they engage in collaborative learning in other learning contexts (Shimizu et al., 2020).

#### **Implications for Theory about Online Learning Environments**

The Community of Inquiry (COI) framework has been the predominant conceptualization of co-constructive collaboration in online learning environments. All domains were evident in qualitative analysis of this case. Prof. Skye embodied teaching presence with the design and organization of the course, facilitation, and direct instruction. One of the largest themes from this study could not be more succinctly stated than the definition of social presence: "the ability of participants to identify with the community (e.g., course of study), communicate purposefully in a trusting environment, and develop inter-personal relationships by way of projecting their individual personalities" (Garrison, 2009). There was a strong sense of group cohesion and open communication among the learning community. Students expressed they were re-energized by the cognitive presence of the course, concentrated in two design projects, one at the course level and their long-term program capstone project. Students expressed difficulty in juggling the variety of exercises and activities, rotating between individual, team, and whole-class activities, but relied on their established cohort relationships to persevere.

The COI framework has regained scholarly attention since the influx of online learning during the pandemic spurred more research on what works and why in course design (Greenhow et al., 2022). The framework is originally rooted in asynchronous computer-mediated learning environments, but recently scholars have critiqued and updated it to align better with synchronous online learning (Shea et al., 2022). Scholars have also criticized the conceptualization of teaching presence for overstating the responsibility of those tasks solely

falling on the instructor (Dempsey & Zhang, 2019). For example, every survey item begins with "The instructor..." and then lists an instructional move. Other scholars have proposed learnercentric dimensions to counterbalance this emphasis on the instructor (Kozan & Caskurlu, 2018). This study integrated Learning Presence (Shea et al., 2012) into its schema because of the face validity of its codes. Many of the self-regulatory behaviors and statements about group selfawareness were evident in team retrospectives and student reflections. There was qualitative evidence of emotional presence: "the outward expression of emotion, affect, and feeling by individuals and among individuals in a community of inquiry, as they relate to and interact with the learning technology, course content, students, and the instructor" (Cleveland-Innes & Campbell, 2012, p. 283); and autonomy presence, that is, student to student learning without teaching presence (Lam, 2015). However, Kozan and Caskurlu (2018) argue that these additional dimensions would violate the intentions of the original COI framework in which all members take turns in different roles, sharing the responsibility to establish each type of presence. The findings of this study support elements of the COI Framework and proposed learner-centric additions of dimensions to the extent the framework describes teaching and learning processes in an online learning environment. As a qualitative case study and not an experimental or quasiexperimental designed study, findings cannot contribute to further development of the COI framework as a theory of action, explaining causal or correlational effects.

Even with these modifications to the COI framework, it still is developing as a theory, not providing much explanatory power for why certain learning experience designs work better than others. It does not present a coherent theory of action. While the findings of this study cannot address that issue, they do signal wisdom in being more inclusive of important themes of online learning. Martin and Borup (2022) present five important themes in research related to online learner engagement (Figure 3). While these categories overlap and are not intended to be exhaustive, they remind us of the complex dynamics of online learning. The importance of a sense of community was emphasized in the earlier section on the authenticity of collaboration in this case study. The three presences from the COI Framework are useful for understanding the interactions of constructivist, collaborative discourse in a learning community. The different types of learner, instructor, and interface interactions highlight the importance of the LMS design and the value of learner-learner interactions as an opportunity to engage in metacognitive behaviors (i.e., Learning Presence). The communication dimension provides vital information for any study on collaborative learning, shaping the design of those experiences. The term "bichronous" denoting "mixed modality" does not offer much analytical utility, nor does the old dichotomy of synchronous vs. asynchronous. Labeling a course "fully asynchronous" has practical value when the course is being designed or when students register for it. Beyond that, the field should continue moving into a direction of increased nuance and deepened conceptual understanding about synchronous and asynchronous interactions within a learning community. More important than the modality may be the nature and frequency of interactions among learners and instructors. Lastly, the theme of collaboration stands on its own, affected by all the other themes.

## Figure 3

Guiding Themes and Frameworks for Online Learner Engagement Research from Martin &

Borup (2022)



## A Design Framework for Collaborative Learning

Based on these insights into theory of collaborative learning, I present some practical

implications on five aspects of online collaborative learning design:

- 1. Program Context for Collaboration
- 2. The Nature of the Collaborative Tasks
- 3. Learning Supports and Autonomy
- 4. Shared Metacognition
- 5. The Emotional Journey of Learning

The findings of this study were shaped by the larger program context and its cohort

model. Like previous studies on cohort-based online graduate education (McPhail et al., 2008;

Tisdell et al., 2004), students valued the relationships they had formed earlier in the program,

particularly in-person residency experiences, to engage in the cognitively demanding collaborative work of the course. Students also reached a milestone in the timing of their group formation for the capstone program project while completing a design project in this course. Program directors, faculty, and learning designers should consider where students are in their program experience when designing collaborative experiences. The design features of collaborative learning in this course may not have been appropriate for students' first semester in the program. These findings are relevant even for programs that do not follow a cohort model. Data can be collected to evaluate the design and experience of collaborative learning throughout a program experience even as the composition of course student rosters vary.

The findings of this study also highlight the importance of designing collaborative learning experiences at the right scale in proportion to the type of collaborative and cognitive processes students are undertaking. Students engaged in a semester-long design project that was deliberately paced to allow space for creativity. Looking back at the data, one example of a problem of practice and a proposed innovation stood out. A group of students (Sara, Jessica, and Scott) identified the slow pace of change in their institutions and imperfect shared governance as a problem in their field. They proposed an "innovation lab" bringing together more stakeholders across the institution to convene a few times a year and formulate solutions to institutional challenges. To maintain confidentiality, I was unable to document their design thinking process in detail (e.g., share screenshots of their work), but Chapter 4 presents their preliminary collaborative discussion in defining innovation and searching for a common problem of practice. It was only a glimpse of the semester-long design thinking process they undertook.

Other types of collaborative learning activities, perhaps less demanding of creativity and instead requiring other skills, may require less time for students to complete or require less

scaffolding. The course goals were transformative, seeking a shift in student mindset as leaders. Courses with goals that are purely conceptual or methodological may not require as many resources for the collaborative process. The learning goals and demands of the collaborative tasks should be considered in designing the sequence, schedule, and resources for collaborative learning activities.

Findings showed the utility of learning supports, including detailed assignment directions, breaking down the project into discrete components, and preparatory directions for students to engage in discussions about readings or their capstone writings. Similar supports are likely necessary in other graduate learning contexts. However, the extent of student autonomy should be considered in relation to course learning goals and the purposes of collaboration. Individual teaching philosophies and pedagogical approaches would also factor into these design decisions.

Although shaped by the religious roots of the research site, secular institutions may also benefit from the whole-person perspectives of *cura personalis* and *cura apostolica* in this case study and how Prof. Skye supported students' mental health. Posselt (2021) researched the prevalence of anxiety and depression among different student identities in various learning contexts, finding a significant relationship with students' perceptions of competitiveness in their courses. Approaches to collaborative learning and students' whole identities could ameliorate the strain of graduate education.

Findings also supported literature that argues for the importance of shared metacognition among students (Järvelä et al., 2021). Periodic team retrospectives were an effective way for students to reflect on their learning behaviors, including what was working well and what they could improve. It also prompted them to plan practical next steps in their collaborations. This appeared to be more efficient than individual team evaluations by enhancing the collaborative process and prompting students to set shared goals. It also provided the instructor useful information about where to provide students feedback or encouragement.

Online learning entails many emotions for students (Zembylas et al., 2008). Findings on student perspectives of their collaborative learning experiences offer practical implications for learning design. A common design practice, experience mapping, would be effective for faculty members and learning designers to anticipate the emotional journey students may undertake in a course and plan supports for them during those times (Crane & Cook, 2023; Samson et al., 2017). Findings showed the value of replicating real-world collaborative practices, but as the learning designer, Charlotte, pointed out:

Like how much authenticity we need to have in the overall learning process...do we have to facilitate that, like start gradually with a little bit authenticity and then gradually move to a more full authentic project. Actually, I think my answer is no. I think it depends on your view of the learner, whether they're capable of doing that at the very beginning of their learning journey.

Charlotte's comments highlight the value of mapping students' journeys not only through the course, but also throughout their entire degree program. This study provided a detailed example of the interplay between a course design and the overarching program experience.

#### Limitations of this Study

The study encountered several limitations that affected the range and interpretation of findings. In terms of available data, observations of how students collaborated were limited to synchronous class meetings and one team session. Student presentations revealed a final collaborative product, but not discrete artifacts along the way that were suitable for studying how collaboration occurred within different stages and developed over time. Drawing on computer-supported collaborative learning (CSCL) literature, the study was set up for a majority asynchronous course that would contain a greater number of student exchanges in LMS

discussions or group projects. Data on student perspectives were also limited due to a low survey response rate.

Some planned analyses were not a good fit with the data or the details of the case. For example, the preselection of teams would have skewed a more robust Social Network Analysis (SNA), and important student team interactions would have been missing from that analysis. Some studies have had greater success in using SNA when the courses were designed as majority asynchronous (Shea et al., 2010). Survey data were intended to triangulate findings from observations of student collaborations but in addition to the low response rate, lacked variation and were inconclusive, therefore limiting their analytical utility. As a result, the study primarily depended on content analysis methods to analyze data from the case.

#### **Recommendations for Future Research**

Future research should continue to develop theory of student engagement in collaborative online learning environments. A multi-case study could investigate differentiation in collaborative patterns among multiple small teams throughout a semester. This would lead to insights about different learning behaviors and patterns among small groups of students. Patterns across groups in terms of their mix of synchronous or asynchronous interactions could expand the range of collaborative learning designs to be more inclusive of students across time zones or affected by other conditions that may limit their capacity for majority-synchronous designs. Collaborative design thinking processes, including problems of practice and proposed innovations, should be studied and presented in more detail than allowed in this study.

This study demonstrated the impact of a cohort-based learning on the nature of student collaboration. Students reached the milestone of forming their capstone project teams during this course, which occurred halfway through the program. A longitudinal research study using SNA

methods (e.g., Sharma & Tietjen, 2016) complemented by student interviews could produce significant findings about how students develop their collaborative relationships over time, analyzing networks within the larger community (Conrad, 2005; Thorpe et al., 2007). It could also track fluctuation in group cohesion (Aviv et al., 2003) in different learning contexts within the program (e.g., lurkers in Zoom sessions might be the ring leader within their own small team meetings). These insights could guide program design and the timing of team-based milestones or forming of interventions for students lacking a sense of group cohesion. Each cohort or course section may have its own culture and display authenticity in different ways. Other qualitative research studies could explore the variety of collaborative learning cultures and further investigate students' perceptions of bringing their authentic, "whole selves" to the learning environment.

Another area of promising research would be the further development of learning analytics metadata as a tool to understand the nature of student collaborations. For example, Hafour and Alwaleedi (2022) used quantitative data (e.g., logged time, number of edits) about a writing collaboration among students in an online shared document to understand their emotional engagement in the activity. Quantitative data could complement qualitative findings or provide more readily accessible snapshots of collaboration occurring and the density of student interactions. Analytics could also provide information to improve the use of that type of learning technology to support student collaboration.

Additional studies on graduate online collaborative learning can also provide insight into undergraduate digital learning experiences, such as the benefits of metacognition (Means & Neisler, 2021). Caution should be taken when transferring designs to other contexts with different learner profiles, but exemplar designs and instructional moves could be replicated with success for undergraduates. Best practices in graduate collaborative learning could be relevant to designing academic advising or other learning experiences outside formal courses that students complete in their undergraduate studies. For example, the connection between graduate in-course learning and their professional practice could inform the design of student internships or community-service experiences.

#### Conclusion

Prof. Skye depended on collaboration with a learning designer, media producer, and graduate assistant to design collaborative learning in this course. After designing the course, he expressed his appreciation for all the types of knowledge the learning designer and media producer brought to the design process, attributing significant aspects of the final course design to their input. In the final interview, Prof. Skye also reflected on the overall learning experience he had created and stated:

We've thought that process through pretty heavily, and I'm very hopeful and I'm not sure how to say it is... If somebody wants to point out that this is risky or ambiguous... I have no argument with that, but what I would also say is, but it's incredibly authentic and potentially transformative.

The course pre- and post-design encouraged an interconnectedness that would be necessary to make collective change as educational leaders for their institutions and the social good. The case illustrated possibilities for profound online learning experiences in which a community of learners care for each other, following the lead of the instructor's ethic of care for students (Noddings, 2013). Students took risks and supported each other in the process, as shown in their metacognition and reflections. Prof. Skye brought his authentic self to the learning space while centering the subject matter in conversations with students (Palmer, 2017). Even if online interactions are not everyone's preferred way to connect with other human beings, this case

demonstrated that bonds can be strengthened over a computer screen. As one student captured the communal feeling in a meeting chat, "I'm feeling a lotta love on this zoom screen right now."

## Appendix A

Coding Scheme for Analyzing Interactions in Collaborative Learning (Adapted from Gunawardena et al., 1997)

Phase 1: Sharing/Comparing of Information

- A. A statement of observation or opinion
- B. A statement of agreement from one or more other 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.

Phase 2: 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

Phase 3: Negotiation of Meaning/Co-Construction of Knowledge

- A. Negotiation or clarification of the meaning 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

Phase 4: Testing and Modification of Proposed Synthesis or Co-Construction

- A. Testing the proposed synthesis against "received fact" as shared by the participants and/or their culture
- B. Testing against existing cognitive schema
- C. Testing against personal experience
- D. Testing against formal data collected
- E. Testing against contradictory testimony in the literature

Phase 5: Agreement Statement(s)/Applications of Newly-Constructed Meaning

- A. Summarization of agreement(s)
- B. Applications of new knowledge
- C. Metacognitive statements by the participants illustrating their understanding that their knowledge or ways of thinking (cognitive schema) have changed as a result of the conference interaction

## Appendix B

Coding Scheme for Learning Presence	
(Adapted from Shea et al., 2012)	

Category	Code	Description	Sample
Forethought	FP1 – Goal Setting	Online learner discourse	"At the end of next week, as
and Planning		establishing desired tangible	a team, we have to submit a
		and intangible outcomes	summary of our discussion
			points."
	FP2 – Planning	Online learners considering	"Why don't we list (all of
		approaches, procedures, or	us) what we perceive to be
		tasks to be used to attain goals.	the cons of outsourcing."
	FP3 – Coordinating	Online learners distributing,	"Are you picking this [task]
	& assigning tasks to	sequencing tasks and sub-tasks	up next?"
	self and others	to others/self for future	
		completion	
Monitoring	M1 – Checking for	Online learners seeking	"Are we sure that everything
	understanding	verification of understanding of	has been cited correctly?"
		tasks, events or concepts from	
		other online learners.	
	M2 – Identifying	Online learners drawing	"I am unable to open the
	problems or issues	attention of other online	quiz. Does anyone else have
		learners to difficulties that may	this problem?"
		interfere with completion of	
		tasks or other outcomes	
	M3 – Noting	Comments between online	"I did some research and
	completion of tasks	learners that indicate that	then typed up the employer
		certain tasks or activities have	section."
		been finished to support	
		attaining a goal.	
	M4 – Evaluating the	Statements between online	"I fully agree with this
	quality of an end	learners that judge the	concept. This is definitely an
	product, its content	accuracy, comprehensiveness,	area we should build upon."
	or its constituent	relevance or other aspects of an	
	parts	end product or its components.	
	M5 – Appraising	Comments between online	"I like being on the 'con'
	level of interest and	learners about self or others'	end of this discussion. I am
	engagement	engagement, interest,	not a supporter of
		commitment or participation	outsourcing."
	M6 – Noting one's	Statements about individual or	"I am more of a hands-on
	own or group's	group's strengths / weaknesses	learner."
	learning behavior	(metacognitive knowledge) or	
		changes in thinking between	
	01 0 1	online learners.	
Strategy Use	SI - Seeking,	Unline learners requesting,	"If you need any assistance,
	offering, providing	offering, or providing	please let me know what I
	neip or information	assistance or information	can do to neip you out."
		related to learning materials,	

S2 – Seeking, offering, providing clarification	Seeking, offering, providing clarification between online learners	"Just as a point of clarification, are you seeking a critique of the specific information contained in the readings or are you concerned with our opinions about how the material is presented?"
S3 – Advocating	Encouraging or urging other	"Has everyone contributed
Effort	online learners to contribute to	their pieces?"
	the online group	

## Appendix C

#### Instructor Interview Questions Adapted from Czerkawski and Lyman (2016)

# Design Phase Interview 1 (Instructional Needs & Defining Instructional Goals and Objectives) – early in design phase

- 1. What are the characteristics of a collaborative learning activity (CLA)? How do you define them?
- 2. Why did you plan to include CLAs in your course?
- 3. What course goals and learning objectives do these CLAs support?
- 4. How do you typically orient students to collaborative learning?
- 5. What conditions do you try to create for students to engage in these CLAs?
- 6. What are some challenges you have had with using CLAs in online courses in the past?
- 7. Are there any professional or content standards that should be considered?

# Design Phase Interview 2 (Learning Environments) – end of Design phase, pre-Course launch

- 1. What are you most excited about in the course?
- 2. What specific CLAs have you planned for the course?
- 3. What particular learning goals do the chosen CLAs support?
- 4. How should students feel during them?
- 5. How will interaction and collaboration be structured?a) To encompass diverse learners?
- 6. What facilitation strategies do you plan to employ in the course? (or How do you plan to facilitate...)
- 7. What feedback mechanisms are in place?
- 8. What is the intended use of self- and peer-assessment?
- 9. What media objects will be used and for what purposes?
- 10. What technologies will be used and why?

## **Post-Course Interview (Summative Assessment)**

- 1. How did you monitor student activity in completing CLAs other than time logged in?
- 2. Were the CLAs being completed like you planned them to be?
- 3. Did you do anything to adapt the activity or modify the learning environment to revise the CLAs?
- 4. How did the online learning technologies help or hinder the completion of these CLAs? Did students go "offline" from the LMS?
- 5. How did the CLAs in your course help students meet course learning objectives?
- 6. What student feedback did you receive about these CLAs besides the Student Perceptions survey?
- 7. What is your interpretation of results from the COI surveys and Student Perceptions Survey?
- 8. How would you revise these CLAs for use in future courses?
- 9. Has your view of CLAs in online courses changed? How does it affect what you do in f2f teaching?

## Learning Designer Interviews

Interview 1

- 1. How do you define collaborative learning activities (CLAs)?
- 2. How do you see learning technologies supporting or hindering the completion of CLAs?
- 3. How do you approach the first phase in the ELED framework Identifying Instructional Needs and conducting a Learner Analysis?
- 4. What data is useful to make decisions about changes to learning environments?
- 5. What kinds of instructional goals do you see CLAs most often addressing?
- 6. What kinds of evidence of student learning in CLAs is most often gathered?
- 7. As a designer, what is your influence on shaping a learning environment to be conducive to CLAs?
- 8. How can designers play a role in the Summative Assessment phase of design?
- 9. How would you like to adapt this procedural framework in your work with the instructor?

Interview 2

- 1. You inherited the course map and worked mainly on the development side of the overarching design. What did you notice about CLAs in what you received?
- 2. What kind of instructional or learning goals do you think CLAs are best suited for?
- 3. What is key to the student side of CLAs?
- 4. How did you work with the faculty to create CLAs in the course? What was the design process / thinking?
- 5. What is your take on the rationale for each of the specific CLAs (name them)?
- 6. What do you think about the regular check ins at the end of each design sprint?
- 7. What was your influence on selection of learning technologies to support CLAs?
- 8. Any other thoughts on the design of CLAs in this course?

## Appendix E

Community of Inquiry (COI) Survey (Retrieved from https://coi.athabascau.ca)

5-point Likert Scale: 1=Strongly Disagree 2=Disagree 3=Neutral 4=Agree 5=Strongly Agree

### **Teaching Presence**

#### Design & Organization

- 1. The instructor clearly communicated important course topics.
- 2. The instructor clearly communicated important course goals.
- 3. The instructor provided clear instructions on how to participate in course learning activities.
- 4. The instructor clearly communicated important due dates/time frames for learning activities.

#### Facilitation

- 5. The instructor was helpful in identifying areas of agreement and disagreement on course topics that helped me to learn.
- 6. The instructor was helpful in guiding the class towards understanding course topics in a way that helped me clarify my thinking.
- 7. The instructor helped to keep course participants engaged and participating in productive dialogue.
- 8. The instructor helped keep the course participants on task in a way that helped me to learn.
- 9. The instructor encouraged course participants to explore new concepts in this course.
- 10. Instructor actions reinforced the development of a sense of community among course participants.

#### Direct Instruction

- 11. The instructor helped to focus discussion on relevant issues in a way that helped me to learn.
- 12. The instructor provided feedback that helped me understand my strengths and weaknesses relative to the course's goals and objectives.
- 13. The instructor provided feedback in a timely fashion.

#### Social Presence

#### Affective expression

- 14. Getting to know other course participants gave me a sense of belonging in the course.
- 15. I was able to form distinct impressions of some course participants.
- 16. Online or web-based communication is an excellent medium for social interaction.

### **Open communication**

17. I felt comfortable conversing through the online medium.

- 18. I felt comfortable participating in the course discussions.
- 19. I felt comfortable interacting with other course participants.

### Group cohesion

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

- 21. I felt that my point of view was acknowledged by other course participants.
- 22. Online discussions help me to develop a sense of collaboration.

## **Cognitive Presence**

## Triggering event

- 23. Problems posed increased my interest in course issues.
- 24. Course activities piqued my curiosity.
- 25. I felt motivated to explore content related questions.

#### Exploration

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

- 27. Brainstorming and finding relevant information helped me resolve content related questions.
- 28. Online discussions were valuable in helping me appreciate different perspectives.

#### Integration

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

- 30. Learning activities helped me construct explanations/solutions.
- 31. Reflection on course content and discussions helped me understand fundamental concepts in this class.

## Resolution

- 32. I can describe ways to test and apply the knowledge created in this course.
- 33. I have developed solutions to course problems that can be applied in practice.
- 34. I can apply the knowledge created in this course to my work or other non-class related activities.

## Appendix F

Student Perception Survey (Adapted from Ku et al., 2013)

5-point Likert Scale: 1=Strongly Disagree 2=Disagree

- 3=Neutral
- 4=Agree
- 5=Strongly Agree

## **Team Dynamics**

- 1. My team develops clear collaborative patterns to increase team learning efficiency
- 2. My team trusts each other and works toward the same goal
- 3. My team members clearly know their roles during the collaboration
- 4. My team sets clear goals and establishes working norm
- 5. My team members reply to all responses in a timely manner
- 6. My team members communicate with each other frequently
- 7. I trust each team member can complete his/her work on time
- 8. My team has an efficient way to track the edition of documents
- 9. My team is receiving feedback from each other
- 10. Communicating with team members regularly helps me to understand the team project better
- 11. My team members encourage open communication with each other
- 12. My team members communicate in a courteous tone

## **Team Acquaintance**

- 1. My team members share culture information to know each other better
- 2. My team members share personal information to know each other better
- 3. Getting to know one another in my team allows me to interact with teammates more efficiently
- 4. My team members share their professional expertise

## **Instructor Support**

- 1. The support from the instructor helps my team to reduce anxiety among team members
- 2. The instructor acts as a referee when our members cannot seem to resolve differences
- 3. My team is receiving guidance on the group project from the instructor

#### Appendix G Design Narrative

Hoadley (2002) argued for the inclusion of design narratives in design-based research studies to help readers understand the context of findings and their relevance to other contexts. This section provides an account of the course design drawing from my first-hand knowledge of the university and Center for digital learning, observations of design meetings, design documentation, and interviews with the faculty and learning designers. A design narrative presents the who, what, when, and where of a learning design, as well as its surrounding conditions and context. It is not an exhaustive record of all decision decisions but highlights major design decisions and key insights into its features. To protect the confidentiality of participants, I do not include images of design documents or the Canvas site.

### **University Context**

At the university where this research was conducted, schools and departments partner with a Center for digital learning that employs learning designers, media producers, learning technologists, faculty support staff, and project managers to create online courses and other digital learning experiences. Before 2019, when the Center was formed, schools and departments would contract with external Online Program Management companies to provide these services. The creation of the Center created more internal capacity at the University for creating and supporting student online learning. The Center reports to the Office of the Provost. The university contains several graduate schools offering a wide range of professional programs, many which started offering online or hybrid options in the last five years.

#### Working with the Center and Joining a Design Team

Prof. Skye was enrolled in a month-long Canvas course for faculty designing online courses for the first time with the Center. The course had resources and activities for faculty to share thoughts and questions about the design process with the Center and initial ideas for learning outcomes, assessments, and their approach to finding content. The course ended in a brief reflection about their learning. The course was geared towards newcomers to online teaching and learning, but for faculty like Prof. Skye with broad range of teaching experience, it offered an introduction to working with the Center and a head start on planning the course.

This process overlapped with the start of his design collaboration with a Learning Designer (LD1) and Media Producer. This was the first time that the faculty member had worked on a design team. Previously, he "wore all hats" building out the LMS course site and producing his own multimedia content. Most often meeting in person, LD1 set the agenda for design meetings, which ran several times a month from September to December of 2021. In early 2022, a different Learning Designer (LD2) took over to assist Prof. Skye in developing the Canvas site, finalizing course details, and selecting learning technologies. Most meetings ended in reexamining and adjusting the development timeline. Prof. Skye and the design team held 21 meetings over a 9-month period. Usually these projects follow a 6-month timeline.

### **Course Ideation**

The first few months of the design process involved course outlining, selecting course topics, and drafting a syllabus. LD1 initiated the collaboration by having everyone complete a work personality survey to familiarize themselves with each other's working styles. LD1 also presented the overall design process, beginning with contextual, "macro" questions about the course (e.g., where it fits in the program, learner profiles, course learning goals), then course mapping (i.e., outlining), and possibly journey mapping for students (i.e., plotting the course events from their point of view). They would move into more detailed design of each module/week of the course, then create a prototype of a module for formative review by another learning designer. After receiving that feedback, they would move into developing the course on Canvas.

From the beginning, Prof. Skye emphasized the nature of the learning goals being transformative and rooted in reflection as opposed to acquiring only new conceptual knowledge. The design team deliberated on the structure of the course: units, one module per week, key concepts. Prof. Skye mapped out the course structure in Miro then shifted to a syllabus template as a means to outline the course.

Early on he identified a design thinking process and related project would be the major assignment for the course. He consulted with a VP of innovation for advice on how to present the process to students. The development of the project details would continue over the next several months.

In this early design stage, the Media Producer and Prof. Skye discussed case study examples for instructional media in the course, but they later shifted towards interviewing experts in the field of educational leadership to complement other learning resources. They produced these multimedia resources over the next several months.

In the ideation phase, Prof. Skye mentioned several goals for the course design. After one of the first design meetings, Prof. Skye noted the benefits of being asked to articulate the reasons for different components of the course outline. Answering those questions helped him think through the design. Prof. Skye expressed the need for activities to be interactive and engaging, not "click through" which occurred to him during the principles training course at the beginning of the partnership with the Center for digital learning. Blogging or student reflective writing was going to be a substantive part of the course. Prof. Skye mentioned his goal to incorporate creativity and play into the course.

## From Ideation to Design and Development

After the course outline was mostly complete, LD1 showed Prof. Skye a sample Canvas site to present the look and feel for him to consider personalizing in his course. They also discussed setting up a prototype (i.e., a sample module/week) for another learning designer at the Center to review and provide formative feedback. They deliberated on the best way to "blueprint" the course (i.e., create each week of the online learning space in more detail).

In early 2022, LD2 joined the project as the course design was shifting into development on the Canvas site. LD1 stepped out of the design process. The discussion about student writing/blogging continued. LD2 researched the platform, Edublogs, and presented her findings to Prof. Skye, who reviewed the tool himself. At the next meeting, he explained his decision not to go forward with it, mostly due its interface and fit with the goals for that series of assignments. LD2 presented the results of the prototype review to identify areas of course design that still needed to be addressed. Prof. Skye finished assembling the majority of learning resources for students. Now that the course was outlined and Canvas building started, Prof. Skye started to interleave content more.

Moving from collecting learning resources to assessment design, a graduate assistant joined the team to assist Prof. Skye in assignment design and incorporating design thinking. Providing a graduate student perspective, she advocated for balancing structure in the course with leaving the learning space open enough for students to explore. This led to an assignment series involving choice and a sense of play for students to select among an array of possible learning tasks, while the design project remained a work in progress.

Prof. Skye sketched out graphic design ideas for the layout of the course, which LD2 translated to Canvas to the extent it could replicate his original ideas. Moving from blueprints to Canvas also allowed him to identify any remaining gaps in the course design.

Prof. Skye continued to consider the fit of the course within the program and how students could make progress towards program goals while completing the course. LD2 and Prof. Skye agreed that Miro and its templates would be a good fit for students to use as a platform to ideate their design projects. As part of the design project, LD2 recommended a metacognitive activity for students to reflect on their learning. Prof. Skye decided to make this a team exercise, replicating team retrospectives that occur in design thinking, because an individual task might feel like busy work to students in this context.

In the last two months of design with the Center, Prof. Skye, LD2, and the GA finalized the assignments. Prof. Skye decided to switch from a rubric approach to a list of submission qualities for some assignments. LD2 provided formative feedback on the course design using the Center's rubric for online course quality. Prof. Skye continued to tweak the course over the summer. One major adjustment was to swap out that series of blogging assignments with writing assignments related to the program capstone project.

In his retrospective interview after teaching the course, Prof. Skye expressed his appreciation for the learning design support, particularly the encouragement from the media producer to pursue ideas for instructional media and produce high-quality original content; LD1's assistance during the ideation phase; and LD2's suggestion for metacognitive student exercises.

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