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Uncovering the Layers of Design Processes of a Global Undergraduate Engineering Course: An Interactional Ethnographic Approach

A dissertation submitted in partial satisfaction of the

requirements for the degree Doctor of Philosophy

in Education

by

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ABSTRACT

Uncovering the Layers of Design Processes of a Global Undergraduate Engineering Course: An Interactional Ethnographic Approach

by

Jenna (Ji Eun) Joo

This dissertation presents an ethnographic study of an instructor's design logic and thinking underlying a global, multi-country undergraduate engineering design course. The study analyzed how, in what ways, and for what purposes, he continually defined and reformulated what counted as (Heap, 1991) "new" learning opportunities and outcomes for engineering design thinking in the 21st century, through his interactions with globally distributed groups of students and teaching teams (i.e., US, India, Israel, China and South Korea). By examining what was discursively made present to students in moment-by-moment and over-time, I identified the processes and practices that members of the class needed to know, understand, produce and engage in (Heath & Street, 2008) to develop their capacities to work in intercultural contexts on local design problems.

Discourse analysis guided by an Interactional Ethnographic logic-in-use (Birdwhistell, 1977), grounded in a social construction of knowledge perspective (i.e., Green, Skukauskaite, and Baker, 2012; Castanheira, Crawford, Dixon and Green, 2001), framed the ways in which I examined the work of participants, what they oriented to and were held accountable for, and how what counted as this "new" instructional approach was

socially constructed (Heap, 1991; Bloome & Egan-Robertson, 1993, Castanheira et al, 2001). This inquiry process required consideration of multimodal texts available to students in different technology-enabled educational contexts, public (re)presentations of this developing program as well as the construction of transcripts. From this perspective, texts were spoken, written and/or published works (Bakhtin, 1986) constructed by key actors (the designer, the support team, a teaching assistant and students).

The analyses made visible how the instructor's discourse focused students on taking a problem-oriented approach to resolving challenges in working interculturally on a common task (e.g., the design thinking project). Three inter-related challenges that impacted the collaborative work and opportunities for learning for students were identified that influenced how the course was designed. The first involved the instructor's desire to engage each participating campus site in face-to-face opportunities from their national sites. The second related to the necessity to address the unique institutional and socio-national contexts of each institution. And, the third, led to the need for the instructor to adapt the planned program to address unanticipated differences in participation due to the holidays in each country.

The present study demonstrates how designing a global course created unanticipated challenges not only for students but also for the instructor, a factor not considered in discussions of innovative design initiatives in higher education. Additionally, this study makes visible how undertaking an Interactional Ethnographic approach, grounded in discourse analysis, makes possible an iterative, recursive and abductive process for constructing warranted understandings of new and emerging curricular design processes in particular interdisciplinary and intercultural (global) contexts.

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Chapter 1. Introduction

This dissertation is *not* a study about answers, but rather about *ways of understanding and uncovering* dynamic design processes of what was claimed as "new" ways of learning in a unique global engineering course. In this chapter, I first begin with how I became involved in the larger research project, which began with the collaborative work between Engineering Educators and Educational Ethnographers, in order to situate my entry into the research site under investigation. I will then situate this study within a recent trend in higher education curricular development and bring together a set of interrelated and interdependent conceptualizations of language, culture, and context, which have informed the methodology and general direction undertaken in this study.

1.1. Entering the Research Site as an Outsider

What drew me into the research project from which the current study originates was my interest in higher education, and more specifically in distance education. Prior to conducting this study, I had interviewed California community college students from different disciplinary backgrounds about their online learning experiences in a range of subject matters and found that online courses serve to meet students' varying needs as they work towards their academic and career goals. In wanting to gain further insight into how new and emerging educational configurations in higher education affect student learning, I volunteered to participate in research meetings in which Engineering Educators and Educational Ethnographers (our group) were engaging in ongoing dialogues (2012-present) about teaching-learning relationships in a unique global engineering course (NDE or *No-Distance-Education* hereafter), which used Internet technology to link classrooms around

the world to enable student learning across national borders and time zones. This participation eventually led to a publication in Pedagogies' special issue on *Exploring Challenges in Designing and Teaching (Inter)disciplinary and (Inter)cultural Programs in Higher Education* based on the outcome of ongoing dialogues between Engineering Educators and Educational Ethnographers (Green, Dai, Joo, Willams, Liu and Lu, 2015). The details of how my participation in this early work led to the formation of the current study are presented in Chapter 4.

Because of the relationship that I developed with Engineering Educator team through the early work, I was able to gain full access to the archival records of their Spring 2014 NDE course, which consisted of video recordings of weekly lecture sessions and various written documents (i.e., course syllabus and lecture slides), in order to support my research interest on student learning in this unique setting. However, upon exploring the available video records, I came to a realization that, since I did not have any lived experience of the course, understanding what was happening in particular moments in time was extremely challenging. Moreover, the video recordings were mainly of the instructor's talking in front of class, and not of students' individual and group work during lecture sessions, which limited what I was able to observe and analyze. Such realization led to me to think critically about my role as an outside researcher and take a reflexive stance in formulating research questions for the present study.

The following question arose after making a conscious effort to suspend my own belief about what constituted *newness* in this unique global engineering course to explore its design processes *from the perspective of insiders*:

> How can I, as an outside researcher without any lived experience of a global engineering course, conceptualize the design processes of the course, which claimed to provide "new" learning opportunities and outcomes for students?

This question served as the overarching question as I uncovered the layers of work that the instructor and the teaching team engaged in to create and make present to students what they claimed as "new" learning opportunities and outcomes postsecondary students. Addressing this question required a series of intertextual and interdependent levels of analyses to situate what counted as "new" in this engineering course. The main representative data included publicly available information (i.e., websites, research papers) as well as the video records of the focal course and course syllabi. Throughout this investigation, I consulted with the NDE program manager, Dr. L, to obtain additional resources or to get confirmation on my analyses. In the following section, I situate this study within a recent trend in higher education curricular development and outline the implications of bringing together conceptualizations of language, culture and context in researching higher education.

1.2. Understanding New Curricular Designing Process in Higher Education: Educating Students for 21st Century

In the past decade, the importance and quality of teaching and learning in higher education have received increased attention, along with the heightened motivation for creating new teaching-learning environments in order to provide unique and better learning opportunities and outcomes for 21st century postsecondary students (e.g., Ramsden, 2003; Garrison & Vaughan, 2008; Oliver, 2002). However, to this day, studies of teaching and learning in higher education remain focused on generic terms, often masking their complexity and diversity (Neumann, 2001; Klette, 2007). In addition, relatively less

attention has been paid to how postsecondary instructors, who associate strongly with their respective disciplines, engage in their teaching scholarship, especially when it comes to new curricular designs (e.g., Lueddeke, 2003).

Contemplating on such issues in the context of changing patterns in knowledge production, Kelly, Luke, and Green in their introduction to the 2008 volume of *Review of Research in Education*, noted that "[c]omplex histories and ethnographies of knowledge production show that universities, school systems, governments, and corporations are in transition, developing new systems for the generation, systematization, surveillance, and management of knowledge" (p. vii). Moreover, they added that, "there is a growing recognition that we are educating current students for jobs, pathways, and life worlds that are still in formation—and some that have yet to come into existence" (ibid, p. vii). Such changing patterns of knowledge production "…challenges the long-standing curriculum directions that have their roots in modernist traditions where the boundaries of knowledge were assumed to be known and the skills needed for future learning and work taken as identifiable and quantifiable" (ibid, p. vii). Their arguments raise a series of important questions relevant to the present study: If we acknowledge that knowledge production patterns (in a particular discipline) are no longer predictable, how can we make sense of what is being accomplished in today's knowledge producing spaces (e.g., college classrooms), which claim to provide "new" learning opportunities and outcomes for 21st century students? How can we conceptualize and understand learning that is supposedly "still in formation" or "[has] yet come into existence"?

Gaining knowledge, particularly that of *disciplinary knowledge*, according to Kelly, Luke and Green (2008), "entails more than acquiring basic skills or bits of received

knowledge. It also involves developing identity and affiliation, critical epistemic stance, and disposition as learners participate in the discourse and actions of a collective social field" (p. ix). Drawing on this perspective, knowledge cannot be assumed to be held solely in static archives or texts, but constructed in and through ways of speaking, writing, knowing, being and doing in particular genres of academic knowledge (Green, Weade, Graham, 1988; Bloome & Egan-Robertson, 1993; Floriani, 1993; Kelly & Green, 1998). Furthermore, knowledge is continually tested, contested and (re)constructed through emerging genres of academic knowledge in both local and disciplinary settings in education (Kelly & Green, 1998).

Using these arguments as a point of departure, the present study set out to explore how what was claimed as "new" knowledge was socially constructed in and through discourse as well as actions and interactions of participating individuals in a unique undergraduate engineering course in which Internet technology was used to connect intercultural (i.e., students of different national origins – US, India, Israel, China and South Korea) and interdisciplinary (i.e., students of different disciplinary backgrounds – engineering, business, social sciences, humanities) groups of students to engage in the common course entitled *Principles and Practices of Global Innovation.* Specifically, the study explored the main instructor's design logic and thinking behind his global engineering course as an anchor to trace how, in what ways, and for what purposes, he was, through his interactions with participating students and teaching team(s) over-time, continually defined and reformulated what counted as "new" ways of engaging in 21st century engineering education in today's global world.

Analysis of literature on the study of teaching and learning in higher education (both face-to-face and online learning environments) has revealed that it has been predominantly studied in generic terms (e.g., Biggs, 1989, 1996; Biggs and Tang, 2011; Garrison, Anderson & Archer, 1999; Garrison & Arbaugh, 2007; Akyol and Garrison, 2011), failing to capture the situated understanding of the complex teaching-learning configurations, as well as the dynamic processes of knowledge and meaning construction in and across times, events, and actors (see Chapter 2, Section 2.2 for more detailed analysis). The present study provides an alternative framework of approaching higher education teaching-learning processes by foregrounding social constructionist, sociocultural and discourse-in-use perspectives at the center of its conceptual framework, methodology, analyses, and interpretation. In so doing, it attempted to make visible the developing processes of knowledge construction, which rarely gets explored in empirical studies of higher education. In the following section, I lay out how conceptualizations of language, culture and context can have implications for researching higher education curricular development processes.

1.3. Conceptualizations of Language, Culture, and Context: Implications for Research

Uncovering the complex layers and dimensions of teaching-learning relationships requires theories of language, and culture, and context to understand what was proposed and made present to students in the Spring 2014 NDE course in and through the discursive work of the instructor both inside and outside of the classroom. These perspectives are brought together to serve as the *orienting framework* of this study to guide its methodology, analyses, as well as interpretation (please refer to the conceptual review in Chapter 2 for more details). Drawing on a social constructionist framework (i.e., Gergen, 2001) grounded

in sociocultural perspectives, the following four perspectives are brought together to inform the methodology and general direction of this study: *language/discourse-in-use* (e.g., Bakhtin, 1986; Duranti & Goodwin, 1992; Bloome & Egan-Robertson, 1993; Bloome & Clark, 2006), *culture-is-a-verb* (e.g., Street, 1993; Agar, 1994, 2008; Scollon, Scollon, & Jones, 2012), *curriculum-in-the-making* (e.g., Weade, 1987; Green & Dixon, 1994; Posner, 1995) and *individual-collective relationships in educational settings* (e.g., Kelly & Green, 1998; Kelly, Crawford, and Green, 2001).

Language/discourse-in-use perspectives posit that study of language cannot be away from the context of its use. When trying to understand any particular communicative event, the researcher needs to ask how and in what ways the event gets accomplished by whom, where, and in what context(s) of use to capture the "whole of the utterance," rather than simply examining abstract bits of sentences (Bakhtin, 1986). Furthermore, context cannot be simply viewed as a set of variables that statically surround the talk; instead, it is argued that context and talk "…stand in mutually reflexive relationship to each other, with talk, the interpretive work it generates, shaping context as much as context shapes talk." (Duranti & Goodwin, 1992, p. 31). Therefore, when studying discourse in an educational setting, researchers need to ask *who is using language and other semiotic tools to do what, with whom, to whom, when, where, and how?* (Bloome & Clark, 2006). In this study, I tried to step back from the preconceived notions of teaching and learning (i.e., as separate sets of phenomena) by viewing individual participants as complex beings, who are capable of engaging in multiple roles (i.e., teachers can engage in learning as much as students can) and as those who are continually constructing and reconstructing contexts of teaching-and-learning in and through their moment-by-moment and over-time interactions. Moreover, the

main analyses attempted to account for the historicity of the events being studied by tracing the developing histories of NDE program and the focal course in and across times and spaces.

In addition, drawing on the notion that "culture" is not something that people possess or live inside of (e.g., Street, 1993; Agar, 2006; Scollon, Scollon, & Jones, 2012), the present study views "culture" as any group of people who participates in particular *discourse system* which constitutes particular ways of thinking, communicating, and learning. Such way of viewing "culture" allows us to think of it away from a deterministic way, and provides us with the necessary tool to understand how people interact with one another and why. In this study, by tracing the instructor's discourse in the focal course, I examined how he attempted to bring students' attention to "new" ways of participating and learning in this global engineering course. In so doing, I attempted to shed light on the process of *culture-in-the-making* in this unique educational setting. Specifically, I focused on how the instructor's design of the course and the reformulation of the structuring of the course tried to promote identities of global citizenship.

Furthermore, drawing on Posner's (1995) notion of curriculum as "…the product of a group of people faced with a series of technical, economic, and political decisions, guided and constrained by their own personal belief systems…" (p. 34), it was important to understand what motivated and guided the main instructor's designing of the NDE program and course. Consequently, one level of analyses asked questions such as:

- Who was the main designer/instructor of the NDE program/course?
- What were the guiding design principles of the NDE program/course?
- What existing educational situation was the NDE program/course addressing?
- What was the focus of the NDE program/course development effort? (adapted from Posner, 1995, p. 34).

In the current investigation, I attempted to look beyond what had been officially recorded about the NDE program/course to understand the developing design processes in which particular actors are involved as well as the sociocultural milieu in which the programmatic initiative grew and developed. Such an approach takes a situated perspective on looking deeper into the process of meaning construction in everyday events of classroom life (e.g., Weade, 1987).

Finally, conceptualizing learning as a complex, situated, and relational process, I drew on a social constructionist perspective that views knowledge as "a byproduct not of individual mind but of communal relationships" (Gergen, 2001, p. 4). It should be noted that although the study mainly traces the main instructor's design logic and thinking of the NDE program/course, the analyses foreground the discourse and actions of the *instructor-within-the-collective* to understand how he, *together* with the international and interdisciplinary group of teaching teams and students, engaged in the continual process of designing and redesigning the structuring of the course to meet the instructional goals. In viewing learning this way, what counts as "learning" is not solely restricted to activities of students; the instructor also engages in "learning" as much as students do by adapting to changing situations in and through his interactions with globally distributed students across time and space. For the remaining of this chapter, I lay out the methodology and general direction of this study informed by the theoretical perspectives brought together in this section, while building on my previous experience and relationship with the NDE teaching team.

1.4. Methodology & Research Direction

The present study examined the main instructor's design logic and thinking behind this unique engineering course as an anchor to understand how, in what ways, and for what purposes, he was continually defining and reformulating what counted as "new" ways of engaging in engineering education in today's global world through his interactions with participating students and teaching teams. Being mindful about my own researcher reflexivity (e.g., Gee & Green, 1998) and my outside researcher status, I took a critical stance in the ways in which I entered this research site to carefully trace what opportunities were being afforded to students in this education setting from the perspectives of insiders. Taking an interactional ethnographic approach grounded in a social construction of knowledge perspective (i.e., Castanheira, Crawford, Dixon and Green, 2001), I examined what constituted "new" ways of engaging in global engineering education and how they were "talked, acted, and written into being, and how, through [members'] actions, [they] make visible to each other what counts as appropriate discursive and literate practices" (ibid, p. 357). Undertaking this approach allowed me to make warranted claims about what was actually happening in moment-by-moment situations across times and events and gain a socially constructed, situated, and context-specific accounts of teaching-learning processes in the current research site.

1.4.1. Research Site and Participants

With the vision that "what you learn depends on with whom you learn," the main instructor/designer of the NDE course, Professor SCLU, who is a chaired engineering professor at a research one university in the US (hereafter USU), brought together a group of

international and interdisciplinary group of students and teaching teams to engage in the collaborative learning and exploration of global innovation principles and practices with the connectivity enabled by internet technology. The NDE course was offered once every year during USU's Spring semester to different groups and configurations of students since the inception of the NDE programmatic initiative in 2010. The main goal of the NDE program was to reformulate engineering education in today's global world, by bringing multiple international classrooms together and collocate learners from diverse cultural and social backgrounds to create, what he called a "borderless learning community" where students from anywhere can study any subjects interactively and collaboratively on their own local campus with the globally distributed peers from leading universities around the world (for details on the NDE programmatic initiative, see Chapter 4).

The focal course analyzed in the present study is the Spring 2014 NDE course in which a total of six different institutions, including USU, participated. Table 1 lays out the names (note that these are all pseudonyms) of institutions, faculty, teaching assistants, as well as the number of participating students from each institution in Spring 2014. In order to account for the time zone differences across the participating institutions, the course was divided into two sessions (morning and evening). The morning session (Session A) was joined by 16 students from US University (USU), 16 students from Israeli University (ISU), 16 students from Indian University Site #1 (INU-Site#1), and 16 students from Indian University Site #2 (INU-Site#2). The evening session (Session B) was joined by a different group of 16 students from USU, 16 students from Chinese University (CNU), and 16 students from South Korean University (SKU).

Table 1.
Participating Universities, Faculty, Teaching Assistants and Students in Spring 2014 (Note that all names listed here are pseudonyms)

	Session A (Morning)				***Session B (Evening)***			***Total Numbers***
Participating Institutions	USU Session A	ISU	INU Site #1	INU Site #2	USU Session B	CNU	SKU	6 Sites and 7 Groups
Participating Faculty	Professor SCLU & Dr. L	Professor E	Professor K	Professor P	Professor SCLU & Dr. L	Professor X	Professor M	7 Faculty Members
Teaching Assistants	Laura	Anat	Baal	Hadi	Paul	Chen	Jinwoo	7 TAs
Number of Participating Students	16	16	16	16	16	16	16	112 Students

Since the aim of this study is to uncover the layers of design process of the Spring 2014 NDE course, the details about the research site and the participating institutions will be presented in a progressively disclosing manner (i.e., Castanheira, Crawford, Dixon & Green, 2001) throughout different stages of analyses.

1.4.2. Research Questions

The overarching question that this study aimed to address is: *How can I, as an outside researcher without any lived experience of a global engineering course, conceptualize the design process of the course, which claimed to provide "new" learning opportunities and outcomes for 21st century students?* Addressing this question required three interdependent levels of analyses, which were progressively built on one another:

1) The first level of analysis involved a range of historical analyses to situate the focal course within the running history of the NDE program/course development.

2) The second level of analyses extended the previous analyses to explore what was getting accomplished in and through times, spaces and contexts within the everyday structuring of the Spring 2014 NDE course. I engaged in a series of mapping processes to map out the *planned* as well as *engaged* structuring of the course to understand how the everyday structuring of the course looked like.
3) The final set of analyses further extended the previous analyses to understand unanticipated challenges that the teaching team encountered in engaging culturally diverse and globally distributed group of students in the NDE course. I specifically focused on Professor SCLU's discourse around these unanticipated challenges in the public space of the classroom.

The analyses will collectively and progressively reveal my *developing understandings* of the instructor's design logic and thinking of this unique engineering course. I will end this dissertation with a discussion about designing and researching global higher education courses as rapidly changing and evolving educational phenomena.

Chapter 2. Literature Review

Underlying the conceptual review of literature presented in this chapter is a critical argument about the need for transparency, not only in reporting the findings, but in reporting the conceptual framework of the logic-of-inquiry (AERA, 2006). Since educational research is often grounded in particular view of education, drawing from research traditions with particular intellectual histories (Gergen, 2001; Bredo, 2006; Waring, 2012; Green & Joo, in press), it is important to make transparent the ontological and epistemological base guiding the current research so that readers could follow the logics inscribed here.

The first three sections of Chapter are organized as following: (2.1) a conceptual literature review, which brings together a group of interrelated and interdependent perspectives of language/discourse-in-use, context, and culture that have informed empirical research in education grounded in a *social constructionist* framework, (2.2) an exploration of a *social constructivist* approach to understanding teaching-learning relationships in higher education by analyzing a body of work within two lines of inquiry—one focusing on traditional face-to-face instruction and another focusing on distance education, and (2.3) a summary of what can be learned from these two sets of reviews. As the chapter unfolds, it will become visible that conceptualizations of what counts as "learning," and who count as "learners," are very different based on different epistemologies of theoretical frameworks. I conclude with (2.4) a brief review of an ethnographic research approach, which will provide a base for my rationale for undertaking an ethnographically framed approach in the current study.

2.1. Conceptual Literature Review: Developing An Orienting Framework Grounded In A Social Constructionist Perspective

Section 2.1 of Chapter 2 lays a foundation for understanding and uncovering the complex layers and dimensions of teaching-learning relationships in the current research setting (i.e., an innovative engineering course). The perspectives presented in this section together serve as the core *orienting framework* of the study, which guided each step of research from its conceptualization to methodology and analyses undertaken, as well as the ways in which different types of evidence are framed, interpreted, and presented. This framework set a stage for a series of fundamental assumptions that underpin the current research to make visible the interrelationships among the concepts explored, as well as their implications.

Michael Waring (2012) called this fundamental set of assumptions the "building blocks" of research. These "building blocks" frame four key questions that constitute research processes: *ontology* (what is the form and nature of the social world?) → *epistemology* (how can what is assumed to exist be known?) → *methodology* (what procedure or logic should be followed?) → and *methods* (what techniques of data collection should be used?) (c.f. ibid, p. 16). The orienting framework, therefore, will serve as the ontological and epistemological underpinnings of the research. By drawing on particular lines of intellectual histories, I make visible how I, as the primary researcher, conceptualized the form and nature of the social world (ontology), and undertook the ways of understanding complex processes of knowledge construction in a new and emerging educational setting (epistemology).

Drawing on a social constructionist framework (i.e., Gergen, 2001) grounded in sociocultural perspectives, I bring together four interrelated and interdependent

conceptualizations of language and culture to approach the investigation of knowledge construction in this educational setting: (2.1.1) *language/discourse-in-use* (e.g., Bakhtin, 1986; Duranti & Goodwin, 1992; Bloome & Egan-Robertson, 1993; Bloome & Clark, 2006), (2.1.2) *culture-is-a-verb* (e.g., Street, 1993; Agar, 1994, 2008; Scollon, Scollon, & Jones, 2012), (2.1.3) *curriculum-in-the-making* (e.g., Weade, 1987; Green & Dixon, 1994; Posner, 1995) and (2.1.4) *individual-collective relationships in educational settings* (e.g., Kelly & Green, 1998; Kelly, Crawford, and Green, 2001). It should be noted that while these perspectives are presented separately, they build on each other and therefore need to be understood holistically. Throughout this section, a series of arguments will be provided to make visible their interrelationships and interconnectedness.

2.1.1. Language/Discourse-In-Use: Inseparability of Language from its Contexts of Use

Central to the orienting framework of the current research is the interactive and dialogically conceived notions of contextually situated language/discourse. One of the earlier roots can be traced back to Mikhail Bakhtin (1895-1975), a Russian philosopher and literary critic, whose work greatly influenced the work of scholars in diverse disciplines including history, philosophy, sociology, anthropology and psychology. In his influential essay, *The Problem of Speech Genres*, Bakhtin (1986) laid out his philosophy of language, which had important implications for the study of linguistics, literature as well as other human sciences. In this essay, Bakhtin provided a series of arguments aimed at challenging a behaviorally oriented linguistic standpoint in studying everyday speech genres, which focused on an individual's talk without taking into consideration its context(s) of use. He critiqued 19th century linguistics, which often positioned communicative function of

language in the background as a secondary dimension, viewing human thought to emerge *"independently of communication*" (ibid, p. 67). Bakhtin viewed the communicative function of language to be central to social accomplishments, and defined "speech genres" in the following way:

> Language is realized in the form of individual concrete utterances (oral and written) by participants in various areas of human activity. These utterances reflect the specific goals of each such area not only through their content (thematic) and linguistic style, that is, the selection of lexical, phraseological, and grammatical resources of the language, but above all through their compositional structure. All three of these aspects—thematic content, style, and compositional structure—are inseparably linked to the *whole* of the utterance and are equally determined by the specific nature of the particular sphere of communication. Each separate utterance is individual, of course, but each sphere in which language is used develops its own *relatively stable types* of these utterances. These we may call *speech genres* (Bakhtin, 1986; p. 60).

In defining "speech genres" this way, Bakhtin brings our attention to the complex processes involved in studying any utterance, which is composed of multiple dimensions (i.e., thematic content, style, and compositional structure). His argument also sheds light on the wealth of different kinds of utterances in various areas of human activities. These speech genres within different spheres of activities therefore develop particular repertoires. Such accounts challenge the notion of *single* generic speech, while foregrounding the historically developing and evolving nature of *multiple* speech genres.

Bakhtin further made a distinction between primary (i.e., simple) and secondary (i.e., complex) speech genres. Unlike primary speech genres, second speech genres develop more complexly in organized cultural communication (e.g., novels, dramas, scientific research genres). He argued that,

> A one-sided orientation toward primary genres inevitably leads to a vulgarization of the entire problem (behaviorist linguistics as an extreme example). The very interrelations between primary and secondary genres and the process of historical formation of the latter shed light on the nature of the utterance (and above all on the complex problem of the interrelations among language, ideology, and world view) (ibid, p. 62).

This quote brings our attention to the inseparability of primary and secondary speech genres. A particular speech must be conceptualized in a way that involves both historical developments and formations of ideologies and worldviews. He further added that,

> To ignore the nature of the utterance or to fail to consider the peculiarities of generic subcategories of speech in any area of linguistic study leads to perfunctoriness and excessive abstractness, distorts the historicity of the research, and weakens the link between language and life. After all, language enters life through concrete utterances (which manifests language) and life enters language through concrete utterances as well (ibid, p. 63).

Bakhtin believed that failing to account for the diverse as well as particular nature of utterances leads to the weakening of the link between language and life. From Bakhtin's point of view, language constitutes and is constitutive of life itself. Only by studying utterances in particular historical contexts involving particular actors, can we understand their meanings. Consequently, he was opposed to research approaches that solely focused on one person speaking, ignoring the role of the "listener" (who may well play the role of a "speaker") in speech communication. He argued that such a deterministic role of a "listener" or an "understander" is a *fiction* and that "[t]hese fictions produce a completely distorted idea of the complex and multifaceted process of active speech communication" (ibid, p. 68). Such an approach not only reduces the process of communication to a minimum, but also completely distorts the actual picture of the speech communication. Bakhtin therefore argued that a single "sentence" or "word" lacks the capability of capturing the active responsive position of the speaker, and that "[o]nly after becoming a complete utterance does an individual sentence acquire this capability" (ibid, p. 82). All of these arguments point to the importance of analyzing language in the context(s) of its use. Bakhtin explained

serious consequences of not taking the context(s) into account when analyzing language, which is well captured in the following quote:

> When one analyzes an individual sentence apart from its context, the traces of addressivity and the influence of the anticipated response, dialogical echoes from others' preceding utterances, faint traces of changes of speech subjects that have furrowed the utterance from within—all these are lost, erased, because they are all foreign to the sentence as a unit of language. All these phenomena are connected with the whole of the utterance, and when this whole escapes the field of vision of the analyst they cease to exist for him (p. 99-100).

Here, Bakhtin urges analysts to trace how, and in what ways, particular communicative event gets accomplished by whom, where, and in what context(s) of use to capture the "whole" of the utterance, rather than simply examining abstract bits of sentences. Decades following Bakhtin's work, scholars from diverse research traditions have continued to explore, define, and problematize the notion of "context" in relation to language in various settings. Of particular interest has been how to methodologically and empirically study "context" as a dynamically constructed and evolving phenomena in and through dialogic and communicative processes.

One notable extension of this line of work is Alessandro Duranti and Charles Goodwin's (1992) book titled, *Rethinking Context: Language as an Interactive Phenomenon*. In this book, Duranti and Goodwin brought together research from different analytic traditions (e.g., Ethnography, The Bakhtin Circle , Vygotsky, Ethnomethodology, Foucault, Conversation Analysis), all of which share a strong commitment to the study of "situated discourse." By juxtaposing a variety of perspectives on the concept of "context," they attempted to provide researchers with opportunities to compare and synthesize these traditions. While recognizing the independent achievements of different research traditions, they argued that each field would benefit from direct communication with each other.

In their introduction to this book, Duranti and Goodwin (1992) explained that there is no one single definition of "context" to date:

> At the moment the term means quite different things within alternative research paradigms, and indeed even within particular traditions seems to be defined more by situated practice, by **use** of the concept to work with particular analytic problems, than by formal definition. From our perspective, lack of a single formal definition, or even general agreement about what is meant by context, is not a situation that necessarily requires a remedy (p. 2).

This lack of a formal definition of "context" they saw as a strength rather than a limitation because "contexts" by their very nature are particular to certain situations embedded in particular sociocultural and historical backgrounds, involving particular configurations of actors within interactional frames. They further added that when the issue of "context" is raised in research, one would need to look beyond the focal event itself to understand ways in which the event is embedded and also shapes "context":

> When the issue of **context** is raised it is typically argued that the focal event cannot be properly understood, interpreted appropriately, or described in a relevant fashion, unless one looks beyond the event itself to other phenomena (for example cultural setting, speech situation, shared background assumptions) within which the event is embedded, or alternatively that features of the talk itself invoke particular background assumptions relevant to the organization of subsequent interaction (Gumperz, this volume). This context is thus a frame (Goffman 1974) that surrounds the event being examined and provide resources for its appropriate interpretation…(ibid, p. 3).

They further added that when it comes to analyzing "context," some of the main methodological issues posed are precisely what is to be included within the system being examined, and where the boundary is to be drawn between context and the behavior that it is context to. In response to these issues, they proposed that it is important to take the perspectives of the participants whose behavior is being analyzed as a point of departure for the analysis of context. This is because what a participant treats as relevant context is shaped by the specific activities being performed in that particular moment in time. They pointed

out “the dynamic mutability” of context—as it can radically change as participants move from one activity to another. To this end, they proposed the following ways to approach analysis of context:

- approach the context from the perspective of an actor actively operating on the world within which he or she finds himself or herself embedded;
- try the analysis of context to the study of indigenous activities that participants use to constitute the culturally and historically organized social worlds that they inhabit;
- and recognize that participants are situated within multiple contexts which are capable of rapid and dynamic change as the events they are engaged in unfold

Drawing further on the work of McDermott (1976), who argued that “people become environments for each other,” and Duranti (1992) and Lindstrom (1992), who argued that context is not created from scratch within the interaction, that those engaged are strategically rearranging context to further their own goals, they conceptualized “context” as a socially constituted, interactively sustained, and time-bound phenomenon.

Moreover, drawing on the work of Ochs (1979: 2-6), they presented different contextual attributes to gain a firmer empirical grasp on the range of phenomena that the notion of “context” must cover (c.f. Duranti & Goodwin, 1992, p. 2-6):

- *Setting*: i.e. the social and spatial framework within which encounters are situated; neither the physical nor the social setting for talk is something that is fixed, immutable and simply “out there.” Instead these phenomena, and the very real constraints they provide, are dynamically and socially constituted by activities (talk included) of the participants which stand in a reflexive relationship to the context thus constituted
- *Behavioral environment*: i.e., the way that participants use their bodies and behavior as a resource for framing and organizing their talk; Rather than constituting a separate “nonverbal” level of organization, the context provided by the behavioral environment of talk is intricately and reflexively linked to it within larger patterns of social activity
- *Language as context*: The way in which talk itself both invokes context and provides context for other talk; In sum, unlike some earlier views of context which conceptualized it as a frame that surrounds talk, all of the chapters in the volume emphasize the way in which talk itself constitutes a main resource for the organization of context

- *Extrasituational context:* how the appropriate understanding of a conversational exchange requires background knowledge that extends far beyond the local talk and its immediate setting

In so doing, Duranti and Goodwin call our attention to the importance of focusing on "how participants attend to, construct, and manipulate aspects of context as a constitutive feature of the activities they are engaged in" (1992, p. 9). By introducing a range of different dimensions of "context" that have developed in different fields of research, they showed that context can no longer simply be viewed as a set of variables that statically surround the talk; instead, context and talk are "…argued to stand in a mutually reflexive relationship to each other, with talk, and the interpretive work it generates, shaping context as much as context shapes talk" (ibid, p. 31).

Within the field of education, Bloome and Clark (2006) brought these perspectives together to make visible their implications in educational research. They bring our attention to the notion of "discourse-in-use" (rather than simply "discourse") to ask *who is using language and other semiotic tools to do what, with whom, to whom, when, where, and how*. In taking this approach, they focused on how people both adopt and adapt the language and cultural practices that are historically available in response to the local, institutional, macro-social and historical situations in which they define themselves. In a classroom, for example, as teacher and students interact with each other, they mutually create events within boundaries and signal to each other what these boundaries are. Bloome and Clark (2006) argued that the meaningfulness of any communicative behavior or any stream/sequence of behavior is not found within itself but in its use and import within the flow of social interaction. People who are engaged in interaction must constantly monitor what is happening, what has happened in the past, as well as what might happen in order to assign

meaningfulness to their communicative processes (i.e., Bloome & Egan-Robertson, 1993). Finally, they leave the following message to educational researchers interested in studying how "education" is created in and through discourse:

> The obligation and warrant for educational researchers interested in how people create education is to trace, moment-by-moment, action by action, response by response, and refraction by refraction, how people use the linguistic tools they have available and the material resources at hand to adopt and adapt extant discourse practices as they define their social relationships, social identities, knowledge, and the acquisition of knowledge. Such an obligation includes the intertextual and intercontextual nature of any event and the dialogic relationship of the event with other events. But, rather than create a description that merely serves as an illustration of extant social theory, the obligation is to create a description and interpretation whose explanation lies close to the meaningfulness of the event produced by the people involved. Such an explanation does not eschew social theory, but redefines social theory as a situated process that is both particular and historical (ibid, p. 22-23).

Here, Bloome and Clark urge educational researchers to not be bounded by existing social theories, but to continually redefine social theories by understanding how social relationships, identities and knowledge become created and recreated by the participants themselves. This kind of approach allows researchers to engage in moment-by-moment and overtime analyses of particular social phenomena to gain deeper understandings of the "situated" developing processes.

Implications for educational research are profound when undertaking a language/discourse-in-use perspective. A discourse-in-use perspective allows us to engage in "making the familiar strange" (Delamont, 2012, p. 8), helping us to rethink concepts and phenomena that are so dearly familiar to us. Researchers are encouraged to look beyond the existing notions of teaching and learning to trace developing histories of moment-by-moment interactions as well as their consequences. Individual participants are viewed as complex beings, who are not bounded by static roles of traditional "teachers" or "learners,"

but as people who are capable of engaging in multiple roles and adopting/adapting to become members of multiple speech genres and communities. Furthermore, an individual participant's agency, as well as historicity of particular events in which he/she is participating and constructing, are not lost, but instead are foregrounded in ways that allow us to advance our conceptual and theoretical understandings of a range of social phenomena.

In the current research exploring a new and emerging educational configuration, it is important to think beyond the traditional notions and boundaries of what counts as "learning" (as well as "learning outcomes" and "classrooms") and who count as "learners" (as well as "teachers"). It is critical to step back from ethnocentrism (Heath, 1982) to closely examine what is actually happening in this unique educational setting to understand how "new" identities, physical spaces, and knowledge are *coming into being*. The following section is intended to rethink another important theoretical concept: "culture." In this unique engineering course, one of the core values emphasized by the instructor was that students could gain "contextual understandings" of global engineering problems by engaging in dialogues with peers from different cultural backgrounds. What may be fruitful ways to conceptualize "culture," and more specifically, "intercultural communication"?

2.1.2. Culture-Is-A-Verb: Culture(s) As Relational Process of Meaning Making

The phrase "culture is a verb" originally comes from Brian Street's (1993) essay titled, *Culture is a Verb: Anthropological Aspects of Language and Cultural Process*. In this essay, Street argued that the notion of culture must be understood as an "active construction of meaning," rather than the somewhat static sense in which culture used to be employed in

disciplines such as Anthropology. Problematizing the notion of culture, Street explained that,

> Anthropologists are currently acutely self-conscious in their use of the term culture, worrying about its neo-liberal, racist and nationalist overtones. Rejecting the notion of a fixed inheritance of shared meanings, they prefer, as Robert Thorton argues, to ask not 'what culture is' but 'what culture does' (1988: 26) (c.f. Street, 1993, p. 23).

Street argued that we, researchers (and non-researchers alike), tend to believe the categories and definitions we construct in an essentialist way. He added that, "[t]he job of studying culture is not of finding and then accepting its definitions but of 'discovering how and what definitions are made, under what circumstances and for what reasons'" (ibid, p. 25), further adding that,

> ...the very term 'culture' itself, like these other ideas and definitions, changes its meanings and serve different often competing purposes at different times. Culture is an active process of meaning making and contest over definition, including its own definition. This, then, is what I mean by arguing that *Culture is a verb* (ibid, p. 25).

Street was particularly interested in the idea of literacy. He viewed literacy as not simply the ability to read and write, but as a range of communicative practices that people engage in to show that they are particular kinds of people, belonging to particular groups. Also, these "abilities" are not just a matter of individual learning or intelligence, but a matter of living together with other people and interacting with them in certain ways.

Ron Scollon, Suzanne Wong Scollon, and Rodney H. Jones (2012) in their book titled, *Intercultural Communication: A Discourse Approach*, further elaborated on these ideas in the context of intercultural communication. In taking a position that "culture is a verb," they conceptualized culture not as something that people possess or live inside of, but as something that they *do*. This, they argued, has important implications when understanding intercultural communication:

> It means that if you want to understand intercultural communication we should not focus so much on the people and try to figure out something about them based on the "culture" they belong to. Rather we should figure out what they are *doing* and try to understand what kinds of tools they have at their disposal to do it. Most cross-cultural research takes as its unit of analysis cultural systems of meaning or behaving or thinking, and these systems are also important in our approach. But they are only important in so far as they affect how people do things with other people. Thus, our unit of analysis will not be just systems of culture by themselves nor just the individual person by herself or himself, but rather "people doing things" under these systems of culture (p. 5).

Their conceptualization of intercultural communication takes the notion of culture beyond the discrete elements that are often associated with the term, and tries to understand how "people" who share (or not share) particular histories interact together. In viewing "culture" as a set of "tools" (or a toolkit), that are not static, but rather continually re-created, they further argued that,

> All tools have histories, which means that any particular person is not free to use them in an arbitrary way, but must see them within some degree of restricted or shared meanings. And so these tools bring with them to any action a pre-established set of limitations. At the same time, these tools are also altered through their use and thus no use of any cultural tool is absolutely determinant of the social action that it can be used to perform. Put another way, all cultural tools bring into social action a set of contradictions and complications, which are the sources of both limitations and of ambiguity, novelty, and creation (ibid, p. 6).

In viewing that people belong to different cultures at once, they also argued that they have lots of different cultural tools available at their disposal to take actions, which are strategically used when interacting with different people in different situations.

Problematizing the term, culture, Scollon, Scollon, & Jones (2012), suggested using "interdiscourse communication," rather than "intercultural communication." If we view "culture, as "[a]ny group that has particular ways of thinking, treating other people, communicating and learning can be said to be participating in particular discourse system" (ibid, p. 9). They argued that like "cultures," "discourse systems" are also heuristics, or "tools that we will use to help us understand something about how people interact with one

another and why" (ibid, p. 9). They argued that viewing human communication as an interdiscourse communication provides a lot more flexibility and analytical power in understanding how people who belong to different groups communicate with one another than a lot of other more traditional ideas of culture. More importantly, the notion of discourse systems helps us to think about culture away from a deterministic way because:

> We are not "controlled" by our discourse systems. Although the tools that discourse systems provide tend to severely limit and focus the kinds of actions that we can take, we are also able to adopt those tools as we appropriate them into different kinds of situations. We may not always be completely conscious of how we appropriate and use cultural tools, but there is an element of choice involved (ibid, p. 10).

Like the notion of "context" discussed in Section 2.1.1, the term "culture" can be understood within the boundaries of participating individuals' agency and the ways in which they interact with each other.

Another articulation of this line of work can be found in the work of anthropologist Michael Agar. Agar (2008), in his invited lecture presented at the Gevirtz Graduate School of Education (GGSE), discussed the concept of "languaculture," which was a concept that was developed in his book titled, *Language Shock* (1994). The concept of "languaculture" was developed to argue that using a language involves background knowledge and local information in addition to grammar and vocabulary. He connected this concept with "ethnography" to argue that ethnography is an encounter between two (or more) languages (LC1 for native languaculture of the ethnographer and the audience, and LC2 for the languaculture of the studied group). Finally, he defined "rich points" as a type of L2 learning (see Agar's 1996 book titled, *The Professional Stranger*, for elaboration on this concept), or surprises that signal a difference between LC1 and LC2 and give direction for subsequent learning for an ethnographer.

Like Street and Scollon et al., Agar (2006) also argued that, "[c]ulture is one of the widely misused and contentious concepts in the contemporary vocabulary" (p. 2) and that there's a tendency to view culture as a closed, coherent system of meaning and action in which an individual *always* and *only* participated. In his attempt to rethink "culture," he argued that,

> Culture becomes visible only when differences appear with reference to a newcomer, an outsider who comes into contact with it. What it is that becomes visible in any particular case depends on the LC1 that the newcomer brought with them, a newcomer who might be an ethnographer, or perhaps an immigrant, or a new employee, or a tourist. Different LC1/LC2 combinations, different rich points, different translations, different cultures" (ibid, p. 7).

Agar argued that such a notion of culture allows us to think of culture as not simply a "property of them" or "property of us," which creates an artificial separation between "them" and "us," but as an *intersubjective* concept. In other words, culture is always *relational* and *plural*.

One key research implication that these perspectives on "culture" make visible is the need to go beyond categorical classification of particular groups of people into certain "cultures," and to examine relational issues that arise when people interact with one another. This is because, as Agar argued, "culture" becomes visible when differences (however subtle they might be) are experienced by interacting individuals. Therefore, when conceptualizing intercultural communication, we need to closely look at the discursive processes that people engage within particular interactional situations. The focus here is not on an individual participant enacting his/her cultural norms and values, but on how participants, by the means of interacting with others (as well as the objects, materials, and cultural artifacts), construct meanings that are proposed, recognized and considered socially

significant (Bloome & Egan-Robertson, 1993). In other words, "culture," like "context," requires a situated perspective grounded in everyday discourse processes that people engage in. The remaining parts of Section 2.1 (2.1.3 and 2.1.4) take these perspectives directly into conceptualizations of teaching-learning relationships in education. The published works presented here are deliberately chosen to shed light on how a situated perspective grounded in a social constructionist framework could provide important insights in understanding these relationships.

2.1.3. Curriculum-in-the-Making: Curriculum as a Dialogic and Developing Process of Meaning Construction

As a point of departure for understanding how a new educational initiative gets created and implemented, George Posner's (1995) work on *Analyzing the Curriculum* could serve as a useful conceptual framework. Posner (1995) laid a foundation for understanding concepts of curriculum and purposes of curriculum study by situating curriculum within various theoretical perspectives. He identified six common concepts of curriculum (p. 11):

- *Scope and sequence*: the depiction of curriculum as a matrix of objectives assigned to successive grade levels (i.e., sequence) and grouped according to a common theme (i.e., scope)
- *Syllabus:* a plan for an entire course, typically including rationale, topics, resources, and evaluation
- *Content outline*: a list of topics covered organized in outline form
- *Textbooks*: instructional materials used as the guide for classroom instruction
- *Course of study*: a series of courses that the student must complete
- *Planned experiences*: all experiences students have that are planned by the school, whether academic, athletic, emotional, or social

In addition to these six common concepts of curriculum, he also identified five different kinds of "concurrent" curricula, which need to be taken into account when we are analyzing any official curriculum (p. 11-12):

- *Official curriculum*: written curriculum; documented in scope and sequence charts, syllabi, curriculum guides, course outlines and lists of objectives; its purposes is to give teachers a basis for planning lessons and evaluating students and administrators a basis for supervising teachers and holding them accountable for their practices and results
- *Operational curriculum*: what is actually taught by the teacher and how its importance is communicated to students, such as (1) the content included and emphasized by the teacher in class and (2) the learning outcomes for which students are actually held responsible; "...there's typically little consistency between the official, the taught, and the tested curricula of a school" (p. 11); Powell, Farrar, and Cohen (1985) and Sedlak, Wheeler, Pullin, & Cusick (1986) argue that students strongly influence the operational curriculum
- *Hidden curriculum*: not generally acknowledged by school officials but may have a deeper and more durable impact on students than either the official or the operational curriculum; schools are institutions that embody a set of norms and values; the messages of the hidden curriculum concern issues of gender, class and race, authority, and school knowledge, among others
- *Null curriculum*: consists of subject matters not taught—e.g., cross-cultural differences in the null curriculum are useful for helping us become aware of the assumptions underlying the curriculum of US schools
- *Extra curriculum*: all those planned experiences outside of the school subjects; contrasts with the official curriculum by the virtue of its voluntary nature and its responsiveness to student interests; not hidden but an openly acknowledged dimension of school experience

Posner argued that when we are analyzing an official curriculum document, we need to continually ask ourselves how the other four curricula affect the official curriculum by asking such questions as: "What is likely to happen to it when it is implemented in schools with powerful hidden and extra curricula? Will it capture the attention of teachers and administrators as a regular part of the official curriculum, or will they push it aside along with other parts of the null curriculum? How vulnerable is it likely to be once teachers and students begin negotiating the operational curriculum? Will its essence be lost as a

consequence of the bargains that are struck?" (ibid, p. 13). In presenting the different concepts of curriculum as well as different kinds of concurrent curriculum, Posner urged readers to think of a curriculum not simply as a "timeless, objective, and absolute," but rather as:

> ...constructed by groups of people confronted with situations that demand action on their part. A curriculum is part of an ongoing dialogue between people with differing beliefs about and commitments to education and, in particular, different beliefs about how people should learn to do in school. To view a curriculum as the product of a group of people faced with a series of technical, economic, and political decisions, guided and constrained by their own personal belief systems, is the first step toward a deeper understanding. In order to analyze a curriculum, we need to determine what motivated and guided its developers (ibid, p. 34).

In this quote, Posner brings our attention to the need for understanding curricula in terms of their historical context: "Who were the architects of the curriculum, and what were their guiding principles? What existing educational situation—including current curricula—or set of problems was the curriculum addressing? To what social or political pressures was the curriculum responding? What was the focus of the curriculum development effort?" (ibid, p. 34).

Moreover, since every curriculum represents a choice as to how to approach the education of students, understanding different theoretical perspectives about the view of education is very important. Posner brought forward five different perspectives that represent particular set of assumptions about education. The five perspectives are named as follow: traditional, experiential, structure of the discipline, behavioral, and cognitive. Posner argued that each perspective provides a particular vision about education (c.f. ibid, p. 65):

- *Traditional*: Schools need to return to the basics, that is, to a mastery of basic literacy and computational skills, to a knowledge of basic facts and terminology that all educated people should know, and to a set of common values that constitute good citizenship

- *Experiential*: Schooling is too detached from the interests and problems of the students, that is, from their ordinary life experience. Make schooling more fundamentally related to the students' experience, that is, less contrived and artificial, and students will grow more and become better citizens
- *Structure of the disciplines*: There is too large a gap between school subject matter and the scholarly disciplines from which they derive. Reduce that gap by engaging students of all ages in genuine inquiry using the few truly fundamental ideas of the disciplines, and students will develop both confidence in their intellectual capabilities and understanding of a wide range of phenomena
- *Behavioral*: There is too much vague talk about objectives, and there are too many unsystematic approaches to the development of curricula. Just decide what the successful graduates should be able to do in very specific measurable terms, analyze those behaviors to identify their prerequisite skills, provide opportunities for students to practice each skills with feedback to the point of mastery, and then evaluate the students' performance. We have the technology to ensure that all students master what they need to know. We need only the determination to implement our knowledge.
- *Cognitive*: Schools emphasize rote learning too much and do not put enough emphasis on real understanding and thinking. Curricula need to allow students to construct their own knowledge based on what they already know and to use that knowledge in purposeful activities requiring decision making, problem solving, and judgments

Each of these perspectives, Posner argued, may serve as a "metaphor" for thinking and talking about the mind, teaching/learning, and curriculum. And these metaphors are powerful since "[t]hey affect the language we use to discuss education, and they make certain proposals reasonable and others unreasonable. They even help determine what we consider to be common sense" (ibid, p. 66).

Finally, Posner introduced the term "reflective eclecticism" (which is the core idea of his book) to challenge the assumption that there is a single absolute answer to any curriculum problem. He argued that different situations require different practices and what curriculum decision makers need is an understanding of the myriad curriculum alternatives and the dilemmas that underlie each curriculum decision and being able to unpack the tacit

assumptions behind each alternative. Drawing on Schwab's (1971) argument, Posner argued that,

> In order to avoid the tunnel vision associated with any theory, Schwab challenges any curriculum to address each of what he calls the four commonplaces of education, i.e., the learner, the teacher, the subject matter, and the social and institutional milieu or context. According to Schwab, any curriculum that fails to take all four commonplaces into account has a fatal flaw that will eventually undermine it. These four commonplaces provide the curriculum analyst with a comprehensive map of education. Such a map enables the analyst to identify aspects education that the curriculum has not taken fully into account (ibid, p. 256-257).

Together, Posner's arguments call for a need to undertake a multifaceted approach in analyzing any curriculum. When researching a new and emerging educational initiative, our analyses cannot be simply restricted to what has been officially recorded and/or observed, but to the developing processes in which actors are involved, particular theoretical perspectives about learning(s) are brought into the design processes as well as the sociocultural milieu in which the initiative grew out of. In the current investigation, the main instructor (who is both the director and designer of the new undergraduate engineering education initiative) will be the analytic anchor for understanding how particular engineering knowledge is foregrounded as crucial for the 21st century education. Particularly, the instructor's *logic-in-use* in both designing and carrying out a new educational initiative will be examined by analyzing multiple dimensions of the curriculum-in-the-making processes. It should be noted, however, that curriculum-in-the-making processes are not the product of the instructor's contribution only, but of all participating individuals including students and the members of the teaching team(s) both at the local and remote sites. Regina Weade's (1987) argument for the merge of the terms "curriculum" and "instruction" (i.e., curriculum'n'instruction) further calls for the importance of looking at the

dynamic and constructed processes through which students gain access to both the social and academic content of lessons.

In reviewing definitions of "curriculum" in the literature, Weade (1987) argued that, unlike the diverse lines of work on curriculum, little attention has been given to the nature of instruction. Instruction, she argued, often goes masked under the name of "teaching" which is oblique and remains implied only within a particular author's use of the term. To illustrate this point further, she presented the following figure (Figure 1):

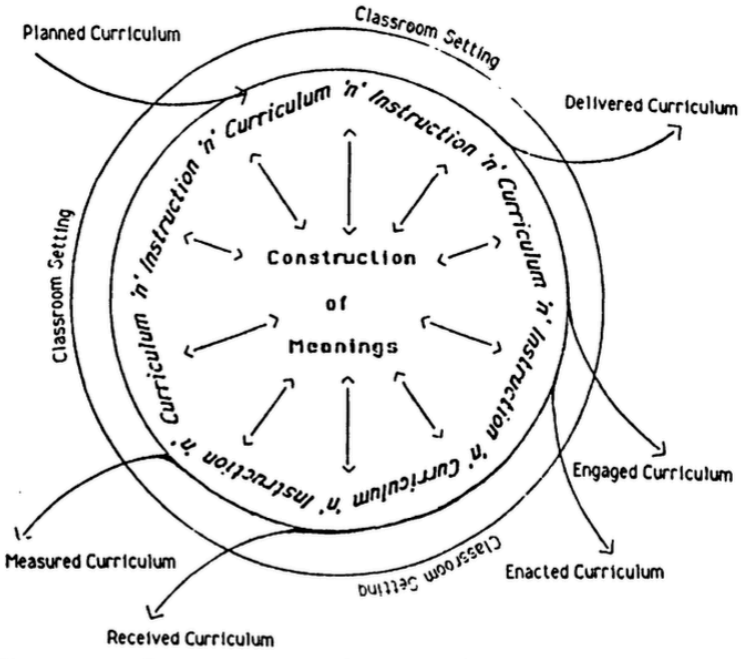

Figure 1. The merger of curriculum'n'instruction in the classroom setting (copied from Weade, 1987, p. 16).

In Figure 1, Weade showed different terms that were identified by curriculum theorists as different types of curricula positioned outside the circle (i.e., planned curriculum, delivered curriculum, engaged curriculum, enacted curriculum, received curriculum, and measured curriculum). By reading this figure in a clockwise direction on the surface of the circle, what became visible were different perspectives of curriculum. These different

perspectives of curricula are often viewed by curriculum theorists as representative of what goes on in the classroom. However, she argued, each of these perspectives failed to capture the development of curriculum that occurs through the interactions between student(s) and teacher as they work together to reach curriculum'n'instruction goals. Each also carries little meaning in assisting policy makers or teachers in influencing the continuing evolution of events and activities in individual classrooms" (ibid, p. 16-17). She argued that what is missing is the central sector of the model, *the construction of meanings*, such as academic and social meanings that are constructed through the interactions among teacher(s) and students.

Weade argued that discourse-based social interaction research, such as sociolinguistics and ethnography, provides a systematic way of capturing and exploring the developing curriculum'n'instruction processes that are constructed during the everyday events of classroom life. She proposed three levels of meaning construction that can be explored, all of which constitute part of the developing curriculum'n'instruction process (c.f. Weade, 1987, p. 17):

- the academic demand structure (c.f. Doyle, 1986; Erickson, 1982);
- expectations for appropriate social participation; who can talk when, where, about what, to whom, and in what ways in the lesson under construction; as well as the social participation structure (Erickson, 1982, 1986);
- and the nature of activity in which the academic and social task are embedded (the activity structure).

In other words, curriculum'n'instruction processes entail particular ways of knowing, understanding, and doing in classroom events (see also Green & Dixon, 1994). It is, therefore, *a process of building understandings of everyday life in classrooms*, which is a "dynamic and developing process through which teacher and students mutually construct the activities and events of life in classrooms as they work together to reach

curriculum'n'instruction goals" (ibid, p. 24). She further added that, "[i]n this process of interactive curriculum development, opportunities become available for gaining access to the social and academic content of lessons. As information is presented, represented, transformed, adjusted, and refined, meanings are continually being constructed and reconstructed" (ibid, p. 24).

While Posner (1995) called for the need to analyze curriculum beyond the officially recorded form to understand the underlying epistemological and theoretical perspectives guiding its design, Weade's (1987) curriculum'n'instruction framework urged researchers to look deeper into the processes of meaning construction in everyday events of classroom life. Both perspectives problematize the notion of one-size-fits-all approach to understanding teaching-learning relationships to a more situated one that is mindful about particular interactive dimensions as well as their consequences for students' access to both academic and social contents. Finally, Section 4 focuses on the individual-collective dialectical relationships in education, specifically conceptualizing "learning" at the collective as well as individuals-within-the-collective levels.

2.1.4. Individual-Collective Dialectical Relationship: Understanding "Learning" at the Collective and Individuals-within-the-Collective Levels

One of the key underlying ideas of the social constructionist framework, in which this study is oriented, is the dialectical relationship between the group and individual, and how the group interaction provides opportunity for individuals to develop new understandings. Learning is viewed as a complex, situated, *and* relational process. As Kenneth Gergen (2001) put in his essay titled, *Social Construction and Pedagogical Practice*, the social

constructionist perspective views knowledge as "a byproduct not of individual minds but of communal relationships" (p. 4). Gergen further added that,

> From the constructionist standpoint, "knowledgeable propositions" gain their meaning within particular contexts of usage, and function as means of coordinating action within these contexts. Knowledge of chemistry, for example, serves to unite a community, to define and grant value to particular projects and identities, and to help in generating outcomes of importance to this community (ibid, p. 11).

The group can contribute to the creation of the individual learning, while the individual can also contribute to the creation of the group learning. Such interactive processes contribute to the shaping and re-shaping of concepts and practices in particular educational situations (Kelly & Green, 1998). To put it differently, as people engage with particular subject matter, they are engaged in a complex and multifaceted relational processes embedded in everyday cultural practices of the group(s) that defines what counts as desirable and valuable knowledge and/or practices of the group. Therefore, learning and knowledge cannot be simply said to originate and reside in an individual's mind.

This notion of individual and group (or individual-collective) relationships in education is well captured in Elvira Souza Lima's (1995) argument on the notion of "potential development," drawing on Vygotsky's theories of human development and education. She argued that while there are immediate forms of development within an individual, there are also "…possibilities that are held in the 'future' and that reside in the knowledge fund of the collectivity…" (p. 447), further adding that,

> We have two dimensions of development: one that resides in the individual and other in the collectivity. Both are interdependent and create each other. Historically created possibilities of cultural development are themselves transformed by the processes through which individuals acquire the cultural tools that are or become available in their context (ibid, p. 447-448).

The interdependence between the individual and the collective, as well as future possibilities for potential learning (and development) in the collectivity, point to the need to look beyond what an individual can do to examine what individuals-within-the-collective as well as the collective groups together can contribute to become sources of knowledge for each other.

As an illustrative case study, Kelly, Crawford, and Green (2001) showed that the construction of physics knowledge involved more than talking, doing, and knowing physics, but also involved establishing/maintaining relationships within the group, negotiating what counts as appropriate contributions to the developing physics knowledge, and also defining limits as well as directions to the given task. In addition, they showed that a common task did not necessarily lead to the same learning opportunities for learning physics for participating members. Their findings showed that while knowledge construction may occur at the group-level (Edwards and Mercer, 1989), individuals within the group may either take-up or not take-up a particular concept being constructed in and through the interactions among members. While individuals may well participate in the construction of knowledge, they can choose to either accept or not accept it. So, group interactions can provide "potential opportunity" (not "automatic opportunity") for an individual to develop new understandings (also see Kelly & Green, 1998). Conceptualizing learning in this way poses methodological challenges, but presents fruitful way of studying the dynamically changing and evolving nature of the knowledge construction in today's connected world.

2.1.5. What Counts as Learning and Who Counts as Learners?

In the previous sections, I brought a diverse body of literature together to lay a foundation for conceptualizing some of the fundamental concepts in order to approach the

study of teaching and learning in this unique research site. In this section, I shift from a focus on teaching-learning relationships to examine the implications of the previous literature on how learning and learners are conceptualized. The conceptual literature review as a whole makes vi1

sible how, and in what ways, a social constructionist framework grounded in discourse analysis raises questions about what counts as "learning" and who count as "learners" in innovative educational settings with socially and culturally diverse participating actors. There are at least four ways in which the previous review of key concepts frames issues that warrant further consideration:

(1) It cautions researchers to avoid crude generalizations about teaching and learning across different settings, events, and actors;
(2) It questions the generic views of "students" and "teachers" to ask questions that attempt to uncover insiders' perspectives on the roles and relationships within the process of knowledge construction in particular settings and/or groups;
(3) It requires that the researcher think beyond the traditional notions of learning that rests on predictable and hierarchical models in order to gain complex understandings of new and emerging forms of knowledge construction processes;
(4) It requires that the researcher explore beyond how an individual learns to examine social relational processes between the individual-within-the-collective as well as the developing collective(s) that shed light on the construction of potential opportunities for future learning(s) within the developing collectives.

These four points will be revisited in the following section (Section 2.2) to explore existing bodies of research in higher education. Specifically, two lines of inquiry that have developed in the past several decades, which had prominent influence in higher education literature will be analyzed to make visible what they afford as well as *limit* us from knowing the complex processes of teaching and learning in higher education. Each of the two lines of inquiry draws on a *social constructivist* framework, which locates the site of learning within social and relational spheres, just like the social constructionist framework, but has very

different focus when it comes to conceptualizing teaching and learning (see Table 2 for theoretical assumptions of social constructivism and social constructionism).

Table 2. *Theoretical assumptions of social constructivism and social constructionism (adapted from Gergen, 2001 & Talja, Touminen, Savolainen, 2005)*

Theoretical Assumptions of Social Constructivism	Common Theoretical Assumptions	Theoretical Assumptions of Social Constructionism
• Sees the social as instrumental in developing students' cognitive development	***Both perspectives locate the site of learning within the social & relational sphere***	• Places strong emphasis on the social domain while maintaining a critical reflexivity
• While the social processes do play an important role, the nature of cognitive processes is the ultimate interest	***Both perspectives view the relationship between teacher and student pivotal to the educational processes***	• Sees all claims of knowledge as embedded within particular communities of meaning making (historical & situated); focuses on discourse, dialogue, conjoint meaning making, discursive positioning
• Individual learners as the center of the focus		• Social relationship as the center of the focus

Throughout Section 2.2, analyses of the conceptual frameworks and research methodology as well as empirical studies developed within the two lines of inquiry will be presented. It should be noted that this exploration is not intended to undermine the social constructivist approach, but it is meant to frame ways in which a situated approach grounded in discourse analysis might shed light on the important processes that often go unnoticed when the focus of how learning is conceptualized primarily on the learner him/herself, the dominant body of research in higher education. Furthermore, the framework provided in this section raised critical concerns for how researchers conceptualize teaching-learning

relationships as well as raise questions about how learning and learners are conceptualized. In the next section, I explore these questions by drawing on two programs of research (Strike, 1989) that have sought to address these questions and formulate ways of exploring this complex set of processes.

2.2. On the Limits of Social Constructivist Approach to Understanding Teaching and Learning in Higher Education

In this section, I explore two lines of inquiry, which have been taken up, often uncritically, to reformulate higher education perspectives on teaching and learning. By including this review, I attempted to frame the need for exploring different perspectives in order to provide a ground for identifying ontological and epistemological issues guiding researchers' philosophical understandings of social world as well as their goals.

The two lines of inquiry reviewed in this section are Biggs' *Constructive Alignment Framework* (e.g., Biggs, 1989; 1996; Biggs & Tang, 2011) and Garrison's *Community of Inquiry Framework* (e.g., Garrison & Hanuka, 2004; Garrison, Anderson, & Archer, 1999; 2001). While the two frameworks constitute separate lines of inquiry, with bodies of work focusing on particular dimensions of teaching and learning in higher education, they share similarities in terms of their social constructivist orientation with an interest in *how individual students construct meanings* in and through the learning activities/environments that are provided to them. In other words, although they view the site of learning as residing in the social/relational spheres, their primary interest is on individual students' cognitive processes and developments; consequently, what gets accomplished in and through discourse and interactions among individuals *as well as* individuals-within-the-developing-

collective is not theorized or foregrounded in these frameworks. As a result, their ontological and epistemological accounts of "what counts as learning*"* and "who count as learners*"* take different forms and shapes, compared to the perspectives presented in Section 2.1 (i.e., a social constructionist perspective grounded in discourse analysis). I will review the two frameworks and make visible what each perspective affords and limits us from understanding with regard to complex teaching-learning relationships in higher education.

2.2.1. John Biggs' Constructive Alignment Framework

John Biggs is an Australian educational psychologist and theorist, who has been developing a set of frameworks to assess the quality of learning outcomes, particularly at the tertiary level. Some of Biggs' earlier work (e.g., 1989; 1996) have attempted to conceptualize a generalizable system which can describe educational processes in diverse contexts involving students from different linguistic, cultural, and educational backgrounds. One of his widely cited models, the 3P model (Figure 2), portrays an educational system, which recognizes that teaching needs to change and evolve in response to the learning needs of diverse student groups. The 3P model has three interrelated stages: *Presage, Process,* and *Product*. The *Presage* stage takes into account both individual students' learning-related factors (e.g., prior knowledge, abilities, preferred approaches to learning, values, expectations, and competence in the language instruction) and the context in which the teaching takes place (e.g., course objectives, assessment, instructional procedures). These *Presage* characteristics foreshadow the educative process, informing teachers of the kinds of activities that need to be prepared and eventually assessed for student learning. In the *Process* stage, students' characteristics come into play in response to the particular tasks that

are set by the teachers. According to Biggs (1996), the *Process* stage relates "to the way students actually handle the task, which is determined by their perceptions of the teaching context, their motives and predispositions and their decisions for immediate action, all of which comprise their approach to the learning task" (p. 52). This stage further leads to the *Product* stage where intended outcomes of the learning task are assessed (i.e., "low" and "high" cognitive outcomes). There is also a feedback mechanism (represented by arrows), which informs both the teachers and students of the changes that need to take place in order to achieve the desirable learning outcomes.

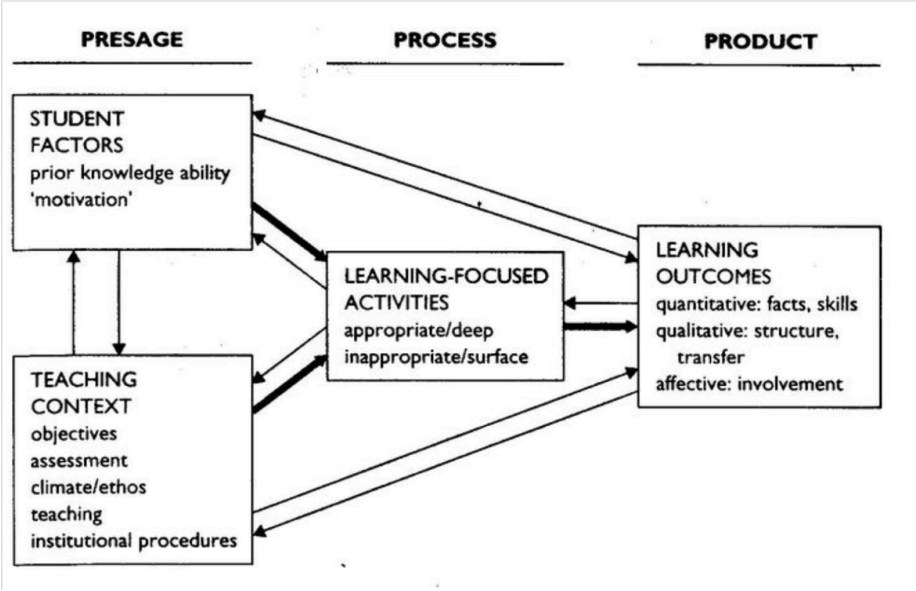

Figure 2. Biggs' 3P Model of Teaching and Learning (1989).

In contrast to the perspectives presented in Section 2.1, Biggs' 3P model deliberately separates teaching from learning (instead of theorizing the interdependence of teaching-learning/learning-teaching relationships), where the focus exclusively lies on what students bring to particular tasks and what approaches they take in completing those tasks or activities. Here, the teacher's role in designing the course activities, objectives, and assessments is considered as given, and not properly theorized. Biggs' 3P model can be

better understood within his Constructive Alignment Framework (1996), which combines some of the features of constructive perspectives into classroom decisions on teaching and assessment. Biggs and Tang (2011), in their recent book, argued that all teachers have particular kinds of theories to conduct and reflect their teaching. The three common theories of teaching, which teachers tend to hold at different points in their teaching career (in a sequential order from novice teachers to more experienced teachers) are the ones that (1) focus on differences in students' abilities as the result of learning outcomes (*blame-the-student* theory of learning), (2) focus on teacher's ability to make learning happen (learning as a function of what the teacher is doing; *blame-the-teacher* theory of learning), and finally (3) focus on "what student does" and how that relates to teaching (what Biggs and his colleagues call *student-centered* or *learner-centered* approach to teaching, with teaching supporting learning). These three theories of learning are summarized in the following figure (Figure 3):

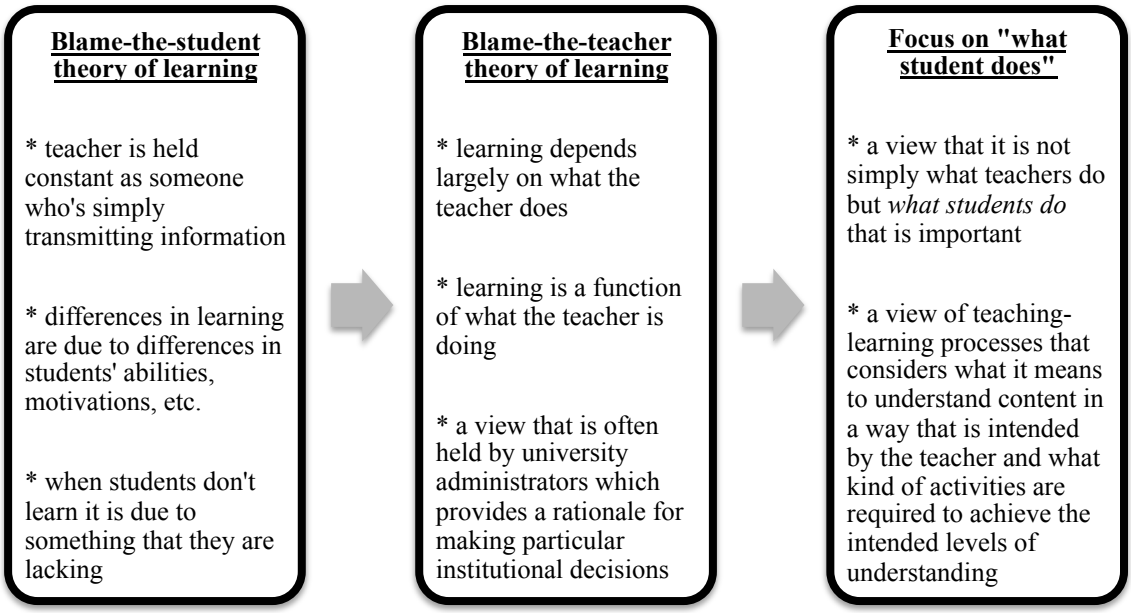

Figure 3. Three Common Theories of Learning (as presented in Biggs & Tang, 2011, p. 15-20).

Biggs and his colleagues argued that focusing on "what student does" (the third box in Figure 3), is the central tenet of the Constructive Alignment Framework, which focuses on students' approaches to learning rather than on individual student's or teacher's abilities. By taking into account students' own *approaches to learning*, what they frame as "deep" vs. "surface" learning approaches, teachers can align their intended goals with the types of learning activities to be incorporated into their classes. Here, higher cognitive level activities (in the order to higher to lower) include: reflect, apply (far problems), hypothesize, relate to principle, apply (near problems), explain, argue, relate, comprehend (main ideas) and describe. And lower cognitive level activities (in the order to lower to higher) include: memorize, identify, name, comprehend sentence, and describe (Biggs & Tang, 2011, p. 27). Students who engage in "deep" learning approaches would engage in these activities at all levels (both high and low), while those who engage in "surface" learning approaches would mostly engage in lower level activities. The challenge for teachers is then to provide activities that can support these missing elements while supplying higher cognitive level activities in order to promote "deep" learning. Biggs' framework is influenced by theories of Constructivism, which emphasize that *learners construct knowledge in and through activities to build on what they already know*. Therefore, teaching is not simply a matter of transmitting information, but "engaging students in active learning, building their knowledge in terms of what they already understand" (ibid, p. 21).

This framework, as intended by Biggs, generalizes beyond specific contexts or topics for which they are designed. Drawing on Cohen's (1986) notion of "instructional alignment," which states that curriculum and assessment methods have to be aligned in order to be

effective, Biggs (1996) calls for a systems approach in promoting deep learning in teaching-learning processes:

> Teaching forms a complex *system* embracing, at the classroom level, teacher, students, and teaching context, student learning activities, and the outcome; that classroom system is then nested within the larger institutional system (Biggs 1993). In a system, the components interact with each other, working towards a stable equilibrium (von Bertallanffy 1968). Thus, if the set assessment tasks address lower cognitive level activities than those nominated by the curriculum objectives, equilibrium will be achieved at a lower level; the system will be driven by backwash from testing, not by the curriculum (Fredericksen & Collins 1989). Attempts to enhance teaching need to address the system as a whole, not simply add "good" components, such as a new curriculum or methods (p. 350).

Put differently, simply adding or adopting a learning activity without thinking about its roles in the entire *system* will not yield fruitful results, especially when "deeper" learning is intended. He explained that "[g]ood teachers are expected to be clear about what they want students to learn and what students should have to do in order to demonstrate that they have learned at the appropriate level; they should know and enact ways of getting their students to learn effectively at the desired cognitive level, to be more student-centred in their teaching-learning activities, and more authentic in their assessment" (ibid, p. 361).

While the framework itself could provide teachers helpful guidance as to how to organize their teaching in order to promote the kinds of learning that they want to promote in their linguistically and culturally diverse students, the framework as a whole, if taken as a *generalizable model* to be implemented across a range of educational settings, masks the complex relationships between teaching-learning/learning-teaching processes. For example, the framework rests on the assumption that simply by examining *what students do* and directing them to *engage in certain activities*, we can ensure "deeper" levels of learning.

Previous research on classroom learning have cautioned towards looking at what students do at particular moment in time as indicative of learning that is taking place (e.g.,

see Bloome, Puro and Theodorou, 1989 on "procedural display"), therefore problematizing the notion of "observable moments." In addition, the outcome of learning in this framework is predefined on a spectrum, ranging from low to high (or surface to deep), which lacks a situated perspective (e.g., Duranti & Goodwin, 1992) of *what counts as lower or higher levels of learning* in a particular subject matter or discipline, under what conditions and circumstances, involving what kinds of actors. Moreover, because of the learner-centered nature of the framework, the teacher's role in creating particular kinds of learning environments for students is opaque and often ignored. What kinds of decision processes did a teacher have to go through in order to create particular kinds of learning activities/opportunities and outcomes? What were the factors that both supported and/or constrained such processes? What kinds of demands did they face in their classrooms? These are just few questions that we simply cannot ask if we were to take Biggs' framework as a generalizable model.

2.2.2. D. Randy Garrison's Community of Inquiry Framework

Canadian education researcher and scholar, Donn Randy Garrison, and his colleagues have been developing *Community of Inquiry Framework (CoI)*, under the goal of conceptualizing the complex process of teaching-learning relationships in higher education, with a particular focus on distance education technologies. The framework rests on the idea that in order to promote "meaningful educational experience," there must be a well-balanced combination of cognitive, social, and teaching presence (Figure 4). Here, *cognitive presence* is defined as "the most basic to success in higher education" (Garrison, Anderson, and Archer, 1999, p. 89), since how individual participants construct meaning through sustained

communication is of special interest within this framework. *Social presence* refers to participants' ability to project their personal characteristics into the community that they are interacting, so that they can present themselves as "real people" in particular digital medium. Finally, *teaching presence* refers to the teacher's responsibility of designing the educational experience, such as selection, organization, and presentation of the course content, as well as the design/development of learning activities and assessments. In this framework, teachers are seen as playing a facilitating role, "to support and enhance the social and cognitive presence for the purpose of realizing educational outcomes" (ibid, p. 90).

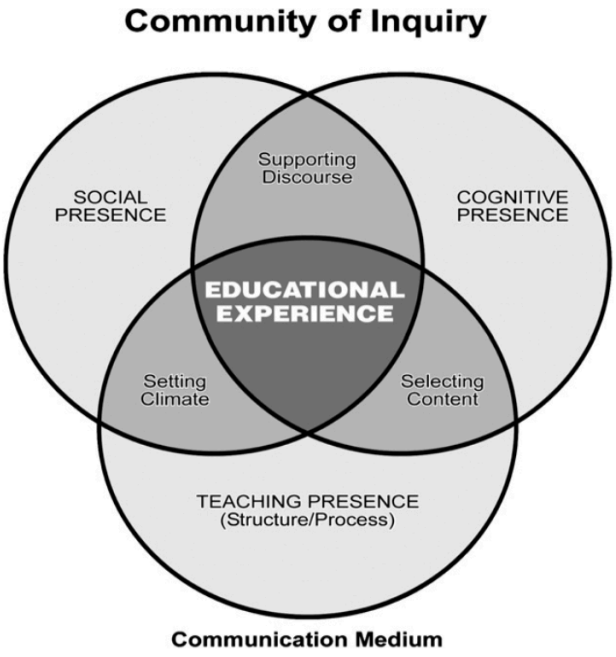

Figure 4. *Community of Inquiry Framework* (copied from Garrison, Anderson and Archer, 1999, p. 88)

Drawing on a *collaborative constructive perspective*, as well as the *practical inquiry model* of John Dewey (1938), which sought to explore the interplay between the personal and social levels of knowledge construction, Garrison and his colleagues conceptualized a meaningful learning experience as a *collaborative communication process*, therefore

emphasizing the importance of social contexts in promoting both higher-order thinking and deep learning. However, as mentioned earlier, although learning is viewed as a social a process, ultimately what gets foregrounded in this framework is how *individual learners* take up what is presented to them to construct meanings and understandings. Under this logic, Garrison (2011) argued that, "[w]hile knowledge is a social artifact, in an educational context, it is the individual learner who must grasp the meaning or offer an improved understanding" (p. 10). Because of this ontological and epistemological stance, the framework naturally sought to uncover predictive relationships between these presences, thereby theorizing each as a mutually exclusive set of processes. The following table (Table 3) shows some examples of the coding scheme used to analyze transcripts generated from a computer conferencing educational setting. As these examples show, analyses of transcript messages relied on three distinct sets of indicators, unique to each presence, in order to ensure that researchers can follow, what the authors claimed to be, an "objective and consistent" coding process.

Table 3.
Community of Inquiry Coding Template (copied from Garrison, Anderson and Archer, 1999, p. 89)

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

Although Garrison and his colleagues recognized the complex and dynamic nature of teaching-learning relationships in educational settings (specifically distance, online, and blended learning environments), their research methodology sought *generalizable laws*, relying on predefined notions of learning (i.e., predefined sets of critical thinking and surface/deep learning approaches), instead of trying to uncover how learning emerges in and through dialogues among participating individuals in and across times and events. In fact, Garrison (2011) explicitly stated that the goal of his research agenda is to *provide conceptual order along with generalizable principles and guidelines for teachers* to use in practice. While social interaction and dialogue are viewed as important in the learning process, their methodology took independent views on teaching and learning, without theorizing the interdependent nature of their relationships. As a result, in one of the recent studies, teacher dialogues were deliberately removed from the analyses for the purpose of examining student learning (i.e., Akyol & Garrison, 2011), even though previous research had demonstrated the importance of the role of teacher in promoting student learning (i.e., Garrison & Cleveland-Innes, 2010).

Such methodological approaches explore "learning" only within the boundary of what students do, and "teaching" only within the boundary of what teachers do. Moreover, such approaches take generic views on students and teachers, often combining different groups of students and teachers in the independent categories of "students" and "teachers." Within this approach, participating individuals' background histories and experiences prior to entering a particular subject matter are never foregrounded. For example, one of the main research sites that Garrison and his colleagues often explore involves graduate-level distance education courses in which students are relatively older and have had diverse academic and

professional backgrounds (i.e., Akyol & Garrison, 2011). Instead of taking a situated perspective grounded in the particularities of the situations and the actors involved, the process of teaching and learning are studied in order to seek generalizable outcomes across a range of higher education settings. Again, similar to Biggs' Constructive Alignment Framework, the CoI framework, if taken as a model to be followed for designing effective learning environments, does not allow us to ask questions that intend to capture the multifaceted and emerging processes of knowledge construction in new educational settings in the 21st century higher education that differ in types of students involved as well as in the level of students within an institution or course in particular a particular subject matter.

2.3. Conceptualizing Teaching-Learning Relationships in Higher Education: Ontological and Epistemological Considerations

Chapter 2 began with my own ontological and epistemological orientation in approaching the current study by laying out how, and in what ways, a social constructionist perspective grounded in discourse analysis might shed light on the complex processes of knowledge construction in a new and emerging educational configuration in higher education by adopting a situated perspective of the actors and events involved across times and contexts. Also, by reviewing and exploring two prominent lines of inquiry within higher education literature (Section 2.2) in light of the orienting framework laid out in section 2.1, I attempted to make visible what these existing frameworks both afford and limit researchers from understanding with regard to the teaching-learning relationships and processes in particular contexts of learning in higher education.

Again, the question raised here is what counts as learning and who count as learners? Both Biggs' and Garrison's frameworks rely on generic views of students (and teachers) and hierarchical models of predefined notions of learning and focus on individual students' learning processes, although they view the social/relational spheres as the crucial sites of learning. In addition, instead of exploring the particularity of the situations and actors involved, they seek to find value-neutral, generalizable laws of teaching and learning, which tend to reduce conceptualizations of teaching and learning to simplistic terms. If I now return to Waring's (2012) four building blocks of research (i.e., ontology, epistemology, methodology and methods), what becomes visible is the importance of understanding the logic-of-inquiry (c.f. Green, Dixon & Zaharlick, 2003) of a particular study or approach to research; that is, how each stage of research was constructed based on the researcher's ontological and epistemological accounts of the social world.

In the following section (2.4), based on the orienting framework laid out in this literature review, I will lay out a rationale for undertaking an ethnographic perspective (Bloome & Green, 2004), and more specifically an interactional ethnographic approach grounded in discourse analysis (Castanheira, Crawford, Dixon and Green, 2001) to answer the questions posed in the current study. At the center of this approach is researcher reflexivity (e.g., Gee & Green, 1998) and taking a situated perspective on examining the work of a professor with students in global learning contexts as well as their consequences for students' access to what the insiders claim as "new" learning opportunities and outcomes for the 21st century.

2.4. Ethnographic Approach to Education Research: A Brief Review

In this final section, I provide a brief review on ethnographically framed perspectives in education research, which have informed the developing logic of inquiry in the current study. As it will become visible in the following chapter (Chapter 3 on Methodology), an ethnographic perspective grounded in discourse analysis allows me to make principled decisions throughout different stages of research.

The word, ethnography, comes from the two Greek words "ethnos" meaning race, people or cultural group, and "graphia" which means writing and representing in a particular field (LeCompte and Prissle, 1993). Scholars have pointed out that ethnography is, in fact, hugely varied in its empirical focus (e.g., Green, Dixon & Zaharlick, 2003; Walford, 2008; R. F. Ellen, 1984; Baker, Green & Skukauskaite, 2008). According to R. F. Ellen (1984), a social anthropologist from the UK, "ethnography is something you may do, study, use, read, or write. The various uses reflect ways in which different scholars have appropriated the term, often for perfectly sound conceptual reasons" (p. 7-8). Moreover, there is little value in seeking a singular point of view in ethnography and we need to understand the "subtle differences" in order to make informed decisions as to whether our work meets the criteria for ethnography defined by specific fields (Green, Dixon & Zaharlick, 2003).

Historically, ethnography has its roots in anthropology and sociology (Walford, 2008, p. 4). A specific emphasis in education emerged in the 1960s (both in the US and UK) due to the institutionalization of teacher education within universities, demanding academics to conduct educational research and publish (ibid, p. 4-5). In 1955, a conference was held at Stanford University under the joint effort of the Stanford School of Education and Department of Sociology and Anthropology and the American Anthropological Association

(c.f. Green, Dixon & Zaharlick, 2003). The purpose of this conference was to explore the interrelationship between education and anthropology. The outcome of this conference was the first books on *Anthropology and Education*. James Quillen in his introduction to the 1955 volume (edited by George Spindler) explained that increasing attention has been directed toward anthropology during this time "as a source of conceptual knowledge and research methods" in order to address problems in education (p. 1). Such movement was, in part, a reaction toward heavy emphasis on psychology in education and quantitative (mostly survey-based) educational research that had little interest in examining the *processes* of teaching-learning relationships. Educationists who wished to look inside the "black box" of educational settings set out to explore micro-cultures within these settings (Walford, 2008, p. 5).

The *Ethnography and Education* journal identified several key elements of ethnography that can be applied to the study of educational contexts (c.f. Walford, 2008, p. 3). Building on these elements, Walford (2008) argued that fundamentally there is a correspondence between the ways in which people (i.e., research participants) and the ways that ethnographers go about exploring their research sites and participants. He further argued that such parallels between the two processes prove that ethnography is well suited for a range of research questions about teaching-learning relationships in educational contexts.

According to Walford (2008), *ethnography is a study of particular "culture."* In order to understand the actions, values, and meanings of a particular individual or a group, we need to take into account their cultural contexts. The word, *culture*, as elaborated in Chapter II, is difficult to define (e.g., Agar, 1994; 2006; Scollon, Scollon and Jones, 2011). Walford (2008) argued that "openness" is at the heart of ethnography, since it is *living through this*

process in which ethnographers get to know an insider's culture. According to an interactional ethnographic approach grounded in discourse analysis following questions can be explored in order to uncover the cultural practices of a particular group (Castanheira, Crawford, Dixon & Green, 2001; Green, Skukauskaite, & Baker, 2012; Baker, Green & Skukauskaite, 2008): What counts as knowing, being and doing in this social group? How are processes, practices, referential systems, academic content(s), common knowledge(s), identities, roles and relationships as well as norms and expectations of everyday life discursively and interactionally constructed? Who has access to these processes, practices, identities, and other social constructions, when and where, under what conditions, in what ways, for what purpose(s)? And what are the outcomes or consequences for students and teachers across times and events and how do these shape repertories for learning that students (and teachers) have available to guide their actions and interpretations in other events, groups or disciplines?

Walford (2008) further argued that, since cultures are complex and multi-dimensional, ethnographers are required to study cultures from multiple angles and from many different ways. Therefore, ethnography exploits a variety of research tools in order to gain a multi-dimensional understanding of the setting, which means that written documents, fieldnotes (conversations, interviews, overheard remarks, observational notes, etc.), audiotapes, videotapes, and quantitative data all may be included (Walford, 2008; Baker, Green & Skukauskaite, 2008). In other words, *ethnographers must be willing to consider many different types of data.*

Another element of ethnography identified by Walford (2008) is human connections with participants, as well as *the investment of time in order to build trust and to develop and*

maintain positive relationship with participants. As Walford (2008) argued "[l]earning is rarely a once-and-for-all process, but depends upon repeated engagement over time" (p. 10). Furthermore, drawing on Blumer (1969), sociologist Robert M. Emerson (1995) explained that field research "is particularly suited to documenting social life as process, as emergent meanings established in an through social interaction (Blumer, 1969). Attending to the details of interaction enhances the possibilities for the researchers to see beyond fixed, static entities, to grasp the active "doing" of social life" (p. 14).

Moreover, researchers need to be mindful of the fact that their analysis of certain cultural phenomena is often subjectively informed. In fact, *ethnographer himself/herself is the main source of the data*. From the very beginning of the research (i.e., selecting sites, framing research questions) to the end of the research (i.e., choosing what to (re)present through writing), the ethnographer's decisions are the main research instrument. Therefore, ethnographers must be cognizant of their prior assumptions as well as lack of knowledge. Ethnographers must always be prepared to document his/her evolving ideas, decisions made in each step of research, and why data collection or analyses were carried out in particular ways. This element is in alignment with the transparency issue raised in American Educational Research Association's (AERA) guideline for reporting on empirical social science research (2008), which states that reports of empirical research should be *transparent*, "…that is, reporting should make explicit the logic of inquiry and activities that led from the development of the initial interest, topic, problem, or research question; through the definition, collection, and analysis of data or empirical evidence; to the articulated outcomes of the study" (p. 33).

If we agree that researcher is the main source of data, then we should also accept the fact that the researcher tends to remain as the high authority in terms of selecting and constructing the final account of a certain cultural phenomena involving its members. The ethnographer must be culturally open-minded and be able to challenge his/her own theories and understandings, while making claims about the culture based on the "empirical experience" of that culture. Most importantly, *ethnographers must give high status to participants' own accounts of their experiences*. Rather than using the preconceived or predefined framework to gather and analyze data, ethnographers must use their interactions with participants to develop a grounded and warranted understanding of their culture. R. M. Emerson (1995) argues that "[t]he object of participation is ultimately to get close to those studied as a way of understanding what their experiences and activities *mean to them*" (p. 12).

Moreover, many scholars agree that developing a theory is *not* an event, but rather a *process*. *Ethnographers make visible the multifaceted cycle of hypothesis and theory building.* In light of new data, what needs to be examined and reported may change, and explanations of what is going on must be triangulated with other resources. This point again reminds us of the importance of "transparency." R. M. Emerson (1995) argues that "[l]ong-term participation dissolves the initial perceptions to subtle patterns and underlying tensions. In short, the field researcher does not learn about the concerns and meanings of others all at once, but in a constant, continuing process in which she builds new insight and understanding upon prior insights and understandings" (p. 13). Therefore, it is important that the researcher document these emerging processes and stages before (re)presenting their interpretation of a particular social group or activity.

This brief review reveals the *interactive* and *responsive* nature of ethnographically farmed research in education. In higher education, Constance Iloh and William G. Tierney (education scholars and researchers) in their recent paper (2014) argued that utilizing ethnography is particularly useful because it allows analyses of "multiple sites and dimensions of cultural exchange and reproduction" (p. 23), and "[w]hen handled with patience and employed with rigor, ethnography can reduce the challenge of distortion by drawing from diverse knowledge bases in the conceptualizing, data collection, and data analysis process" (p. 32). In striving to identify patterned ways of perceiving, believing, acting and evaluating what members of particular social groups develop within and across times and events, we can move away from "a mere descriptive account of an environment to a data-driven picture of an insider-informed space" (ibid, p. 21). Their argument further strengthens my rationale for undertaking an ethnographic approach in this study.

In an attempt to take a more focused approach, an interactional ethnographic approach grounded in a social construction of knowledge perspective (i.e., Castanheira, Crawford, Dixon and Green, 2001) is undertaken in this study. From this perspective, an ethnographer examines what members of a particular sociocultural group count as appropriate forms of actions, practices, artifacts and processes. Here cultural knowledge is defined as a socially constructed phenomenon, which is "visible in the actions members take, what they orient to, what they hold each other accountable for, and what they accept or reject as preferred responses of other, and how they engage with, interpret, and construct text" (ibid, p. 354). Castanheira et al. (2001) further argued that, "[b]eing a member of a class, then, means understanding, constructing, and engaging in literate actions that mark members in that class

(Chandler, 1992; Green, Weade, & Graham, 1988; Putney, 1996; Rex, Green, & Dixon, 1997)" (c.f. p. 356).

Therefore, an interactional ethnographer "must look at what is constructed in and through the moment-by-moment interactions among members of a social group; how members negotiate events through these interactions; and the ways in which knowledge and texts generated in one event become linked to, and thus a resource for, members' actions in subsequent events" (ibid, p. 357). Through these processes, we can examine how particular cultural knowledge is "talked, acted, and written into being, and how, through their actions, members make visible to each other what counts as appropriate discursive and literate practices" (ibid, p. 357). Undertaking this approach allows me to make warranted claims about what is actually happening in moment-by-moment situations across time and events to gain a socially constructed, situated and context-specific accounts of teaching-learning processes in a culturally unique and socially significant group(s) as well as setting(s).

Based on the three sets of reviews done in this chapter, the following chapter will lay out the methodology of the current study including the purpose of the study, research site/participants, and how I went about analyzing the archival records to uncover the instructor's design logic and thinking in a unique global engineering course. Given the issues raised and my goal of redefining how to conceptualize teaching-learning relationships (beyond predefined notions), I take a reflexive stance, one that will make visible that has previously not been included in the developing models and approaches reviewed here.

Chapter 3. Methodology

In this chapter, I frame how, and in what ways, an ethnographic perspective, and particularly an Interactional Ethnographic approach (Green et al., 2012; Castanheira et al., 2001), can inform the developing logic of inquiry in the current study. At the center of the orienting frame of the current study is the goal of problematizing the notion of a one-size-fits-all approach to understanding teaching-learning relationships, by undertaking a situated perspective that examines moment-by-moment interactive dimensions across times, spaces, and contexts, in order to understand their consequences for students' access to both academic and social contents (e.g., Weade, 1987). Such an approach conceptualizes teaching-learning relationships beyond the level of individual to individuals-within-the-collective, and to collective levels, to understand how they can together become sources of knowledge for each other (e.g., Souza Lima, 1995; Kelly & Green, 1998; Gergen, 2001).

In order to undertake this kind of approach, analyses cannot be simply restricted to what has been officially recorded and/or observed in particular moments in time, but rather must develop a warranted and systematic way of tracing the developing processes in which actors are involved, how particular conceptualizations of teaching-learning relationships are brought into the design processes of the course, as well as the sociocultural milieu in which the educational initiative grew and developed (e.g., Posner, 1995). Therefore, by taking a situated perspective grounded in everyday discourse processes that people engage in (e.g., Bakhtin, 1986; Duranti & Goodwin, 1992; Bloome & Clark, 2006), I explore the dynamically changing and evolving nature of the knowledge construction processes in particular social-cultural settings in order to gain complex and multifaceted understandings of unique educational practices in today's connected world.

3.1. Purpose of the Study

The present study takes, as an anchor, the main instructor's design logic and thinking behind a non-traditional higher education course in order to trace how, in what ways, and for what purposes, the instructor was continually defining and reformulating what counted as a "new" and emerging body of engineering knowledge in today's global world through his interactions with participating students and teaching teams located at multiple international campuses. By examining how the significance of the "new" engineering knowledge was discursively made present to the culturally diverse group of students in a moment-by-moment and over-time basis, I sought to uncover an *emic*, or insider, understanding of what was being proposed by instructor as ways of participating and engaging in, what he referred to as "new" ways of learning (and teaching) for global innovation, rather than beginning with predefined notions of learning and teaching inscribed in higher education literature. The overarching question asked in this study is:

> *How can I, as an outside researcher without any lived experience of a global engineering course, conceptualize the design process of the course, which claimed to provide "new" learning opportunities and outcomes for students?*

Being mindful about my own researcher reflexivity (e.g., Gee & Green, 1998), I take a critical stance in the ways in which I entered this research site in, and through, a set of available archival records (e.g., course syllabi, lecture videos) to *construct* the data (Ellen, 1984) and trace what opportunities were being afforded to students in this unique educational setting. Furthermore, drawing on the guidelines provided by American Educational Research Association's (AERA, 2006) Standards for Reporting Empirical Social Science Research, I seek to provide both warranted and transparent accounts of every

stage of the research to make explicit the developing logic-of-inquiry and growing theoretical understanding that this ethnographic process makes visible.

3.2. Research Site and Participants

The research site for this study was a new engineering education programmatic initiative, which began in 2010 by the designer/director/instructor of the program, Professor SCLU, who is a chaired engineering professor at a private, four-year research intesnvie university in California, USA. With a vision that "what you learn depends on with whom you learn," Professor SCLU created what he called a *No-Distance Education* (NDE) platform to engage culturally diverse group(s) of students and teaching team(s) around the world (i.e., US, China, India, Israel, and South Korea) in a common course both synchronously and asynchronously via Internet technologies.

While the arrangement of the technological devices was different each year at individual institutions, conceptually the design of the NDE interactive classrooms was similar to the one depicted in Figure 5. At this local campus, students would join in weekly lecture/discussion sessions as they normally would from their local campuses. Students at other national sites would be visible on the screens in the front right (Interactive Classroom B) and front left (Interactive Classroom A) of the front wall. With additional projectors (i.e., represented by sun symbols) and cameras (i.e., represented by red circles with white crosses), students can see and interact with their classmates at different international campus sites synchronously through the screens in front of the room (i.e., Interactive classrooms A & B). The purple circles on students' desks represent microphones that they can use to engage in active discussions with their peers across different campus sites. Additional

screens were hung in the back of the room, so that the instructor, too, could see the students at remote campuses, while interacting with his students at his local campus. It is this very organization and linking of the multiple NDE interactive classrooms that makes this course a *no-distance*, as opposed to a *distance* education course. Given that this was claimed as a different kind of educational configuration, it was important *not* to approach this course simply as a traditional distance education course. Therefore, one of the goals of this study was to uncover how and in what ways this course was truly "new" from the perspectives of the insiders.

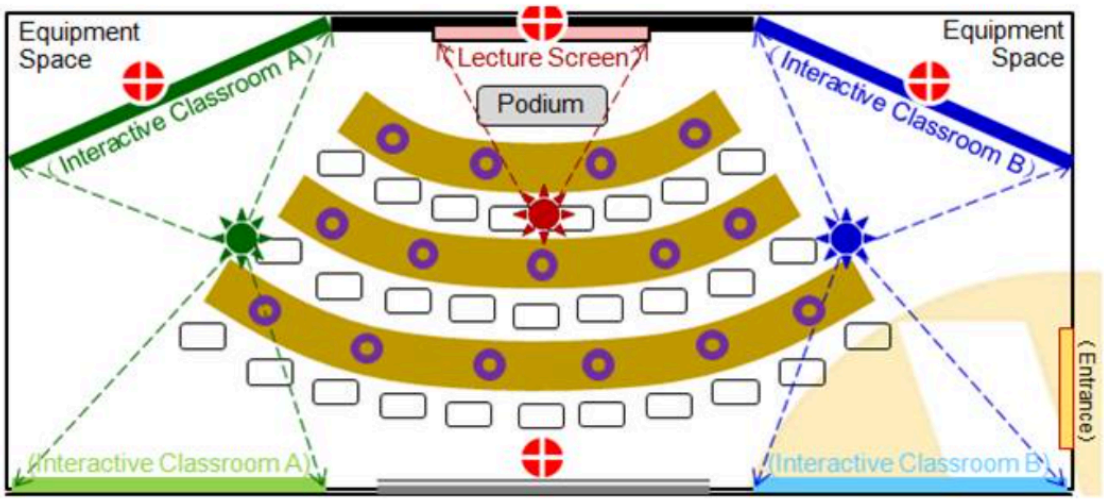

Figure 5. Conceptual Design of a NDE Interactive Classroom (copied from the NDE program public website)

3.2.1. Historical Context of NDE Cornerstone Course

Since its inception in 2010, the NDE program has been offering its cornerstone course titled, *Principles and Practices of Global Innovation*, to different cohorts of undergraduate students each year (e.g., Spring 2010, Spring 2011, Spring 2012, Spring 2013, and Spring

2014). The focal course in this study is the Spring 2014 course (the fifth iteration) in which 112 students with interdisciplinary backgrounds (e.g., engineering, business, social sciences and humanities) joined from 6 different campuses located in the US, India (two campus sites), Israel, China and South Korea. The students were linked in two sections to meet the time differences (US, China and Korea, India (Sites #1 and #2), and Israel). Including the main instructor of the course (Professor SCLU), there were 7 faculty and 7 teaching assistants across the participating campuses, all of whom took the responsibility of supervising students at their local sites (please refer back to Table 1 in Chapter 1). Given the complex nature of the NDE course, details about the course organization are systematically analyzed and presented in the following chapters (specifically Chapters 4 and 5). In the present study, Professor SCLU's (the designer as well as the main instructor of the course) design logic as well as discourse in the Spring 2014 NDE course were traced as anchors for the series of analyses that will follow. Because Professor SCLU did not want researchers to have any direct contact with students during the live sessions, the analyses relied heavily on the archival records (e.g., course syllabi, lecture videos) that were provided by the teaching team.

3.2.2. Data Collected/Data Set

The following table (Table 4) was created to provide a map of the available archival records based on their category, content and amount. Additional data that were requested and/or sought from the team are listed in the fourth column. It should be noted that not all of the records listed here were provided at one point in time; rather, data collection required an

ongoing iterative, recursive and abductive chain of interactions and negotiations with SCLU's team over the two years of this study (2014-2016) to gain access to these records.

Table 4.
Archival records available for analysis

Category	***Content***	***Amount of Data Received***	***Additional Information Requested/Sought***
Video	2 hour face-to-face lecture sessions (morning session & evening session) between Week 1 and Week 14	Twenty seven video files (~3240 minutes)	Individual conversations with two former students (one who took the course in 2012 and another who took the course in 2014)
Course Syllabus	Official course syllabus outlining the purpose of the course, participating universities, course requirements, organization, grading scheme, and course schedule	14-pages long	Syllabi of the course from previous years (2010-2013) requested in order to situate the 2014 course within the running history of the program
NDE Program Contextual Information	Official program website & Published articles written by the instructor of record	Publicly available information online (i.e., course public website, Google, Google Scholar)	Ongoing conversation with the program manager
Interview	Interview done for a magazine article (of the instructor of record) in 2015	53 minutes of audio recording	Article written based on the interview (publicly available online)

3.3. Data Analyses: Developing An Ethnographic Logic-of-Inquiry

Drawing on Green, Skukauskaite and Baker's (2012) *ethnography as epistemology* perspective, I approached the analyses of the archival records with *a logic-of-inquiry, or a way of knowing* (Agar, 2006), not simply with a method or a technique. The analyses that

are presented in the following three chapters, i.e., Chapters 4, 5, and 6, make visible the particular decisions that I, as an outside ethnographer, made in order to make sense of the available archival records. Each analysis presented makes visible particular actions necessary to uncover the design processes that Professor SCLU framed as constituting the "new" ways of learning in this unique global engineering course.

It should be noted that although the following three chapters focus on particular analytic decisions I made, the logic for these decisions is embedded throughout all seven chapters. The epistemological decisions guiding the current study are grounded in the following logic of inquiry, adapted from Green, Skukauskaite, and Baker (2012, p. 309), one that shaped ways of:

- Selecting phenomena to study ethnographically;
- Constructing an orienting framework to guide participant observation processes through archival records;
- Selecting methods and resources to guide collection and analysis (e.g., managing available video/audio recordings, collecting published documents and online resources, seeking further information from the teaching team);
- Identifying a tracer unit (i.e., Professor SCLU) to engage in moment-by-moment and over-time analyses of what he proposed to students;
- Engaging in a historical analysis to understand what is happening in particular moments of classroom life;
- Identifying rich points as anchors for a series of analyses;
- Constructing data sets using the available archive for analysis;
- Constructing grounded accounts to develop explanations of observed events and/or phenomena;
- Making transparent the logic-in-use throughout the analyses.

At the center of this range of decisions is the argument that the *researcher is the main research instrument* (Walford, 2008). Since the main source of data in the present study involved video records and transcribed texts, I decided that it was important to understand how data were conceptualized throughout the research process in which they were collected

and/or constructed. This argument builds on the following argument by Green, Dixon and Zaharlick (2003), who noted that,

> The nature of the record (e.g., specimen records or narrative accounts of the sequence of activity) and the approach to analysis (e.g., using preset codes or developing grounded codes) depend on the goals of the researcher. Technological records (e.g., audiotapes, videotapes, and photographs) are open systems that record sounds and/or actions within the field of the camera lens or the microphone. These records make post hoc analyses possible but they do not represent all that occurred, and like narrative systems, are influenced by the choice of focus or placement by the researcher. Narrative systems and technological records can be ethnographic tools when used as part of participant observation but the mere use of such observation approaches does not constitute ethnographic method (Green & Wallat, 1981; LeCompte & Priessle, 1993; Spradley, 1980) (p. 202).

Based on the above quote, any kind of record(s) that a researcher works with (video/audio clips, transcripts, or fieldnotes) is a *product* of a researcher's (the original one or one drawing archived records) "choice of focus" and therefore does *not* represent all that occurred. Therefore, making visible *how* these technological "tools" are used during analyses (either primary, or in this case secondary analysis) is of greater importance than the mere use of these tools for some observational or analytic purposes.

Conceptualizing Video Records. According to Interactional Ethnographers (i.e., Castanheira, Crawford, Dixon, & Green, 2001; Green, Skukauskaite, & Baker, 2012; Baker, Green & Skukauskaite, 2008), how video is used and constructed in research is of a *theoretical concern*—that is, what is recorded is the researcher's theoretically driven inscription of a particular bit of life using a recording device for post hoc analyses. Interactional Ethnography, as a philosophy of inquiry, draws on the theories from multiple disciplines (i.e., anthropology, cognitive science and learning sciences, education, linguistics, and sociology) and explores discursive and social construction of everyday life. Interactional

ethnographer, therefore, (re)presents local theories and situated knowledge that members draw on and co-construct in particular social groups. This philosophy of inquiry, according to Baker, Green and Skukauskaite (2008, p. 84), views life in classrooms as "*discursively constructed, socially accomplished, and as developing a particular set of linguistic, cultural and social resources that are socially and academically significant* (Cazden, John and Hymes, 1972; Cazden, 1988; Collins and Green, 1992; Erickson, 1986; Green and Wallat, 1979; 1981; Cook-Gumperz, 1986; Gumperz, 1986; Smith, 1987; Bloome et al., 2005; Rex, 2006." Therefore, the use of video records, whether for primary or secondary analyses, allows Interactional Ethnographers to revisit and watch a bit of life multiple times, while fully concentrating on, and taking note of, the details and subtleties in multimodal conversations.

For Interactional Ethnographers, videos permit exploration of the work of members at multiple levels of analytic scale (i.e., individual and collective actions, actions across times and events, historical and future actions referentially signaled). From this perspective, what are captured on videos are not only intentional actions of members in a sustaining social group, but also intentionally framed bits of life created in particular ways. Therefore, what gets recorded and analyzed in videos depend on when, where, and how the equipment was initially positioned, its capacity to capture both audio and video artifacts, as well as how participants (including researchers) react to and interpret these records. In this process, "reduction" inevitably occurs with the representation of a recorded bit of embodied discourse and action.

Conceptualizing Transcripts. Emerson (1995) argued that, a transcript is "never a "verbatim" rendering of discourse, because it "represents…an analytic interpretation and selection" (Psathas and Anderson 1990: 75) of speech and action," (p. 9) further arguing that,

> …a transcript is the product of a transcriber's ongoing interpretive and analytic decisions about a variety of problematic matters: how to transform naturally occurring speech into specific words (in the face of natural speech elisions); how to determine when to punctuate to indicate a completed phrase or sentences (given the common lack of clear-cut endings in ordinary speech); deciding whether or not to try to represent such matters as spaces and silences, overlapped speech and sounds, pace stresses and volume, and inaudible or incomprehensible sounds or words. In sum, even those means of recording that researchers claim come the closest to realizing an "objective mirroring" necessarily make reductions in the lived complexity of social life similar in principle to those made in writing fieldnotes (p. 9-10).

Based on these points, both videos and transcripts (as well as other bits of data and even facts) are *products* of the methodology applied and methods used; in other words, "*what* the ethnographer finds out is inherently connected with *how* she finds it out" (Emerson, 1995, p. 11). Therefore, knowing, and carefully documenting one's theory-method-data relationships is crucial, as such process enable a researcher to take his/her own "findings" as contingent upon the circumstances created through and within the interactions ethnographers have with participants and analytic activities. These processes often go "invisible" in published text or works, but constitute the core of an ethnographic analytic work—as it is through this interpretive work of recording, noting, reducing, transcribing, and triangulating different bits of data that make visible particular cultural meanings.

In order to systematically trace the developing instructional context in and through discourse in the current research site, I drew on a sociolinguistic description of the instructional conversations developed and articulated by Green and Wallat (1979). Through this descriptive analytic process, I was able to engage in retrospective analysis of the

discursive work of Professor SCLU as it unfolded across times and events. To make transparent my logic-in-use, I described each message (organized in lines – i.e., Line 1, 2, 3, etc.) at the levels of actions signaled/proposed as well as phases of activities. In so doing, I attempted to make visible how the instructor, through his interactions with interdisciplinary and international groups of students, tried to create particular instructional context(s), or what he claimed as "new" ways of engaging in engineering education. I demonstrate what the transcription/analytic processes entailed by providing an example in the next section (note that this example is drawn from Transcript Segment 5 in Chapter 6).

An Example of Transcription and Analytic Process. The following example is drawn from a transcript segment from the beginning part of Session A's Week 4 lecture session. In order to understand this bit of instructional talk, it was important to situate it within the running course schedule with the actors who were involved in this particular event. The following gray box provides a brief contextual description to situate the example transcript segment:

Contextual Description: Professor SCLU greets students during Session A's Week 4 live lecture session. The participating institutions were USU (Session A), INU-Site#1, and INU-Site#2. ISU students had the option of joining from their home computers.

Following this description, Professor SCLU's talk in the beginning part of this lecture session is organized into message units (Green & Wallat, 1997, p. 164) to (re)present the his flow of talk in the public space of the classroom:

Contextual Description: Professor SCLU greets students during Session A's Week 4 live lecture session. The participating institutions were USU (Session A), INU-Site#1, and INU-Site#2. ISU students had the option of joining from their home computers.

Line	***Professor SCLU***
1	Let's get started for today's class
2	I always say "good morning" to [USU] students
3	because it is actually only 7:30 in the morning

4	I know that some of you are still working on your breakfast
5	It's okay
6	we need to get used to this global life
7	I understand now
8	in India in both campuses
9	this is quite close to very late evening midnight
10	and in [ISU] it's late afternoon
11	perhaps you are ready to start your dinner
12	I wanted to conduct this course
13	as an integrated part of your life
14	so as long as you are able to participate and engage
15	you can bring your breakfast
16	bring your dinner
17	bring your lunch
18	as long as you don't disturb the class's progression
19	you are free to do so

Following this quick transcription process, each message unit is described based on the actions signaled/proposed by Professor SCLU to his students. This analytic process makes visible moment-by-moment what was made present to students as important to pay attention to during this event:

Contextual Description: Professor SCLU greets students during Session A's Week 4 live lecture session. The participating institutions were USU (Session A), INU-Site#1, and INU-Site#2. ISU students had the option of joining from their home computers.		
Line	***Professor SCLU***	***Actions Signaled***
1	Let's get started for today's class	*signaling the beginning of class*
2	I always say "good morning" to [USU] students	*situating local time*
3	because it is actually only 7:30 in the morning	*providing rationale for situating time*
4	I know that some of you are still working on your breakfast	*situating local actions*
5	It's okay	*providing approval for local actions*
6	we need to get used to this global life	*making present to students what is expected*
7	I understand now	*situating time at remote sites*
8	in India in both campuses	
9	this is quite close to very late evening midnight	
10	and in [ISU] it's late afternoon	*situating time at another remote site*
11	perhaps you are ready to start your dinner	*situating remote actions*
12	I wanted to conduct this course	*providing instructor's goal*
13	as an integrated part of your life	

14	so as long as you are able to participate and engage	*providing required conditions*
15	you can bring your breakfast	*providing approval for local actions*
16	bring your dinner	*providing approval for actions at remote sites*
17	bring your lunch	
18	as long as you don't disturb the class's progression	*providing approval for actions under certain conditions*

Throughout this process, the video recording is revisited to gain further understanding of this bit of talk. In revisiting the video recording, the sequences of talk are identified and inscribed into the transcript using black arrows. The sequences include additional contextualization to this bit of talk and add transparency to how and in what ways these actions were signaled by Professor SCLU to his students:

Contextual Description: Professor SCLU greets students during Session A's Week 4 live lecture session. The participating institutions were USU (Session A), INU-Site#1, and INU-Site#2. ISU students had the option of joining from their home computers.		
Line	***Professor SCLU***	***Actions Signaled***
1	Let's get started for today's class	*signaling the beginning of class*
		⬇
2	I always say "good morning" to [USU] students	*situating local time*
3	because it is actually only 7:30 in the morning	*providing rationale for situating time*
4	I know that some of you are still working on your breakfast	*situating local actions*
5	It's okay	*providing approval for local actions*
		⬇
6	we need to get used to this global life	*making present to students what is expected*
		⬇
7	I understand now	*situating time at remote sites*
8	in India in both campuses	
9	this is quite close to very late evening midnight	
10	and in [ISU] it's late afternoon	*situating time at another remote site*
11	perhaps you are ready to start your dinner	*situating remote actions*
		⬇
12	I wanted to conduct this course	*providing instructor's goal*
13	as an integrated part of your life	
		⬇
14	so as long as you are able to participate and engage	*providing required conditions*
15	you can bring your breakfast	*providing approval for local actions*
16	bring your dinner	*providing approval for actions at remote sites*
17	bring your lunch	

18	as long as you don't disturb the class's progression	*providing approval for actions under certain conditions*

Finally, the actions signaled/proposed and the sequences identified are used to identify larger phases of activity to understand what this bit of instructor's talk attempted to accomplish; that is, proposing to students to get used to a "global lifestyle," which entails particular ways of participating in this NDE course:

Contextual Description: Professor SCLU greets students during Session A's Week 4 live lecture session. The participating institutions were USU (Session A), INU-Site#1, and INU-Site#2. ISU students had the option of joining from their home computers.

Line	***Professor SCLU***	***Actions Signaled***	***Phases of Activity***
1	Let's get started for today's class	*signaling the beginning of class*	*getting started – brings everyone to a common frame*
		⬇	
2	I always say "good morning" to [USU] students	*situating local time*	
3	because it is actually only 7:30 in the morning	*providing rationale for situating time*	
4	I know that some of you are still working on your breakfast	*situating local actions*	
5	It's okay	*providing approval for local actions*	
		⬇	
6	we need to get used to this global life	*making present to students what is expected*	*proposing a global life(style) – signals everyone to new ways of participating in this course*
		⬇	
7	I understand now	*situating time at remote sites*	
8	in India in both campuses		
9	this is quite close to very late evening midnight		
10	and in [ISU] it's late afternoon	*situating time at another remote site*	
11	perhaps you are ready to start your dinner	*situating remote actions*	
		⬇	
12	I wanted to conduct this course	*providing instructor's goal*	
13	as an integrated part of your life		
		⬇	
14	so as long as you are able to participate and engage	*providing required conditions*	
15	you can bring your breakfast	*providing approval for local actions*	
16	bring your dinner	*providing approval for actions at remote sites*	
17	bring your lunch		
18	as long as you don't disturb the class's progression	*providing approval for actions under certain*	

19	you are free to do so	*conditions*	

Such transcription/analytic process provides a way of visualizing rich contextualization information of bits of talk being analyzed in this study. Also, by uncovering moment-by-moment what was made present to students in the discursive work of the instructor, I, as an outside researcher, was able to retrospectively understand how instructional contexts unfolded in and across times and events.

The analytic processes, therefore, attempted to make transparent my own logic-of-inquiry in order to address the overarching question: *How can I, as an outside researcher without any lived experience of a global engineering course, conceptualize the design process of the course, which claims to provide "new" learning opportunities and outcomes for students?* Throughout these analyses, I make visible the series of decisions that I made at each point of analytic process in order to make warranted claims about the phenomena under study. The following figure (Figure 6) (re)presents the ethnographic logic of inquiry constructed throughout this study, starting with the overarching question, followed by a series of posing questions that emerged for further exploration. Figure 6, therefore, makes visible the chain of reasoning (Krathwohl & Smith, 2005) that provides a logic-map of the logic-in-use (Birdwhistell, 1977).

As indicated previously, the specific analytic processes undertaken to address these questions will be made present as I (re)present each level and process of analyses to address the question posed in order to construct a set of warranted claims about how and in what ways the instructor designed the fifth iteration of this developing innovative course within the larger program that he argued as No-Distance Education (NDE) model.

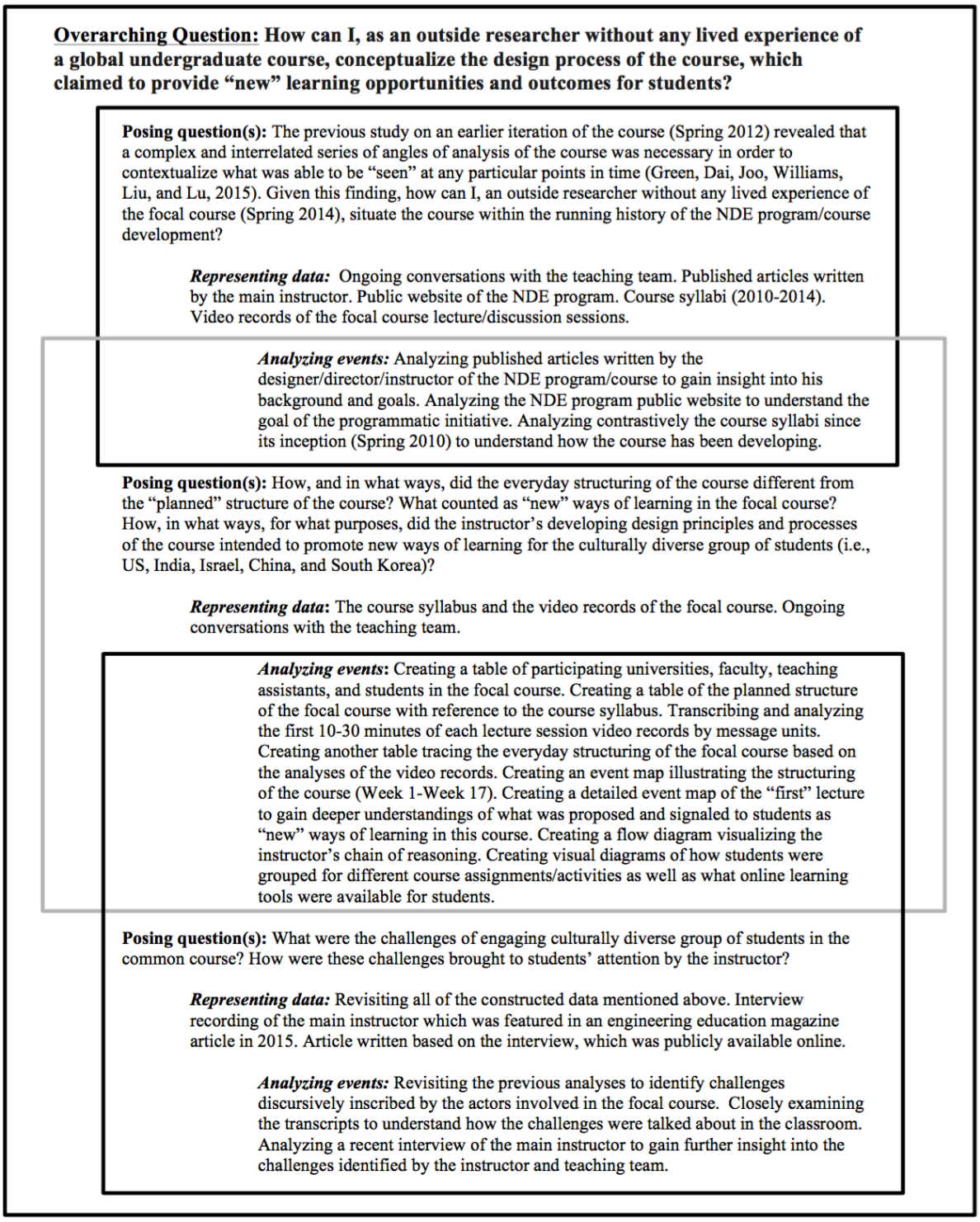

Figure 6. The Ethnographic Logic of Inquiry Constructed Throughout the Present Study

Chapter 4. Historical Analyses of the No-Distance Education Program

This chapter is organized into two parts: (4.1) first is the *personal reconstruction* to situate my participation within the larger research project and frame a rationale for the direction undertaken in this study, and (4.2) second is the *archival reconstruction* to situate the focal NDE course within the developing history of the NDE programmatic initiative. Throughout this chapter, I (re)constructed the layers of historical accounts and analyses using progressive disclosure (i.e., Gutierrez, 1993, Castanheira et al., 2001) to situate the present study and the focal course under exploration.

4.1. A Brief History Leading to the Present Study

In May 2014, I became involved in a project in which a *research alliance* had already developed between Engineering Educators at USU (SCLU's team) and Educational Ethnographers in my home institutions (JLG's team) to have ongoing dialogues (2012-present) about the conceptual and epistemological underpinnings of SCLU's global engineering course on *Principles and Practices of Global Innovation*. By tracing what the research alliance members have both interactionally and discursively accomplished within and across time, we examined how multiple forms of dialogues among the members over the years (i.e., virtual, email, phone, and face-to-face) became resources for deepening and reformulating members' understandings of how SCLU's team provided opportunities for learning global innovation processes for a culturally diverse group of students from multiple interactional campuses to achieve what he called *No-Distance Education* (NDE) model.

The (re)construction of this history begins by focusing on the inscribed history in a collaborative paper published in a special issue of the International Journal, Pedagogies

(Green, Dai, Joo, Williams, Liu and Lu, 2015). In this article, the writing team, on which I worked, identified an unanticipated transformation in understandings of the both teams, SCLU's team and JLG's team (the team on which I worked). This unanticipated transformation resulted from the ongoing dialogues among alliance members; this transformation as described below was conceptual one, which was visible at the surface level of the interactions during the dialogues at particular points in time.

The transformation was made visible by SCLU's team when JLG's team posed the question, *so what did you gain by inviting our ethnographic team?* In response to this question, as inscribed in the Pedagogies article, SCLU's team in 2014 responded in an unanticipated way; they shared with JLG's team a table (please see Table 5) to show how their conceptual and theoretical transformation about teaching-learning relationships that they argued led to (re)consideration of actions they took in the NDE course design. Upon receiving this table, JLG's team, as stated in the article added their own unanticipated learnings from this process. This table made visible the mutual exploration of the theory-practice-understanding relationships and how these were constructed across times and in and through the dialogues and actions taken by the alliance members.

As indicated in Table 5, the dialogues between the alliance members collectively made visible the need to examine institutional, discipline-based and interpersonal dimensions of processes involved in designing intercultural and interdisciplinary opportunities for learning with global participants. My participation in the writing of this article, therefore, served to introduce me to a range of historical perspectives and actions undertaken by the two teams and the perceived outcomes of these actions. In the sections that follow, I trace what *I* learned as an outside researcher entering the ongoing collaboration between SCLU's team

and JLG's team and present a number of points that served as *anchors* (Baker, Green, & Skukauskaite, 2008) for developing my own logic-in-use for the present study.

Table 5.
Inscription of chains of transformed understandings provided by SCLU's team

SCLU and AL's (a team member) inscription of the chains of transformed understandings				***JLG's (and team) developing understandings of role of dialogues***
Topic	***Initial Assumptions***	***Transformed Understandings***	***Transformed Actions***	***What conceptual transformations made visible***
Constructivism and constructionism	Design is a social construction process but we failed to distinguish between social constructivism and social constructionism.	Social constructionism focuses on the artifacts that are created through the social interactions of a group, while social constructivism focuses on an individual's learning that takes place because of their interactions in a group.	Social constructionism can be regarded as the foundation of collaborative design, where the focus lies in the artifacts being created – team project. Social constructivism is the foundation of studying how students learn from each other via peer-peer interactions.	SCLU and AL's actions to differentiate between constructionism and constructivism, making visible the need to explore often-invisible theoretical goals of SCLU as an engineering educator
Culture as national-bordered	Our past interpretation of cultures was very limited. For example, we used to characterize cultures merely from the national perspective – American, Chinese, Taiwanese cultures.	The class developed an exclusive no-distance teaching/learning culture and the project teams developed a multi-cultural virtual collaboration culture.		Take up of dialogues on conceptual view of classes as cultures-in-the-making, and how these led to (re)consideration of what counts as culture
Teaching as an iterative and progressive process	SCLU's teaching developed in an iterative manner, for example, the same concept/principles was repeated in different scenarios…SCLU's teaching also developed in a	Together, SCLU's teaching developed in a recursive manner, repeating items in a self-similar way with increasing details or divergent contexts.	Avoid repeating the same content, instead, assign different problems to practice the same design methods both in class and after class.	Opportunities to examine basis for iterative and recursive practices during instruction in response to student understandings of proposed content as well as cultural

	progressive manner, following a gradual zoom-in process…			differences in interpretation of common tasks
Knowing how to learn	Students will naturally know or actively learn how to learn in a new no-distance learning environment.	It is important to start preparing students' mind along with the whole process.	Start to prepare students' mind early as during the student selection stage. Collecting advice from former students to future students in terms of challenges of attending this class…	Multiple points of entering the course and SCLU's use of student feedback as grounding for changing particular dimensions of course processes

Anchor 1: Situating the Study. The Spring 2012 course, which was explored in the previous study (Green et al., 2015), was the *third-iteration* of the course on Global Innovations, which means that there were two earlier iterations of the course that preceded the 2012 course with different cohorts of international and interdisciplinary students and teaching teams (US, China, and Taiwan). What this made visible is that the point of researchers' entrance of JLG's Interactional Ethnography team and the observed moments thereafter could not be seen as *the* starting point of the study of the 2012 course. Drawing on Bakhtin's (1986) argument that discourse is fundamentally dialogic and historically contingent, and is positioned within, and inseparable from, the interactional ethnographic team engaged in a process of exploring the developing community in 2012, the history being constructed as well as the earlier histories (2010 and 2011). Guided by this argument, like JLG's Interactional Ethnographic team, I engaged in a process of continual *backward*, as well as *forward*, mapping (Green & Meyer, 1991) of the developing history of the 2014 course in order to contextualize what was able to be "seen" at particular moments in time on

video records archived by SCLU's team. Figure 7 depicts a general sketch of how this study of the NDE 2014 course was situated within its larger social, political, institutional, and historical contexts. Here, the directionality of each bar is not intended to represent the linear progression of each set of historical processes, but rather to (re)present the continuing nature of each set of running histories. Viewed in this way, exploring particular moment(s) of the 2014 course inevitably required "freezing" of time for analyses and interpretations. It should also be noted that, while depicted in a simple and straightforward manner, each bar constitutes multi-faceted and multi-dimensional processes of constructions of cultural meanings that are dynamic and plural.

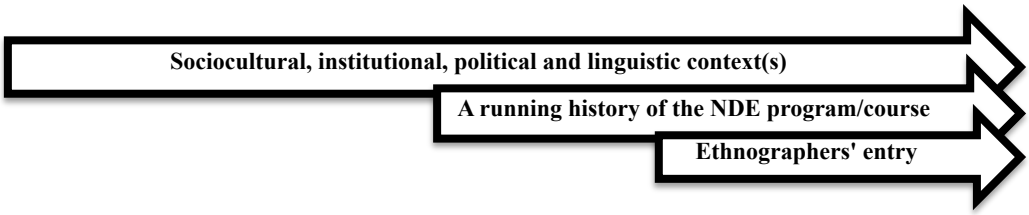

Figure 7. A General Sketch of Contextualizing a Study

This figure (re)presents the flow of relationships for the program itself, as well as for each course studied within the developing program.

Anchor 2: Gaining Access to Archival Records. When ethnographers first entered the research site in 2012, the period in which I was not part of the research alliance, SCLU's team and JLG's team engaged in ongoing dialogues about the NDE course both virtually and face-to-face on a weekly and/or bi-weekly basis to explore the conceptual understandings of teaching-learning relationships in this unique educational setting. Between 2012 and 2014, when I entered the project, two other graduate students from JLG's

ethnographic team were involved in researching the developing nature of the Spring 2012 course lecture sessions and served as participant observers virtually for this course. When I joined the group in 2014, the ongoing dialogues between the alliance members did not happen on a regular basis due to members' busy schedules and frequent travels. Nevertheless, because of the trust that was built and sustained between the alliance members over the years of ongoing dialogues and collaborations, SCLU's team granted me full access to the online repository in which the video records of the course lecture sessions as well as the course syllabi were stored. This online repository of archival records was initially created by the teaching team for the purposes of allowing access to their students, who could revisit these records during their enrolled semesters. Over the years following the 2012 participant observation process, ethnographers from JLG's team were continually engaged in a process of consulting with SCLU's team in order to gain insiders' perspectives on what counted as (or not counted as) academically significant and socially significant dimensions in this educational setting (Baker, Green, & Skukauskaite, 2008). My entry, therefore, was informed by these ongoing dialogues about the 2012 course as well as by the analyses and dialogues that I have undertaken for the 2014 course.

Anchor 3: NDE Course Development as Continuing Experimentation Process.

Professor SCLU made visible his conceptual understanding of global engineering education by sharing his published texts with ethnographers on the topics of *synthesis reasoning, sociotechnical framework* and *collaborative engineering* in 2012 prior to the beginning of the groups' collaboration (i.e. Jing & Lu, 2010; Lu, 2008). We found that his research on engineering design thinking influenced how he designed the course as well as the kinds of

learning opportunities he sought to provide for his undergraduate students (i.e., emphasis on intercultural communication, collaborative group projects, and active participation). In the early phase of the developing exploration, Professor SCLU revealed to the ethnographers that he constantly engaged in a process that he called "teach to learn" experiments, in which he learns about ways of developing the NDE model by engaging in the teaching process, and that his learning continues throughout multiple iterations of the course.

The following excerpt is a segment from SCLU's email to JLG on March 7, 2012 that captures this approach (copied from Green et al., 2015, p. 8):

Topic set	***Inscribed understandings by paragraph***	***Actions and challenges inscribed by SCLU***
Paragraph 1		
3	• Since I believe that an innovator must know the content and the context of a hidden demand, • I have tried to teach my students both in this course.	Defining what constitutes the innovator's knowledge and actions
4	• That may be a reason for the sometimes confusing focuses on them	Framing possible consequences of his actions for students
5	• I believe that, unlike contents, which can be taught in classrooms, contexts can only be learned among each other; • and the best way to acquire both is to do them iteratively	Contrasting teaching of content with learning as contextual and iterative
6	• However, trying to do both in one class is challenging because targeting the development of contextual understanding as a learning objective really challenges the traditional pedagogy of classroom lecturing of contents.	Framing challenges for doing both as challenge to traditional pedagogy
7	• Not knowing how to achieve this learning objective exactly and not having an established body of knowledge to "learn to teach", I often find myself doing the "teach to learn" experiment. • Therefore, I also feel that often times I find myself switching the roles between a teacher and a student with this [NDE] course.	Framing limits to knowledge of how to "learn to teach" in new way to achieve goals and take action: *switching roles between teacher and student*

As visible from the email segment above from 2012, Professor SCLU identified one of the main challenges of designing his global engineering course: that is, "targeting the development of contextual understanding as a learning objective" (Line 6). The challenge, he argued, was related to the fact that, unlike traditional content-driven lectures, contextual understandings of global engineering problems cannot be clearly defined ahead of time; instead, it requires, he argued, active participation among culturally diverse groups of students to construct particular socio-technical understandings that extend beyond their local interpretations and understandings of engineering problems. In fact, during my analysis of the Spring 2014 NDE course, this challenge that Professor SCLU was also reiterated during the first introductory lecture in Session A (Transcript Segment 1). Transcript Segment 1 provides a (re)presentation of SCLU's presentation to the student sin this course in the first week session.

Transcript Segment 1. NDE Course Participation as a Process of Experimentation (2/16/2014, Week 1, Session A)

Line	***Professor SCLU***	***What he signaled to students***
11	This is a very exciting experiment	Participating in NDE course as an exciting experiment
12	you are participating in	
13	I'm very excited	Sharing his excitement
14	and today I'm going to explain to you	Beginning to share the excitement as well as the *challenge* of running the NDE course
15	the excitement as well as the challenge	
16	of running such a course	
17	which is very different	
18	I guarantee you	
19	It will be very different from	NDE course is very different from other courses students have taken so far
20	any other course you have taken so far	
21	and a lot of things require you to	Sharing his expectation of students due to the uncertainty associated with the course
22	accommodate	
23	because a lot of things we don't	
24	know the detail yet	
25	and this is not	NDE course as *not* a "well established

26	a very well established model of learning	model of learning"
27	so in a way	
28	you are part of this experiment	
29	and you have to really collaborate	Sharing his expectation of students
30	you have to cooperate with us	
31	and let us know how we are doing	Asking for students' feedback throughout the semester
32	and we are very excited about this possibility	

Professor SCLU's statement in Line 11, "This is a very exciting experiment," was rather puzzling, given the fact that the Spring 2014 course was the *fifth iteration* of the course. Despite the years of experience with the course, he continued to call it an "experiment" course, one in which he was uncertain about how it would actually be carried out throughout the semester. He also stated that that the course will be very different from the courses that students have taken so far (Lines 19-20), and this is, in fact, *not* "a very well established model of learning" (Line 26), since not all the details are known ahead of time. On this note, Professor SCLU asked students to accommodate, collaborate, and cooperate with the teaching team in order to make possible this exciting experiment course. This excerpt served as a *rich point* (Agar, 1994), or a *surprise*, which provided an anchor for tracing the roots and routes of the developing process of this course in order to build warranted accounts of this statement from the point of view of the insiders.

What exactly was it about this course that made the instructor to continue to call it an "experiment course" even after several years of its development? Drawing on what was learned from the previous study, as well as the rich point crated by Professor SCLU's comment in Spring 2014, the first step in understanding the developing process of this global engineering course, which claimed to provide "new" learning opportunities and outcomes for students, was what Green, Skukauskaite, & Baker (2012) called the principle of "leaving ethnocentrism aside." I first needed to suspend my own beliefs about what

constituted “new” learning opportunities and outcomes in the course, and try to trace the historical development of the course while carefully and systematically following the insider language as well as references.

4.2. Tracing Historical Roots of NDE Program and Course Development

The first question posed was: *how can I, an outside researcher without any lived experience of the focal course (Spring 2014), situate the course within the running history of the NDE program?* Answering this question required intertextual analyses of multiple forms of archival records shared by SCLU’s team. The initial set of analyses involved exploring a range of publicly available information on the NDE program, including the official program website, as well as published journal articles written by Professor SCLU.

Analysis 1: Complementary Relationship between Professor SCLU’s Research and Teaching Activities. Professor SCLU is a Chaired Professor at USU in the School of Engineering, affiliated with Industrial and Systems Engineering, Aerospace and Mechanical Engineering, and Computer Science Departments. His many years of professional involvement in his field(s) of expertise are evident in his published work around his research topics, including but not limited to, collaborative engineering design and innovative productive development. By searching his name on GoogleScholar, I was able to locate some of his published work. The following table (Table 6) was created after reviewing abstracts of eight papers in which Professor SCLU had co-authored with his colleagues between 1988 and 2006. These papers were selectively chosen because of their perceived relevance to this design thinking behind the NDE course on global innovation principles and

practices. Furthermore, by listing the papers in the order in which they were published, I attempted to explore Professor SCLU's developing ideas across the eighteen-year time span.

Table 6.
Professor SCLU's selected work between 1988 and 2006

Professor SCLU's Selected Published Work (1988-2006)	***Key Conceptual Arguments Identified***
Ham, I., & Lu, S. C. Y. (1988). Computer-aided process planning: the present and the future. *CIRP Annals-Manufacturing Technology*, *37*(2), 591-601.	• Developing computer-based planning systems for manufacturing tasks from a global perspective
Klein, M., & Lu, S. C. Y. (1989). Conflict resolution in cooperative design. *Artificial Intelligence in Engineering*, *4*(4), 168-180.	• Developing conflict resolution models for effective cooperative engineering design processes involving design experts of different backgrounds
Jin, Y., & Lu, S. C. Y. (1998). An agent-supported approach to collaborative design. *CIRP Annals-Manufacturing Technology*, *47*(1), 107-110.	• Developing a computer software that can monitor and support collaborative engineering processes
Lu, S. Y., Shpitalni, M., & Gadh, R. (1999). Virtual and augmented reality technologies for product realization. *CIRP Annals-Manufacturing Technology*, *48*(2), 471-495.	• Developing effective product realization methods in order to meet societal expectations on engineers (i.e., develop affordable, functional and sustainable products)
Lu, S. Y., Cai, J., Burkett, W., & Udwadia, F. (2000). A methodology for collaborative design process and conflict analysis. *CIRP Annals-Manufacturing Technology*, *49*(1), 69-73.	• Proposing a socio-technical framework to analyze collaborative design processes and conflicts
Lu, S. C. Y., & Cai, J. (2001). A collaborative design process model in the sociotechnical engineering design framework. *AI EDAM*, *15*(01), 3-20.	• Proposing a socio-technical design framework to understand the interdependent relationships between the design tasks and the perspectives of different stakeholders
Lu, S. C., & Cai, J. (2000). STARS: A socio-technical framework for integrating design knowledge over the Internet. *Internet Computing, IEEE*, *4*(5), 54-62.	• Proposing a socio-technical analysis system to support interaction between interdisciplinary stakeholders in collaborative design spaces
Lu, S. C. Y., Li, Q., Case, M., & Grobler, F. (2006). A socio-technical framework for collaborative product development. *Journal of computing and information science in engineering*, *6*(2), 160-169.	• Conceptualizing interdependency of human behaviors and technical decisions • Proposing a socio-technical framework to understand collaborative product development as "socially mediated technical activity" that is continually evolving through collaborative negotiations among different stakeholders

By reviewing the abstracts of some of Professor SCLU's earlier work and identifying the key conceptual arguments in each, I was able to uncover that he has long been conceptualizing and researching effective ways of designing manufacturing spaces in which potential conflicts may arise due to the different perspectives and expectations that

stakeholders bring to engineering design and product realization. He has been proposing what is called a "socio-technical framework" to take into account both the social and technical aspects of collaborative engineering design activities. In his 2006 paper (Lu, Li, Case & Grobler, 2006), for example, the interdependent relationship between the social and technical aspects are discussed; according to this framework, it is argued that human behaviors impact technical decisions that cause changes in society which, in turn, shape social dynamics to influence future technical decisions. In this interdependent and relational framework, product development is conceptualized as "socially mediated technical activity aiming to achieve a human purpose and modeled as a dynamic co-construction process, where stakeholders' perspectives continuously evolve to form a shared reality through collaborative negotiations" (ibid, p. 160).

Collectively, these papers made visible his interest in complex, oftentimes globally distributed, collaborative engineering design spaces in which stakeholders bring different cultural and disciplinary perspectives to their collective spaces and work together to realize a product. Not surprisingly, these core ideas on socio-technical framework and collaborative engineering design in globally distributed engineering spaces are the central focus of the NDE course on *Principles and Practices of Global Innovation*. What this analysis has uncovered is that a course, designed and developed by an academic faculty, may have a long, sometimes *invisible*, history of conceptual development, grounded in faculty member's rich research background in his/her respective field.

This realization that the design of the NDE course was not solely restricted to his teaching activity, but complementary with his research activity, was confirmed in an interview that Professor SCLU participated in 2015 for the American Society for

Engineering Education (ASEE) Prism magazine, which was shared by Dr. L, the main program manager, on October 24, 2015. Following is a short transcript segment from the interview (Transcript Segment 2):

Transcript Segment 2. Teaching as Research (ASEE Prism magazine on 10/24/2015)

Line	***Professor SCLU***	***What he signaled to interviewer***
967	because right now many people who know my career	His involvement in NDE program/course development does not mean that he is switching his focus to teaching
968	[are] surprised that suddenly I switch from research to teaching	
969	it's not	
970	the reason is what I see what I'm doing now as a	NDE program/course development is part of his research endeavor
971	laboratory test bed for my research	
972	because my research is in collaborative engineering and design thinking innovation right?	NDE program/course development process as a "test case" related to his research topics
973	this is just a test case	

For Professor SCLU, the NDE program and the course on global innovation represent part of his life's work, and the designing and (re)designing of this unique course go hand-in-hand with his own research. This analysis uncovered that teaching cannot be simply assumed to be an activity that is separate from a faculty's field of research. Therefore, when examining a course, the course designer's disciplinary background as well as history may also need to be taken into account.

Analysis 2: NDE Programmatic Initiative's Visions and Goals. Professor SCLU's visions and goals for his NDE course can be better understood within the development of the larger programmatic initiative, the NDE program. Since NDE program has a strong online presence, it was effortless to find information on its visions and goals presented in a form of

public display. In the sections that follow, I drew mostly from the information presented in the main program website to trace Professor SCLU's chain of reasoning behind his NDE visions and goals. Professor SCLU, who played the role of main instructor as well as the designer/director of the NDE program, stated in his welcome message in the NDE public website that NDE is "a place you can witness and participate in a revolution of higher education in the 21st century" (Table 7, Line 2).

Table 7.
A Segment of Professor SCLU's Welcome Message in NDE Public Website

Line	***Professor SCLU***	***What was inscribed in the welcome message***
	Paragraph 1	
1	Welcome to the [NDE] Office,	NDE program as a revolution of higher education in the 21st century
2	a place you can witness and participate in a revolution of higher education in the 21st century.	
	Paragraph 2	
3	Rapid globalization and technology advancement	Situating the NDE initiative within the context of rapid globalization and technology advancement
4	have fundamentally changed the landscape of global competition,	
5	leading to many "over-supplied" technology markets.	
6	Consequently, the engineering mindset must transform	The need for reformulating engineering mindset (i.e., rethinking engineering education)
7	from "production thinking", to "design thinking",	
8	from "technology-focused" to "demand-driven"	
9	and from "do-the-thing-right" to "do the right thing".	
10	In other words, the engineering discipline	Redefining the role of engineering discipline
11	must become a powerful "enabling tool" for human civilization.	
12	This is what our Dean, Dr. XXX, calls	Situating the reformulation of engineering mindset in USU
13	the "engineering+" vision.	
14	Under this engineering+ vision,	Calling for a need to expand engineering education to become a socio-technical discipline
15	engineering education must expand from	
16	a purely technical subject to become a socio-technical discipline	

In this welcoming message, Professor SCLU called for a need to reformulate the engineering mindset in the context of globalization and technological advancement (Lines 3-

5) by shifting the vision from a purely *technical* view to a *socio-technical* view (Line 16). This rethinking of engineering education, according to Professor SCLU, entails transformations of mindset that are (re)presented in Table 8. At the center of these transformations is conceptualizing today's complex engineering problems as concerning not only of technical aspects, but *also* of social aspects (i.e., people and their demands and needs).

Table 8.
Professor SCLU's proposed transformations in engineering education mindset

Engineering education from purely a technical point of view		***Engineering education from a socio-technical point of view***
Production thinking	→	Design thinking
Technology-focused	→	(Customer) Demand-driven
"Do-the-thing-right"	→	"Do the right thing"

With these proposed transformations in mind, the pedagogy of NDE course(s) emphasized *interactive* as well as *international* aspects of global engineering education by collocating learners from diverse cultural and social backgrounds to learn the unique demands in their local sites and co-construct, what Professor SCLU called, "contextual understandings" of global engineering problems, not merely learning "contents" of subject matter. The NDE program, therefore, as intended by Professor SCLU, is a "borderless learning community" where students from around the world can study together interactively and collaboratively. This is based on Professor SCLU's belief that "what you learn depends on with whom you learn" and that in order to become tomorrow's global leaders, students must learn how to study with their global peers.

Within the NDE program, there is continually growing *NDE Alliance*, an international consortium among higher education institutions in major world cultural regions that shares the mutual purpose of developing, promoting, implementing, and disseminating the NDE-

style of engineering education in order to continue creating borderless world-classrooms. Currently, there are a total of 11 universities, who comprise the membership of the NDE Alliance, including universities from the United States, India, Brazil, Israel, South Korea, Taiwan, China, Middle East, and Germany.

Among these partner universities, the operating principles of the NDE Alliance indicate that: (1) there are equal contributions as well as mutual benefits among all members, (2) members are responsible for costs of their participation in all activities and no money will be exchanged between the members, and (3) the goal is to share course development and delivery, and not to create joint degrees among the partnering universities. Currently, there is only one undergraduate course that has been developed and delivered through the NDE course, *Principles and Practices of Global Innovation,* which has been taught by Professor SCLU and his teaching team at the US University (USU). One graduate-level course was offered in September 2014 on *Technology of Unconventional Oil and Gas Resources Development*, which was taught by another professor at USU, with participating students from USU and Chinese University (CNU). The present study specifically focuses on the *Principles and Practices of Global Innovation* course, or the NDE cornerstone course, which has shaped and attempted to achieve the NDE vision since its inception in 2010.

Analysis 3: Purpose and Goal of the NDE Cornerstone Course. The primary goal of the NDE cornerstone course, *Principles and Practices of Global Innovation*, is to provide students with interactive environment in which they can learn with their peers from other countries who have different cultural and social backgrounds. According to what was inscribed in the NDE program public website, learning objective of the course is "to prepare

global innovation leaders of the future." Also, having completed the course, "students should be able to understand how to use various socio-technical factors to identify the emerging global market trends as innovation targets, before individual customers become aware of their needs and wants." More importantly, Professor SCLU and his teaching team believed that peer-to-peer learning emphasized in this course could potentially be great resources for students' future career as global leaders in any professional field they choose to pursue (i.e., beyond engineering fields). In order to ensure the kind of peer-to-peer learning that NDE strived to achieve, each institution involved limited student enrollment to about 16 to 20 students per institution per semester. Also, at the end of each semester, students had the option of traveling to one of the partner universities (i.e., Taiwanese university in 2012, and South Korean university in 2013, and Israel University in 2014) to interact with each other face-to-face.

While the exact procedures undertaken to admit students into the course at different institutions is not known, at USU in particular, a campus-wide call would be announced to attract interested students, who would then apply and later undergo an interview process before being admitted as a student in this course. When the main program manager, Dr. L, connected me with James (pseudonym), who was a student in the NDE course in Spring 2014, a teaching assistant in Fall 2014, and later a program coordinator, to share his experience in the NDE course, he told me that one of the criteria for the student selection process was to make sure that students are "interested in going overseas for the right reasons" (see Transcript Segment 3, Line 775) and represent USU well internationally. Another criterion, from which James benefited from when he was applying to enroll in the course, was whether a student had any previous overseas experience. Because the teaching team

wanted to provide opportunities for students to gain new and broader understandings of the world that they live in, they gave priorities to students who had never traveled outside the country (Lines 791-795).

Transcript Segment 3. Conversation with James (2/20/2015 at USU campus)

Line	*James*	*Jenna*	*What was discursively made visible by James*
774	so the interview process is the way for us to make sure that		At USU, interviews were done to determine who would be in the NDE course and participate in the overseas study at partnering institutions
775	we have students who are interested in going for the right reasons		
776	not just for going for getting drunk or making our school look dumb		
777	we get enough of that as is (laughs)		
778	so we don't have that problem as much as other schools in USU do		Students at USU's school of engineering are generally "good" students
779	XXX engineering school - we are generally		
780	I say generally		
781		better	
782	we are generally better		
783	but we want to cover our bases in terms of international travels		The USU teaching team wanted to make sure that they were sending "good" students to partnering institutions
784		of course	
785	because you want to put your best foot forward		
786	especially when you are internationally being represented		
787		right right	
788	so that's traditionally what the interview process is like		Selecting students via interview process was how the teaching team managed who would be representing USU internationally
789	Making sure that the best applicants are going		
790	and we do sometimes a little bit of		When selecting who would be going overseas, the teaching team gave priorities to those who had never been out of the country
791	in my case I've never been out of the country before		
792	I think that helped a little		
793	because they really want people to gain new		
794	a broader understanding in the world that we live in		
795	for instance that was one of the defined decisions between one student and another		

796	what happened last semester		The teaching team had previously given priority to a student who had never been out of country instead of another who had comparable grade and level of participation
797	one of the students who had never been out of the country before		
798	versus one who is very very active in class		
799	they are both comparable		
800	they actually made about 50% of the participation grade		
801	in terms of the volume of words in the discussion in the entire class		
802		do you look at those too?	The teaching team utilized various metrics when determining who would be in the NDE course
803	we look at those as well		
804		wow	
805	the volume at least I did		
806	I thought it was a cool metric to look at		
807	it was [difficult] to get all the information		
808	I think they had about 46% between 2 students out of 20 students total		
809	90-95 students in totalish		
810	they were both active		
811	one who had been in Dubai two to three times ultimately		
812		didn't get (chosen)	
	didn't get chosen		

By making decisions about who gets to be admitted to the NDE course, given the large amount of interested students, the teaching team tried to make every effort to make possible the kind of learning that they desired to achieve in this course (i.e., gaining a global perspective), so that it meets the visions of the NDE program.

Analysis 4: Over-time Analysis of the NDE Course Development (2010-2014). This final analysis was carried out to explore contrastively the NDE course syllabi between Spring 2010 and Spring 2014. This analysis was undertaken for two purposes: (1) to situate the Spring 2014 course (the focal course in this study) within the running history of the NDE course development, and (2) to understand the developing process of the NDE course over

the years by holding common artifacts (i.e., syllabi) over-time. Table 8 was created to after pulling out key elements of the different iterations of the course, as inscribed by Professor SCLU in the course syllabi.

Insert Table 8 Here

Table 8.
An Over-time Analysis of NDE Course Syllabi to Understand the Developing Process of the Course

	Spring 2010	***Spring 2011***	***Spring 2012***	***Spring 2013***	***Spring 2014***
NDE Course Name	Principle and Practice of Global Innovation Teams	Principle and Practice of Global Innovation	Principles and Practices of Global Innovation	Principles and Practices of Global Innovation	Principles and Practices of Global Innovation
Instructor	Professor SCLU	Professor SCLU	Professor SCLU	Professor SCLU	Professor SCLU
Participating Institutions	US University (USU) & Chinese University (CNU)	US University (USU), Chinese University (CNU) & Taiwanese University (TWU)	US University (USU), Chinese University (CNU) & Taiwanese University (TWU)	US University (USU), Israeli University (ISU), Chinese University (CNU) & South Korean University (SKU)	US University (USU), Israeli University (ISU), Indian University (INU), Chinese University (CNU) & South Korean University (SKU)
Number of Participating Students	24 (12 from each institution)	60 (20 from each institution)	60 (20 from each institution)	90 (36 from USU; 18 from SKU; 18 from CNU; and 18 from ISU)	112 (32 from USU, 16 from INU-Site #1, 16 from INU-Site #2, 16 from ISU, 16 from CNU, and 16 from SKU)
Course Goal	• To provide students with a boundless, learner-centered learning environment and teach them on how to appreciate and explore cultural diversities as a source of inspiration for global innovation	• To employ interactive learning pedagogy for students to learn how to interactively co-construct and collaboratively acquire 'dynamically changing contexts' of basic concepts and important principles related to technological	• To provide students with an interactive, learner-centered experience via which they can learn with, and from their peers from other countries with different cultural and social backgrounds	• To learn key principles (the content) and important practices (the context) of open technological innovation in competitive global market	• To nurture innovation ability and creative design thinking (the key emphasis is on the cross-cultural aspects of socio-technical subjects with an emphasis on systematic thinking methods for technological innovation in light of rapid globalization)

		innovations on technology global markets			
Course Learning Model	• Students learn from each other through interactive in-class questions/answers, case study discussions and collaborative team projects as much as from the instructor via classroom lectures	• Focus on the expanded engineering scope which is socio-technical rather than purely technical and disciplinary	• Engage students to play the role of a teacher to their classmates via participation in discussions, case studies and team project interactions • Engage students in co-constructing cross-cultural knowledge of global contexts and develop socio-technical problems	• Collaborative teamwork across multiple campuses as the key feature and requirement	• Students pre-study materials for next lecture, discuss with other students, complete a quiz and online feedback to indicate how easy/difficult each concept was and based on students' feedback the instructor prepares for class lecture (inverted learning model) • Engage students in various group projects
Course Learning Components	• Classroom lectures • Case studies (identify technology, project, or service examples in cross-cultural contexts) • Team projects (discover global innovation opportunity by understanding customer needs)	• Classroom interactions (cross-cultural exercises) • Case studies • Team projects (work on innovative projects collaboratively with global classmates)	• Interactive lectures • Cross-cultural exercise • Case study • Final term project	• Phase 1: classroom lectures to learn subject contents • Phase 2: interactive activities to develop contextual understandings • Phase 3: overseas visit to interact face-to-face with global classmates	• Phase 1: content lectures where key principles and practices are explained • Phase 2: cross-campus study groups and in-class exercises to develop contextual understandings • Phase 3: optional overseas study

A number of observations were made after exploring contrastively this set of NDE course syllabi:

1) **Change in the course name:** In the years 2010 and 2011, the NDE course title was "Principle and Practice of Global Innovation," as if there is a single principle or practice pertaining to global innovation. Since Spring 2012, the course title has changed to "Principles and Practices of Global Innovation" to reflect the multiplicity of principles and practices of global innovation within cross-cultural settings.
2) **Increasing numbers of participating institutions and students:** The Spring 2010 course was the first pilot NDE course involving two institutions (USU & CNU) with a total of 24 students (12 students from each institution). In the subsequent years, the numbers of participating institutions and students have increased. By Spring 2014, six institutions joined the course (i.e., USU, ISU, INU-Site #1, INU-Site #2, CNU and SKU) with a total of 112 students. This continuing growth as well as diversification of the participating institutions and students over the years make visible Professor SCLU's goal of creating a culturally diverse and interactive platform for students around the world to learn together to create innovative ideas.
3) **Continually rephrased course goals:** The course goals, as proposed by Professor SCLU in the syllabi, were phrased and rephrased over the years to finally take the shape it took in Spring 2014. What was remarkable to note was that Professor SCLU continued to revise the course syllabi along with the ways in which he frame the goals of the course. While there is a common thread in the goals inscribed in the five syllabi (i.e.,

learn socio-cultural aspects of global innovation projects), the ways in which they were communicated were different each year.

4) **Continually changing course learning model and components:** While the common thread in the course learning model and components all involved interactive team projects and cross-cultural exercises, the ways in which they were organized have also changed over the years to take the shape of 3-phase model in 2013 and 2014. The three phases were developed to organize the three main learning components of the course in a more organized way, with phase 1 focusing primarily on exploring the contents of the course, phase 2 focusing on interactive activities between students to develop contextual understandings of global innovation, and finally phase 3 focusing on the overseas (optional) experience for students to interact face-to-face with global classmates. In Spring 2014, the "inverted" model was developed to have students engage in the course materials and provide feedback to the teaching team (i.e., which concepts are harder or easier to understand) prior to attending the 2-hour lectures every week in order to ensure continuous learning cycle, not just for students, but also for Professor SCLU, as he continually reformulated what he was to focus on each lecture session.

This contrastive analysis made visible the often-invisible dimensions of the new curricular designing processes in higher education, by not simply focusing on a course in a generic term (i.e., an iteration of the course as the stand-alone phenomena), but situating it within its over-time conceptual development process to shed light on the developing process. The continually changing nature of the course over the years with added complexity (i.e., increasing numbers of partnering universities and students) and the organization of the

course (i.e., different phases of learning and inverted learning model) shed light on Professor SCLU and his teaching team's continual effort in designing and (re)designing the course to meet the visions and goals of the NDE program.

4.3. Summary of the First Set of Analyses: Conceptualizing Designing and (Re)designing Process as "Working Methodology"

The rich point that was raised when Professor SCLU called the fifth iteration of the course an "experiment" served as an anchor to engage in a series of interrelated analyses that made visible the importance of taking into account the historicity (Baker & Green, 2007) of this new and emerging higher education program and course. A historical perspective exploring the intertextual relationships between the actors involved, events constructed, as well as the conceptual ideas formulated and (re)formulated over time provides a view of higher education course as one that is embedded in a developing conceptual design process, away from a simple delivery model.

What this first set of analyses made visible is that designing a new curricular program or course requires an over-time conceptual development process; therefore, simply trying to find the best design model that applies across all contexts may not be feasible. It would be important to keep documenting the developing logics-in-use (Birdwhistell, 1977) of the design process, so as to continually experiment, rethink, and reformulate along the way. This is what Ravenscroft (2001) called "design as theory." He called for the need to think of the design process as theories that can be developed, validated, evaluated and refined over time. In reviewing the literature on e-learning interaction designing in higher education, Ravenscroft further argued that since technologies and practices employed for educational

purposes are becoming ever more complex, we should be flexible and creative about the design process and stay away from deterministic methods for technological development and exploitation. If we conceive a designing process of a course as a "working methodology" that can be systematically evaluated and developed to address shifting situations, this process itself can become powerful tools for examining how what is claimed as "new" learning processes in higher education come into being. Indeed, this is exactly what Professor SCLU and his teaching team tried to accomplish over the years by trying out different configurations of activities, partnering with additional institutions, and structuring/restructuring the course content and learning models.

Furthermore, this set of analyses made visible that researching a course of any kind requires a non-linear system that traces the roots as well as routes of the course in and through time, space, and contexts. While tracing the complete and exhaustive history of any course may not be possible, it is important to be transparent about the logics used in tracing particular bit of course history, by taking into account the researcher's conceptual framework and background knowledge of the course under investigation as a point of departure (AERA 2006; Green & Joo, in press). For an international perspective on methodological challenges of studying learning in and across time, space, and contexts, please see the special issue by Kumpulainen & Erstad (in press).

In the chapter that follows (Chapter 5), I extend these analyses to continue exploring Professor SCLU's conceptual development process in this unique global engineering course. The second set of analyses focus specifically on how this developing process was constructed in the classroom to promote student learning. On the first day of the Spring 2014 course in Session A (Transcript Segment 1), Professor SCLU explained to students that this

course is “very different” from any other courses that they have taken so far (Lines 19-20). This unique characteristic of the NDE course is central to the program’s visions and goals and requires further exploration. By tracing how, in what ways, and for what purposes, Professor SCLU made present to his culturally diverse group of students *what counted as* new ways of learning in this NDE course, I aimed to zoom into what gets proposed and referenced in and through the organizational structuring of the Spring 2014 course.

Chapter 5. Tracing the Design and Organizational Structuring of the NDE Course

In this chapter, I extend the analyses from the previous chapter (Chapter 4) to continue exploring how Professor SCLU and his teaching team's design process of the NDE course intended to promote particular kinds of student learning. The questions that guided the second set of analyses are: (1) *What counted as different or "new" ways of learning in this NDE course?* (2) *How, in what ways, and for what purposes did the instructor's design principles and processes intended to promote, what he claimed, "new" ways of learning for culturally diverse group of students?* Answering these questions required a closer examination of what was proposed and referenced as "new" ways of learning in the public space of the classroom during live NDE course sessions. My role as an interactional ethnographer approaching these questions was similar to that of a newly entering student to this course (e.g., Spradley, 1980; Walford, 2008), trying to understand the demands of the NDE course, as signaled by Professor SCLU from the first day of class.

The main form of data analyzed in this section were video recordings of weekly lecture sessions provided by the teaching team, which amounted to about 3240 minutes of video records (see Chapter 3, Table 4 for more information). The videos were originally prepared by the teaching team in order to provide access to these course materials to enrolled students who were either absent (i.e., due to national and institutional holidays in their local campuses) or who wanted to revisit the videos at later times. The camera was mainly focused on the instructor's talking during the sessions, so most of students' collaborative work (both online and face-to-face) was not visible.

While analyzing the video records, it was important to simultaneously consult the Spring 2014 course syllabus to understand what Posner (1995) termed "official curriculum," or written/planned curriculum, which served as a basis for Professor SCLU's lesson plan as well as the evaluation of students' work in this course. What became visible as the analyses progressed was that in order to gain deeper understandings of the meanings proposed, constructed, and (re)constructed in and through classroom interactions, I needed to investigate the course at the level of "operational curriculum," or the kinds of contents and meanings proposed by the instructor, and the ways in which their importance was being communicated to students (Posner, 1995) in a moment-by-moment basis. Therefore, this section involves a series of intertextual analyses at the two main levels of structuring processes of the course: (5.1) one at the instructor's planning level and (5.2) another at the moment-by-moment interaction level within the classroom.

5.1. Tracing the Planned Structure of the Spring 2014 NDE Course

The previous study exploring Spring 2012 NDE course involving three universities located in the US (USU), China (CNU), and Taiwan (TWU) (Green et al., 2015) revealed that due to differences in national and institutional policies and practices, not all campuses were able to join the course at the same time. An event map of the course in the duration of 22 weeks (ibid, p. 13) made visible that students at USU students attended the first week of the course, while students in CNU attended the first and fifth but not the twenty-fourth week, and students in TWU did not attend the first five weeks. These differences were related to the weeks of the Chinese New Year celebrations in the beginning of the semester, and both CNU and TWU students were given the option of participating in the sessions through

virtual links and/or access to video records through the course online repository. This analysis of who attend or not attended particular course sessions revealed the often-invisible structuring process of a course in studies that focus primarily on teacher-students interactions in observable moments in time. By tracing actors across times and events to contrast who had what kinds of access to which cycles of activity, I was able to identify the complex and developing nature of the course as well as the challenges faced by the teaching team in meeting the different institutional and national practices, while trying to engage students in the common NDE course. What the previous study (Green et al., 2015) revealed was the importance of multiple levels of analyses in order to uncover the historical decisions involved in structuring for global interactions among students. Such multiple time frame and angles of analyses challenged the dominant view that effective teaching and learning can be studied solely by direct observations in particular moments in a developing course.

As it was indicated in Table 8 in Chapter 4, Spring 2014 course was the fifth iteration of the NDE cornerstone course and had the largest number of participating students (total 112 from 5 different universities located at 6 different geographical sites; see Chapter 1, Table 1 for more information). Given the added complexity to the NDE course in Spring 2014 compared to Spring 2012 (i.e., 6 campus groups, 112 students and 2 sessions versus 3 campus groups, 60 students, and 1 session), the first step in understanding the planned structure of the course was to map out how the course was organized, how many weeks of instructional time were involved, and which institutional groups were involved across times and space in the Spring 2014 NDE course. The 14-page main course syllabus prepared by Professor SCLU was consulted in order to uncover how the structuring of the course was originally planned. The following table (Table 9) was created to visually (re)present how the

course was organized into different learning phases (i.e., introduction, content lectures, contextual interactions and optional overseas study) and which campuses were present in each week.

Table 9.
Planned Structure of Spring 2014 Course

Date	***Session***	***Live Institutions During Session***
Introduction		
Week 1 (2-6-14)	Session A	USU, INU-Site #1, INU-Site #2
	Session B	USU
Phase 1 (Content Lectures)		
Week 2 (2-13-14)	Session A	USU, INU-Site #1, INU-Site #2
	Session B	USU
Week 3 (2-20-14)	Session A	USU, INU-Site #1, INU-Site #2
	Session B	USU, CNU
Week 4 (2-27-14)	Session A	USU, INU-Site #1, INU-Site #2
	Session B	USU, CNU
Week 5 (3-6-14)	Session A	USU, INU-Site #1, INU-Site #2, ISU
	Session B	USU, CNU, SKU
Week 6 (3-13-14)	Session A	USU, INU-Site #1, INU-Site #2, ISU
	Session B	USU, CNU, SKU
Week 7 (3-20-14)	Session A	USU, INU-Site #1, INU-Site #2, ISU
	Session B	USU, CNU, SKU
Phase 2 (Context Interactions)		
Week 8 (3-27-14)	Session A	USU, INU-Site #1, INU-Site #2, ISU
	Session B	USU, CNU, SKU
Week 9 (4-3-14)	Session A	USU, INU-Site #1, INU-Site #2, ISU
	Session B	USU, CNU, SKU
Week 10 (4-10-14)	Session A	USU, INU-Site #1, INU-Site #2, ISU
	Session B	USU, CNU, SKU
Week 11 (4-17-14)	Session A	USU, INU-Site #1, INU-Site #2, ISU
	Session B	USU, CNU, SKU
Week 12 (4-24-14)	Session A	USU, INU-Site #1, INU-Site #2, ISU
	Session B	USU, CNU, SKU
Week 13 (5-1-14)	Session A	USU, INU-Site #1, INU-Site #2, ISU
	Session B	USU, CNU, SKU
Week 14 (5-8-14)	Session A & Session B (Presentations on Final Group Projects)	USU (Session A), INU-Site #1, INU-Site #2, ISU, USU (Session B), CNU, SKU
Phase 3 (Optional Overseas Study)		
Week 15	No class (travel day)	
Weeks 16 & 17	Overseas visit at ISU in Haifa, Israel	Unknown

This first level of mapping process (Table 9) made visible the ways in which the structuring of the course was planned to meet the needs of multiple institutions across

national borders. Unlike typical university courses, in which all students are expected to enter the course at the same time, the teaching team made it possible for students to enter in different points in time to meet the national and institutional calendars at their local campuses (i.e., CNU was scheduled to enter at Week 3, while SKU and ISU were both scheduled to enter at Week 5). In order to provide access to course materials for students who could not join from their local campuses, the teaching team provided a range of online tools (i.e., WebEx and Bluejeans – to be discussed more in detail in Chapter 6), so students can have the option of joining the class using their home computers. While it is not known whether or not all of the students had fully taken advantage of these online resources, it is worth noting the teaching team's effort to provide as much access possible for their global students located at different sites around the world. While this mapping process was useful in shedding insight into the ways in which the structure of the course was originally planned by Professor SCLU and his teaching team, it was insufficient for understanding what actually occurred in the classroom throughout the semester. Drawing on a body of research which has demonstrated that teaching-learning relationships are constructed in and across times and events (e.g., Baker, Green, Skukauskaite, 2008; Castanheira et al., 2000) as well as Posner's (1995) call for the need to analyze curriculum beyond its officially written form, the following section trace the everyday structuring of the course in and through week-by-week and moment-by-moment inscribed by the actors and the events involved.

5.2. Tracing the Engaged Structuring of the Spring 2014 NDE Course

The second level of mapping process required an examination of the video records to uncover what was happening each week during the 17-week span of the course. In order to

understand the structuring of the course throughout the semester, I focused on the beginning segments of all of the available video records in which Professor SCLU and his teaching team oriented students to what was to be covered that week (as well as what was covered the week before) along with important announcements before getting into the details of the subject matter. The duration of the beginning segments of these videos varied from one video to another, ranging from 10 to 30 minutes of the 2-hour lecture time. The boundary of the beginning segment of each lecture was not predefined, but rather uncovered during the transcribing process, as signaled by the participants themselves. These beginning segments of video records were transcribed in message units with numbers assigned for each unit to represent actual flow of the talk by the speakers (Skukausakaite, 2012) and analytic processes were added in the second and third columns to keep a running record of phases of activity and actions proposed/enacted by Professor SCLU (please see Appendix A for an example of the transcript). This transcribing process made visible what was not visible simply by examining the original written plan (i.e., syllabus) of the course. The following table (Table 10) was created to reflect revisions made to the original plan (Table 9) with an added column including notes, or "surprises" that I, an outside researcher, encountered while going through the beginning segments of all available video records.

Table 10.
Engaged Structuring of Spring 2014 Course (Note: Revisions or "Surprises" Indicated in Bold)

Date	***Session***	***Live Institutions During Session***	***"Surprises" Noted***
Introduction			
Week 1 (2-6-14)	Session A	USU, INU-Site #1, INU-Site #2	
	Session B	USU	
Phase 1 (Content Lectures)			
Week 2 (2-13-14)	Session A	USU, INU-Site #1, INU-Site #2	
	Session B	USU	

Week 3 (2-20-14)	Session A	USU, INU-Site #1, INU-Site #2	**Surprise #1: Professor SCLU delivered lecture from his hotel room in Beijing, China**
	Session B	USU, CNU	**Surprise #2: Professor SCLU delivered lecture from CNU classroom** **Surprise #3: CNU provost and other officials attended the lecture** **Surprise #4: About ten SKU students joined virtually**
Week 4 (2-27-14)	Session A	USU, INU-Site #1, INU-Site #2	
	Session B	USU, CNU	
Week 5 (3-6-14)	Session A	USU, INU-Site #1, INU-Site #2, **ISU (not all students joined)**	**Surprise #5: Week 5 was *not* the official week that ISU joined the class live** **Surprise #6: Eight students from ISU and Professor E joined the class live and this was unanticipated**
	Session B	USU, CNU, SKU	
Week 6 (3-13-14)	Session A	USU, INU-Site #1, INU-Site #2, ~~**ISU**~~	
	Session B	USU, CNU, SKU	
Week 7 (3-20-14)	~~**Session A**~~	~~**USU**~~, INU-Site #1, INU-Site #2, ISU	**Surprise #7: USU was on Spring break and did not attend lecture this week (CNU and SKU did not attend either)** **Surprise #8: This was the official week ISU joined the class live and Professor SCLU delivered lecture from ISU classroom**
	Session B	~~**USU**~~, ~~**CNU**~~, ~~**SKU**~~	
Phase 2 (Context Interactions)			
Week 8 (3-27-14)	Session A	USU, INU-Site #1, INU-Site #2, ISU	
	Session B	USU, CNU, SKU	
Week 9 (4-3-14)	Session A	USU, INU-Site #1, INU-Site #2, ISU	
	Session B	USU, CNU, SKU	
Week 10 (4-10-14)	Session A	USU, INU-Site #1, INU-Site #2, ISU	
	Session B	USU, CNU, SKU	
Week 11 (4-17-14)	Session A	USU, INU-Site #1, INU-Site #2, ~~**ISU**~~	**Surprise #9: ISU was absent due to Passover Holiday** **Surprise #10: Professor SCLU announced that due to**

			International Workers' Holiday in China, Session B students will be presenting their second cross-cultural exercises a week earlier
	Session B	USU, CNU, SKU	
Week 12 (4-24-14)	Session A	USU, INU-Site #1, INU-Site #2, ISU	
	Session B	USU, CNU, SKU	
Week 13 (5-1-14)	Session A	USU, INU-Site #1, INU-Site #2, ISU	
	Session B	USU, ~~CNU~~, SKU	**Surprise #11: CNU was absent due to International Workers' Holiday**
Week 14 (5-8-14)	Session A & Session B (Presentations on Final Group Projects)	USU (Session A), INU-Site #1, INU-Site #2, ISU, USU (Session B), CNU, SKU	
Phase 3 (Optional Overseas Study)			
Week 15	No class (travel day)		
Weeks 16 & 17	Overseas visit at ISU in Haifa, Israel	**All USU students & selective groups of students from other campuses**	

By engaging in a contrastive analysis of the planned structure of the course (Table 9) and engaged structuring of the course (Table 10), I was able to uncover the dynamic construction of the course structuring in and through time and space involving particular configurations of actors and events. It should be noted that these so-called "surprises" would not have been made visible if only the syllabus was consulted to map out the structure of the course. This analysis made visible the importance of looking at what gets accomplished in the everyday (or in this case every week) structuring of the classroom lives. These "surprises" were turned into "rich points" (Agar, 1994; 1996) for further exploration, which will be revisited in the following chapter (Chapter 6) as "telling cases" (Mitchell, 1982) as I discuss the challenges associated with both designing and running this global engineering course. This second mapping process also made possible the making of a visual event map of the Spring 2014

course, showing the actors involved, who entered when and how, as well as the major episodes in each week at each campus site (Figure 7).

Insert Figure 7 Here

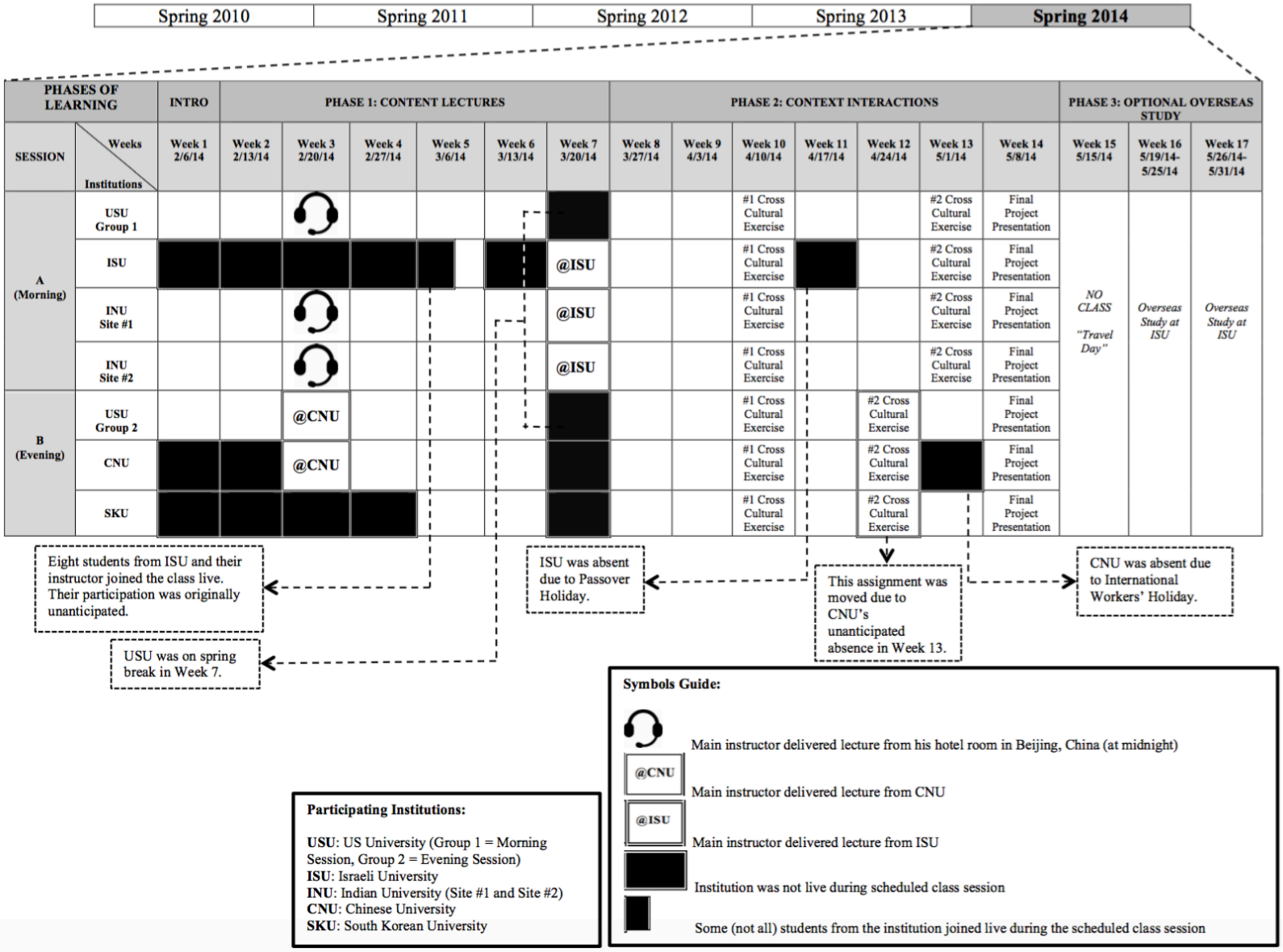

Figure 7. Visual (Re)presentation of Structuring of Spring 2014 NDE Course

This set of mapping processes afforded a better understanding of what happened in each week of the course, which campuses participated in each week and each session, as well as the changes that had to be made to the original plan of the course in order to respond to the differences across national and institutional systems. Going back to the questions posed in the beginning of this chapter (*What counted as different or "new" ways of learning in this NDE course? How, in what ways, and for what purposes did the instructor design principles and processes intended to promote, what he claimed, "new" ways of learning for culturally diverse group of students?),* the mapping processes made visible the unique configurations of this global engineering course that are different from conventional university courses. However, in order to get to the meanings that were constructed to guide the activities and assessments of students' work in this course, additional analyses were needed to examine beyond the level of course structuring (Weade, 1987). The final section of this chapter analyzes the "first" day of the NDE course (note that the "first" day(s) of the NDE course were different across participating universities) in which Professor SCLU met with his (first group of) students for the first time to go over the course syllabus and the course requirements.

5.3. Tracing What Was Proposed on the "First" Day to Understand What Counted as "New" Ways of Learning in the Spring 2014 NDE Course

I engaged in an in-depth analysis of the "first" day (the introductory lecture) of the Spring 2014 NDE course in order to understand what was proposed to students by Professor SCLU and his teaching team as "new" ways of learning. A full transcript of the Week 1

lecture with Session A students were prepared (similar to the example provided in Appendix A) and examined in its entirety in order to identify the events as well as sub-events within each event (see Appendix B). Time stamps were also included in the analysis to keep track of how much time was spent for each of the events as well as their sub-events. It should be noted that the boundaries of these events and their sub-events reflect how Professor SCLU organized this introductory lecture as signaled by his discourse in and through his interactions with students. Such an approach was intended to gain an emic (or insider) understanding of what was proposed and referenced without making any *a priori* assumptions.

The first column in the table in Appendix B lists the sequence of events identified in the Spring 2014 course introductory lecture. As indicated by the times spent in each event, Professor SCLU spent one full hour (out of the two hour lecture time) to explain to students *why* the teaching team designed the NDE course as they did. The remaining of the lecture time was distributed to explain the NDE pedagogy (~19.5 minutes) and how the NDE course was organized, including its learning objectives (~22 minutes). Since about half of the introductory lecture was devoted on explaining *why* Professor SCLU and the teaching team had designed the NDE course in the first place, it was signaled as important and therefore requiring further exploration. The following flow chart (Figure 8) was created by tracing the chain of reasoning (Krathwohl & Smith, 2005) as discursively made present to students by Professor SCLU on what motivated the teaching team to design this kind of unique global engineering course.

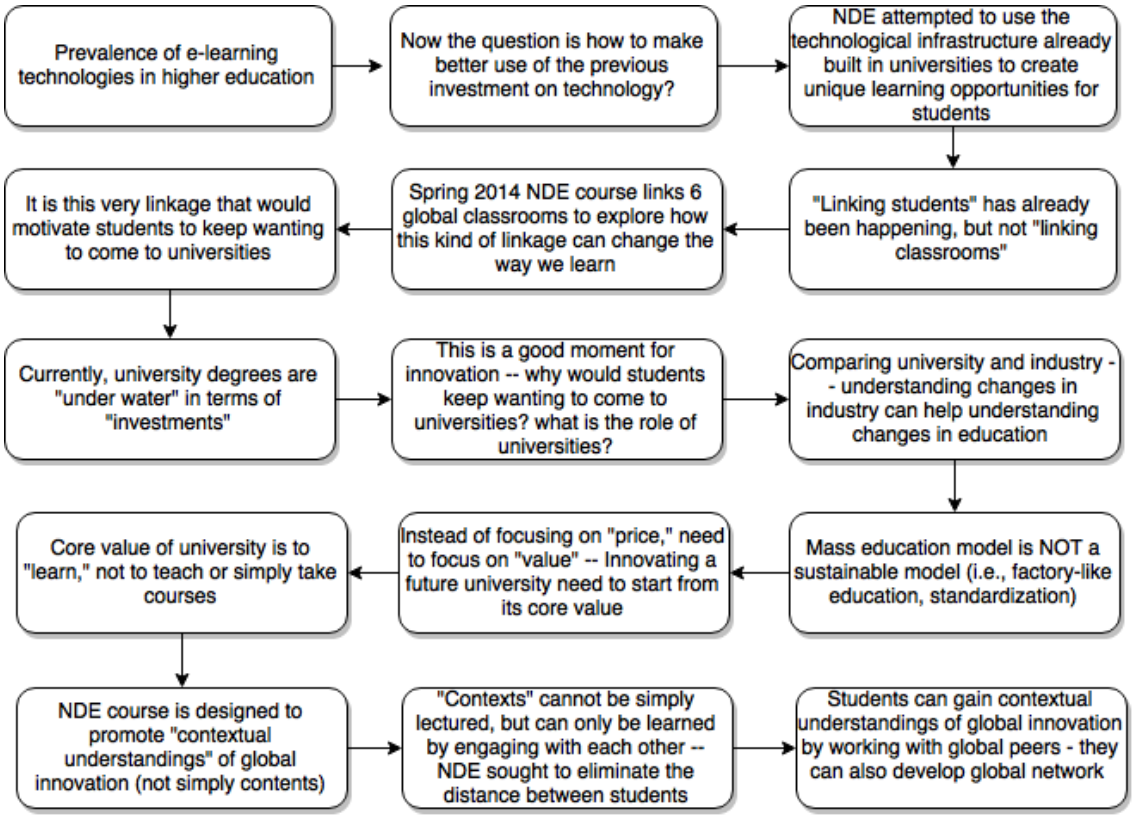

Figure 8. Professor SCLU's Chain of Reasoning Behind the Design of the NDE Course

What this tracing of the chain of reasoning made visible is that the NDE program/course was developed in the midst of some of the major educational trends that were (and still are) receiving a lot of media attention, such as MOOCs (Massive Open Online Courses) and e-learning/online education initiatives, which have been presented as potential ways for universities to increase educational access to students around the world, while saving money by serving many students. Given the prevalence of e-learning technologies in university classrooms, the question that Professor SCLU proposed was *how to make better use of the investment that universities have already made on technology*. At the same time, he argued that university degrees are "under water," which means that in relation to the "investment" (both monetary and time) that students put into their education, the "returns" (in terms of future prospects in career) are rather small.

Professor SCLU explained that this is "a good moment" for innovation, asking questions such as, *what is the role of the university, and why would students want to keep coming to the university (given that there are abundant free online courses and that university degrees are "under water")?* Based on the belief that mass education model (i.e., factory-level education, standardization) is *not* a sustainable model under "market competition," the teaching team believed that innovating a future university must start from its core value, which is promoting learning. The NDE course, therefore, was designed to promote particular kind of learning that the teaching team find valuable in today's global world; that is, "contextual understandings" of global innovation subjects, beyond the simple "contents," which can be lectured and/or self-learned at home. Professor SCLU and his teaching team proposed that it is through interacting and engaging with others that students learn important global innovation contexts. In order to achieve this goal, the NDE course(s) have sought to eliminate *the distance* between students by "linking classrooms" around the world, and creating various opportunities for peer-to-peer interactions.

Underlying the design principle of the NDE course is the teaching team's belief that working with people from other cultural backgrounds could potentially lead to innovative ideas, which is one of the core learning objectives of the Spring 2014 course. In fact, the NDE course itself was presented on the first day of class as an example to illustrate to students *how to spot an opportunity for global innovation*. As illustrated in the following transcript segment (Transcript Segment 4), Professor SCLU presented the NDE course as the teaching team's way of doing global innovation for global education profession (Lines 84-88).

Transcript Segment 4. NDE Course as a Global Innovation Example (2/16/2014, Week 1, Session A)

Line	***Professor SCLU***	***What he signaled to students***
82	now you signed up to learn innovation	Reminding students that they signed up to learn about global innovation in this course
83	you signed up to learn global innovation	
84	I cannot find any better example	NDE course development as teaching team's way of doing global innovation for global education profession
85	to explain to you what you are doing now in this course	
86	In fact	
87	it's our way of doing global innovation	
88	for global education profession	
89	now I'm using this program as an example	NDE course as an example of how to spot opportunity for global innovation (one of the main learning objectives of the course)
90	to illustrate to you	
91	how do you spot the opportunity for global innovation?	
92	After all that's a billion dollars question right?	

The analysis of Professor SCLU's chain of reasoning (Figure 8) made visible *why* the teaching team designed the NDE course, and how the design of this course can be taken as an example to illustrate to students ways of engaging with the principles and practices of global innovation in the field of education. Therefore, the very design of the course, as well as the ways in which it was organized, were at the center of what constituted as "new" ways of learning in this course. In examining the transcript of the first day, I was able to identify at least four ways in which *the design and organization of the course* attempted to promote "new" ways of learning to promote contextual understandings of global innovation:

Minimizing the Distance Between Students. In Spring 2014, in order to minimize the distance between students to promote active peer-to-peer engagement throughout the semester, the teaching team provided a number of different online tools, all of which were intended for particular kinds of group interaction. Table 11 was created to show four main

online tools that were provided by the teaching team to make possible a range of peer interactions both inside and outside of classroom.

Table 11.
Online Learning Tools to Minimize Distance Between Students

Name of the Online Tool	***Purposes of the Tool as Intended by the Teaching Team***
WebEx	An online tool that allows students who cannot join sessions through their local classrooms (due to differences in academic and national holidays) to participate in the sessions individually from their home
Blackboard	An online system provided by USU distance education for all students free of charge; students can access audio/video recordings of the lecture sessions
Piazza	An online system developed by a student in India; students can participate in weekly pre-class studies; the system also runs statistics of polls which are useful for the teaching team
Bluejeans	A multipoint audio/video conferencing system for students to work on in-class exercises across campuses with their weekly study groups

In addition to WebEx, Blackboard, Piazza, and Bluejeans, which were provided and managed by the teaching team, students were also encouraged to use various social networking services of their choice (e.g., Facebook, Twitter, Skype, and Google Hangout) in order to maximize their ability to work together on group projects. These Internet technology tools were provided to encourage and promote peer-to-peer interaction, given the goal and vision of the NDE program/course. According to Professor SCLU, unlike traditional university courses that are often content-driven, the NDE course focuses on promoting "contextual understandings" behind global innovation principles and practices by providing opportunities for students from around the world to interact with each other to actively discuss and share the unique market demands in their own local cultures. Moreover, unlike other online courses that uses technology to often maximize the distance between students (for the purpose of increasing educational access), the NDE course focuses on quality and personal interactions among students through a range of group activities and later through an (optional) overseas trip to meet face-to-face. This kind of configuration was possible by limiting numbers of students at each campus site to 16 students and by having a

faculty and a teaching assistant at each campus to supervise and lead globally distributed groups of students.

Organizing Student Groups for Breadth and Depth of Peer-to-Peer Interaction. In addition to the online learning tools mentioned above, students were grouped into two different group configurations, one that rotated weekly and another that stayed the same throughout the semester in order to promote both breadth and depth of peer-to-peer interaction in this NDE course. Figure 9 was created to (re)present how students in each campus and each session were organized into *changing* "weekly study groups" in which they can work on discussion questions while participating in the 2-hour live lecture sessions for *breadth* of interaction with their global peers. In addition, the teaching team organized "semester project teams" in which students across all campuses were grouped to work on their final projects for *depth* of interaction. It is worth noting that although the participating campuses had to split up into two sessions (Session A and Session B) to accommodate for time zone differences across the 6 campus sites, the teaching team attempted to create opportunities for students to work across the two sessions, creating a sense of "oneness" in Spring 2014 course.

Insert Figure 9 Here

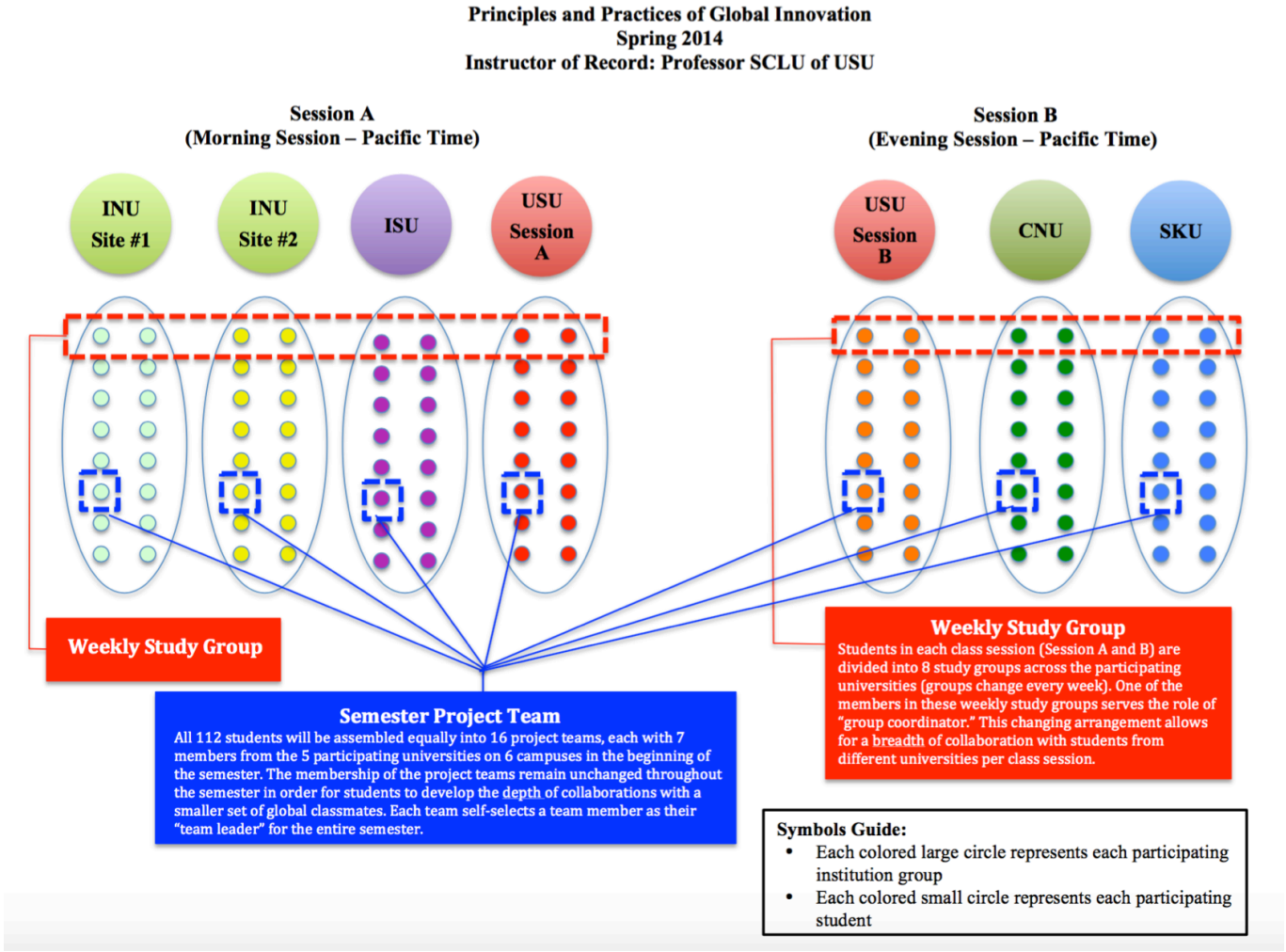

Figure 9. Structuring of student groups within and across sessions to promote breadth and depth of peer-to-peer interaction

Promoting Continuous Learning Cycle for Both Students and Instructor. Furthermore, the weekly schedule of the NDE course was organized in ways that sought to promote continuous learning cycle for both students *and* the instructor by developing an "inverted" learning cycle. This was intended to promote continuous cycle of learning between students and the instructor in ways that sought to design and organize materials for 2-hour live lecture sessions to meet the learning needs of students. The cycle occurred in a weekly basis and followed a series of steps, which are summarized in Table 12.

Table 12.
Inverted Weekly (Continuous) Learning Cycle in Spring 2014 NDE Course

Steps	***Activities Proposed by Professor SCLU and His Teaching Team***
1	72 hours before the next lecture, Professor SCLU would post pre-study lecture materials online (via Piazza)
2	Students first would study the concepts presented in the pre-study materials and
3	Students would complete a short quiz and give online feedback (a.k.a. "pain index") to indicate which concepts were easier or harder to understand
4	24 hours before the next lecture, after reviewing students' pain index results, Professor SCLU would prepare slides for next lecture and
5	Professor SCLU would post these slides 1 hour before the class begins
6	In class, students would participate in 2-hour lecture session that is structured based on their feedback on pain index
7	And the cycle continues throughout the semester

Here, what constitutes "learning" is not assumed to be only of students' responsibility, but also of the instructor, who continually engages in weekly studying(s) of students' online feedback on pre-class study materials in order to make decisions on what to focus on in the 2-hour lecture sessions. Professor SCLU urged students to make this cycle as part of their routine throughout the semester, so that this eventually becomes an easy and enjoyable learning process.

Setting Participation & Group Work as Key Assessment Criteria. Towards the end of the "first" day's introductory lecture, Professor SCLU briefly went over the grading scheme in this NDE course (~7 minutes). Compared to how much time was spent on explaining *why* the teaching team created this kind of learning environment (~1 hour), grading in this course was minimally emphasized. In fact, Professor SCLU explicitly stated that he would not repeat this information for the rest of the semester because it is not the most important part of the course. Nevertheless, in examining the breakdown of the grading scheme, I was able to uncover what counted as valuable assessment criteria in this course. The grading scheme of the Spring 2014 course was as follows:

- 20%: participation (including pre-class studies)
- 20%: in-class exercises
- 20%: cross-cultural exercises
- 30%: final group project

It should be also noted that students' assessments of their peers in terms of their contributions to group discussions as well as group projects were also figured into the grading system. By setting up the grading system in such a way, Professor SCLU and the teaching team attempted to encourage students to actively participate and engage in this course. More importantly, they wanted to encourage students to help each other to learn. The grading in this course, therefore, was not individually based grades, but collectively based ones which were later turned into individual grades to meet the institutional policies on assigning individual grades for students. Moreover, all faculty and staff across the 6 campus sites participated in the grading of all 112 students, again signaling that this was not simply a mix of different campus classrooms around the world, but that they together constituted "one class."

Collectively, the analyses on the first day of the Spring 2014 NDE course made visible what was proposed as "new" ways of learning (in terms of the organization of the course) as well as *why* this kind of educational configuration was designed to meet what needs. Tracing Professor SCLU's chain of reasoning as discursively made present to students, as well as the time he spent on explaining the design and organization of the course together make visible what counted as different ways of learning in this course.

5.4. Summary of the Second Set of Analyses: Designing the "New" and Studying the "New"

Given the unique configuration of the NDE course, uncovering what counted as "new" ways of learning in this course required multiple levels of analyses that traced the roots as well as the routes of what was proposed and referenced by Professor SCLU and his teaching team to the culturally diverse group of students. The first three levels of mapping process (Sections 2.1 & 2.2) made visible the need for examining both the written (official) as well as everyday construction of the course in order to gain deeper understandings of the dynamic and multi-faceted ways in which a group of global students were brought together to engage in this common course. Furthermore, analysis of the "first" day of the NDE course revealed Professor SCLU's chain of reasoning in the rationale for designing this global engineering course, and what counted as "new" ways of learning in terms of how the course was designed and organized.

The analyses presented in this chapter together made visible how, in what ways, and for what purposes, the NDE course was designed in order to provide an alternative educational model, one that attempted to redefine the role of university as a place to promote particular

kinds of learning (i.e., contextual understandings) by reformulating participation structures in and out of classroom for both students and the instructor with learning objectives that the teaching team deemed important in today's global world. Given that the Spring 2014 course had the largest numbers of participating universities, faculty, teaching assistants and students during the five years of the NDE program's development, it is no wonder why Professor SCLU continued to call this an "experiment" course, one that does not represent a "well established model of learning." His comment on the experimental nature of the course had to do with the *uncertainty* associated with how the everyday constructions as well as the outcomes of the course may look like with the added complexity to the course design/organization as well as student demographics. Moreover, since active participation and engagement in group discussions, activities and projects constituted the main part of the assessments of students' performance in this course, exactly what kind of configuration of actors would lead to what kinds of contextual learning and understandings could not have been predicted ahead of time. This very uncertain nature of the course posed challenges not just for the designer team, but also for the outside researcher trying to understand what was happening in this educational setting.

The challenges posed here are those of "designing for the new" and "studying the new." From the designer's point of view, working within an institutional setting where traditionally conceived notions of learning objectives and outcomes are prevalent (known and predefined learning outcomes), designing a course that breaks the norms, like the one explored here, was not an easy task, especially when the outcome of the course was not clearly known from the beginning. In fact, Professor SCLU, towards the end of his introductory lecture in the 2014 NDE course, explicitly stated that this was a "big step" for universities and that

students must understand all negotiations that the participating universities had to go through in order to provide unique learning opportunities for students. From the researcher's point of view, understanding what was claimed as a "new" and emerging educational configuration required a methodological approach that went beyond the pre-defined and traditional notions of learning to allow flexibility in tracing the histories as well as the developing processes in and through the insider's languages and references across time, space, and contexts.

In Chapter 6, I present the final set of analyses that extended the analyses presented in this chapter to further explore the unanticipated challenges that Professor SCLU and the teaching team encountered in creating an alternative or what they called "new" educational model in the Spring 2014 NDE course. Such a direction was chosen based on the rich points that were raised from the series of mapping analyses, which revealed unanticipated changes that had to be made to the planned structure of the course throughout the semester in reformulating the content as well as participation structure of the course to provide unique learning opportunities for students. Specifically, I examined the actions proposed and enacted, as well as rationales given by Professor SCLU to students when they encountered unanticipated challenges associated with "new" ways of learning in this NDE course. While engaging in the final set of analyses, I address the following questions: What can we learn from the challenges that Professor SCLU made present to students in this global engineering course? What implications can we draw for both designing and researching new and emerging global education programs?

Chapter 6. Tracing Instructor's Discourse Around Unanticipated Challenges in the NDE Course

In this chapter, I build on the analyses done in Chapters 4 and 5 to situate and analyze Professor SCLU's discourse during live lecture sessions to gain further understandings of how, in what ways, and for what purposes he was proposing, enacting, and providing rationale for "new" ways of learning to students in the Spring 2014 NDE course on *Principles and Practices of Global Innovation*. Specifically, I focus on Professor SCLU's discourse in and around unanticipated challenges encountered in the course (i.e., challenges of creating the "new") to show how these challenges were talked about and were turned into resources for future learning(s), not just for students, but also for the instructor and his teaching team. The main representative data for the analyses presented in this chapter are the transcripts of the beginning segments of lecture sessions that were originally prepared for the analyses done in Chapter 5, with added columns to show the analytic process uncovering the actions signaled (and/or proposed) as well as phases of activities identified in a moment-by-moment discursive work of the instructor during live lecture sessions.

Analyses thus far have revealed that the NDE program was created based on Professor SCLU (designer/instructor) and his teaching team's perceived need to rethink engineering education in the context of globalization and technological advancement. This rethinking of engineering education required transformations of mindsets from purely *technical* ones toward *socio-technical* ones that focus on people's demands and needs when conceptualizing and realizing products for global market. Consequently, the focal NDE course on global innovation sought to redefine the role of university as a place to promote learning that the teaching team found valuable in today's world; that is, *contextual*

understandings of global innovation subjects which go beyond the simple content-driven approach of learning. As a result, what was emphasized in the NDE course was active interaction and engagement among students around the world to learn important global innovation principles and practices in diverse cultural contexts. In order to achieve this goal, the teaching team sought to eliminate the distance between globally distributed students (therefore, *no-distance* education model) by incorporating various technological tools (to enable both synchronous and asynchronous peer-to-peer interactions) and creating various opportunities for group learning experiences both at the local and global levels. Such attempts for rethinking and reformulating engineering course were not without challenges, however, mainly because they disrupted what was ordinary or normative.

6.1. Developing a Global Lifestyle: Embodying Expanded Notions of Time and Space

Traditionally conceived notions of classrooms often rest on the idea of bounded times and spaces; students and teacher meet to engage in some subject matter in particular spaces for certain duration of time. As it became visible from the findings presented in Chapter 5, Professor SCLU and his teaching team attempted to expand the traditional notions of classrooms, by promoting interactions among students (and students with the instructor) both in and out of classroom, crossing national boundaries, time zones, as well as institutional calendars. In the Spring 2014 course, USU students in the morning session had to meet between 7:30 AM to 9:30 AM (8:00 AM to 10:00 AM after Daylight Saving Time change in March, 2014), and those in the evening session had to meet between 6:00 PM to 8:00 PM (7:00 PM to 9:00 PM after Daylight Saving Time change in March, 2014). Accordingly, students in the remote campuses (i.e., India, Israel, China and South Korea)

joined the class from their institutions at their respective local times. These different time frames for joining the common course from geographically distributed campuses make visible that "time" and "space" were important aspects in this kind of global classroom arrangement, since they are the aspects of the course that could support and/or constrain the flow of instructional processes.

The importance of "time" and "space" were signaled by Professor SCLU almost every lecture, as he greeted students according to their campuses' local times. Below is a transcript segment from Week 4 lecture in Session A (Transcript Segment 5) in which Professor SCLU emphasized the importance of getting used to a "global life" by studying with people in different spaces and time zones in this NDE course. The transcript segment is divided into two main phases of activities, one in which Professor SCLU brings everyone attention to a common frame (Lines 1-5) and another in which he proposes students to engage in a "global life" (Lines 6-19). In bringing everyone's attention, Professor SCLU first situated the course within the local time (Lines 2-3), and provided approval for students' actions (i.e., eating breakfast) at the local site (Lines 3-5). While proposing everyone to "get used to this global life" (Line 6), he situated times and spaces of the participating institutions in India and Israel (Lines 7-10) and provided approval for bringing meals to class under the condition that students "participate and engage" (Line 14) and "don't disturb the class's progression" (Line 18).

Insert Transcript Segment 5 Here

Transcript Segment 5. Professor SCLU Greeting Students in the Beginning of Lecture (3/6/2014, Week 4, Session A)

Contextual Description: Professor SCLU greets students during Session A's Week 4 live lecture session. The participating institutions were USU (Session A), INU-Site#1, and INU-Site#2. ISU students had the option of joining from their home computers.			
Line	***Professor SCLU***	***Actions Signaled***	***Phases of Activity***
1	Let's get started for today's class	*signaling the beginning of class*	*getting started – brings everyone to a common frame*
		⬇	
2	I always say "good morning" to [USU] students	*situating local time*	
3	because it is actually only 7:30 in the morning	*providing rationale for situating time*	
4	I know that some of you are still working on your breakfast	*situating local actions*	
5	It's okay	*providing approval for local actions*	
		⬇	
6	we need to get used to this global life	*making present to students what is expected*	*proposing a global life(style) – signals everyone to new ways of participating in this course*
		⬇	
7	I understand now	*situating time at remote sites*	
8	in India in both campuses		
9	this is quite close to very late evening midnight		
10	and in [ISU] it's late afternoon	*situating time at another remote site*	
11	perhaps you are ready to start your dinner	*situating remote actions*	
		⬇	
12	I wanted to conduct this course	*providing instructor's goal*	
13	as an integrated part of your life		
		⬇	
14	so as long as you are able to participate and engage	*providing required conditions*	
15	you can bring your breakfast	*providing approval for local actions*	
16	bring your dinner	*providing approval for actions at remote sites*	
17	bring your lunch		
18	as long as you don't disturb the class's progression	*providing approval for actions under certain conditions*	
19	you are free to do so		

Although students were connected synchronously via Internet technology to participate in the common lecture sessions, the local meeting times at participating institutions were

unique (i.e., early morning for USU, late afternoon for ISU, and evening for INU students) and required different kinds of demands on students. It is this very time-space configuration of the course that Professor SCLU turned into opportunities for students to learn about how to engage in a "global life," and by extension, *how to engage in new ways of participating* in this course on global innovation. While making present to students one of his goals of the course (Lines 12-13), Professor SCLU approved students' actions at their institutions (i.e., bringing breakfast, lunch, or dinner to class; Lines 15-17) so that the course becomes an "integrated part" of their lives. He takes a *situated approach* in orienting globally distributed students who live in different spaces and time zones to engage in the common course.

The importance of "time" was, in fact, emphasized from the very beginning of the course. Towards the end of the Week 1 introductory lecture (Transcript Segment 6), Professor SCLU urged students "not to be constrained by the clock," (Line 2371) because a *global citizen*, and by extension a *global innovator*, does not simply look at the local clock (Lines 2377-2378). In order to develop a "global lifestyle," students need to make efforts to meet and work with their peers both inside and outside of class regardless of their local times and locations (Lines 2383-2385).

Transcript Segment 6. Professor SCLU on How to Develop a Global Lifestyle (2/16/2014, Week 1, Session A)

Contextual Description: Towards the end of the Session A's Week 1 lecture session, Professor SCLU proposed students a new mindset for participating in this course. The participating institutions were USU (Session A), INU-Site#1, and INU-Site#2. ISU students had the option of joining from their home computers.			
Line	***Professor SCLU***	***Actions Signaled***	***Phases of Activity***
2371	do not be constrained by the clock	*proposing an action*	*proposing a new mindset – signals everyone to a new way of participating in this course*
		⬇	
2372	I want you to experience how to be a global innovator	*providing rationale for proposed action*	
2373	in order to do that you first have to see yourself	*providing condition for engaging in proposed action*	
2374	as a global citizen		

		⬇	
2375	what does a global citizen mean?	*providing a definition for proposed identity*	
2376	global citizen means that		
2377	you don't look at your local clock		
2378	your life doesn't look at the local clock	*situating the definition*	
		⬇	
2379	you want to bring your breakfast here to eat?	*providing approval for a local action*	
2380	I don't mind		
2381	you want to bring dinner when you meet people?	*providing approval for an action at a remote site*	
2382	I don't mind		
		⬇	
2383	but make sure you meet	*providing conditions*	
2384	got it?	*asking for confirmation on proposed action*	
2385	try to develop a global lifestyle okay?		

As visible from the two transcript segments above (Transcript Segments 5 & 6), what was proposed to students by Professor SCLU and his teaching team was a particular way of understanding time and space in the NDE course and therefore a particular way of student participation and development of *global citizenship* identities. Promoting such identities required transformations of how participants conceive of time-space configurations in the NDE course as well as how they organize their ways of living (i.e., lifestyle). What is worth noting is that such reformulations were not simply communicated to students as an important part of the course participation; Professor SCLU engaged in the process of "global lifestyle" to create opportunities, not only for students, but also for himself and the teaching team to physically experience and embody this kind of lifestyle in and through the NDE course.

In the following section, I present three *telling cases* (Mitchell, 1984) to illustrate three sets of unanticipated challenges encountered in the NDE course in trying to embody the global lifestyle that Professor SCLU and the teaching team designed for their students (i.e.,

learning not bounded by time and space). By focusing on how the unanticipated challenges were talked about by Professor SCLU in the public space of the class, I hoped to make visible the kinds of norms and expectations he was setting up for his students and how these challenges were turned into resources for future learning(s) for those involved.

6.2. Unanticipated Challenges in the NDE Course: Three Telling Cases

Drawing on the previous analyses and observations, three *telling cases* (Mitchell, 1984) were constructed to illustrate how and in what ways three unanticipated challenges in the NDE course were *talked into being* (Green & Dixon, 1993). Mitchell (1984) defined telling cases in the following way:

> Case studies are the detailed presentation of ethnographic data relating to some sequence of events from which the analyst seeks to make some theoretical inference. The events themselves may relate to any level of social organization: a whole society, some section of a community, a family or an individual. What distinguishes case studies from more general ethnographic reportage is the detail and particularity of the account. Each case study is a description of a specific configuration of events in which some distinctive set of actors have been involved in some defined situation at some particular point in time (p. 237).

Therefore, telling cases are different from "typical" cases, which seek to find generalizable laws across a range of situations and settings; instead, telling cases represent particularity of some accounts situated within particular points in time, involving particular configurations of actors and events. According to Mitchell (1984), a good case study is one that enables the researcher to discern valid theoretical connections between particular events and phenomena of interest that were previously invisible. Throughout this chapter, transcript segments are presented to illustrate the points being made in each section. It is recommended to consult Figure 7 in Chapter 5, the structuring of the Spring 2014 NDE course, to situate these transcript segments within the running history of the course.

6.2.1. Telling Case 1: Traveling to Partnering Universities to Deliver Lectures

In Spring 2014, Professor SCLU traveled to partnering universities in China (CNU) and Israel (ISU) in two separate occasions to deliver lectures during the scheduled class times. This actually was not the first time he delivered face-to-face lectures at partnering universities; in 2012, he traveled to China and Taiwan (Green et al., 2015) to provide Chinese and Taiwanese students face-to-face experience of the NDE course, while US students experienced the course virtually. In the following transcript segment (Transcript Segment 7), which is comprised of two separate lecture sessions tailored for different student group audiences in Week 2 (Session A and Session B), Professor SCLU announces his plans for delivering face-to-face lectures from China in Week 3 and Israel in Week 7 to students. Given that Professor SCLU had to deliver lectures twice each week for Sessions A and B students in India, it was important to examine his discourse across both sessions to understand his plan as well as rationale for delivering lectures from China and Israel.

As visible in Transcript Segment 7, in both sessions, Professor SCLU announced his plans for traveling to and delivering lectures from China and Israel (Week 3 and Week 7, respectively) while situating these plans within the course schedule (Lines 130-149 & Lines 207-212). He then brought students' attention to the *continuous learning cycle* (see Table 12 in Chapter 5) that was embedded in the course design in order to explain that no matter where students were, and no matter which time zones they were in, "the process of learning remains the same" (Lines 150-152). In other words, whether Professor SCLU delivered lecture face-to-face in the classroom or virtually on screen should not have any difference as far as students' learning is concerned. This continuous learning cycle that is not bounded by time and space goes back to what Professor SCLU has been emphasizing since the very

beginning of the course related to developing a global lifestyle (please refer back to Transcript Segment 6).

Professor SCLU further elaborated on the importance of getting used to the kind of "global arrangement" provided by the NDE course in Session B (Lines 220-243). He first situated when Session B lecture would be taking place in Beijing time from the CNU campus (Lines 227-228), and then reminded students that there was another lecture that he had to deliver for Session A the night before between 11:30 PM and 1:30 AM (Line 232). Because Session A lecture was taking place during such late time of the day, he explained that he would be delivering lecture from his hotel room (Lines 235-237). By sharing his future travel plans to two of the partnering institutions, and situating the overseas lectures both in time and space, Professor SCLU made present to students what the process of engaging in a global lifestyle entails. Also, by physically engaging in this process (i.e., delivering lecture from his hotel room at midnight in Beijing), Professor SCLU modeled for his students how to embody this global arrangement processes into their own lives.

Transcript Segment 7. Professor SCLU Communicating His Plans for Delivering Face-to-Face Lectures from China and Israel (2/13/2014, Week 2, Sessions A & B)

Contextual Description: In the beginning of Session A's Week 2 lecture session, Professor SCLU announced his plans for traveling to China in Week 3 and to Israel in Week 7 to deliver lectures. The participating institutions were USU (Session A), INU-Site#1, and INU-Site#2. ISU students had the option of joining from their home computers.			
Session A			
Line	***Professor SCLU***	***Actions Signaled***	***Phases of Activity***
130	and I also told you	*beginning to repeat what was announced before*	*announcing traveling plan for following week*
131	next week	*situating location of next week's lecture*	
132	I will be in Beijing		
133	and I will actually deliver this lecture		
134	to you		
135	in China		

		⬇	
136	as a matter of fact	*situating the means for getting to the location of next week's lecture*	
137	tonight I have a lecture finish until 8		
138	8 PM in Los Angeles		
139	for Session B		
140	and right after that		
141	I have to drive to the airport and leave at 12 midnight to Beijing		
142	and then I will start the cycle over there	*situating the continuous learning cycle in the new location*	
		⬇	
143	and the week after that	*beginning another announcement*	*announcing another future traveling plan*
144	I will come back to [USU] and	*situating the traveling plan within the course schedule*	
145	we will have another three lectures		
146	and month later I will be repeating the same routine		
147	and this time I will be going to Israel	*situating the location of future lecture*	
148	so I will be delivering lecture from Israel		
149	okay?	*asking for confirmation on proposed plan*	
		⬇	
150	now no matter where you are	*situating learning in this course (not bounded by time and space)*	*bringing everyone's attention to the learning cycle – proposing students to make the learning cycle into a routine*
151	no matter which times you are		
152	the learning process remains the same		
		⬇	
153	you have to really put yourself in this routine cycle	*situating students in the proposed learning cycle*	
154	and then you will feel really comfortable		
155	okay?	*asking for confirmation on proposed action*	
Contextual Description: In the beginning of Session B's Week 2 lecture session, Professor SCLU announced his plans for traveling to China in Week 3 and to Israel in Week 7 to deliver lectures. The participating institutions were USU (Session B) and CNU. SKU students had the option of joining from their home computers.			
Session B			
Line	***Professor SCLU***	***Actions Signaled***	***Phases of Activity***
207	next week is the beginning of the [CNU] class	*situating the first traveling plan*	*announcing future traveling plans*
208	and we would like to get a chance to get to know them		
		⬇	

209	and you can tell exactly months later I will be repeating the same thing from	*situating the second traveling plan*	
210	[ISU]		
211	from Israel		
212	So I will be speaking to you in the screen and from Israel		
		⬇	
213	But as far as your learning goes	*beginning to talk about students' learning*	*bringing everyone's attention to the learning cycle – that no matter where students are and what time zones they are in, the learning remains the same*
214	the pattern remains the same	*situating everyone's actions during the instructors' travels*	
215	and you still come to the classroom and log in there		
216	and you will see me either standing here		
217	or talking from there (pointing at the screen)		
218	It doesn't make any difference	*signaling that learning pattern remains the same*	
219	Okay?	*asking for confirmation*	
		⬇	
220	So, you need to get used to this kind of global arrangement	*proposing particular actions*	*proposing that students get used to the global arrangement*
221	that your watch or clock doesn't matter	*situating proposed actions within students' learning lives*	
222	that you get up in the midnight you do so		
223	And where people actually physically present		
224	it doesn't matter		
		⬇	
225	As a matter of fact	*situating his future travel within students' learning lives*	
226	when I go to Beijing		
227	and I will be giving the lecture from [CNU] campus		
228	in the morning from 10 to 12 Friday	*situating time of future lecture (session B) at the remote site*	
229	which is your time now		
		⬇	
230	But remember that I have another session	*situating time of future lecture (session A) at the remote site*	
231	Session A in the morning right?		
232	And session A in the Beijing time is 11:30 to 1:30 AM		
233	in the midnight		
234	So I have to give that lecture		
		⬇	
235	And certainly I didn't want to bother the [CNU] partners	*situating location of future lecture (session A) for remote site*	
236	to open up the campus for me		

237	so I will be giving a lecture from hotel		
		⬇	
238	Same thing for when I travel to Israel	*situating location and time of future lecture at another remote site*	
239	one of the lectures will be in the midnight		
240	and one of the lecture will be in the daytime okay?		
		⬇	
241	So you really need to get used to this kind of	*signaling the need for getting used to global arrangement*	
242	this kind of		
243	this kind of arrangement		

As indicated above, traveling to partnering institutions to deliver lectures at unconventional spaces (i.e., hotel room) and times (i.e., midnight) was not without challenges. In the following transcript segment (Transcript Segment 8), Professor SCLU, upon returning from his trip to Beijing, China, made visible to Session A students the difficulties that he faced in delivering lecture from his hotel room at midnight. In bringing everyone's attention to this past experience, Professor SCLU signaled to students that the challenge he experienced was not just associated with the space (i.e., hotel room) and the "body jet lag" (Line 15), but also the "psychological jet lag" (Line 16) resulting from fatigue. After long hours of flight to Beijing and arriving his hotel room at 8:00 PM, Professor SCLU had to prepare for the 11:30 PM lecture for his Session A students. Moreover, he was also scheduled to deliver the second lecture for Session B students in the following morning at 10:00 AM from CNU classroom (Lines 17-21). Concerned that his fatigue may have negatively impacted Session A students' learning (Lines 22-23), Professor SCLU suggested students to look at the video recording of Session B's lecture which was delivered from CNU classroom (Line 25). He then made an explicit link between the challenge he experienced in delivering lecture from his hotel room at midnight to the *experimental nature* of the NDE course (Line 36). This is again the *uncertainty* associated

with engaging in "new" ways of learning in embodying a global lifestyle that breaks the conventional norms and expectation when it comes to participating in a course (i.e., embodying expanded notions of time and space).

Transcript Segment 8. Professor SCLU Talking About His Experience Delivering Lecture from His Hotel Room in China (2/27/2014, Week 4, Session A)

Contextual Description: In the Beginning of Session A's Week 4 lecture session, Professor SCLU shared with students his experience of delivering lecture from his hotel room in Beijing, China, at midnight in Week 3. The participating institutions were USU (Session A), INU-Site#1, and INU-Site#2. ISU students had the option of joining from their home computers.			
Line	***Professor SCLU***	***Actions Signaled***	***Phases of Activity***
1	Now I want to share with you	*starting to share the instructor's experience of delivering lecture from his hotel room*	*bringing everyone's attention to past experience – making visible the challenge of delivering lecture from his hotel room in Beijing at midnight*
2	my experiences of		
3	giving you lecture		
4	from my hotel room in Beijing last week		
		⬇	
5	and the	*sharing the challenge that the instructor experienced*	
6	the short story		
7	it was terrible		
8	and at least for me		
9	and it was hard		
		⬇	
10	not just because I couldn't see	*signaling that the challenge was not associated with the space (i.e., hotel room)*	
11	anything happening in the classroom		
12	although I can see a little [on the] screen		
		⬇	
13	but started realize that	*providing reasons behind the experienced challenge*	
14	the jet lag		
15	and it's more than that your body has a jet lag		
16	there's a psychological jet lag		
		⬇	
17	so I arrived in Beijing about	*situating the experienced challenge*	
18	8 o'clock in the evening		
19	and I checked in the hotel room		
20	and the lecture started at 11:30		
21	and I was totally exhausted and I wasn't really		
		⬇	

22	well I hope you didn't really suffer much	*situating the challenge within students' learning lives*	
23	I wasn't really sure how I was talking in the class		
		⬇	
24	and that's why I said at the end that	*providing rationale for what was said before*	*bringing everyone's attention to lecture for another session – suggesting Session A students to look at Session B's recorded lecture session*
25	I suggest you to look at Session B	*suggesting everyone to look at Session B lecture*	
26	because Session B actually turns out to be in the morning	*situating Session B lecture in time and space*	
27	in Beijing		
		⬇	
28	I don't know how many of you	*situating Session B lecture with actors involved*	
29	actually looked at Session B		
30	the cohorts of [CNU]		
31	actually attended the whole lecture		
32	so we had a nice interaction with their cohort		
33	as well as their dean		
34	and the		
35	[CNU] students were very engaged in		
		⬇	
36	So these things are really an experiment as you can tell	*reminding students the experimental nature of the course*	*bringing everyone's attention to the experimental nature of the course*

Another challenge was identified when Professor SCLU shared his experience of delivering lecture from CNU campus to Session B students in Week 4. The challenge was related to what Professor SCLU perceived as *valuable* in fulfilling his role as the main instructor of the NDE course. As visible in the following transcript segment (Transcript Segment 9), Professor SCLU first situated the lecture delivered from CNU campus in time and space (Lines 1-2), and situated his interactions with students as well as past relationships with people at CNU (Lines 3-14). He explained how much he valued his face-to-face interactions with CNU students during his stay in Beijing, China (Lines 15-26) because it is crucial for him to understand the "issues that are really important to [students]" (Line 32).

He then explained his inability to travel to three of the partnering universities (i.e., INU-Site#1, INU-Site#2, and SKU) in Spring 2014 (Line 38). While Professor SCLU was able to take advantage of his consulting activities overseas to create opportunities to visit students in China and Israel in Spring 2014 (Lines 47-50), he was not able to find additional travel funding opportunities in India and South Korea, which prevented him from visiting students in these countries (Lines 58-60). Acknowledging that NDE course is different each year (Line 65) depending on what kinds of consulting activities become available, Professor SCLU further explained that he would do his best visit students face-to-face in their home campuses by taking advantages of travel support from his professional activities outside of class (Lines 66-70). This example makes visible Professor SCLU's efforts to leverage his global resources to make possible the visions that he had for the NDE course. However, finding travel funding opportunities to visit students located at multiple international campuses posed challenges, especially when the number of participating institutions in the NDE course increased in Spring 2014.

Transcript Segment 9. Professor SCLU Sharing His Experience Delivering Lecture from CNU (2/27/2014, Week 4, Session B)

<table>
<tr><td colspan="4">Contextual Description: In the beginning of Session B's Week 4 lecture, Professor SCLU shared his experience of delivering lecture from CNU classroom in Week 3. The participating institutions were USU (Session B) and CNU. SKU students had the option of joining from their home computers.</td></tr>
<tr><th>Line</th><th>Professor SCLU</th><th>Actions Signaled</th><th>Phases of Activity</th></tr>
<tr><td>1</td><td>Last week at this time</td><td>beginning to situate last week's lecture</td><td rowspan="9">bringing everyone's attention to past experience – situating his experience of delivering lecture from CNU</td></tr>
<tr><td>2</td><td>I was over there (pointing at the screen – [CNU] classroom)</td><td>situating space of the past experience</td></tr>
<tr><td></td><td></td><td>⬇</td></tr>
<tr><td>3</td><td>And had a wonderful interaction with</td><td rowspan="5">situating interaction with students at the remote site</td></tr>
<tr><td>4</td><td>students on [CNU] campus</td></tr>
<tr><td></td><td></td></tr>
<tr><td>5</td><td>not only we had a chance to</td></tr>
<tr><td>6</td><td>have a live discussion in class</td></tr>
</table>

		⬇	
7	and as you remember	*situating relationships with particular actors at the remote site*	
8	their provost was a professor in chemistry		
9	as well as their dean of engineering		
10	by the way the dean of engineering		
11	used to be a faculty at [USU]		
12	so I know these people long time ago		
13	and they both attended the lecture		
14	so we had a very good interaction		
		⬇	
15	and the time I value the most	*signaling what experience counts as valuable (i.e., interaction)*	
16	was the second day on Saturday in Beijing	*situating the valuable experience in time and space*	
17	in the morning		
18	I had a chance to invite all the [CNU] students		
19	to my hotel room		
20	then we had a very nice informal chat		
21	about their		
22	whatever problem they had		
23	so we talked about a lot of different issues		
24	except for anything related to the class		
		⬇	
25	and that kind of interaction is really something	*repeating what counts as valuable*	
26	that I value very much		
		⬇	
27	this kind of course is good	*providing rationale for why interaction is valuable*	
28	but to me		
29	if I really don't have a chance to		
30	sit in front of you		
31	it's pretty hard for me to really understand		
32	issues that are really important to you		
33	so I appreciate this opportunity		
34	to visit Beijing		
		⬇	
35	and came back this weekend	*announcing future travel plan*	*reorienting back to the present space and time and projecting forward in time – making visible how he plans*
36	and I will repeat the same process next month to Israel	⬇	
37	and unfortunately	*announcing inability*	

38	I will not be able to visit India and Korea	*to plan future travels to two remote sites*	*to achieve what he values the most (i.e., face-to-face interaction with his students)*
39	this semester		
		⬇	
40	well the reason is because	*providing rationale for inability to plan future travels*	
41	xxx ran out of travel fund		
42	as a matter of fact		
43	now my trips are funded by xxx		
		⬇	
44	and I just want to make sure you to understand that	*situating funding situations with future travels*	
45	when I go to China		
46	when I go to Israel		
47	I was able to find people who were		
48	willing to pay for other work		
49	so take their business trip and then go there		
50	and then stop by the university and do my job		
51	[USU] do not fund these trips of mine		
52	they fund your travel partially		
		⬇	
53	but I find at least for myself	*signaling what counts as valuable*	
54	it's very important that		
55	I have a chance to see everyone		
56	during the semester		
		⬇	
57	but this semester	*situating inability to do what is valuable*	
58	I have not managed to		
59	find someone willing to pay me from		
60	Korea and India		
		⬇	
61	and if we find someone	*opening it up for future possibilities*	
62	I would be happy to go there to meet the students		
		⬇	
63	two years ago I actually had a chance to go visit [SKU]	*bringing everyone's attention to past travel experience*	
64	and had a lecture at [SKU]		
		⬇	
65	so every year is very different	*bringing everyone's attention to differences across years*	
		⬇	
66	but as much as I can do	*signaling that he will do his best to visit*	
67	I will try to arrange my own consulting		

	activity	*students on their campus*	
68	and take advantage of their travel support		
69	and go to visit you on your campus		
70	which is very enjoyable		

The first telling case made visible how Professor SCLU attempted to engage students in "new" ways of learning in this NDE course as *global citizens* through the means of modeling. Leveraging his global resources, he created opportunities to meet students in two of the remote campuses face-to-face and had everyone in class to both witness and experience what it is like to be engaged in a global lifestyle with continuous learning cycle that is not bounded by time and space. This kind of global arrangement, however, was challenging for Professor SCLU who had to deliver lecture from his hotel room at midnight after long hours of air travel and also fulfill his role as the main instructor in meeting all of his students who are globally distributed face-to-face at least once during the semester. By making present to students the challenges that he encountered during his overseas lecturing experience, Professor SCLU made visible why Spring 2014 course is still an *experiment* course, requiring continual designing and redesigning.

6.2.2. Telling Case 2: Students' Different Entry Points into the NDE Course

Another important way in which the NDE course differed from traditional university courses was the different entry points of students into the course due to differences in national and institutional systems of partnering universities (please refer back to Figure 8, Chapter 5). Since USU was the host university and Professor SCLU was the main instructor of the course, the course was naturally designed to start on the first day of USU's Spring semester (2/6/2014), the system which worked for students in INU campuses (Site #1 and

Site #2), but not for students in other campuses (CNU, SKU, and ISU). As visible from Figure 8 in Chapter 5, the first official day of CNU was 2/20/2014 (Week 3), while SKU joined for the first time on 3/6/2014 (Week 5) and ISU on 3/20/2014 (Week 7). Although he encouraged students in CNU, SKU, and ISU to access course materials, and to watch the recorded lecture videos before officially joining the course, the teaching team could not ensure full participation of students from these three campuses, especially prior to their official entry points. While understanding the impact of such structuring on student learning is beyond the scope of this study, I explore how Professor SCLU brought together different groups of students at different entry points in this second telling case.

What became visible, as I showed in this section, upon a closer examination of how Professor SCLU, through his discourse in classroom, brought new groups of students into the NDE course as the semester progressed, was that the visions and goals of the NDE program, and why the teaching team designed this kind of course, were repeated every time new groups of people joined the class live. Given that students had different starting points, Professor SCLU saw the need to repeat what was said in the introductory lecture (please refer back to Section 5.3 in Chapter 5) to orient new students, and to (re)orient exiting students collectively to the common goal. Therefore, Professor SCLU's discourse here played the important role of bringing people together in this global engineering course where learning sites and times were distributed.

In the following transcript segment (Transcript Segment 10), Professor SCLU explained the visions and goals of the NDE course on the day when CNU was joining the class live in Week 3 (note that this was also the day when he flew to China to deliver lecture). Not only were the CNU students present in the classroom, but also CNU's provost and school

officials, who made possible the collaboration between the two campuses (USU and CNU) (Lines 35-36). In order to orient to the "special guests" and the incoming cohort of CNU students joining the NDE course, Professor SCLU took some time in the beginning of lecture to go over *why* and *how* NDE attempted to provide new learning opportunities for students in today's global world by emphasizing the inverted, interactive and international aspects of the course.

Transcript Segment 10. Professor SCLU repeating the visions and goals of NDE program for students and special guests at CNU during his visit (2/20/2014, Week 3, Session B)

Contextual Description: In the beginning of Session B's Week 3 lecture, Professor SCLU, who was delivering a face-to-face lecture from CNU, repeated the visions and goals of the NDE course to students and special guests at CNU. The participating institutions were USU and CNU. SKU students had the option of joining from their home computers.			
Line	***Professor SCLU***	***Actions Signaled***	***Phases of Activity***
35	Now because we have these special guests here	*providing rationale for plans for this lecture*	*bringing everyone's attention to a common frame*
36	and because this is the first time actually [CNU] students joined		
37	this live lecture		
38	I want to spend a little bit of time at the very beginning	*providing plans for the beginning part of lecture*	
39	to explain how this class is organized		
40	what are the differences in the way we teach, we learn	*situating the course in what is happening in the world*	
41	versus how people would learn in a typical flipped classroom		
42	and how do we compare or relate to this		
43	very fashionable MOOC movement		
44	that's going on in the world		
161	this is a really brief overview for our guests here	*addressing the main audience of this overview*	*Reiterating the vision(s) of NDE program for the newly joining group of students and audience at CNU*
162	now people often ask me	*situating a question that is often asked*	
163	what's really the vision for [NDE]?		
164	and I said		
165	[NDE] vision is try to create	*providing vision of NDE program*	
166	something we called classrooms without borders		
		⬇	

167	why?	*providing rationale for the NDE vision*	
168	because we believe that		
169	if we are able to put young people together		
170	if they are able to study together		
171	the world becomes a better place		
		⬇	
172	so our vision	*rephrasing the vision of the NDE program*	
173	our dream is		
174	for learning together for a better world		
		⬇	
175	now important thing is what this "i" stands for	*beginning to provide explanation for NDE's conceptual framework*	*bringing everyone's attention to different conceptual components of the NDE program – inverted, interaction, and international*
		⬇	
176	the first "i" stands for "inverted"	*providing explanation for what component #1 is*	
177	now the inverted		
178	the concept is related to flipped classroom	⬇	
179	and I'm going to explain to you how our inversion	*providing explanation for why component #1 is different from what is typical*	
180	is related		
181	but different		
182	from the typical flipped classroom		
		⬇	
183	the reason we want to flip this is	*providing rationale for adding component #1 to the course design*	
184	so that we can devote the class time here		
185	the two hours here is very valuable for everybody		
186	we can devote this time for "interaction"	*providing explanation for how component #1 can achieve what counts as valuable*	
187	rather than lecture		
188	and we want you to have interaction with each other	⬇	
189	because that is the best way to learn the "context"	*providing rationale for adding component #1*	
		⬇	
190	as well as	*situating explanation in previous lecture*	
191	to remember from the lecture number one		
192	I explain to you this example		
193	what is content and what is context		
		⬇	
194	the second "i" in [NDE] represents "interactive"	*providing explanation for what component #2 is*	
		⬇	

195	and you are gonna see that the main point of	*providing rationale for adding component #2 to the course design*	
196	putting together this platform		
197	is so that people can interact		
		⬇	
198	here we want you to interact not only	*providing different dimensions of component #2*	
199	during the class in these two hours		
200	we want you to interact virtually online		
201	through the Piazza system		
202	through the bluejeans systems		
203	throughout the whole week		
204	constantly you are thinking together		
205	thinking and understanding issues with your classmates		
206	although you are located at different places		
		⬇	
207	because we believe that in a lot of subject	*providing rationale for adding component #2*	
208	what you learn really depends on with whom you learn		
		⬇	
209	this is very different	*providing difference between NDE course and traditional classes*	
210	in a traditional class		
211	which you learn depends on from whom you learn from		
		⬇	
212	this class you will find out	*proposing actions that could lead to learning in this course*	
213	if you are able to learn from people		
214	who have different thinking than you		
215	you actually learn more		
		⬇	
216	that leads to the next one called "international"	*providing explanation for component #3*	
		⬇	
217	that's the meaning of the third "i"	*providing rationale for adding component #3 in the course design*	
218	and the reason we have this international platform is because		
219	we believe that if we have diversity in the class		
220	everyone can benefit more		

Previous research has demonstrated that repetition in discourse plays an important function in creating particular kinds of interpersonal relationships (e.g., Tannen, 1987).

Based on this conceptual argument, the repetition observed in Professor SCLU's discourse around differing entry points of students required further exploration to address the following question: Exactly what functions did Professor SCLU's repeating of the goals and visions of the NDE program/course seek to accomplish?

In Week 5, when SKU students were scheduled to officially join the class (Session B), and when some of the ISU students joined the class live in Session A (which was unanticipated), Professor SCLU referred to the entry of new campus groups as "new milestone(s)" for the NDE course (Transcript Segment 11, Line 40). He explained that while the pre-semester participation for students, especially for those in SKU and ISU, was optional (Lines 61-62), it was important for them to catch up with the course materials before immersing themselves into the course (Lines 63-65). This was because starting from Week 8, all students were scheduled to begin their Phase 2 of learning cycle which focused on "contextual interactions" through a range of group activities and assignments. On this note, Professor SCLU encouraged students who were participating the course early to help those who were entering late (Lines 68-76). What this example makes visible is that different entry points of students posed challenge, not just for those entering late, but also for those who have been participating from the very beginning. Since a large portion of students' grades were based on group assignments, it was important for students to work together despite their different levels of participation history in the course.

In order to bring students together while encountering such challenges, Professor SCLU reiterated the importance of the global experience in this experimental course by sharing his own experience of coming to the United States from Taiwan 35 years ago. He explained that he, too, experienced many challenges coming to the new country and interacting with people

who shared very different value systems (Lines 119-140), which at the time came to him as a "burden" (Line 142). However, looking back at his 35 years of "struggles," he realized that what he initially thought was burdensome eventually became valuable resources for him (Lines 144-157). His designing of this unique NDE course, therefore, was to create opportunities for students to gain global experience and learn to appreciate the value of such experience within a shorter period of time (Lines 158-163). In so doing, he turned the somewhat daunting task of interacting with global peers, who were entering the course at different points in time, into potential resources for students in the future (Lines 165-167). However, in order to make this kind of learning possible, Professor SCLU urged, students had to "participate" (Line 168), and see the underlying purpose behind the new and challenging global educational configuration (Lines 172-173). He further assured students that if students went through this process, all these burdensome and challenging experiences could potentially become valuable resources for them in the future. Here, what he referred to as future valuable resources are global networks that students can carry with them and develop even after the completion of the course.

Transcript Segment 11. Entry of New Campus Groups as New Milestones for the NDE Course (3/6/2014, Week 5, Session A)

Contextual Description: In the beginning of Session A's Week 5 lecture, Professor SCLU situated entries of new campus groups into the NDE course as "new milestones" while encouraging students to help other students, especially those entering late. Professor SCLU also shared his own experience of coming to the US to explain the value of interactions with global peers to students. The participating institutions were USU (Session A), INU-Site#1, and INU-Site#2. ISU students had the option of joining from their home computers.			
Line	***Professor SCLU***	***Actions Signaled***	***Phases of Activity***
40	today is a new milestone	*signaling a new milestone*	*framing a new beginning*
41	because another few hours later	*situating the new beginning*	
42	when I start the second session B		
43	we are going to have our classmate from [SKU]		

44	to officially join this class		
45	I understand that [SKU] students have already been participating in	*situating the new group of actors*	
46	many of the meetings through WebEx		
47	But today is the day	*situating the new beginning within the remote site's institutional setting*	
48	and their campus begins the spring semester		
49	and they will officially join us tonight		
50	now it is actually a pleasant surprise for me to	*signaling unanticipated event*	*framing ISU's participation which was unanticipated*
51	also see our students from [ISU]	*situating the unanticipated participation of a remote site*	
52	Because according to the schedule		
53	[ISU] class will be live two weeks later	*situating official joining day within the course schedule*	
54	and not today		
55	But I want to especially thank Professor E	*thanking for the unanticipated participation*	
56	for coordinating this early connection		
57	and earlier we had a miscommunication	*situating past scheduling experience*	
58	because we thought [ISU] would join earlier		
59	but it turns out that your semester start much later		
60	so this is all okay	*signaling approval*	*framing approval for remote site's later entry into the course*
61	and we will keep your pre-semester participation	*providing approval for not participating before official entry*	
62	as optional		
63	as long as you are able to finish the materials	*providing conditions for optional participation*	
64	at your own pace		
65	before your classroom become live		
66	and you are okay		
67	and this is also		
68	I want to remind every team in the study group	*reminding student teams*	*bringing study group teams' attention to a common frame – importance of helping*
69	and try to help each other	*requesting teams to help other members*	

70	some of you already started the semester months earlier	*situating early entry of some sites*	*each other*
71	like [USU] and in [INU]		
72	and some of you get to start and	*signaling importance of helping team members to learn and succeed in this course*	
73	you are all being assigned to the same team		
74	to the best opportunity that you can help each other		
75	and help each other to learn		
76	so that overall your team can work together to succeed		
119	since we have new classmates joining us from Korea and [ISU]	*bringing everyone's attention to a common frame*	*sharing his experience of coming to the US 35 years ago – global experiences as great resources*
120	I wanted to say a few words		
121	to address your global experience in this experimental class okay?	*signaling what will be addressed*	
		⬇	
122	and I want to really speak to you as	*signaling from whose perspective this will be addressed*	
123	a person who went through this process 35 years ago myself		
		⬇	
124	I remember 35 years ago when I came to this country from Taiwan	*situating time and space of past experience*	
125	where I was born		
126	I really wanted to globalize	*providing rationale for coming to the US*	
127	that's the reason why I came to the United States		
		⬇	
128	and now I was able to engage in a lot of activities	*situating previous actions engaged*	
129	in the classroom right away		
130	I was just basically sitting at the back of the corner		
131	and trying to see what other people are doing		
132	at the very beginning		
133	I tell you I was really troubled	*sharing challenges experienced*	
134	I was really struggled		
135	because I find out that many things that people do	*providing rationale for the experienced challenges*	
136	in their life as normal things		
137	it was so different from me		
138	it's different from my own value system		
139	it's different from my own schedule		
140	it's different from what I want what I wanted to do		

		⬇	
141	and at the beginning	*sharing initial reaction to experienced challenges*	
142	all these global things become a huge burden in my life		
143	in my study		
144	now fortunately I was able to hang on	*situating how past experiences and challenges later became valuable resources*	
145	and I strongly believed that I really wanted to be a global person		
146	so I struggled, hang on		
147	after many many years I tell you		
148	and this was 35 years ago		
149	after many many years		
150	suddenly I started to realize		
151	that many of the global experiences that I have had		
152	in my classroom, in my job		
153	as I traveled around the world		
154	suddenly become my very very valuable resources		
155	so this turning from this huge burden		
156	into very rare resources in my life		
157	is something that I really enjoy		
		⬇	
158	now in my case it took me 35 years	*situating past experience within duration of time*	*framing the potential value of global experience for students*
159	I really don't think that you want to spend your 35 years to do so	*providing rationale for creating the NDE program*	
160	so I decided that I create this program		
161	called [NDE] program		
162	I wanted to see whether such experiences can be		
163	compacted a little bit more		
164	so rather than 35 years		
		⬇	
165	let's see whether we can go through this	*proposing everyone to turn a burden into resources*	
166	turning this global interaction from a burden		
167	to a resource		
		⬇	
168	now this requires your participation	*proposing required condition*	
169	if you do not participate	*providing consequences of not following the required condition*	
170	if you do not see this hurdle in front of you		

171	which is different from other classes right?		
172	if you do not see this additional purpose and dimension		
173	the way we design our course		
174	we completely miss our (goals)		
175	if you do	*providing consequences for following the required condition*	
176	I will assure you		
177	you will suddenly realize that		
178	all the extra trouble that you have to go through this course		
179	will turn from being a burden on your regular life into very enjoyable resources		

Finally, when the cohort of ISU students officially joined in Week 7, Professor SCLU, once again, reiterated the importance of participating in this course because students' active participation is at the core of the design of this engineering course, which attempted to promote exchange of cultural knowledge among globally distributed students to generate innovative ideas (note that Week 7 was when Professor SCLU delivered face-to-face lecture at ISU). In bringing students' (primarily ISU students) attention, Professor SCLU explained that "this course is not just subject that [students] study," but is about "all the activities" that the teaching team had designed for students to participate in (Lines 45-46). Given that the ISU was the last group to join the course and the pre-class study participation from ISU had been minimal compared to student participation in other campuses (Lines 51-54), ISU's late entry posed a challenge to accomplishing the goal of the course. Just as he did in Week 5 when SKU students officially joined the course, Professor SCLU urged ISU students to catch up with the course materials, so that they can participate in the Phase 2 (Week 8 – Week 14) of the course, which involved a range of group activities including two cross-cultural exercises and final group project (Lines 96-134). By reiterating the importance of

student participation in this course, Professor SCLU also attempted to prepare ISU students before they hosted the optional overseas face-to-face interactions in ISU (Week 16 – Week 17) in which all USU students and some CNU/SKU students, and a couple of INU students participated in the five-day intensive activity together in Haifa, Israel (Lines 67 – 91). Professor SCLU encouraged ISU students to think of themselves not simply as hosts (Line 93) but as active participants in this learning process (Line 94).

Transcript Segment 12. Professor SCLU During His Visit in ISU (3/20/2014, Week 7, Session A/B)

Contextual Description: In the beginning of Week 7 lecture, which was delivered from ISU campus, Professor SCLU explained to students the importance of making the continuous learning cycle (i.e., participating in pre-class study before coming to lecture) their daily routines in this NDE course. The main audience of this week's lecture was the newly joining cohort of ISU students. Students at other campuses (USU, INU-Site#1, INU-Site#2, CNU and SKU) had the option of joining from their home computers.

Line	***Professor SCLU***	***Actions Signaled***	***Phases of Activity***
42	but I think the important thing for me is to	*bringing everyone's attention to what is important*	*framing what is important and valuable to the instructor*
43	have a chance to really talk to you in person	*explaining what is important*	
		⬇	
44	and make sure that you understand that	*providing rationale for why talking to students in person is important*	
45	this course is not just the subject that you study		
46	it's all the activities that we hope you can participate		
		⬇	
47	you can tell by now	*explaining the requirements of the course*	
48	we really require you to do the work before the class		
49	and we are very serious about that		
		⬇	
50	and one of the things	*providing goal of the visit*	
51	my mission to come to [ISU]		
52	is to make sure that [ISU] participation		
53	can go about 50%		
54	and I really think you can do that		
55	It's not that hard		

		⬇	
56	I also want you to understand the	*providing rationale for why participation is important for learning*	
57	importance of that		
58	because that really comes to the		
59	major part of your learning okay?		
		⬇	
60	if you really follow this as a routine	*providing consequences for meeting the requirements*	
61	it will be just like a routine		
62	and if you don't do that and	*providing consequences for not meeting the requirements*	
63	just come to the classroom		
64	you will get lost		
		⬇	
65	very important	*emphasizing the importance of required participation*	
66	you do the pre-class study		
		⬇	
67	I also want to emphasize	*bringing everyone's attention to what is (also) important*	*framing what is (also) important and valuable to the instructor*
68	specifically to [ISU] students	*addressing the main audience*	
69	that the opportunity to directly work with	*explaining and situating what counts as valuable in this course*	
70	students across the campus		
71	both in class here		
72	as well as in May		
73	when other students will come to visit you		
74	that is the most valuable opportunity		
		⬇	
75	the differences	*explaining consequences of the NDE experience*	
76	by the time they come visit you in May		
77	you have already worked with them		
78	very closely for three months		
79	therefore		
80	and therefore		
81	it is not just a new acquaintance experience		
82	and we find out		
83	when students get together at the end		
84	a lot of very exciting things will happen		
		⬇	

85	this year	*situating actors who will be participating in the optional overseas study*	
86	we will have students from China		
87	and from South Korea		
88	I don't think		
89	maybe one or two students from India		
90	and all the students from [USU] will be here		
		⬇	
91	so we are gonna have a very intensive 5-day activity	*situating the overseas study within duration of time*	
		⬇	
92	I hope you can really enjoy this opportunity	*proposing a role during the overseas study*	
93	not just be a host		
94	but be a participant of their study over here		
		⬇	
95	I would like to begin our class here	*reorienting to the present lecture session*	*framing his expectation of students before starting the lecture session*
96	my assumption here	⬇	
97	is this is week number seven in this class	*situating present session within the course schedule*	
		⬇	
98	I understand that your semester just started last week right?	*situating semeste schedule of remote site*	
99	so my assumption	*providing what is expected of students*	
100	is that you have already studied		
101	all the six weeks materials		
		⬇	
102	I know that may not be your case	*proposing to fulfill the expectation*	
103	but if that's not the case		
104	you really need to catch up		
		⬇	
105	and the reason is	*providing rationale for the proposal*	
106	one of the difficulty of this course is that		
107	because every school started at different hours okay?		
		⬇	
108	My assumption of continuing this course	*situating present lecture session*	
109	continuing this class today is		
110	you have studied and understood the first six lectures		
111	now we are moving forward		

		⬇	
112	now today's lecture is number seven week	*situating present lecture session within the course schedule*	
113	it is also the end of our phase two		
114	oh I'm sorry the end of phase one		
		⬇	
115	so starting from phase two	*bringing everyone's attention to future lecture sessions*	*framing his expectation of students before transitioning into future lecture sessions (phase 2)*
116	which is next week		
		⬇	
117	we will start to do a lot of exercises	*explaining what students will be engaged in future sessions*	
118	it is also starting from next week		
119	we will start to organize you to start working on your team projects		
		⬇	
120	it is through these team projects	*providing rationale for engaging in proposed activities*	
121	you really get to know each other better		
122	and the team project is also the opportunity		
123	for you to acquire all the principles		
124	which we have explained to you		
125	in a classroom		
126	to solve a real problem		
		⬇	
127	therefore by this week and next week	*providing required aging in proposed activities*	
128	you really have to make sure		
129	that all the materials that we talk about first seven weeks		
130	you fully understood		
		⬇	
131	otherwise when you participate in projects	*providing consequences for not fulfilling the required conditions*	
132	you will be behind		
		⬇	
133	this is particularly important for students in [ISU]	*signaling who the target audience are*	
134	because you are the last batch to join the class okay?		

The second telling case traced the entry points in which different campus groups joined the NDE course (CNU in Week 3, SKU in Week 5, and ISU in Week 7) as anchors to

understand how Professor SCLU attempted to bring students together in working towards the common goal. Each point of campus group entry was considered as a "new milestone" for everyone involved in the NDE course, since joining of a new group posed challenges due to students' different participation history with the course. At each point of entry, Professor saw the need to reiterate the visions and goals of the NDE course/program, emphasizing the need for students to be active participants of the course by making sure that they have studied the course materials and participated in weekly pre-class studies to carry on the continuous learning cycle (prefer refer back to Figure 12, Chapter 5). While encouraging students who entered earlier to help those who entered later, Professor SCLU shared his own personal experience to convince students that what may initially appear as burdensome interactions with global peers could potentially become valuable resources for them in the future. Together, the analysis of these entry points makes visible how instrumental Professor SCLU's discourse around these challenges was in bringing globally distributed groups of students in the common course.

6.2.3. Telling Case 3: Unanticipated Absences of Different Campuses Due to Local Holidays

The final telling case involves another challenge that Professor SCLU and the teaching team encountered in running this global engineering course. While overcoming the time and calendar (and space) differences across participating institutions was manageable, what the teaching team did not anticipate was the local holidays observed in different institutions that were not accounted for in the early planning of the course schedule. In the following transcript segment (Transcript Segment 13), Professor SCLU makes present to students two

unanticipated changes to the course schedule due to local holidays in ISU and CNU. He first situates ISU's absence (due to Passover Holiday) in Week 11 (Lines 58-63) and proposes that students "look into this holiday" (Line 65) because this is a "good opportunity" for students to learn more about its background (Lines 69-73). He then brings students' attention to the following week, and explains that CNU students will be absent from Session B's lecture session in Week 13 due to International Workers Holiday in China (Lines 74-78). While informing students that this is one of the major holidays in China (Line 80), he explains that, as a consequence of this holiday, cross-cultural assignment #2, which was scheduled to be presented by all students in Week 13, will be moved to Week 12 for Session B students (Lines 90-91). And once again, he encourages students to do some research to learn more about this Chinese holiday (Lines 92-96). Although Professor SCLU turns these unanticipated campus absences into opportunities for learning about holidays in Israel and China, he acknowledges that this is another unforeseen challenge of "running this international class" (Line 98). He further explains that this is a challenge because accounting for all of the local holidays at different institutions leaves little time for students to study together (Lines 102-103).

Transcript Segment 13. Unanticipated Absences of ISU and CNU Due to Local Holidays (4/17/2014, Week 11, Session A)

Contextual Description: In the beginning of Session A's Week 11 lecture, Professor SCLU explained that ISU was absent due to Passover Holiday in the Jewish community. He also explained that in order to account for another holiday in China (i.e., International Workers Day), Session B students would be presenting their cross-cultural assignments a week earlier. In so doing, he made present to students one of the challenges of running this global engineering course. The participating institutions were USU, INU-Site#1, and INU-Site#2. ISU students, who were absent, were encouraged to visit the course lecture video from their home computers.			
Line	***Professor SCLU***	***Actions Signaled***	***Phases of Activity***
58	So today is our week 11	*orienting everyone to the present lecture*	*framing a local holiday in Israel*
		⬇	

59	and today	*signaling importance of "today"*	
60	and you probably know		
61	is a major holiday in the Jewish community	*situating "today" within a cultural tradition*	
		⬇	
62	so our classmate from [ISU]	*situating "today" with a group at a remote site*	
63	is on holiday		
		⬇	
64	and actually	*encouraging students to do research on Passover holiday*	
65	you should look into this holiday		
66	Passover holiday		
67	and if you are not familiar with the		
68	background of this holiday		
69	it's a good opportunity to get a little bit of understanding of this		
		⬇	
70	and it turns out that	*providing explanation about the holiday*	
71	this is not just a specific holiday for Jewish community		
72	many other ethnic groups observe this holiday		
73	so it's quite a interesting background if you look into it		
74	and I want you to pay attention to next week	*orienting everyone to next week's lecture session*	*framing another local holiday in China*
		⬇	
75	well this is mostly for session B	*signaling the target audience (Session B students)*	
		⬇	
76	But I just wanted to inform Session A	*providing rationale for sharing with Session A students*	
77	because a week later is holiday		
78	called international workers day	*introducing another holiday ceebrated at a remote site*	
		⬇	
79	and different countries observe this international workers day differently	*situating the holiday in space and time*	
80	it turns out this is one of the major holidays in China		
81	and they have holiday in the Chinese new year		
82	October first		
83	their national day		
84	and then they have their holiday in May first		

85	which is really this international workers day		
		⬇	
86	so [CNU] students will not be able to join the class that day	*explaining consequences of this holiday*	
87	as a result we have made minor changes to Session B		
		⬇	
88	and again this is just for your information session A okay?	*re-affirming the target audience*	
89	so for session B	*sharing the change in course schedule (for Session B students)*	
90	they will do the cross-cultural exercise a week earlier		
91	so that [CNU] students can be in class	*providing a rationale for the change in course schedule*	
		⬇	
92	and again if you are interested in this	*proposing to learn about this holiday*	
93	international workers' day		
94	and you should look into the website		
		⬇	
95	actually it turns out that quite a number of countries around the world	*providing brief information about this holiday*	
96	observe this holiday		
		⬇	
97	and this is one of the difficulties of	*beginning to share difficulty of running this course*	*bringing everyone's attention to the challenge of running the NDE course*
98	running this international class		
		⬇	
99	and as you can tell	*explaining what differences the teaching team was able to overcome (i.e., time and calendar)*	
100	we can somehow overcome the time difference		
101	we can also manage the calendar difference		
		⬇	
102	however if we are going to observe all the local holidays	*providing explanation for why different holidays pose a challenge*	
103	basically you don't have much time to study right?		
		⬇	
104	so everybody take holiday differently	*proposing that this is a challenge that needs to be overcome*	
105	so we have to find a way to overcome this challenge		

The final telling case sheds light on another challenge of engaging globally distributed groups of students in the common course to participate in the common learning cycle.

Despite the careful structuring and designing of the course grounded in years of experience, running such a course came with unanticipated challenges which influenced the flow of instruction process as well as the teaching team's goal of fully engaging *all* students for active participation throughout the semester. This challenge again speaks to the *experimental nature* of this NDE course, as the course schedule does not always necessarily go as planned due to the unforeseen differences in the local cultures of participating institutions.

6.3. Summary of the Third Set of Analyses: Instructor's Talk as Instrumental for Learning

The three telling cases presented in this chapter extended the analyses done in the previous chapters to gain further insights into how Professor SCLU made present to his culturally diverse group of students what it means to engage in new ways of learning in this NDE course. Specifically, by tracing how unanticipated challenges that the teaching team encountered were talked about throughout the semester as anchors for further exploration, the telling cases made visible the importance of instructor's discourse around these challenges in bringing together globally distributed (both in time and space) groups of students to engage in the common course and work towards the common instructional goal. In the public discussions of higher education, there is a tendency to view *lecturing* as something to be minimized or even avoided in the name of "learner-centered" curricular practices. In some extreme cases, instructor's discourse in classrooms is deliberately omitted from data analyses in order to study the process of student learning (i.e., Akyol & Garrison, 2011). however, as visible from the cases presented above, the Professor SCLU's discourse

was instrumental in bringing students' attention to particular ways of studying and participating, while promoting certain values and identities of being a student in this unique engineering course. Therefore, these analyses call for the need to look closely at instructor's discourse in defining and redefining innovative educational practices in higher education. Understanding *what counts* as innovative practices requires a situated perspective, tracing how certain meanings are proposed and negotiated in and through times, spaces, and events.

From the course designer's point of view, creating "new" learning opportunities and outcomes for 21st century postsecondary students in today's global world is both exciting and challenging. While Professor SCLU attempted to expand the traditional notions of time and space to redefine the role of university, the challenges identified were the ones that arose due to the existing institutional boundaries as well as unique socio-national contexts of participating universities in this global engineering course. In Spring 2014, partnership between multiple campus groups and the differences between their institutional systems posed challenges to the teaching team's goal of bringing every group of students to full participation and engagement throughout the semester. Therefore, each iteration of the course was continued to be called as an *experiment,* which required continual process of designing and redesigning. However, even with such continual efforts to reformulate, it is likely that the teaching team would encounter new challenges, ones that are specific to newly entering campus groups with unique institutional and socio-national contexts.

Chapter 7. Discussion and Final Remarks

7.1. Overview of the Study

The present study sought to explore the dynamic process of new knowledge construction in a unique global undergraduate engineering course by undertaking a discourse-based ethnographic approach grounded in a social constructionist perspective in order to gain a situated understanding of how the main instructor's design principles and processes of the course created "new" learning opportunities and outcomes for globally distributed and culturally diverse group(s) of students. Given that the focal course examined in this study constituted a new and emerging educational configuration (as indicated by the main instructor and his teaching team), the focus here was *not* to seek generalizable laws about teaching-learning relationships using pre-existing social theories, but to explore *ways of understanding and uncovering* the continually changing and evolving nature of this new engineering educational programmatic initiative. By engaging in a series of interrelated and intertextual levels of analyses, anchoring on emerging sets of *rich points* throughout the analytic process, I took a reflexive stance on making transparent my own developing logic-of-inquiry to make warranted claims about what counted as "new" ways of learning (and teaching) in this no-distance education course. Specifically, I explored a range of available archival records as well as the main instructors' discourse in and out of classroom as tracer units to uncover what was proposed and socially/academically recognized as significant to those participating in the course across times, spaces, events and contexts.

The overarching question that this study explored was: *How can I, as an outside researcher without any lived experience of the course, conceptualize the design process of a global undergraduate engineering course, which claimed to provide "new" learning*

opportunities for students? This question arose after thinking reflexively about my position as an outside researcher, taking a conscious effort to suspend my own beliefs about teaching-learning relationships in order to explore the design processes of this unique engineering course from the perspectives of insiders. The first level of analysis, therefore, involved a range of historical analyses to situate the focal course within the running history of the NDE program/course development. What became visible through these analyses was that the NDE course had a long (and invisible) history of concept development, grounded in the main instructor's (Professor SCLU) research background in his areas of expertise. Moreover, the contrastive analysis of the course syllabi from its inception in Spring 2010 to Spring 2014 revealed how the course has been developing conceptually over the years towards meeting the desired learning objective—which was to provide an interactive global platform for students around the world to together develop contextual understandings of global engineering problems. Parallel to Ravenscroft's (2001) argument on "design as theory," Professor SCLU's "teach to learn" experiment in the NDE course, where he included new partner universities, new dimensions to the course activities and assessments throughout different iterations of the course call for the need to take a historical and multifaceted view of any new course as an *overtime process* that requires continual and sustaining development, validation, evaluation, and refinement.

The second level of analysis intended to extend the previous analyses to explore exactly what was getting accomplished in and through times, spaces, and contexts within the everyday structuring of the Spring 2014 NDE course. Before addressing the main questions (*How, in what ways, and for what purposes, did the instructor's developing design principles and processes of the course intended to promote new ways of learning for the*

culturally diverse group of students?), a series of mapping processes (i.e., contrasting the planned and engaged structuring of the course) was needed in order to understand how the everyday structuring of the course were constructed.

What this set of analyses made visible is the need for a discourse approach in examining not only the official or written form of the course plans, but also the everyday construction of the course to gain a deeper understanding of the dynamic ways in which the international and interdisciplinary groups of students were brought together to engage in the common course. In addition, a detailed video analysis of the "first" day of the NDE course revealed Professor SCLU's chain of reasoning in defining what counted as "new" ways of learning in today's global world, and how the design as well as the organization of the NDE course reflected his rationale. Moreover, this analysis shed light on why Professor SCLU continued to call the NDE course as an *experiment course*, even after several years of teaching the same course. The experimental nature of the course had to do with the uncertainty associated with the everyday construction of the course, given the added complexity to the course design and student demographics in Spring 2014 course. Because the learning objective that Professor SCLU desired to target (i.e., contextual understanding) was not something that could have been readily predicted or articulated ahead of time, this very unknown nature of the course outcome posed challenges to the teaching team working within an institutional setting with a long standing tradition of known and predictable learning outcomes.

The final set of analyses further extended the previous analyses to understand the unanticipated challenges that the teaching team encountered in engaging culturally diverse group of students in the common NDE course. Specifically, I focused on Professor SCLU's discourse around these unanticipated challenges in the public space of the classroom. The

three telling cases made visible three interrelated set of challenges that were related to the *experimental* nature of the NDE course that Professor SCLU has been referring to since the inception of the NDE program. The three challenges were those related to: (1) developing a global lifestyle by engaging in a teaching-learning cycle that is not bounded by time and space, (2) bringing globally distributed groups of students up-to-date with the flow of the instructional process, given the different entry points of the students due to differences in the institutional calendars across the participating universities, and (3) accounting for the local holidays at different institutions (i.e., Passover Holiday in Israel and International Workers' Day in China) which left little time for students to study together during the live lecture/discussion sessions.

Tracing of these challenges made visible the importance of the instructor's discourse in bringing globally distributed (both in time and space) groups of students to engage in the course to work towards the common goal. In addition, the three telling cases illustrated the challenges of creating "new" learning opportunities and outcomes for 21st century students in today's global world, ones that are specific to the unique institutional and socio-national contexts of each participating universities.

7.2. Designing for the "New" & Researching the "New": Implications for Future Practice and Research

Designing for new learning opportunities and outcomes, as demonstrated by the case of the NDE course exemplified in this study, is not without challenges. The challenges illustrated here are the ones that stem from the longstanding institutional traditions on clearly defined and articulated learning outcomes, as well as the unique socio-national

contexts of the participating universities that sometimes "disrupted" the flow of the instructional processes. At each point of the recognized challenges, Professor SCLU's discourse in and around these challenges was instrumental in bringing students' attention to the rethinking of these challenges as potential resources for future learning.

This instrumental role of the instructor's discourse needs increased attention, when researching ways of designing new learning objectives for 21st century students. One possible way to promote new curricular designs in higher education might involve productive ways of talking about and making a case for the importance of particular learning objectives for the future of uncertainty (see Appendix C for a "concrete example" of how students in the NDE course can benefit from contextual understanding of global innovation problems). Indeed, this study shows that in and through language, i.e., ways of talking about something, these discourse processes and content gradually turn the invisible to visible and intangible to tangible overtime.

Another challenge that was identified by Professor SCLU on a separate occasion (see Appendix D) was faculty buy-in and involvement in the development of NDE course, given the extra burden associated with such a new kind of teaching-learning configuration. Understanding the unique demands of different stakeholders (i.e., university presidents, faculty, administrators, students) to think about what forms of support might be needed in making new curricular development possible is important when it comes to thinking about future practice.

Finally, researching something that is claimed by the participants as "new" cannot just rely on predefined notions based on past practices. In order to enhance the analytic power and flexibility, there is a need to undertake a research approach that can systematically study

the areas of uncertainty. In this study, I demonstrated how an interactional ethnographic approach grounded in discourse analysis (Green et al., 2012; Castanheira et al., 2001) could provide both abductive (Agar, 1994; 2006) *and* reflexive ways of understanding the dynamic processes of new knowledge construction in 21st higher education practice. Such an approach does not rely on normative views of classrooms or hierarchical models of predefined notions of learning, but takes interdependent and interrelated notions of teaching-learning relationships that are situated in and through the developing contexts in which they occur. Future research needs to continue to explore the process of new knowledge construction from multiple angles and dimensions, i.e., triangulation of actors, perspectives, data, and methods (e.g., Denzin, 1978; Corsaro, 1981; Patton, 2002).

This study mainly focused on the new knowledge construction process from the point-of-view of the main instructor's design principles and practices, with little attention to how and in what ways students took up the new learning opportunities. Such research is a next step in this ethnographic process, and will require further analyses in subsequent studies. What this study did make visible, however, is that research needs to explore how students' different cultural backgrounds support and/or constrain them in their collaborative work in innovative courses that require them to create innovative ideas. This area of study is an emerging one to be explored systematically in future research, particularly in courses which international and global groups of students are engaged in learning or developing common knowledge of ways of knowing, being and engaging disciplinary, interdisciplinary and transdisciplinary work.

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Appendix A. An Example of the Transcribing Processes

Week 1 (2/6/14): Introductory Lecture – Session A				
Line	***Time***	***Speaker***	***Transcript***	***Flow of Instructional Process***
1	3:29	Professor SCLU	It is seven thirty in California	Greeting students according to local times in their institutions
2			It's about nine thirty in India right?	
3		INU Instructor #1	Okay nine o'clock? 9 p.m.	
4		Professor SCLU	nine o'clock	
5			oh I'm sorry	
6			nine o'clock in India	
7			I want to welcome everyone	
8			to this [NDE] class	
9			I have to say "good morning" to [USU] students	
10			and "good evening" to your classmates in India	
11			This is a very exciting experiment	Referring to NDE course as a "very exciting experiment"
12			you are participating in	
13			I'm very excited	
14			and today I'm going to explain to you	Orienting students to what will be covered in the intro lecture
15			the excitement as well as the challenge	
16			of running such a course	
17			which is very different	Explaining that NDE course will be very different from other university courses
18			I guarantee you	
19			It will be very different from	
20			any other course you have taken so far	
21			and a lot of things require you to	Urging students to accommodate because teaching team doesn't know the details of the course yet
22			accommodate	
23			because a lot of things we don't	
24			know the detail yet	
25			and this is not	Explaining that this is *not* "a very well established model of learning" and therefore an "experiment"
26			a very established model of learning	
27			so in a way	
28			you are part of this experiment	
29			and you have to really collaborate	Urging students to collaborate/cooperate and provide feedback to teaching team
30			you have to cooperate with us	
31			and let us know how we are doing	

32			and we are very excited about this possibility	Orienting students to what is to be covered in the intro lecture
33			and today I'm going to explain to you why	
34			okay?	
35			ah is the students in India	Asking students at remote sites to wave their hands to indicate they can see and hear Professor SCLU well
36			able to hear my voice?	
37			clear?	
38		INU Instructor #1	yes	
39			okay	
40		Professor SCLU	this is [INU-Site #2] campus right?	
41			which one is [INU-Site #1] campus?	
42			can you wave hand?	
43			oh okay thank you	
44			how about [INU-Site #2] campus?	
45		INU Instructor #2	yes	
46		Professor SCLU	okay	
47			thank you very much	
48			It seems that audio, video works very well today	
49			I have two things I want to share with you today	Orienting students to what is to be covered in the intro lecture – why teaching team is doing this NDE course
50			This is the first lecture	
51			It's a introductory lecture	
52			So we will not have much of the content discussion	
53			But I want to tell you the two things okay?	
54			The first thing I want to tell you is what is [NDE]?	
55			You have already registered for this course	
56			And some of you even go through	
57			very competitive selection process	
58			to be part of this class	
59			and I want to tell you now	
60			What you are getting into it okay?	
61			I also want to tell you why we are doing this	
62			And there is very important reason	
63			behind what we do in this class	
64			Now	Explaining the first reason for doing the NDE course – (1) because education profession is going through a historical change
65			the reason I want to explain to you why	
66			about this program before we enter the course	
67			Is the-	
68			there are two purposes behind this	
69			one is	
70			we are doing this program because we believe that	

71			the professions we are in	
72			which is education	
73			is really going through a historical change	
74			as we speak now	
75			And I want you to understand	
76			why this change is happening	
77			and the second reason is	Explaining the second reason for doing the NDE course – (2) when there's a groundbreaking change in an industry (i.e., education), there's a great opportunity for innovation
78			we believe that every time	
79			when a industry goes through such	
80			groundbreaking change	
81			there's a great opportunity for innovation	
82			now you signed up to learn innovation	Explaining that NDE course is an example of teaching team's way of doing global innovation
83			you signed up to learn global innovation	
84			I cannot find any better example	
85			to explain to you what you are doing now in this course	
86			In fact	
87			it's our way of doing global innovation	
88			for global education profession	
89			now I'm using this program as an example	
90			to illustrate to you	
91			how do you spot the opportunity for global innovation?	
92			After all that's a billion dollars question right?	
93	6:52		In 1980s, when Bill Gates started writing little programs	Using Bill Gates and Mark Zuckerberg as examples of innovators who were able to spot changes in an industry
94			what is it called?	
95			I don't even remember the name, right?	
96			I'm sure many people think he is crazy	
97			But I'm sure in his mind	
98			And he knew	
99			that the industry that he wants to participate is changing	
100			and that's why he work hard	
101			and eventually change the industry	
102			and change the world	
103			and you know just as of yesterday	
104			Facebook was 10 years old now right?	
105			I'm pretty sure when Zuckerberg	
106			decided to start Facebook in Harvard	
107			Many people think	

108			this is just a group of students trying to play game right?	
109			And 10 years later	Foreshadowing that students will learn how to spot changes in a profession and industry and see them as opportunities to innovate
110			and people start to wonder	
111			how come I didn't see it	
112			how come I was not aware	
113			that was that critical historical moment	
114			that I didn't join?	
115			So, you will find that one of the most critical things	
116			and critical abilities you are gonna learn	
117			or you have to learn in global innovation	
118			and become a global innovator	
119			is to have this sense to spot	
120			the changes	
121			and particular those changes of different types	
122			when you have this very fundamental change	
123			in other words when ground is shaking	
124			in any profession	
125			any industry	
126			and you see the great opportunity	
127			so today I'm going to explain to you the change in	Explaining that education is a kind of market which involves competition and changes
128			education industry	
129			you say well	
130			we are not making money	
131			we are not companies	
132			this is non-profit	
133			wait a minute	
134			this is really the old thinking	
135			I'm not promoting universities should be for-profit	
136			I'm simply saying that	
137			whether it is profit or non-profit	
138			the way competition goes is the same	
139			it is because the competition	
140			that everyone want to win in the competition	
141			survive in the competition in the market	
142			which is education market	
143			that trigger the change	
144			and in the next two three lectures	Foreshadowing that students will learn in this course about global innovation under market
145			you are gonna see a lot of market competition	
146			and this course talks about global innovation	
147			as a matter of fact	
148			we are gonna talk about global innovation	

149			under market competition	competition – situating the context of the course content
150			if you have competition versus	
151			if you don't have competition	
152			the way you innovate is very different	
153			so I'm going to explain to you competition in education	
154			I'm gonna explain to you	Foreshadowing that students will learn about changes that are happening in the education industry/market around the world
155			what kinds of changes we see	
156			in our industry	
157			in the business that you are living in here	
158			both in United States	
159			in India	
160			in Israel	
161			in China	
162			in Korea	
163			all over the world	
164			and then we are gonna explain to you	
165			what we see as the new business model	
166			and we call it new value proposition	
167			because every time you want to create a	
168			great innovation to have a long lasting impact	
169			you are not really creating a product	
170			you are creating a thing which can be a product	
171			it could be a service	
172			but has to have a new value proposition	
173			beyond the old value proposition	
174			and we are gonna explain to you	
175			what is the new value proposition	
176			that this kind of course can offer to you	
177			and you as a customer in this case	
178			can really be in charge to see	
179			whether this is something you think will really	
180			take off	
181			now if it's going to take off	
182			and then 10 years later	
183			10 years later or 15 years later	
184			and I assure you when you look back	
185			what you did in university	
186			and you will really be very proud	
187			because you were part of this beginning	
188			in 10, 15 years ago	
189			so that's the first thing that I want to explain to you	Orienting to

190			about this program	students what will be covered in the intro lecture – why and what
191			and why do we do it	
192			and how do we do it	
193	10:31		the second thing I want to explain to you today	
194			is about this specific class	
195			this class studies a specific subject	
196			called principles and practices of global innovation	
197			and we are gonna explain to you the principles	
198			we are gonna explain to you the practice	
199			how do you do that	
200			and we are going to organize	
201			you into small study groups	
202			as well as project teams	
203			you will have a chance to work with people	
204			in the room	
205			people across the border	Making sure that students at remote sites can see him better
206			can we switch this to over there so they can see better?	
207			ah are we in control today?	
208			no they are in control	
209			I'm sorry	
210			okay thank you thank you	
211			where was I	Explaining that how the teaching team designed activities in this class follows the new value proposition that they believe as important in education
212			okay	
213			so I want you to understand	
214			how we conduct the course	
215			after you already understand the purpose of this program	
216			and you will see that the way we design activities in the course	
217			follow exactly what we believe as	
218			the new value proposition for	
219			this kind of education	
220			so this should make sense to you	Explaining why the teaching team emphasizes on the details of the course – because the course entails very different way of learning
221			when we come to the specifics of the course	
222			and the reason I want to labor you through the details of the course	
223			is because you're gonna see that this is very different	
224			not only different requirement	
225			but there's a different way of learning	
226			which is very important	
227			so if you are sitting here	
228			you anticipate that this will be just a lecture	
229			which you can listen	

230			and there will be a course which you can	
231			review the material a week before final exam	
232			and go through the course	
233			you [are] better off not to be here	
234			the reason is that is not how we are gonna learn	
235			as a matter of fact	Explaining that the teaching team believes that "engagement" is best way to learn (as opposed to exams)
236			you will learn this course has no exams	
237			we don't believe that final exam is a way to really gage(?)	
238			how much you learn	
239			we really want to make sure that you participate	
240			we believe that engagement is the best way to learn	
241			other kinds of learning still occur	Explaining that the role of university is promoting learning that cannot happen at home when students study alone
242			but you can do it outside of the classroom	
243			you don't come to the class	
244			you don't come to the university	
245			simply because you want to listen to lecture	
246			right?	
247			you want to come to university	
248			you want to wake up that early	
249			stay that late	
250			because you want to have something else	
251			which you cannot do alone at home	
252			it's the new value proposition	
253			we want to explain to you	Making sure that everyone has a copy of the syllabus
254			so we are gonna go through the course syllabus	
255			now everyone at the [USU] campus hard a hard copy	
256			I do not know whether students in [INU]	
257			already have the hard copy of the syllabus	
258			now do you have a copy of syllabus?	
259			do you have a copy of the syllabus?	
260			or maybe an electronic copy?	
261			okay	
262			so we will go through the syllabus in the second part	Foreshadowing that there will be lots of things that students need to engage in as soon as the intro lecture ends
263			and make sure you understand what we are gonna do	
264			more importantly what we require of you to do	
265			and then there're lots of things need to take place	
266			right after our class ends	
267			to prepare for next week's lecture	
268			which is really the beginning of our lecture	
269			so to summarize	Foreshadowing that students will
270			two things I want to do today	

271			I want to explain to you the [NDE]	learn why and how of this NDE course in the intro lecture
272			the [NDE] pedagogy	
273			the [NDE] program	
274			why do we do it?	
275			and I want to explain to you this [NDE] class	
276			and I want to explain how we are gonna do this class	
277			what you need to do to really	
278			learn and enjoy in this new class	
279			okay?	
280	13:55		so those are the two things I want to do	

Appendix B. Structuring of the Spring 2014 Introductory Lecture

Week 1 (Session A) **Participating Institutions:** USU, INU-Site #1, and INU-Site #2 (ISU students had the option of joining from their home computers via WebEx)		
Events	**Time**	**Sub-Events**
Session Preparation (~ 3 min)	0 – 3:19	Last-minute configurations (making sure that Internet connections are good and everyone has the course materials)
	3:20 – 3:26	Professor SCLU asking everyone if they are ready to begin
Professor SCLU's Introduction (~ 10 min)	3:27 – 3:55	Professor SCLU greeting students by taking into account their local times (7:30 PM at USU and 9:00 AM at INU-Site#1 & INU-Site#2)
	3:56 – 4:40	Professor SCLU explaining that this is an "experiment" course, very different from other courses that students have taken so far; urging students to cooperate and accommodate because "this is not a very well established model of learning"
	4:41 – 4:48	Professor SCLU checking whether students in India can hear his voice
	4:49 – 4:59	Professor SCLU checking which campus is INU-Site#2 and which campus is INU-Site#1 (two INU campuses joining from India)
	5:00 – 5:43	Professor SCLU explaining that this is an "introductory lecture" without much of the "content discussion"; explaining that he will cover two things: (1) what is No-Distance Education (NDE) and (2) why the teaching team is doing this
	5:44 – 6:51	Professor SCLU explaining the two purposes behind the course: (1) the teaching team believes that the education profession is going through a historical change and (2) when an industry is going through a groundbreaking change, there's a great opportunity for innovation; explaining that the course itself is a great example of spotting an opportunity for global innovation
	6:52 – 7:48	Professor SCLU explaining two individuals who are well known as innovators in America: Bill Gates & Mark Zuckerberg (Facebook); explaining that 10 years later people are starting to ask such questions: "how come I didn't see it?" "how come I was not aware that it was that critical, historical moment that I didn't join?"
	7: 49 – 8:50	Professor SCLU explaining that in order to become a global innovator, they need to have the "sense to spot changes"; foreshadowing that he will explain such groundbreaking changes that are occurring in the "education industry"
	8:51 – 10:30	Professor SCLU explaining that the course will explore "global innovation under market competition"; foreshadowing that he will explain what the engineering team sees as a "new business model" (new value proposition); explaining that when students look back at this experience 10-15 years later, they will be proud (thinking beyond the immediate moment)
	10: 31 – 12:45	Professor SCLU foreshadowing that students will be working with peers in the room as well as across the national/institutional borders to learn the principles and practices of global innovation; explaining that there is a certain value of attending an university and going to lectures

		(to learn something that they cannot do alone at home) – this is the new value proposition
	12:46 – 13:55	Professor SCLU making sure students in INU campuses have a copy of the syllabus (hard copy or electronic version); foreshadowing that he will explain what students are required to do to prepare for next week's session; foreshadowing at least three things will be discussed: (1) the NDE, pedagogy, and program – why they are doing this, (2) this particular NDE class, and (3) how they are going to organize the class
Going over the Syllabus Part 1: NDE program (*Why they are doing this)* **(~ 1 hr 7 min)**	13:56 – 15:39	Professor SCLU foreshadowing that he will explain why the teaching team came up with the idea of NDE; explaining the prevalence of e-learning technologies in higher education classes
	15:40 – 19:10	Professor SCLU explaining that when "technology has already reached the maximum" or its limit, we need to think about how to make better use of the previous investment on technology; explaining that NDE classroom has attempted to use the infrastructure that was already built earlier (and adding additional technology- i.e., screens, cameras) to create this unique kind of learning environment ("no-distance education," as opposed to distance education)
	19:11 – 22:37	Professor SCLU explaining the diverse student body in the current higher education spaces; explaining that "linking students" has already been happening, but "linking classrooms" has not; explaining that in this course, 6 classrooms will be linked in order to explore how this kind of linkage can change the way we learn; explaining that this might be the reason why students would want to continue coming to universities; explaining that cultural resources can only be harvested through interactions, and these interactions may in turn lead to innovative ideas
	22:38 – 26:55	Professor SCLU explaining the current MOOC trends that are making higher education in the headline news; explaining how the MOOC movement is trying to go opposite of the traditional model of university (massive and completely open)
	26:56 – 28:27	Professor SCLU explaining that many university degrees today are "under water"; explaining when looking at education in terms of "investment," many degrees are "under water"
	28:28 – 31: 26	Professor SCLU explaining that "this is a good moment for innovation"; throwing students the following question: "why are you coming to the campus?" "what will be the role of the university? classrooms? buildings? infrastructures?"
	31:27 – 37:52	Professor SCLU explaining "mass production" in industries, and how the same thing is happening in education (mass education); explaining the consequences of mass education (factory-type education and standardization); explaining that "mass production" and "mass education" share similar goals: (1) serve the many and (2) save the money
	37:53 – 39:38	Professor SCLU explaining one fundamental difference between industry and university—universities collect payment first and even if you may not like the outcome of your education (i.e., degree), you cannot have your money back

	39:39 – 42:00	Professor SCLU explaining changes in the industry since the 1980s because understanding changes in industry can also help us understand changes in education (price competition, automatization, outsourcing); explaining that if education is taken only as a "commodity" then only price matters (and there's no value)
	42:01 – 44:09	Professor SCLU explaining that universities are going through a similar pattern (courses offered online, teachers becoming robots, outsourcing, degrees becoming devalued, automating courses, etc.); explaining that this kind of model is not sustainable
	44:10 – 47:49	Professor SCLU explaining that currently we are at a point where supply of education "overshoots" demand (also called "Strategic Inflection Point"); explaining that at this point, the rate of the increase in supply is higher than the rate of the increase in demand (due to competition); explaining that both industry and education follow a similar pattern
	47:50 – 51:41	Professor SCLU using the competition in the smartphone industry as an example; explaining that when competition gets intensified the purpose of the product gets lost (initially to satisfy the customer, but now to kill other companies)
	51:42 – 53:50	Professor SCLU explaining that key lessons that universities can learn form industry is automation and/or outsourcing is not the solution; explaining that instead of focusing on "price," need to focus on "value" and not just any values but "core values" and staying with that value (instead of jumping around); again explaining that the two core lessons are: (1) to focus on the value that you offer and (2) to innovate from your core value
	53:51 – 56:20	Professor SCLU explaining that the "core value" of university is really to learn, not to teach or to take courses; explaining that learning on campus is another core value; explaining that in order to innovate a future university, need to focus on two things: (1) why do people come to the campus? what are the things that they can get from campus that they cannot get from anywhere else? (2) how do I use what I have to keep increasing that core value? (and this is what he calls "a new value proposition")
	56:21 – 1:00:22	Professor SCLU explaining why the teaching team designed the course in this particular way (because "context" is more important than "content"); explaining that in order to understand content, you need to know the context; explaining that students should come to universities to learn "context" not only the "content"; explaining that "context" cannot be simply lectured, but can only be learned by "engaging with each other"; explaining that this course really requires students to "engage"; explaining that by using technology, they sought to eliminate the distance of engagement
	1:00:23-1:02:19	Professor SCLU explaining that the course provides global learning experience right on campus; explaining that many great innovations have tried to solve needs of the many not for the few
	1:02:20-1:07:34	Professor SCLU explaining the difference between "content" and "context" by using an example - "Is there a fourth of July in China?"; explaining that the "context" of this question

		would allow you to answer, "yes, however, it is on October 1st"; explaining that having this kind of contextual understanding allows you to have "global awareness"; explaining that therefore interactions with other peers in this course is crucial; explaining that this course takes an inverted learning model (homework is done before class rather than after schoolwork); explaining that this course has a lot of work before class and urging students to be serious about this
	1:07:35-1:12:09	Professor SCLU explaining that the best way to learn about other cultures is to talk to global peers; explaining that he wants student to gain contextual understandings and develop mutual understanding of people (something that students cannot learn in a traditional classroom); explaining that the course creates a global network of students and students from past courses continue to stay in touch; explaining that the two things they will get out of this are: (1) contextual understanding of the subject "global innovation" and (2) useful personal network globally that students can carry on with their career (reminding students that there are a lot of things that they have to do in order to achieve this)
	1:12:10-1:15:10	Professor SCLU sharing his concern about how technology may be focused on exchange of contents only (without contextual understanding) (i.e., tweets)
	1:15:11-1:20:44	Professor SCLU trying to play a video (about NDE Alliance) which keeps stopping in between (and loses connection with INU students); reminding students that this is an "experiment"; encouraging students to watch this video at home (on Youtube)
	1:20:45-1:21:29	Professor SCLU sharing a photo from the overseas trip to South Korea in the previous year (when all students got together in South Korea – USU, CNU, and SKU); explaining the value of meeting each other face-to-face
Going over the Syllabus Part 2: NDE pedagogy **(~19.5 min)**	1:21:30-1:27:16	Professor SCLU explaining the inverted learning model (homework before class); explaining that students' feedback on which concepts are easy/hard based on their studies of pre-class slides (i.e., pain index) and how their feedback will result in how he organizes materials to be covered and discussed in class sessions (and this learning cycle starts 72 hours before next class; encouraging students to continue their discussions outside of class sessions as well as before the 72 hour learning session
	1:27:17-1:38:18	Professor SCLU explaining that interaction is the most important thing because without it students would not gain contextual understanding; explaining that there are multiple ways of interact with 122 students from 5 universities in 6 campuses: (1) interact online asynchronously (24/7), (2) during class sessions (2 hours/week), (3) through group work (weekly study groups & team project groups for breadth and depth of interaction) both in class and outside of class using the system called "Bluejeans"; explaining that the teaching team wants students to learn with a lot of different students from different campuses (important as students launch for their future career)
	1:38:19-1:39:09	Professor SCLU explaining that international learning is

		important because the teaching team believes "what you learn depends on with whom you learn" (not restricted to local but global)
	1:39:10-1:40:33	Professor SCLU explaining that in the future he wants to have an additional column appear on students' transcripts indicating with whom they learned this course; explaining that if he were the future employer, he would regard highly of that; explaining that this is what students are paying for when they come to university
	1:40:34-1:41:59	Professor SCLU explaining the typical format of class sessions (50 minute lecture and 10 minute for students to engage in discussions with groups across campuses); encouraging students to read the 14-page syllabus very carefully
Going Over the Syllabus: Part 3: the focal course (*how the course is organized; learning objectives*) **(~22 min)**	1:42:00-1:48:11	Professor SCLU explaining about the partner universities and how many students from each campus are joining in the two sessions; explaining that they are getting together to study the "Principles and Practices of Global Innovation" (principles = what; practices = how); explaining that the learning objective of this course is to take advantage of the cultural diversity that is not typically available in other courses; explaining that he wants students to learn at least three things: (1) how to discover innovative opportunities? (2) how do you select something as a target? (3) how do you ideate a concept? or create ideas? (due to limited time, students are only required to complete a concept w/o actual implementation); explaining that there are different methodologies/methods but due to the limited time they have, he will select one and explain it in detail (one of the many perspectives)
	1:48:12-1:50:28	Professor SCLU introducing the teaching team members: Dr. L (the program manager), Laura (TA for Session A) and Paul (TA for Session B); explaining that Lisa and Steve were two of the best students from the NDE course last year; explaining that there are faculty and TAs at each campus (a huge team); inviting students to contact teaching team members at other institutions as well; reminding students that this is an experiment
	1:50:29-1:51:16	Professor SCLU explaining that there is also a research team (led by a professor at USU who is an education assessment expert) that will look at students' learning processes and outcomes (not to grade students' performance)
	1:51:17-1:54:04	Professor SCLU repeating the organization of the groups and how they will be interacting inside and outside of classroom; explaining that scheduling a meeting across 17.5 hour difference is hard, but since we are in a global world, students have to make an effort to meet with team members even at midnight; encouraging students to make these kinds of arrangements as a routine in their life (thinking ahead about working in any global company in the future)
	1:54:05-2:00:54	Professor SCLU explaining how to navigate the NDE main website, where students can access different online learning tools: (1) WebEx – through which students who cannot make it to session through their classrooms (due to academic calendar and national holidays) can join the session online

		individually at home (CNU, SKU and ISU joined class later), (2) Blackboard system provided by USC distance education for all students for free (students can access audio/video recordings of the classroom session – tells them to be careful about what they in class b/c everything is recorded and archived), (3) Piazza (system developed by a student in India) – which is a tool for weekly pre-class studies (72 hours before) – Piazza also runs statistics of polls, and finally (4) Bluejeans – a multipoint audio/video conferencing system for students to do in-class exercise across campus with study groups (in addition to these four, Facebook and Twitter pages can be used); encouraging students to utilize such online tools to work on their team projects (students can decide with their team members which tool is most useful for them)
	2:00:55-2:04:06	Professor SCLU explaining different phases of learning; explaining that Phase 2 starts from the end of March until the beginning of May and it's the most important one because this is synchronized classroom-to-classroom interaction phase (cross-cultural exercise) and Phase 3 will be optional (face-to-face overseas study); Explaining the effort that went into creating the course schedule to accommodate students and teaching teams across 6 campuses (mentioning Daylight Saving time); Mentioning that regardless of the fact that USU is on spring break, he still has to give lecture because INUs and ISU don't have spring break; mentioning that he will be delivering lecture from Beijing and later from Israel
	2:04:07-2:05-32	Professor SCLU briefly going over the learning cycle again (72 hours, 24 hours, in-class, outside of class)
	2:05:33-2:07:25	Professor SCLU briefly going over the grading scheme (explaining that he will not repeat this for the rest of the semester – not the most important part of the course) – 20% (participation), 20% (in-class exercises), 20% (cross-cultural exercises), and 30% (final project); explaining that students will vote on who was the most helpful member in their teams (who will then get higher scores)
Professor SCLU's Concluding Message (~4 min)	2:07:26-2:11:00	Professor SCLU explaining that while participating in this course may be a "small step" for students, it's a "big step" for universities because they had to make a lot of exceptions and negotiations to make this kind of learning environment possible; urging students to actively participate and provide feedback to the teaching team along the way

Appendix C. An Example of Contextual Understanding of Global Engineering Problem (an excerpt from Professor SCLU's Interview with ASEE Prism Magazine)

Line	*Speaker*	*Transcript by message units*
333	Interviewer	can you give me a concrete example of how
334		contextual learning through [NDE]
335		made a student into a better engineer?
336	Professor SCLU	that can be demonstrated by some of the projects they did
337		like for example
338		last year we had
339		actually it was led by a German faculty
340		we asked the students to design a global toaster
341	Interviewer	Hmmm
342	Professor SCLU	it was a big deal toaster right?
343		well but now we realize that
344		the bread in Europe, in America, in Asia
345		are all made very differently
346	Interviewer	Hmmm
347	Professor SCLU	and Jewish would eat bread in a very particular way
348		and you will then have students from multiple regions
349		very good insight about a culture
350		and you will then be able to come with a set of very unique
351		functional requirement of a global toaster
352	Interviewer	Hmmm
353	Professor SCLU	this is something that you cannot teach them in classroom alone
354		or let them to discover in a laboratory
355		so they actually end up designing different kinds of global toaster
356		the bread warmer and different things
357		so not all the subjects require contextual understanding
358		we mostly focus on engineering problems
359		which we call social technical subject
360		in other words the proper technical solution depends on social contexts and vice versa
361		but if you really look carefully
362		you will see many many such great engineering challenges we are facing today
363		is actually social technical

Appendix C. Challenges of Involving Faculty in Joining the NDE Course Development (an excerpt from Professor SCLU's interview with ASEE Prism magazine)

Line	*Speaker*	*Transcript by message units*
617	Interviewer	what is your relationship with other faculty from-
618		from the other universities that you partner with?
619	Professor SCLU	oh okay
620		um the agreement among these university to become member of the alliance
621		are all signed by the president
622		so it is not for individual faculty to join
623		certainly not individual school departments
624		it's for the whole university to join
625		because this is really something to do with tuition
626		and recognition of the course credit right?
627	Interviewer	Right
628	Professor SCLU	so the university president signs
629		however in the actual delivery of the subject
630		you do need faculty coordinator which are very important
631		they make things happen
632		so far we are very lucky to find
633		few faculty who are really interested in and believe in this kind of things work with us
634		however faculty buy-in remains to be one of the main challenges for us
635		because it really add a lot of extra work
636	Interviewer	how much extra work?
637	Professor SCLU	well you need to fundamentally change the way you teach
638		right?
639		for example now
640		the subject that I teach
641		although I have been teaching that subject over the past 15 years
642		but every year will be different
643		because you know what?
644		when I teach the content
645		every year will be the same
646		but when I teach the context
647		particularly if I want to prepare contextual discussion based on student feedback
648		everything will be different

649		because my students are different
650		right?
651	Interviewer	Yeah
652	Professor SCLU	so in terms of buy-in it's very interesting
653		we have no problem for
654		university president to buy in
655		we have no problem at all for university students buy in
656		everyone wants it
657		I mean the wait line for our course is tremendous
658	Interviewer	Oh really
659	Professor SCLU	but the buy-in has been slow in faculty