INFLUENCING THE AGENDA: EXPLORING THE ONLINE CLASSROOM AS A THIRD SPACE FOR AMPLIFYING RESPONSIBLE ENVIRONMENTAL CITIZENRY

by

Autumn Leigh Miller

A dissertation submitted to the faculty of
The University of Utah
in partial fulfillment of the requirements for the degree of

Doctor of Philosophy

Department of Communication

The University of Utah

May 2016

The University of Utah Graduate School

STATEMENT OF DISSERTATION APPROVAL

The dissertation of **Autumn Leigh Miller**

has been approved by the following supervisory committee members:

James Anderson	, Chair	**8/18/2015** Date Approved
Timothy Larson	, Member	**8/18/2015** Date Approved
Connie Bullis	, Member	**8/18/2015** Date Approved
Glen Feighery	, Member	**8/18/2015** Date Approved
Debra Scammon	, Member	**8/18/2015** Date Approved

and by **Kent Ono**, Chair/Dean of

the Department/College/School of **Communication**

and by David B. Kieda, Dean of The Graduate School.

ABSTRACT

Online learning communities (OLC) have the potential to become powerful amplification stations for promoting responsible environmental citizenry. This dissertation explores how interactions in an online classroom (e.g., with course content, instructor, peers, and interface) might encourage students to become more active environmental citizens and help amplify a more green agenda. Using a multimethod case study approach, which includes the use of a pretest/posttest measure, this research demonstrates ways instructors in higher education can transform online learning platforms into collaborative learning environments or Third Spaces. Within these Third Spaces, students can learn and practice skills necessary for environmental problem solving and decision making as well as increase their overall awareness and concern for the environment. In part, this work seeks to build a bridge between scholarship and practice in Marketing and Public Relations with online and distance education.

Suggestions are also made for ways educators can structure and facilitate similar online learning experiences.

TABLE OF CONTENTS

ACKNOWLEDGMENTS

First, neither my doctoral degree nor my dissertation would have been possible without the support of my advisor and other committee members—my sincerest gratitude and thanks go to Jim Anderson, Connie Bullis, Glen Feighery, Tim Larson, and Debbie Scammon. Second, thank you to all my family, friends, and all those others in the world who were somehow sounding boards or integral to this process–you too are responsible for the content herein. Third, thank you to the University of Utah, especially the Department of Communication, for this incredible opportunity to learn, teach, and expand my mind. I will forever remain grateful and speak highly of this experience. My hope is that people will read this dissertation and do something cool with it—make ripples, if you will. Thanks in advance for reading.

CHAPTER 1

INTRODUCTION

Voices From the Field

"Now that I know just how much difference one person's behavior can make, I plan on doing more to help the environment."

"I'm already making changes. Because of the group projects, I am now more conscientious of my water usage and am trying to cut back. I'm also encouraging my family to use less energy and recycle. They are little steps, but I believe they can make a big difference."

"I am so glad I took this class. Now that I'm graduating, I'm going to see about getting more involved in my community to see what difference I can make with the environment."

~ Comments from students in COMM 2004: *Communicating about Health, Science and the Environment*, University of Cincinnati, spring 2013

The above excerpts are all examples of students expressing their intentions to engage in environmentally responsible behavior (ERB), seemingly as a result of their participation in an online learning community (OLC). The voices of these students serve as the impetus for this dissertation and are just a small indication of the large impact

participation in an OLC can have when it comes to sensitizing students to environmental issues (among other possibilities). At the heart of it, my study explores pedagogical techniques that can be used in online classrooms to facilitate community building and encourage pro-environmental attitudes and behaviors.

I argue that one way we can encourage students to be more environmentally responsible citizens is by creating unique Third Spaces, or hybrid spaces that are both real and virtual with qualities not attainable in a traditional, nonhybrid classroom. Within these spaces, opportunities for interaction and collaboration can encourage discussion and deliberation, critical thinking, self-reflection, and small group problem solving, all of which have been designated as necessary skills for individuals to become more active, environmental citizens (Chawling, 2006).

Considerable research across disciplines suggests that conversing with others about current/political issues can increase citizenship behaviors,[1] and has the potential to ripple out (Kasperson et al., 1988), diffuse or innovate (Rogers, 1962), influence (Keller & Berry, 2003), and "effect" the publics' agendas in multiple ways. Put another way, it is in the act of conversation (i.e., the interaction), be it virtually or face-to-face, where influence potentially occurs. Because deliberation can have such a deep impact on the way people think and behave, more scholars have become increasingly interested in figuring out ways to encourage meaningful conversations with procivic as well as pro- environmental outcomes (e.g., Chawla & Cushing, 2007; Shah et al., 2005).

From Barber's (1984) perspective, it is ". . . the exploration of mutuality through conversation . . . that gives life to the notion of citizen" (p.184). Cissna and Anderson

[1] See Searing (2007) for a complete review

(1994) contend that it is this back-and-forth process that allows for the changing and being changed of individuals (as cited in Kim & Kim, 2008, p. 57). It may also be a key ingredient for the preparation of more responsible environmental citizens.

To explore the possibility of promoting responsible environmental citizenship through interaction, I use as my case study a discussion-based class I teach at the University of Cincinnati called COMM 2004: Communicating about Health, Science and the Environment. COMM 2004 satisfies the requirements of both Communication and Environmental Studies students, and is open to all majors. It is a sophomore-level class and has no prerequisites to take it. The data collected for this study come from my third iteration of teaching COMM 2004 online and is described in detail in later chapters.

In this chapter, I discuss the impetus for the current research and the literature relevant to carrying out this study, including key research from distance education, marketing, political communication, and environmental education (EE). I argue that although we have made strides in Marketing and Public Relations concerning the building of online communities for enhancing brands and selling products, we are less savvy about how such communities might promote a more pro-environmental agenda. First, I review several definitions for community that have emerged, including the definition appropriate for the current study. I argue that OLCs form as a result of communicative work (i.e., interaction) and discuss the collaborative learning framework that informs the current study. I also outline several typologies that help us examine the communicative processes of OLCs, including the following: 1) Types of Online Interaction; 2) Types of Online Presence; and 3) Spirit, Trust, Learning, and Interaction. Third, I explain how an OLC can be further enhanced by embodying qualities of a Third Space. Finally, I give a sense

of how to go about measuring the success of OLCs, particularly when pro-environmental outcomes are the primary measure for success.

Literature Review

What Is an Online Learning Community (OLC)?

Depending on the group of people and context involved, there are various ways to define community. If we are talking about online communities of *Lord of the Rings* fans, for example, their experience of what it means to be a part of a community will perhaps differ vastly from how students in an online classroom covering science, health, and environmental content experience community. It is also possible that merely forming online can change the way community is experienced (Blanchard, 2007). Therefore, in this section, I describe several basic definitions of community, including how it was first envisioned in traditional classrooms as well as and how opportunities for online interaction have expanded our understanding.

SOC, or sense of community, was first recognized as important for the successful functioning of communities in face-to-face situations by Sarason (1986). McMillan and Chavis (1986) defined this sense of community as the extent to which participants experienced a sense of belonging, identity, and attachment to a group (as cited in Arbaugh, 2007). This attachment is crucial because it can be an important precursor to satisfaction and commitment in groups (Burroughs & Eby, 1998; DeVincenzo & Scammon, 2015). Less is known, however, about the impact community can have on commitment to the environment.

Because previous work focused primarily on face-to-face interactions, as opposed

to those that occur online, researchers sought to expand our understanding of community to also include virtual environments, arguing that there is something unique about communities that form online (Blanchard, 2007; Blanchard & Markus, 2004; Koh & Kim, 2003; Roberts, Smith, & Pollock, 2002). For example, although it may seem counter intuitive, Blanchard and Markus (2004) found that those in virtual communities felt that they got to know people better and observed more personal relationships than in face-to-face communities (p. 66). Cutler (1996) demonstrated that self-disclosure begets trust, and trust begets increased satisfaction and a strengthened sense of community.

There is also evidence to suggest that students may learn environmental content more effectively in online platforms (e.g., Aivazidis, Lazaridou, & Hellden, 2006). Therefore, distance learning scholars in particular have more recently emphasized the importance of the online space in their definitions of community.

For example, Preece (2001) described an online community more generally as "any virtual social space where people come together to get and give information or support, to learn, or to find company. The community can be local, national, international, small or large" (p. 349). In this definition of community, although Preece alludes to the importance of attachment and belonging, she seems to privilege the online space itself and the resources it makes available to its participants. The size of the community also seems important, although what the ideal sizes are for encouraging online communities is not discussed.

As we are talking about OLCs that form in the classroom, the following definition pulled together from multiple authors by Papastergiou et al. (2011) is most apt for the current study:

> An OLC is a group of individuals that are connected through technologically mediated communication who actively participate in collaborative learning activities, sharing common principles and practices, in order to achieve common learning objectives. (p. 129)

The Papastergiou et al. (2011) definition operates under the assumption that students in the community collaborate and share some set of core principles and learning objectives. Similarly, in COMM 2004, a group of students is connected through the Blackboard web portal and are encouraged to regularly interact by contributing to asynchronous discussion board assignment; at the same time, they are also guided by a course syllabus, common learning objectives, and instructor. Arguably, it is these common elements (i.e., the online space and structured learning opportunities and resources it provides) that initially bring participants together and set the stage for the formation of OLCs.

How Does an OLC Form?

Online learning communities form as a result of communicative work (i.e., interaction). According to Lave and Wenger (1991) "These communities and the learning that takes place within them, happens through communication, negotiation and interaction, and is seen as a process of social participation" (as cited in Papastergiou et al., 2011, p. 129). It is through this process of participation that students are able to lurk and move "from feeling like outsiders to feeling like insiders" (Wegerif, 1998, p. 34).

Essentially, it is this feeling of connectedness or "we-ness" that fuels the level of community experienced in the class.

In essence, as participants interact, acquire more information, and understand

the processes of how the community functions, they eventually gravitate "towards the center," and begin to more fully engage in the community (Papastergiou et al., 2011). The level of engagement experienced by students in these communities depends on the kind and quality of the interactions they have with teachers, students, and content (Anderson & Garrison, 1997; Moore; 1989). This emphasis on interactivity in the classroom is the cornerstone of collaborative learning pedagogy, which undergirds the current study, serves as a helpful framework, and is discussed next. After explaining the collaborative learning framework, I describe three typologies used to conceptualize the process of OLC formation.

Collaborative Learning

Those who study online and distance education tend to find that a key driver of success in online learning is the extent to which students are able to participate in collaborative learning (Anderson, Rourke, Garrison, & Archer, 2001; Bourne, McMaster, Rieger, & Campbell, 1997; Brown & Campione, 1990; King, 2002; Wegerif, 1998). At the heart of it, collaborative learning emphasizes active interaction and participation between instructors and students alike (Hiltz, 1997; Jonassen, Davidson, Collins, Campbell, & Haag, 1995). Although the way these interactions play out in the classroom can vary, Jonassen et al. (1995) contend "the most valuable activity in a classroom of any kind is the opportunity for students to work and interact together and to build and become a part of a community of scholars and practitioners" (p. 7, as cited in King, 2002). It is through a variety of interactions that these scholars and practitioners emerge.

Types of Online Interaction

We can envision OLCs forming through several types of online interaction. In the late 1980s, when the possibility of learning online was becoming increasingly more real,

Moore (1989) recommended that distance educators become more systematic about studying the types of interaction that are possible when teaching students across the boundaries of space and time. Although other scholars have since added to the scope of his typology, Moore (1989) suggested observing a minimum of three types of interaction in the online classroom: 1) Learner-instructor, 2) Learner-content, and 3) Learner-learner (see Figure 1.1). These interaction types serve as a helpful starting place for conceptual-izing how an OLC might form and are each described in the next section.

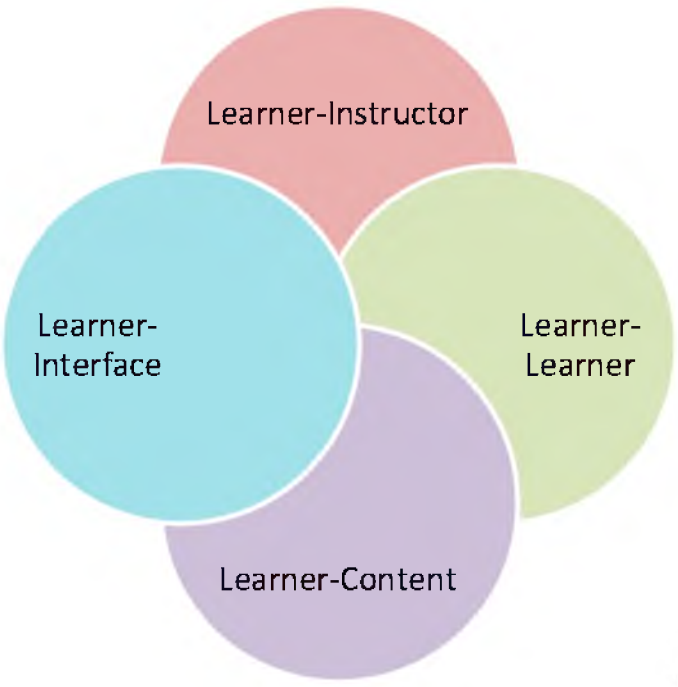


Figure 1.1. Depiction of Moore's (1989) three levels of interaction in the online class-rooom with Hillman, Willis, and Gunawardena 's (1994) addition of the fourth level, Learner-Interface.

Learner-Content

The first type of online interaction occurs between learners and content.

According to Moore (1989), the content of a class is the "defining characteristic of education" (p. 2). Put another way, it is the foundation upon which everything else in the class is built. Moore (1989) goes on to say the following about course content:

> Without it there cannot be education since it is the process of intellectually interacting with content that results in changes in the learner's understanding, the learner's perspective, and the cognitive structures of the learner's mind. (p. 2)

From this perspective, it is the content of the class that provides opportunities for students to heuristically process information, thereby involving themselves in a self-persuasion process or what Holmberg (1986) refers to as "internal didactic conversation" wherein students learn to "talk to themselves" about the content they experience (as cited in Moore, 1989). As a result of this self-persuasion process, course content and the associated assignments of a class can become important catalyzers for heuristic processing, self-reflection, and critical thinking.

Tallent-Runnels et al. (2006) found that some of the most pivotal learning moments occur when there is a deep understanding of course content. Put another way, content can expand and change people's minds. Therefore, presentations, videos, PowerPoint lectures, and the like can all make lasting impressions in students' minds. In addition, the interactions students have with their peers can also have an impact on learning outcomes and the extent to which students feel a part of an OLC.

Learner-Instructor

The second type of online interaction occurs between the learner and instructor. Whether it is online or in a traditional classroom, the interactions (or lack thereof)instructors

have with students play a significant role in the learning outcomes and the sense of community experienced in a class. In fact, teaching presence and direct facilitation of instructors may contribute more to students' sense of connectedness and learning than instructional design, learner characteristics, and course organization (e.g., see Shea et al., 2006). Swan (2012) expanded on the significance of the role played by the teacher in the classroom:

> In any educational setting, the instructor serves as an expert who plans instruction to stimulate student's interest, motivates their participation in the learning process, and facilitates their learning. (p. 4)

In Swan's (2012) description, the onus of instruction becomes the sole responsibility and direct result of the teacher; however, it fails to account for the following: 1) instances when students become experts and knowledge leaders, 2) the impact the internet and information seeking on it can influence the creation of new knowledge production in an online class, 3) the possibility that the instructor can be on more level ground with students, and 4) the amount of autonomous or self-directed learning students must do in online classrooms. Additional scholars have described alternative ways the instructor's role can manifest in the classroom as well.

For example, Howe, Brown, and Campione (1990) suggest that within a collaborative learning framework, instructors must step down from their authoritative roles, acting more as mentors or guides to students and fully participating and becoming cooperative members of the learning community themselves. Berge (1995) confirms that online instructors should be accessible and maintain a nonauthoritarian style in the online classroom. Essentially, rather than being the all-knowing "sage on the stage," the role of the instructor then shifts from being the "mentor in the center" to the "guide on the side" (Lave & Wenger, 1991).

Arguably, this change in teaching style is an adjustment for many students who may be accustomed to a more top-down approach from instructors and must be communicated appropriately. Instructors can start this process by establishing norms and etiquette in the course syllabus and on the course site itself. They can continue this process by modeling such norms during interactions with students throughout the class.

Kleinman (2005) makes three additional suggestions for teachers in the online classroom: First, instructors should be upfront about course expectations and how discussion boards will be evaluated. Second, they should foster a community that encourages self-disclosure. Third, they should use course software to track students' abilities.

Learner-Learner

The third type of online interaction occurs between learners and other learners. When he originally came up with his typology in 1989, Moore hypothesized that we would eventually be most interested in the impact peers can have on one another in the online classroom. We have seen empirical evidence of this peer/normative influence when it comes to people being willing to alter their thinking or behaviors regarding their health in particular (e.g., Jang, Rimmel, & Cho, 2012; Liang & Scammon; 2012). We have also seen the impact normative influence can have regarding political topics (Griffin, Neuwirth, & Dunwoody, 2002; Kim et al., 1999; Mcleod, Scheufele, & Moy, 2005; Shah et al., 2005; Shah et al., 2001). Put simply, when we talk to others, they can influence us, and we can influence them.

Cothrel (2000) defines this influence as "implicit or explicit effect of one thing (or person) on another" (p. 5). When we couch this influence in the online setting, Cothrel's explanation can be expanded to include the extent to which someone's words, links, and/

or videos make another person think, say, or do something.

When marketers are asked how this influence happens in online brand communities, they tend to use the following formula: expertise + trust = influence. In the context of online teaching and environmental education interventions, this formula becomes particularly relevant. Although we are not selling a product in the context of an online class per se, we are selling ideas, and we are promoting our own brand of teaching, whether we realize it or not. Moreover, it is possible and highly likely that when students (and the instructor) are perceived as being more credible, trustworthy, or having some sort of expertise, that they too would ultimately be more persuasive (i.e., influential).

Opportunities for collaboration with peers, small group work more specifically, may enhance the overall experience of community in online classroom (King, 2002; Shea, 2006; Rovai, 2002; Tallent-Runnels et al., 2006). According to Rovai (2002), small group collaboration allows students to engage meaningfully in learning and make connections with one another, thereby increasing social bonding and feelings of community. Gunawardena and Zittle (1997) add that when students are able to interact in new social situations (e.g., small group settings), they are in essence able to create interpersonal connections critical for the development of OLCs. In addition to these interactions with other students, OLCs can also forms as a result of interactions learners have with the online interface used to facilitate a course.

Learner-Interface

More recently, researchers have began to examine the extent to which interactions students have with online interfaces can impact learning (e.g., Hillman et al., 1994; Swan, 2012). For example, Swan (2012) found that the usability of course sites as well as

factors, such as clarity, consistency, and simplicity, affected students' perceived learning (i.e., the fewer problems students encountered with a site, the more perceived learning that took place). As a result, Swan (2012) suggested using consistent, transparent, and simple course structures to enhance the clarity of meaning in an online class and insure that learners only have to adapt to the course structures once (Swan, 2012).

Without a clear, consistent course design, students may experience distracting "noise" that can frustrate them and impede their learning experience as well as the extent to which they experience feeling a part of a community. According to Preece (2001) "whenever possible, the opportunity for users to make errors should be engineered out" (p. 6). The goal of instructors should be to make the user interface as seamless, flawless, and transparent to students as possible to help promote the formation of OLCs.

Ultimately, the communicative work performed by online instructors, students, content and the interfaces themselves, are what form the foundation of OLCs. One way to examine these interactions is using Moore's (1989) typology of online interactions, discussed above. In addition to these various forms of interaction, we can also envision community manifesting as three types of classroom "presence."

Types of Classroom Presence

Based on their read of the collaborative learning literature, Garrison, Anderson and Archer (2000) argue that meaningful learning experiences result from the intersection and overlap of three necessary presences in an online classroom: social, cognitive, and teaching. Figure 1.2 depicts how these three presences overlap to help form an OLC. Next, each type of presence is discussed in detail.

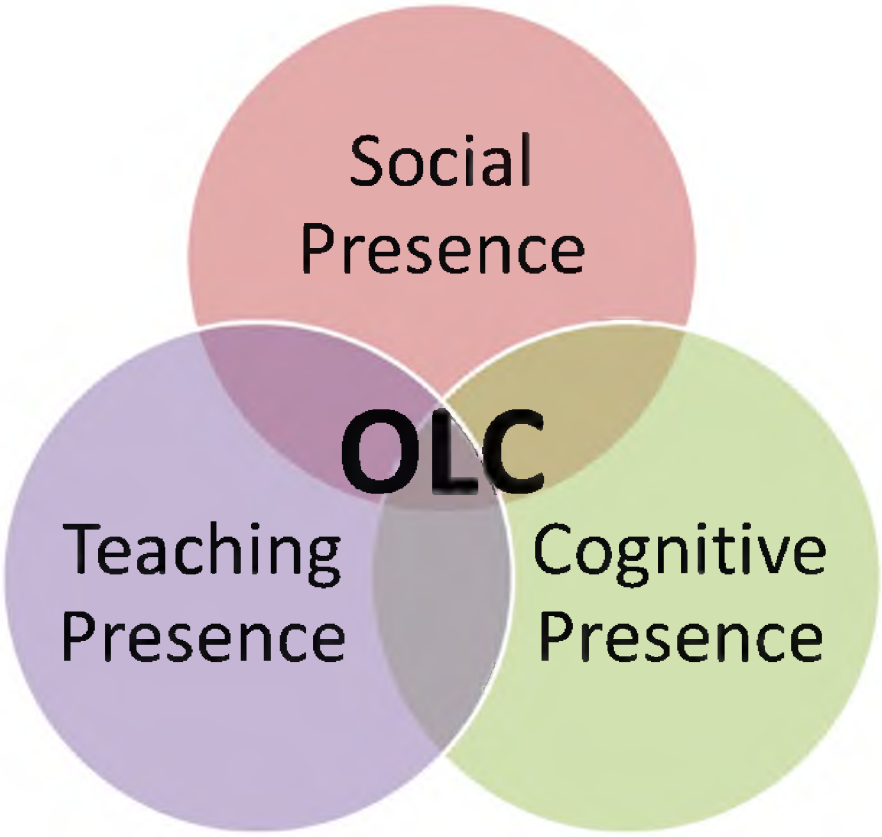


Figure 1.2. Garrison et al. (2000) types of online presence[2]

Social Presence

Social presence has been defined as "the ability of participants to identify with the community (e.g., course of study), communicate purposefully in a trusting environment, and develop interpersonal relationships by way of projecting individual personalities" (Garrison, 2009, p. 9). Arbaugh, Cleveland-Innes, Diaz, and Garrison (2008) further elaborate on social presence, breaking it down into three subcategories: open communication, group cohesion, and personal/affective projection. It is the effective combination of these

[2] Note that in this dissertation, the author explored an additional fourth type of presence, "learner presence."

three subcategories that predict a student's ability to both project and experience social presence in an OLC.

Gunawardena and Sittle (1997) define social presence as "the degree with which a person is perceived as a 'real person' in mediated communication" (p. 9). In other words, the extent to which individuals get to "be themselves," or least some version they are able to (un)intentionally construct and project in the class, is shaped by and helps shape the formation of OLCs. OLCs also emerge through cognitive presence.

Cognitive Presence

The second type of presence, cognitive presence, occurs as a developmental process over time, which instructors can track to help decipher if an OLC has developed: 1) triggering event, 2) exploration, 3) integration, and 4) resolution/application (Garrison, Anderson, & Archer, 2001). Ideally, instructors are able to help students effectively move through this entire process, with application being the ultimate capstone of achievement (Garrison et al., 2001). Self-reflection and critical thinking can both be identified as forms of cognitive presence. Cognitive presence can also be impacted by the choices instructors make in the classroom.

Teaching Presence

The third presence in an online community, teaching presence, has been determined as an important factor in the satisfaction and success of OLCs (Garrison, 2007; Garrison & Arbaugh, 2007). Several authors have developed helpful checklists of actions that teachers must perform to make their presence known in an OLC. For example,

Shea, Li, and Pickett (2006) break teaching presence down into three distinct, yet related, types of actions: 1) design, 2) facilitation, and 3) direct instruction. Shea, Li, and Pickett (2006) further recommend instructors do the following: set curriculum, design methods, establish time parameters, utilize the medium effectively, and establish group norms via conventions of "netiquette." Ideally, these rules of netiquette are made clear early in the process of community building, modeled by the instructor and mimicked by the students.

Additionally, Shea et al. (2006) argued online instructors must do the following: a) identify points of agreement and disagreement; b) seek consensus and understanding; c) encourage; d) acknowledge; e) reinforce student contributions; f) set the climate for learning; g) draw in participants; h) prompt discussion; and i) assess the efficacy of the process. According to Anderson et al. (2001), teaching presence is also made known by direct instruction, presenting content and questions, focusing the discussion on specific issues, summarizing discussion, confirming understanding, diagnosing misperceptions, injecting knowledge from diverse sources, and responding to technical concerns.

Based on their qualitative work on graduate students and their interactions with online instructors, McIssac, Blocher, Mahes, and Vrasidas (1999) and Tallent-Runnels et al. (2006) found that the most positive online learning experiences resulted from instructors encouraging social interaction, participating in social interaction themselves, providing prompt feedback, and employing collaborative learning strategies. Therefore, Berge (1995) suggests that within a collaborative learning framework, the main role of instructors becomes facilitation (i.e., they encourage learners to interact). Anderson et al. (2001) concur that the best indication that a genuine OLC has formed is the extent to which focused and sustained deliberation has taken place.

The Anderson et al. (2000) conceptualization of community in terms of three overlapping online presences (i.e., social, cognitive, and teaching) is another helpful way to imagine the process of OLC formation. In addition to these various types of presence, we can envision OLCs forming as a result of the spirit, trust, interaction, and learning that occurs online.

Spirit, Trust, Interaction, and Learning

Rovai (2001) conceptualized the online classroom community in terms of four distinct, yet overlapping, components: 1) spirit, 2) trust, 3) interaction, and 4) learning (see Figure 1.3). First, the spirit component involves more emotional aspects of being part of a community such as the bonding, feelings of friendship, and cohesion that result from students spending time with one another (Rovai, 2001). According to Moormon, Zaltman, and Deshpande (1993) trust, the second component, actually consists of two dimensions: credibility and benevolence. Credibility is the notion that students come to trust that other learners (and the instructor) can be relied on; benevolence is the extent to which instructors and students take a legitimate interest in others and are motivated to help them learn (Rovai, 2002). The third component, interaction, is the means through which all the other components in Rovai's model materialize. Thus, interactions and the platforms that enable them are important prerequisites for building online communities. Finally, learning, the fourth component, tends to be the initial reason for the formation of online learning communities (Rovai, 2006). Perhaps not surprisingly, the extent to which learning needs are met has been directly linked to the level of interaction and active participation in the community (Rovai, 2006). Therefore, instructors should play an active role in creating opportunities for meaningful interactions and learning in an online class.

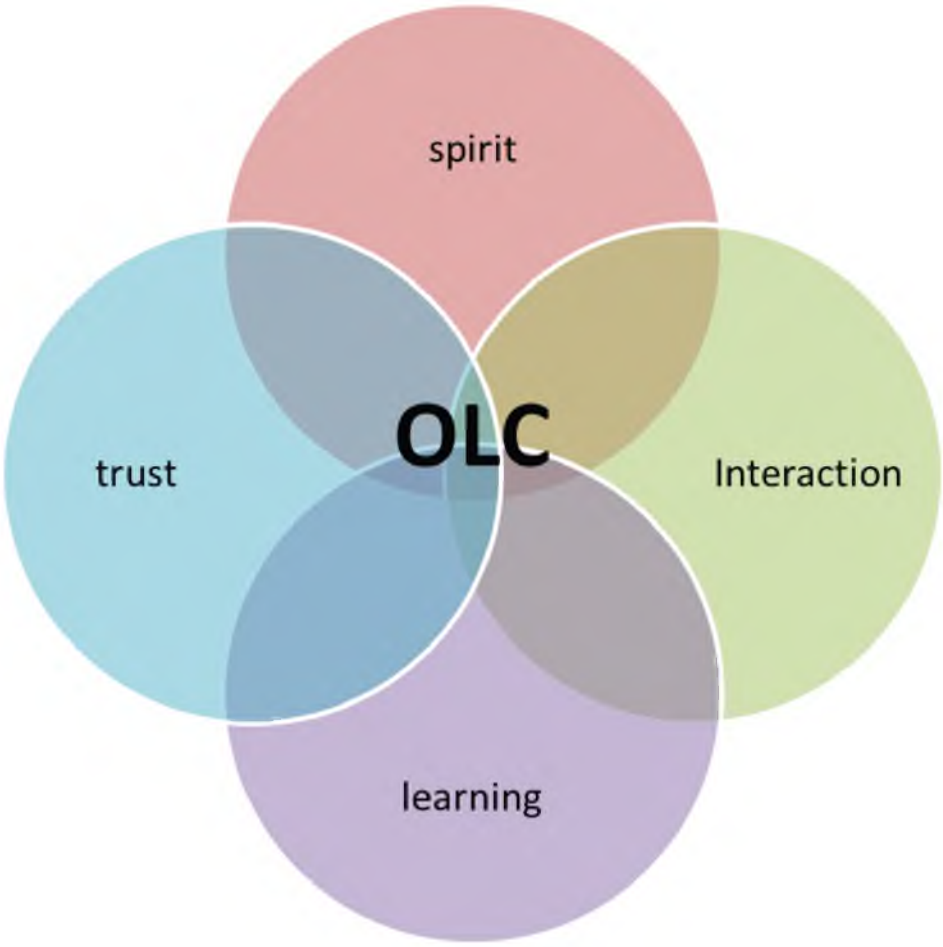


Figure 1.3. Depiction of Rovai's (2006) 4 components of community: spirit, trust, interaction, and learning.

Teachers should accept responsibility for creating a conducive environment for the building of OLCs by modeling communicative behavior and cultural norms. These efforts by the instructor in turn allow for socialization, thereby increasing levels of trust and feelings of community (Cutler, 1996; Zhu, 2006). It starts with the course guidelines, initial tone set by the instructor, and consistency in the course design; it hinges on the students' ability and willingness to participate and conform to the norms of practice.

Online Learning Community (OLC) Summary

A sense of community is a direct result of communicative interaction and an important precursor to the formation of OLCs. Through the process of communicating and collaboratively learning, OLCs are built. The formation of OLCs can be conceptualized in terms of the types of online interaction that comprise them, the types of online presences that co-mingle to produce them, and the extent to which they embody trust, spirit, interaction, and learning. In addition to these typologies, an OLC can be further understood and enhanced by the extent to which it embodies qualities of a Third Space.

The Online Classroom as a Third Space

The online classroom may be the ideal space for communities to develop given its propensity to embody qualities of a Third Space. A Third Space is a nonconventional place or hybrid space where community building and deliberation can take place. It blurs the lines between real and virtual and becomes something new by inhabiting qualities of both. Habermas (2005) distinguishes between two ideal types of spaces for political deliberation: "a) among citizens within the informal public sphere and b) among politicians or representatives within formal settings" (p. 53, as cited in Kim & Kim, 2008). The online classroom can be considered a hybrid of both of these deliberative settings and resembles what Bhabha (1990) refers to as a Third Space:

> The Third Space displaces the histories that constitute it, and sets up new structures of authority, new political initiatives. The process of cultural hybridity gives rise to something different, something new and unrecognizable, a new area of negotiation, meaning and representations. (p. 211, as cited in Davies, 2006)

The Third Space turns traditional learning on its head, giving birth to new ways

of interacting where new meanings can be created and negotiated in ways perhaps not possible in other realms.

Asynchronous discussion affords participants opportunities to reflect on their classmate's contributions while also creating their own. A mindfulness and a culture of reflection may develop in online courses that may be more difficult to achieve in a traditional classroom (Swan, 2012). Arguably, the real-time nature of most face-to-face classes makes it difficult to foster this level of mindful independent thought and reflection, which may be an advantage of online classes in general.

Moreover, the online classroom and the communities it helps foster might be important gateways to deeper, deliberative conversations needed for significant political change. As environmental issues are necessarily political issues, it makes sense that instructors find ways to enable students to deliberate about those as well. Third Space learning may encourage such deliberation.

According to Davies (2006), it is within the online classroom that Third Spaces are realized. Gee (2004) refers to these special spaces as "affinity spaces" in some detail and Davies (2006) highlights the most relevant elements pertaining to online learning:

-There is a common endeavor (interests, goals or practices);

-The space has content;

-The content is organized;

-Individuals can choose to interact with content and/or each other;

-Individuals share the space, even fulfilling different roles;

-There are many ways (portals) of entering the space;

-New content can be generated;

-Many types of knowledge (individual, distributed, disperse and tacit) are valued;

-Group endeavor is valued and encouraged;

-Interactivity is required to sustain the affinity space;

-Novices and the experienced occupy the same domain; there is no segregation;

-There are many ways of participating and these can change temporally;

-Leadership is "porous";

-There are many ways of gaining status;

-The organization of the space can change through interaction;

-Learning is social and enjoyable. (pp. 220-221)

These affinity or Third Space qualities serve as a helpful checklist and starting place for instructors wishing to encourage the cultivation of collaborative learning environments. They also help conceptualize how we might go about measuring the success of OLCs.

How Is the "Success" of OLCs Measured?

Defining Success

Much like the definition of community, the ways we define "success" in a classroom will vary across context, depending on our goals and desired outcomes: Some instructors focus primarily on end-of-semester grades, for example; others focus on the extent to which students actively engage in classroom discussion. Preece (2001) advises that success is based on instructors' abilities to identify key determinants of sociability and usability (e.g., the number of messages per unit of time, members' satisfaction, reciprocity, number of on-topic messages, and trustworthiness). In online studies, thread depth has also been discovered as an indicator of interactivity (Liang & Scammon, 2011;

Rafaeli & Sudweeks, 1997) and could also be a precursor to or indicator of success.

If we couch success in terms of how effective an intervention is at influencing environmental attitudes and behaviors, we can learn much from Environmental Education (EE) literature. Scholars in Environmental Education (EE) and Online/Distance education have been exploring the use of the internet and other multimedia software and technologies in learning outcomes for some time now (e.g., Ballantyne, Fien, & Packer, 2001; Bullard, 1998; Houtsonen, 2003, Moore, 1989; Moore & Huber, 2001). However, less work has explored the specific impact OLCs can have on EE interventions. A few scholars have called for more use of the online medium for EE interventions (e.g., Potter, 2010; Whitehouse, 2008), but most EE research has focused on the impacts of outdoor/ experiential education on children in primary or secondary education settings.

There have been a few notable exceptions (Aivazidis, Lazaridou, & Hellden; 2006; Nomura, 2004; Papastergiou, Antoniou, & Apostolou, 2011). Aivazidis et al. (2006), for example, examined how the impact of EE interventions in online classrooms compares to traditional classrooms. The researchers used a pretest/posttest quasi- experimental design using a measure they developed specifically for capturing knowledge acquisition and attitude change after students took part in a secondary EE program about rivers. Ultimately, students who received the online instruction scored significantly higher than their traditional classroom counterparts. In addition, there was a significant, although slight, increase in environmental attitude scores of those in the online class, compared to those in the traditional setting.

Papastergiou et al. (2011) used an in-depth case study to examine the participation of secondary education students in an OLC and the impact it had on students' attitudes

and knowledge regarding the natural environment, social skills, and their attitudes toward Information and Communication Technologies (ICT). Using a pretest/posttest measure, Papastergiou and colleagues found that pro-environmental attitudes were strengthened as a result of participation in the OLC, and knowledge of the environment and computer skills also increased, evidence that EE interventions online may have implications beyond just changes in environmental attitudes and behaviors.

Nomura (2004) described the online EE intervention strategies of the World School Network (WSN). As an active nonprofit from the years 1994-2003, WSM fostered an approach to environmental issues using a global perspective with the assistance of computer technology and the internet. Ultimately, researchers found evidence that opportunities for children to talk to each other by participating in "project circles" online helped motivate students to learn more about environmental issues, increased knowledge, impacted environmental behavior, and enhanced intercultural communication (Nomura, 2004).

Based on their metareview of the literature on Environmental Education (EE) interventions, Chawla and Cushing (2007) deduced that the most effective EE programs embody the following characteristics: "an extended duration of time, opportunities to learn and practice action skills, and success in achieving some valued goals" (p. 441). Papastergiou et al. (2011) suggest four additional criteria of successful EE interventions: 1) students actively collaborated in a group project to achieve learning objectives, 2) students contributed materials to the discussion boards regularly, 3) students engaged in social interactions and exchange viewpoints, and 4) students regularly access content (i.e., lectures and readings for the class).

Methodological Approaches

Most work on OLCs stems out of the qualitative paradigm. For example, ethnography is a widely used technique, which has proven quite effective for developing understanding of online communities. Ethnography allows for thick descriptions (Geertz, 1973) and intimate understandings of interactions within specific contexts, which quantitative methods are unable to produce. On the other hand, in Environmental Education (EE) interventions, it is common to measure the success of a class based on some sort of significant change on a pretest/posttest measure related to environmental knowledge, attitudes, or behavior.

Arbaugh et al. (2008) stressed the need to reach beyond strictly qualitative approaches for studying OLCs and argues the following:

> This exploratory interpretivist approach certainly has shown to be fruitful, but it may be time to move from a descriptive to an inferential approach to studying online communities of inquiry. This would permit large studies of online and blended learning across institutions and disciplines. For this to happen we need to develop a structurally valid and psychometrically sound survey instrument with the potential to expand the study of online and blended learning. Such an instrument would also provide the means to study the structure of each of the presences and their inter-relationships. (p. 134)

Ultimately, Arbaugh et al. (2008) call for more quantitative studies to complement our girth of qualitative studies. To answer such calls, several measures have been developed to capture the extent to which community is experienced online, including the Arbaugh et al. (2008) Community of Inquiry Instrument (CoI), Blanchard's (2007) Sense of Virtual Community Measure, and Rovai's (2002) Classroom Community Scale, all of which are further discussed in Chapter 3.

Whether it is quantitative or qualitative research, Preece (2001) cautions us

against using strict mono-method approaches for studying OLCs because of the potential to create "false impressions" (p. 1). In other words, we may need multiple methods to get a better sense of what happens in our online classrooms and how OLCs form. Therefore, Preece (2001) encourages the use of several methods to study OLCs, with scales being added to complement primarily qualitatively-driven approaches.

In part, the current research seeks to build a bridge between scholarship in EE, Online/Distance education, and Marketing. Our colleagues in Marketing have made strides toward documenting what it takes to successfully build an online community (e.g., see Howard, 2010; Kraut & Resnick, 2011; Millington, 2012). However, most of this work has focused on what these communities can do for branding products, diffusing trends, and contributing to the bottom line, with a few exceptions among transformative and sustainable marketing scholars.

We have seen evidence recently, however, that social media and online communities can have an impact on social movements (e.g., 350.org, Occupy, etc.) as well as health behaviors and decisions (e.g., Donnelle & Hoffman-Goetz, 2008; Eichhorn, 2008; Liang & Scammon, 2011; Liang & Scammon, 2013). Although an online class is not a social movement per se, given the potential for people enrolled in the class to invigorate or positively change their own environmental attitudes and behaviors as well as educate others about what they have learned, it makes sense that we explore more about the potential impact people in online classrooms can have on the environmental agenda. Therefore, I propose the following Research Questions for further investigation.

Research Questions

My research is guided by six overarching Research Questions, which are expanded upon in subsequent chapters:

RQ 1: Does an OLC appear to form in COMM 2004?

RQ 2: To what extent does COMM 2004 embody qualities of a Third Space?

RQ 3: To what extent does participation in COMM 2004 affect participants environmental attitudes and behaviors?

RQ 4: To what extent does participation in COMM 2004 seem to influence participants?

RQ 5: How does participation in COM 2004 affect the students' desire to seek out and share information?

RQ 6: Is there a relationship between participation in an OLC and students' overall satisfaction with COMM 2004?

Summary/Overview of the Dissertation

In Chapter 1, I gave voice to a group of students who reported engaging in pro-environmental behaviors after participating in COMM 2004. I made the case for further exploration of the higher education online classroom setting as a Third Space for promoting pro-environmental citizenship in OLCs. I argued that an OLC forms through communicative work and described three different ways to conceptualize how this process unfolds. I also described the collaborative learning framework that undergirds this study and why it is appropriate for exploring OLCs. Then, I briefly discussed how to measure the success of OLCs when pro-environmental outcomes are desired. Finally, based on the

aforementioned review, I presented the Research Questions used to guide my study.

Next, Chapter 2 details my methodology. Given the applied nature of my work, I position my project alongside other scholars in multiple, practical, and applied fields (e.g., Health Promotion, Environmental Education, Public Relations, Social Marketing), who have in recent years employed the use of multiple methods to help answer their Research Questions and explain their Hypotheses. First, I provide background on the classroom site and participants. Second, I explain the procedure I used to collect my data and the types of qualitative and quantitative data I gathered. Third, I briefly explain the hybrid confirmatory/emergent coding scheme I used to analyze my qualitative data. Fourth, I discuss the quantitative measures of the study, including the scales used in my pretest/posttest measure. Finally, I briefly discuss how I combined my data sources.

Chapter 3 details the results from my qualitative data. First, I provide some descriptive information on the texts used for analysis. Then, I explain the coding process I used to generate themes. I also provide relevant tables and graphs and highlight exemplars from discussion board conversations and field notes.

Chapter 4 covers the results from my quantitative data. First, I provide population and descriptive findings. Then, I detail the instrumentation, constructs, and associated reliabilities. I also explain the results from the factor analysis from the Course Influence Scale (CIS), which I developed for use in this study. Finally, I describe the statistics I used to test my hypotheses and highlight significant findings.

Chapter 5 summarizes the qualitative and quantitative results. First, I answer each of the six research questions put forth by this dissertation and explain what is learned

from combining both data sets. Next, I discuss the implications of the findings for online learning more generally and pro-environmental/sustainability campaigns in higher education more specifically. I also discuss the limitations of the current study, call attention to future needed research and offer practical advice.

CHAPTER 2

METHODOLOGY

This study employed a multiple method case study approach with a pretest/ posttest measure. Researchers have used the case study method for many years across a variety of disciplines to get a more intimate understanding of various objects of study, including online communities. This particular case study allowed for a more in- depth understanding of a real-world online classroom. In this chapter, I first describe the class I used as context for the current study as well as the group of individuals who participated in the class. Next, I explain the procedure I used to collect my data followed by a brief discussion of the types of qualitative and quantitative data I collected.

Course Description: The Context of the Study

The site for this study was an online iteration of a class offered at University of Cincinnati called COMM 2004: Communicating about Health, Science and the Environment. COMM 2004 is a sophomore-level class and satisfies general studies requirements for all majors. It also helps satisfy major requirements for students in both Communication (COMM) and Environmental Studies (EVST). There are no pre- requisites for the class, and it runs a full academic semester lasting 16 weeks. Since its inception, I have

taught the class a total of four times, three of which have been online. I gathered the data for this dissertation during the spring semester of 2014. The following excerpt from the COMM 2004 course syllabus (2014) helps describe the crux of the class:

> In the areas of science, health and the environment, communication plays a fundamental role. Whether it's the technical journals we rely on for the latest scientific findings of the day, messages we glean from the mass media, words exchanged with others in chat rooms, or face-to-face conversations with our doctors, we use communication to define and help make sense of our world and the problems that arise in it for us. In this class, students will learn about the everyday symbolic and material consequences of a variety of science, health and environmental issues as well as ways in which we evaluate and communicate about such issues in a variety of contexts. Whether it is talking with one of your peers about how you feel regarding a video we viewed in class, working with a partner to learn more about an area of health you are both interested in, or brainstorming solutions to environmental problems in small groups, in this class, you are asked to interact with your peers, critically engage material and actively apply what you learn. (p. 1)

Additionally, there were 10 course objectives that guided the class:

• To recognize some of the historical and contemporary influences on the public's understanding, enthusiasm, and overall literacy in the areas of science, health, and the environment

• To recognize ways in which communication can serve as both a barrier to and vehicle for the public's understanding, enthusiasm, and overall literacy in the areas of science, health, and the environment

• To learn some of the fundamental theories and concepts from the field of Communication that can inform how we communicate in the areas of science, health, and environment

• To apply some of these fundamental theories and principles to real-life examples and case studies

• To bolster students' understanding, critical thinking, skills, and overall media literacy

• To take part in meaningful conversations with peers that get us thinking, talking, and applying course concepts to our respective areas of study and lives.

• To generate a community of interested individuals that can learn from, interrogate, and critique each other's ideas

• To gain a better sense of (and develop a vocabulary for) one's own and others' ideological worldviews

• To practice communication skills in small groups to research and problem-solve

• To learn about ways we can become more informed citizens and better advocates for our own health, environment, and society.

The preceding course description and learning objectives served as the foundation for the class and I referred to them when making decisions about how I organized the class as well as what content and assignments I chose to include.

COMM 2004 runs a full academic semester lasting 16 weeks. The class was divided into three sections: During the first third of the class (Weeks 1-4), the course focused on science communication and mass communication. During the second third of the class, the focus was on health communication (Weeks 5-9). It was during the final third of the class (Weeks 10-16) when content specifically devoted to environmental topics was covered, and it was also during this time when I recruited students for the study and pre- and posttests were administered. Figure 2.1 depicts the overall flow of COMM 2004 including a brief overview of what was covered in each part of the class as well as when the pre- and posttests were administered. The complete course syllabus can

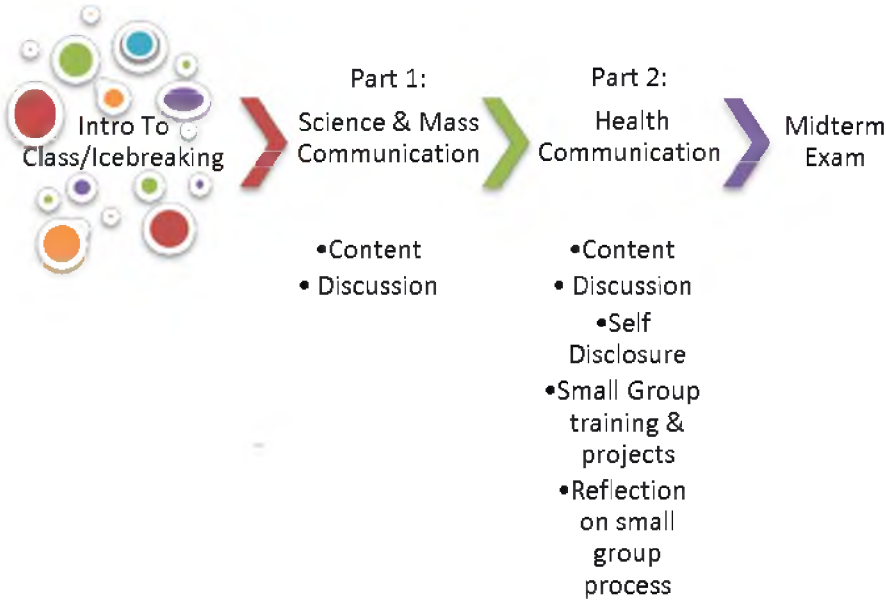


Figure 2.1. Flow of COMM 2004[3]

[3] Note when pre- and posttests were administered

- Content
- Discussion
- Reflection on carbon footprints and NEP Scores
- Small group training, icebreaking & group projects
- Reflection on small group process
- Reflection on the class

be found in Appendix C.

In part, the class was designed to give students opportunities to "learn and practice action skills" through discussion board assignments and small group problem solving. Research in both political communication and Environmental Education (EE) emphasize the need for individuals to be able to think critically, deliberate, and collaborate to in order to solve the problems facing the world, environmental issues notwithstanding. As a result, I attempted to provide opportunities to practice these skills in COMM 2004.

Students participated in COMM 2004 several ways. These methods of participation are first briefly discussed, then each is unpacked in detail. First, students were assigned weekly readings. Second, students were given access to lectures that corresponded to the weekly readings. Third, students took a 10-point quiz each week on the readings. Fourth, students were assigned a midterm and a final that covered weekly readings and lectures. Fifth, students were asked to participate each week on the class discussion board (DB) by responding to one instructor-posed prompt based on the content from the course readings and lectures for the week as well as commenting on a minimum of three peer's posts (all discussion board prompts for the class are included in Appendix B). Finally, students partook in two small group DB projects.

In terms of course readings, there were four required books for the class that were read in the following order:

• Mooney, C., & Kirshenbaum, S. (2009). *Unscientific America: How scientific illiteracy threatens our future*. Philadelphia, PA: Perseus Books Group.

• Olson, R. (2009). *Don't be such a scientist: Talking substance in an age of style*. Washington, D.C.: Island Press.

• Parrott, R. (2009). *Talking about health: Why communication matters*. West Sussex, UK: Wiley Blackwell.

• Corbett, J. B. (2006). *Communicating nature: How we create and understand environmental messages*. Washington, D.C.: Island Press.

The first two books corresponded with the first part of the class and focused primarily on science communication. I used the third book in the second part of the class to help teach about health communication. Finally, I used the fourth book to focus on Environmental Communication. These four books were lighter reads and less like traditional textbooks typically used in a college classroom. There were also several short, supplemental articles assigned throughout the semester to complement the books and lectures.

My lectures were meant to supplement and complement the student reading and drive home key concepts by providing graphics, videos, and relevant examples and case studies. I created lectures in Microsoft PowerPoint and recorded my voice so students could listen to them. There were a few weeks when lectures contained no narration (e.g., when small group communication was taught), but the vast majority of lectures contained voice-narrated slides available to students on the Blackboard site to help familiarize them with the weekly flow of the class.

Although the class was offered online, the way I disseminated the class content flowed much like a traditional Tuesday/Thursday class. More specifically, each Tuesday and Thursday, I posted a new lecture based on readings students were to complete for the week. Table 2.1 displays an abbreviated schedule of COMM 2004. On Wednesday nights, weekly quizzes were due. Quizzes were worth 10 points each and based on the readings from the week prior. There were 10 quizzes total, comprising 100 out of the 600 points

Table 2.1. Abbreviated weekly schedule for COMM 2004

Sun	Mon	Tues	Wed	Thurs	Fri	Sat
-Weekly quiz appears -Weekly Module, Weekly Notes & To-Do List appears		-New Lecture/ Video Posted **-3 Peer comments due** on previous week's DB	**-Weekly quiz due** on the previous week's readings	-New lecture/video posted	**-DB Posts Due**	

for the class. Students also had a chance to earn one bonus point every time they took a quiz by answering an additional 11th question per quiz. Students also completed a mid-term (worth 50 points) and a final (worth 100 points).

Participation in DBs was the most heavily weighted aspect of the class; individual DB posts comprised 35% of the total grade for the class. An additional 23% of the course grade came from the two small group DB projects. Hence, 58% of the total course grade resulted from students' participation in DB assignments. Figure 2.2 displays each aspect of the course and what percentage of the total grade each was worth.

I also provided detailed instructions and a rubric for how their posts would be evaluated (see Figure 2.3). These instructions included what an "A" performance looked like as well as how many words must be written to meet the grading criteria. For each initial prompt response from students, they were asked to write between 300-500 words.

Note that more than any other aspect of the class, Discussion Board posts are weighted the most heavily at 35% of the final grade. In addition, in the three responses students wrote to their peers, they were asked to write a minimum of 50 words.

The amount of participation in the DB assignments varied week by week, with some participants going above and beyond the three post minimum every week and

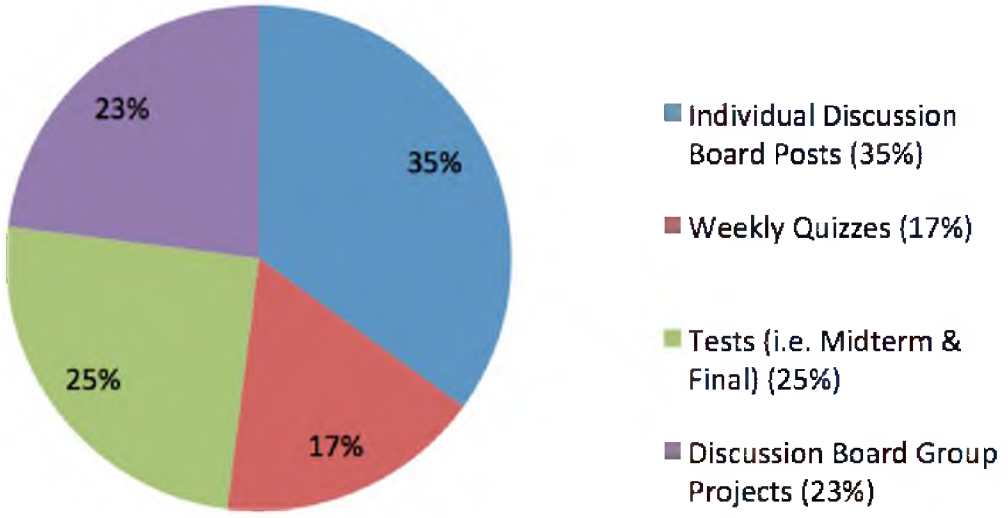


Figure 2.2. Grade breakdown percentages by assignment for COMM 2004.

others not participating at all (see Figure 2.4). The use of the DB had five primary purposes: 1) to provide a space for participation in class discussion and build community, 2) to encourage critical reflection and interrogation of course material (i.e., so students could think and talk about what they and their peers thought and talked about), 3) to provide an avenue where students could simultaneously learn from and teach peers and the instructor, 4) to give students chances to apply ideas and concepts to real-life examples and case studies, and 5) to create a tool kit of resources students could use to learn more about science, health, media, and the environment.

After students posted their initial DB responses, by the following Tuesday, they were also asked to respond to a minimum of three peer's posts. These responses were to be at least 50-100 words in length and were meant to critique, interrogate, and supplement what other students wrote the week prior. These deadlines were staggered intentionally so students had ample time to read other people's posts, process the content, and

COMM 2004 Discussion Board Grading Rubric	
A	**Exemplary:** -Contributes well-written (i.e., well thought out, free of grammar, spelling, and proofreading errors) commentaries about the assigned readings and thoughtful peer responses to the discussion boards -Offers examples and demonstrates understanding of assigned readings and concepts in an exemplary manner -Properly cites sources of outside information and ideas -Meets deadline for submitting posts and peer comments -Regularly asks and answers questions and participates in online discussion above and beyond the required 3 peer response minimum -Responds to peers when they ask questions on posts—attempts to have interactive discussion
B	**Good:** -Contributes well written commentaries about the assigned readings and thoughtful responses to peers' posts -Offers examples and demonstrates understanding of assigned reading -Properly cites sources of information and ideas -Meets deadline for submitting posts and peer responses -Meets the minimum 3 peer comment requirement
C	**Satisfactory** -Contributes commentaries about the assigned readings and peers responses to the discussion board by the weekly deadline -Offers examples and demonstrates understanding of assigned readings -Does not meet the 3 peer response minimum
F	**Failing:** -Does not contribute regularly and substantively to the discussion boards.

Adapted from Kleinman, S. (2005). Strategies for Encouraging Active Learning, Interaction and Academic Integrity in Online Courses. Communication Teacher 19 (1). 3-18.

Figure 2.3. COMM 2004 discussion board grading rubric

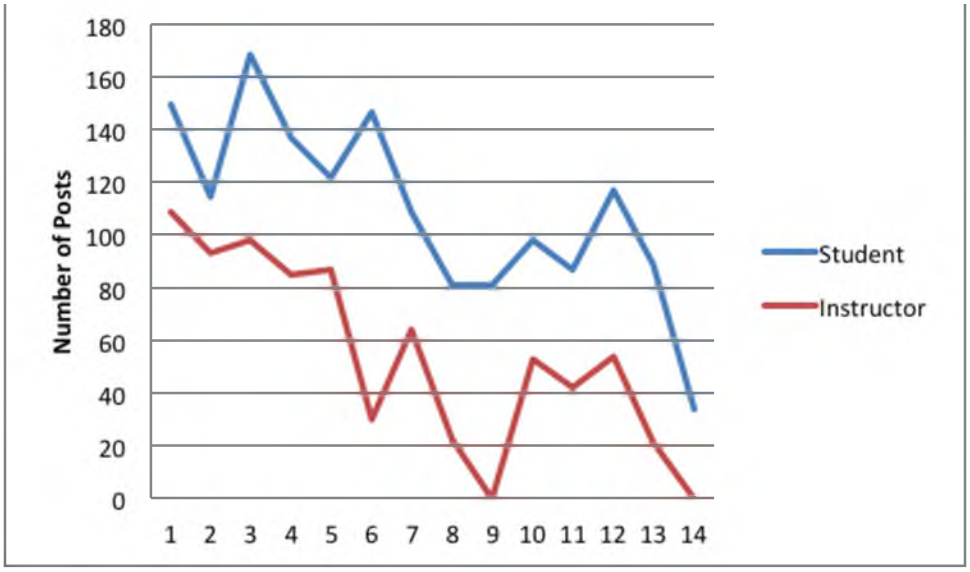


Figure 2.4. Discussion Board participation over 15 weeks of class

respond thoughtfully to their peers.

In addition to individual DB posts, quizzes, and tests, students also participated in two small group DB projects. In the first small group project, students were randomly assigned and asked to do research on various types of alternatives to western medicine and make recommendations to their peers based on their research. For the second project, students were asked to develop an action plan to solve an environmental problem of their choosing.

In the first project, students were randomly assigned into a dyad pair of two students and asked to do research on various types of alternatives to western medicine. For example, if students chose to do the topic of acupuncture, students discussed the pros and cons of doing acupuncture based on their own research and advised whether others should engage in the activity as a form of medical treatment. Students had to write 500 words for their initial post, provide a bibliography and comment on three other groups'

projects. Students were also asked to fill out a peer evaluation form for their partners based on their experience during the project.

Then, based on the outcomes on peer evaluation forms from the first project, membership of the groups for the second project was determined. Among other questions about their peers' performance, students filled out a revised version of the Net Promoter Score (NPS) for their peers. More specifically, they answered to what extent they would recommend working with their peers to others on a 5-point Likert scale.

Based on the NPS, some students stayed with their original group members and some students moved into new groups (e.g., if students reported having positive experiences, then they stayed in their original groups. If they had negative experiences, they were put into a new group). This peer evaluation process aimed to help reduce disharmony and promote collaboration. It also gave students a chance to reflect on their first groups experience and hopefully improve for their next group experience. The peer evaluation form and icebreaker assignment used for the group projects can both be found in Appendix B.

For the second project, students worked in a group of three to four and were asked to develop an action plan to solve an environmental problem of their choosing. For example, if students chose to talk about saving endangered rhinos, they were asked to first discuss the problem and why it was an important one to address. Then, based on their research, students were asked to develop an action plan to help save the rhinos.

These action plans were supposed to include actions that could be taken on an individual and collective level to help solve the problem. Additionally, students created a PowerPoint presentation to demonstrate the problem they researched and the action plan

they developed to solve it. Students also provided a bibliography of at least 10 resources, two of which had to be videos. Similar to the first project, students also completed peer evaluation forms for one another, which were also used to help calculate each individual's final grade on the project.

For both projects, to help facilitate the group process, I provided basic instruction in small group communication and an icebreaking period for students to get to know one another. The project descriptions as well as the icebreaker assignment used for both projects can be found in Appendix B.

Class Members

Participants for this study were students from the University of Cincinnati (UC), a large, Midwestern university situated in an urban setting, with approximately 42,000 students. Most UC students tend to commute to school and many of them also work at least part-time.

In my experience teaching COMM 2004, there has generally been a mix of genders and ethnicities. There is also usually a wide range of majors from the sciences to the humanities and everything in between. For this particular iteration of COMM 2004, the enrollment in the class was 41, 20 of whom were Environmental Studies (EVST) majors. Six students were Communication majors. There were also students from a variety of other disciplines, including the following: Criminal Justice, Geology, Psychology, Chemistry, Finance, Biology, Language Arts, Philosophy, and Graphic Design. Eighteen of the students were males and 23 were females.

Procedure/Data Collection

In this section, I first describe the design of the current study and explain the procedure I used to collect data from the participants. Second, I detail the types of texts I gathered for my qualitative analysis. Finally, I describe the measures I used for my quantitative analysis.

This study incorporated a basic quasi-experimental design. To more fully understand the impact the class (i.e., the intervention) had on the outcomes, I administered a pretest/posttest measure designed to determine what impact, if any, COMM 2004 had an students' environmental attitudes, behaviors, and willingness to talk to others about environmental issues. Because I studied an online course with certain expectations and goals, the design was as follows:

Participant group → Pretest → Intervention → Posttest/Outcomes

As shown in Figure 2.1, I administered the pretest just prior to the coverage of environmental content in the class, and I distributed the posttest immediately after the environmental portion of the class.

Students had two opportunities to participate in this study: a) the completion of the pretest/posttest measure and b) the permission to use their Discussion Board posts. Pretests were completed before the final third of the class, prior to the start of week 10 when environmental content officially began. Participation was voluntary with extra credit available for participation. If students chose not to participate, they were offered alternative extra credit opportunities per IRB protocol.

The class was alerted to the research opportunity via an "Extra Credit" tab in the main entryway of the class that was housed in our shared BlackBoard web portal.

Students also received two reminders when the pre- and posttests were available and due for completion. Participants filled out the measures online using a SurveyMonkey account. This account was kept separate from the researcher until after the class was complete so that bias could be avoided on the part of the instructor (i.e., the instructor did not know who was participating while the class was in session so as not to influence grading and perceptions of students).

No data were analyzed until the student's final grades were submitted. I accessed the surveys to award extra credit points after the final exams in the class were turned in, but I did not access their actual responses until students knew their final grades. The protocol was discussed with the University of Cincinnati's IRB and met all of its requirements.

Qualitative Data

To analyze my data more thoroughly, I used NVivo version 10 Software as well as both confirmatory and emergent methods of coding to help content analyze my data. Initially, I was interested in exploring several a priori theoretical concepts that exist in the literature including the notions of "community," "types of online interaction," "presence," "trust," and qualities of a "third space." I was also interested in learning more about the extent to which the course and class participants seemed to exert "influence." There were several goals with collecting qualitative data: 1) To give some depth to the posttest measure outcomes, 2) To pick out emergent themes using multiphase coding, 3) To empirically observe ways in which an OLC appears to (or not to) have formed, 4) To identify what appears to be peer/normative influence in posts, 5) To capture some empirical in situ data that might reveal how interactions in the class (e.g., conversations with instructors

and peers) might influence posttest outcomes, and 6) To empirically observe ways cognitive, social, and teaching presence emerged in the class.

With asynchronous discussion being the foundation of the class, I was most interested in finding out what happened during the discussion board interactions; therefore, the primary unit of analysis for this study was a discussion board post. These posts can be split into two types, instructor and students. However, I was also analyzing other data along with DB posts, which were also included in the total number of codes as well.

Texts/Sources

Field Notes

My field notes spanned the entire period of the class. In total, I had 133 single spaced pages of field notes. Field notes helped me develop a sense of how the class was structured, provided a helpful narrative for how the class progressed, and identified significant interactions I experienced as the instructor of the class. I detailed my reactions as to what was happening in the class as well as how changes I made to content and structure seemed to impact the class. I also used my notes to give more thick description (Geertz, 1973) on the actual content and structure of the course.

Discussion Board Posts

There were 36 out of the 41 participants in the class who gave me permission to use their DB posts in this dissertation. All available posts from these 36 students across all three segments of the course were coded. There were some weeks when students opted not to participate in the DB; therefore, when posts were absent, they could not be

included in analysis. There were a total of 1,536 posts included from the students. There were an additional 758 posts and 136 email reminder posts included from the instructor.

Syllabus

The syllabus for a course is an important document that helps instructors set the stage for a class. The syllabus helps students understand the goals and expectations of the class, establishes tone, and sets up guidelines and netiquette for the class.

Arguably, because online classes lack the physical presence of an instructor, which students get in the face-to-face classroom, the course syllabus could be an even more important document in the online classroom as it also helps establish teaching presence. Hence, the course syllabus is worth analyzing in a case study about using online spaces to promote the environment.

Coding Process

I used a hybrid coding approach that was both a priori and emergent. First, I began developing my initial set of codes based on my experiences teaching the class previously. For example, among other possibilities, I thought I might find examples of "peer influence," "instructor influence," "leadership," and "self-disclosure."

Second, based on my previous experiences, I sought out literature to help me try to explain some of the observations I had made. As a result, I used several conceptual frameworks to guide my coding, which I previously discussed in my literature review and here mention again: 1) The Papastergiou et al. (2011) definition of an OLC, 2) Moore's (1989) three types of online interaction, 3) Anderson's (2001) four types of online

presence, and Davies' (2006) conceptualization of the Third Space using Gee's (2006) explanation of affinity spaces. I also expected to find evidence of collaborative learning (De Laat, Lally, Lipponen, & Simons, 2006), "playful learning" (Vygotsky, 1962), peer influence/encouragement (Jang et al., 2012; Liang & Scammon, 2013;), as well as evidence of heuristic processing (Griffin, Neuwirth, & Dunwoody, 2002).

I first engaged the complete data set and took notes about what themes started to emerge. Second, I input my initial list of codes into NVivo, which I used as a starting place for my coding process. Then, I coded all documents week by week using the initial set of codes. As I coded, I wrote memos, added new codes, refined old codes, and made note of potential exemplars from the data set.

As the coding process continued, concepts were further expanded and refined and other themes emerged. While I was primarily interested in what I could learn about the formation of online communities and the impact such communities might have on environmental attitudes and behaviors, I tried to stay open to other emergent possibilities as well. For example, I started with three main codes for presence (i.e., cognitive, social, and teaching), and an additional fourth category for "learner presence" emerged, as well as dozens of additional subcategories for each type of presence.

Another unexpected finding occurred during the second part of the class, which covered health content. More specifically, students engaged in the action of "uncertainty reduction," which did not happen in any other part of the class. I also ended up coding for "Awareness" (e.g., of health problems, environmental issues, new sources), which was not originally anticipated in initial codes. There were also many "actions" performed by the instructor and students alike that I originally did not expect to emerge, which I

ultimately coded as well.

After all the data were coded and all categories were finalized, I totaled the number of posts for the class and the number of codes for each category, confirmatory and emergent, and input the information into Excel. I used excel to generate charts, tables, and graphs to display the trends in the qualitative data. Finally, I used the themes and their associated codes, to tease out and examine exemplars to gain a better sense of the process behind the numbers.

Quantitative Data

The pretest/posttest survey I used for this study contained six different scales (see Appendix C for all measures). The scales were based on 5-point Likert scale from strongly disagree (1) to strongly agree (5). For each scale, the means were calculated on the pretest and compared with posttest measures (with negative items being reverse scored). Students were also asked to share some basic demographic information. In the section that follows, I explain each scale and why it was used in the current study.

Instruments

The CoI

First, I incorporated two scales to capture more about the students' perceptions of the extent to which they experienced feeling like part of an online community. The first instrument was the Community of Inquiry Instrument (CoI) (Arbaugh et al., 2008). The CoI framework has been used extensively in qualitative online learning research (e.g., Anagnostopoulos, Masmadjian, & McCrory, 2005; Garrison & Arbaugh, 2007; Garrison

& Cleveland-Innes, 2005), and more recently, there has been a move to use the framework more quantitatively (Arbaugh, Cleveland-Innes, Diaz, Garrison, Richardson, & Swan, 2008), hence the development of the CoI scale itself. The CoI was intended to help researchers tease out what is needed for the creation of meaningful learning experiences and community, including three types of overlapping presence (i.e., social, cognitive, and teaching) (Arbaugh et al., 2008). The CoI used in this study is the same version originally created by Arbaugh and co-authors; it contained 34 items and it factored out into the three multiple interrelated presences.

Initially, the CoI was created to answer calls from researchers to move beyond strictly qualitative studies, which incorporated the community of inquiry framework, but did not have empirical (i.e., quantitative) evidence to validate it. With approximately 763 citations to date (google scholar, March 2015), the CoI has become a trusted measure when it comes to understanding more about how communities are conducted online.

Multiple researchers across disciplines have called for additional testing of the CoI, which includes the use of multi-institutional samples as well as quantitative and mixed methods approaches to improve the usability and generalizability of the scale (e.g., Arbaugh, 2007; Garrison, 2007; Ho & Swan; 2007), a call which is partly answered by the current study.

The SOVC

The second instrument I used to further explore the extent to which a sense of community was experienced by members of the class was the Sense of Virtual Community (SOVC) measure developed by Blanchard (2007). According to Blanchard (2007),

SOVC is defined as: "members' feelings of membership, identity, belonging and attachment to a group that interacts primarily through electronic communication. SOVC assesses the 'community-ness' of virtual communities; it distinguishes virtual communities from other types of virtual groups" (p. 827).

The development of the SOVC stemmed from extensive work done in psychology on SOC or sense of community, first recognized as important for the successful functioning of communities in face-to-face situations by Sarason (1986). Because previous work had focused primarily on face-to-face interactions, as opposed to those which occur online, researchers sought to expand our understanding of sense of community to also include virtual environments, hence the creation of the SOVC (Blanchard, 2007; Blanchard & Markus, 2004; Koh & Kim, 2003; Liang & Scammon, 2013; Roberts, Smith, & Pollock, 2002).

The NEP Scale

The first scale I used to explore the environmental attitudes of participants was a revised version of the New Ecological Paradigm Scale (NEP) (Cordona, Welcomer, & Scherer; 2003). The scale was originally created by Dunlap and Van Liere (1978) and has since been revised and used by the original creators of the scale (e.g., Dunlap, Van Liere, Mertig, & Jones, 2000) and others in Environmental Education and related fields to examine the environmental attitudes of various populations. The higher the score a respondent has on the NEP scale, the greater the pro-environmental attitudes an individual is said to have (Dunlap et al., 2000). According to Shultz and Zelezny (1999), NEP scores can also correlate to what degree an individual perceives humans as protectors of nature rather than consumers of nature.

Put simply, if an individual has a high NEP score, they are more likely to prescribe to the NEP and be less likely to be in line with the Dominant Social Paradigm (DSP). The NEP and DSP can be viewed as opposite ends of an ecological worldview continuum (La Trobe & Acott, 2000). While the DSP emphasizes the dominant ideologies of modern Western culture (e.g., consumption, growth, technology, and consumerism), the NEP serves as a more environmentally conscious worldview, which counters these "everyday" cultural views about the environment (La Trobe & Acott, 2000; Mayer & Frantz, 2004).

Dunlap et al. (2000) claim what the NEP is used for depends on the goals of the research; furthermore, questions on the NEP can be omitted or added and still produce reliable results. For example, Dunlap et al. (2000) found their revised version produced a Cronbach's alpha of .81. Additionally, the Cordano et al. (2003) eight-question abbreviated version produced a.72 Cronbachs alpha.

The NEP and its various versions has been one of the most widely used instruments to compare the environmental concerns of different groups (Cordano et al., 2003; Dunlap et al., 2000; Ewert & Baker, 2001; LaTrobe & Acott, 2000; Sherburn & Devlin, 2004; Van Liere et al., 1981). Furthermore, NEP scores have been correlated with factors such as political affiliation, religion, college major, education, age, sex, and other cultural factors. Research has shown it to be a useful, trusted, and reliable tool. Thus far, however, no research has used the NEP scale to study environmental education interventions in an online classroom. The same is true for the next scale I used to learn more about the environmental tendencies of the class.

The CHEAKS

The next environmentally focused scale I used tapped into emotions/affect, behavioral intentions and behaviors. It was a revised version of the Children's Environmental Attitudes and Knowledge Scale (CHEAKS) (Leeming, Dwyer, & Bracken, 1995). The CHEAKS was originally developed as an instrument that could be used in a wide range of research contexts with sound psychometric properties. Until the creation of the CHEAKS, there were no instruments that could be tested across contexts, which had also been tested for reliability and validity. As a result, Leeming and the other co-creators of the scale sought to create an instrument that could not only be used across contexts, but could also be used in comparative studies as well.

The design of the instrument was based off of a similar scale intended to measure the environmental attitudes and knowledge of adults created by Maloney, Ward, and Braucht (1975). Based on a review of the Maloney et al. original scale by Gray, Borden, and Weigel (1985), it not only had acceptable reliability and validity, but also tapped into the complexity of attitudes by factoring out into other components, including affect, behavioral intentions, and actual behavior (as cited in Leeming et al., 1995).

I chose to include a modified version of the CHEAKS, originally intended for children, rather than Maloney's scale intended for adults, for a few reasons. First, the wording of the CHEAKS was much more simplistic, accessible, and easy to understand. Second, the CHEAKS scale had shown to be a reliable and valid measure and been tested more recently than Maloney and colleagues' original version (e.g., Alp, Ertepinar, Tekkaya, & Yilmaz, 2008; Walsh-Daneshmandi, & Machlan, 2006;). Third,

the CHEAKS was the only scale I could find that had been tested for reliability and validity, which could also measure attitudes and behaviors in one scale. Given the number of questions and scales I was asking participants to fill out, I also wanted to err on the side of fewer questions to avoid less exhaustion on the part of the participants.

I excluded the knowledge portion of the scale originally included in the CHEAKS, because the content in COMM 2004 did not align with the content taught when the CHEAKS was originally created. Rather, I used the scale primarily as a helpful tool to get at both attitudes and behaviors.

The CIS

The fifth scale I used was comprised of two subscales: 1) the CIS1 (Course Influence Scale and 2) the CIS2 (Course Information Scale). I developed these sub-scales myself based off of Moore's (1989) three types of interaction and what I had already experienced in previous iterations of teaching COMM 2004. This measure was composed of four questions for each of the three types of interaction for a total of 12 questions. I used these two subscales scales to explore the extent to which students perceived the class, content, or peers as influential as well as to what extent they were willing to share or communicate about health, science, and environmental information. Although I had not yet tested the instrument prior to this study, my dis-sertation served as an excellent opportunity to see if the scale had good measurement properties.

Net Promoter Score (NPS)

Finally, I included the net promoter score (NPS) for each respondent to see if I could find any relationship between the levels of community experienced by students and their overall satisfaction with the class. The NPS was originally created to measure customer satisfaction and loyalty. In this study, it was used to measure the satisfaction level of the students after participating in an online learning community.

At the posttest assessment time, each student was asked to give a rating of the class on a scale of 1-10 (where 1 = "You definitely would not recommend this class" and 10 = "You most certainly would recommend this class"). Students who rated the class 0-6 were classified as Detractors, while students who rated the class 9-10 were classified as Promoters.

Inferential Statistics

The research questions developed for this study lent themselves to hypotheses concerning attitude and behavior changes across the various measures over their pretest and posttest administrations. To test the supporting hypotheses, I ran various inferential statistics using SPSS Software to examine the survey data (i.e., pretest/posttest). I was interested to see if there appeared to be a significant change between how students scored on the various measures before and after the class as well as what relationship (if any) existed among various demographic/background variables (e.g., major, age) and students' responses to community and environmental attitudes/behaviors measures. The reliability of the all measures used in the pretest/posttest were examined using Cronbach's alphas. In addition, the dimensionality of the CIS, developed by the

researcher, was tested using confirmatory factor analysis. Additional information on the quantitative results can be found in Chapter 4. Next, in Chapter 3, I discuss the results from my qualitative data.

Mixing the Data

Ultimately, I split the qualitative data set into thirds for purposes of comparing each part of the class. I separately coded, saved, and printed the data at each interval of the class after completing the coding such that each 1/3 of the class could stand on its own and be compared to the others. Then, I used the pretest/posttest results from my quantitative data to help corroborate and/or refute my qualitative codes. For example, during my coding, I looked for evidence that an OLC had formed; in my pretest/posttest measure, two of the scales I incorporated (i.e., the CoI and the SOVC) tapped into what extent participants felt like they were a part of a community. Additionally, in the qualitative data, I coded for evidence of various types of "presence," which were also factors in the CoI scale.

I also looked for evidence in the qualitative data that the course content, instructor, and/or peers seemed to exert an influence on students in the class; the CIS instrument I developed for this study likewise teased out this influence quantitatively. I used two scales to learn more about the impact the class had on students' environmental attitudes and behaviors (i.e., the CHEAKS and the NEP) and also coded for evidence of behavioral intentions and actual behavior toward the environment in the qualitative data set as well.

Summary

This chapter discussed my methodology. I described the multiple method case study approach that I used. I discussed the site of the study, the participants, and the types of qualitative and quantitative data I collected and analyzed. Finally, I discussed how I went about mixing the various types of data I used in this study. The findings from my coding process and resultant themes are further discussed next in Chapter 3. Chapter 4 contains the quantitative results. Finally, what can be learned by combining the qualitative and quantitative results is discussed in Chapter 5.

CHAPTER 3

QUALITATIVE RESULTS

This chapter discusses my qualitative results in five steps. First, I provide some descriptive information about the texts, the level of participation in the Discussion Board (DB) posts by both the students and myself, and the number of themes and the percentage of coded texts that comprised each theme. Second, to foreground the explanation of how community developed in COMM 2004, I provide some basic graphical data that summarizes the major concepts that comprised community, and exemplars from the participants that emerged during each part of the class.

Third, I describe the multiphase process through which community developed. This process followed—with a few exceptions unique to COMM 2004—Tuckman's (1965) explanation of the small group process: (a) forming, (b) norming, (c) storming, (d) maintenance/renewal, (e) performing, and (f) transformation. To help conceptualize how this process occurred, I provide a visual model and weave in additional exemplars from the voices of participants. Fourth, I discuss the emergence and development of Third Space qualities in COMM 2004. Again, I provide a brief summary of the major Third Space qualities that emerged in each part of the class

using graphical data and exemplars. I also provide a visual model to conceptualize how a Third Space seemed to function in COMM 2004.

Fifth, I discuss the extent to which the class seemed to influence participants, including their behavioral intentions and information seeking-sharing tendencies. Finally, I conclude by briefly summarizing how the qualitative analysis helps answer the Research Questions of the study.

Descriptive Information on the Texts

Thirty-six students gave permission to use their DB posts in this study. The total number of DB posts used for analysis was 2,293. Students contributed to 67% of these posts. I contributed to 33% of the posts. These 2,293 posts yielded 17,840 coded segments. These segments resulted from the coding of posts, with a post being the primary unit of analysis. All posts had at least one coded segment. These posts can be split into two types: instructor and students.

Themes

There were five major themes, each with its own subsets of codes. The most prevalent coded segments were for the theme of community, which represented 79% of all coded segments. Following community were themes for topic/content (10%), Third Space (6%), influence (2%), behavior and intentions (2%), and other emergent codes (1%). Table 3.1 and Figure 3.1 display the total number of coded segments for each theme as well as the percentage of coded segments that made up each theme.

Table 3.1. Total number of coded segments for each theme

Community	14134
Third Space	1022
Influence	317
Behavior and Intentions	362
Topics/Content	1744
Other Emergent Codes	261
Total	17840

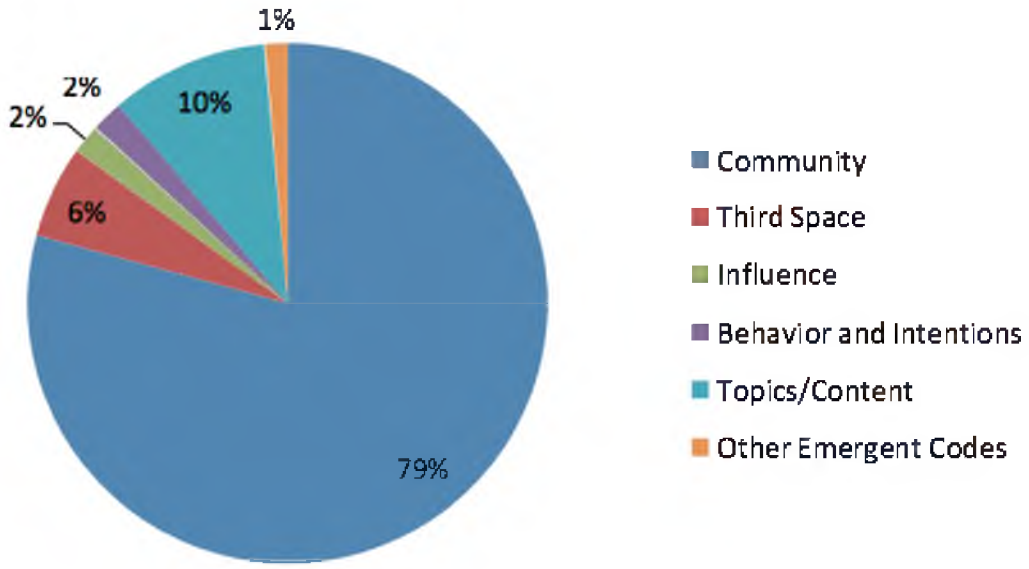


Figure 3.1. Percentage of total coded text fragments that compose each theme

Community

According to McMillan and Chavis (1986) a sense of community has developed when participants experience a sense of belonging, identity, and attachment to a group (as cited in Arbaugh, 2007). Essentially, this feeling of "we-ness" becomes the mainstay for the level of community experienced in the class and can be stimulated through the discovery of mutual tendencies, interests, and similarities; self-disclosure that begets trust (Cutler, 1996); and the building of personal relationships (Blanchard & Markus, 2004).

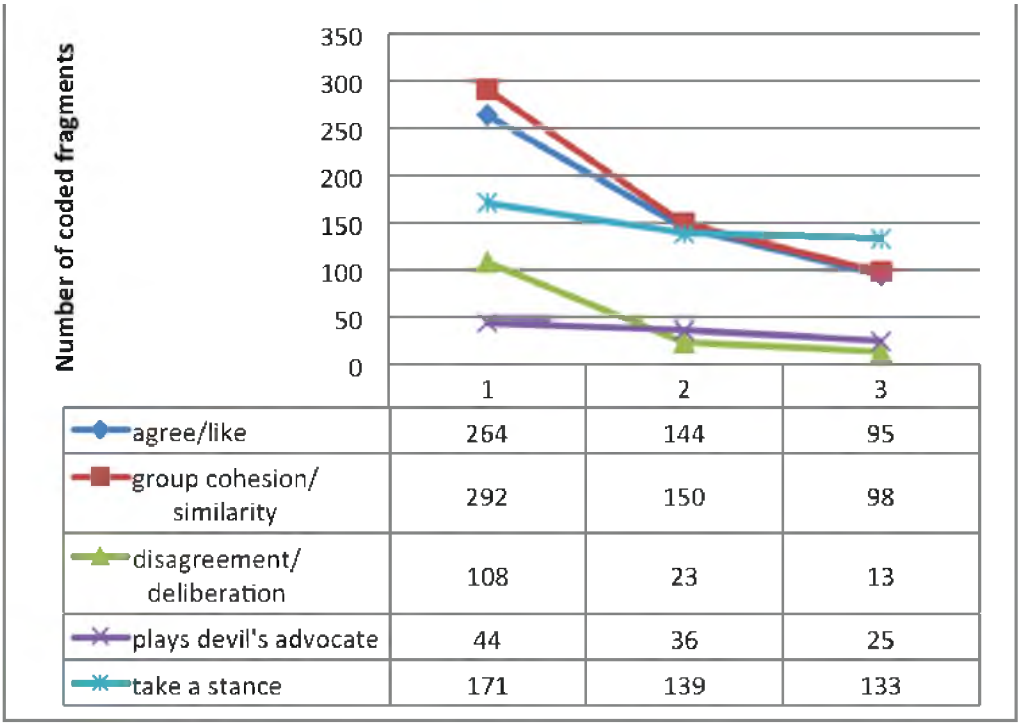
For the current study, community is conceptualized and described as the outcome and interplay that results from the co-mingling of the following five variables: (a) interactions among members (including the instructor); (b) four types of online presence; (c) a multiphase membership-development process, which includes the establishment and conferral of group membership and a norming of class netiquette; (d) an increasing prioritization of others' interests in the community; and (e) an emerging sense of a collective "we." Following this introduction, the chapter will present the evidence for interaction, presence, membership development, prioritization of needs, and the sense of "we."

To help determine if a community formed in COMM 2004, I began by coding for several a priori concepts from the literature—the types of online interaction and presence reported in Chapter 1—as well as evidence of trust building and sustained deliberation, which have all been dubbed by previous authors as necessary precursors for online communities to develop. Additionally, because previous work in collaborative learning indicates that opportunities for small group work enhance the level of community experienced by participants, I coded for instances of community building via teamwork. Finally, I did text searches over community-connected terms ("we," "our," etc.) to ensure a broad capture of community discourse.

Based on qualitative coding, it does appear that a sense of community developed in COMM 2004. In Part 1 of the class, 83% of all text fragments were coded for community. In Part 2, 81% of all coded fragments were for community. Finally, in Part 3 of the class, 77% of all text fragments were coded as some element of community. One possible explanation for the gradual decline in the number of coded fragments for community is the reduced number of posts required of students later in the semester for the two group projects. Another explanation is that students may have been experiencing general exhaustion near the end of the semester, with other commitments competing for their attention. The supporting qualitative evidence that this community developed and was maintained is described in the section that follows.

Types of Online Interaction

Online learning communities can be understood as the process and product of various interactions (e.g., communication) in an online context over an extended period of time. It is through interaction that community is performed, and in an online class, this performance can be studied through a close examination of posts. I coded for four types of online interaction: (a) learner-instructor (b) learner-content, (c) learner-learner, and (d) learner-interface. The first three types of interaction were initially described by Moore (1989) and the fourth type was added by Gudawarena et al. (1994). I was interested to learn more about the frequency and character of interactions across time. I was also interested in exploring the theoretical relationship between online interactions and the types of online presence, which I will discuss in the next subsection. Figure 3.2 displays the types of interactions that happened in each part of the class and their frequency.



	1	2	3
agree/like	264	144	95
group cohesion/ similarity	292	150	98
disagreement/ deliberation	108	23	13
plays devil's advocate	44	36	25
take a stance	171	139	133

Figure 3.2. Types of online interaction

Learner-Instructor

A post was coded as learner-instructor whenever I initiated communication or interacted with a student. Learner-instructor interactions were at their highest frequency during the first part of the class when I welcomed students, helped break the ice, drew in participants, set the tone of the class, and began disciplining the process of the class flow and structure.

Students also initiated communication with me, although not as often as I initiated with them. When students did begin the exchange with me, I coded it as "upward communication with the instructor." Figure 3.3 displays the number of instances of upward communication coded in each part of the class. These interactions, like others, also peaked during the first part of the class and continued to decline throughout the semester. Usually, when students did directly interact with me, it was the result of me

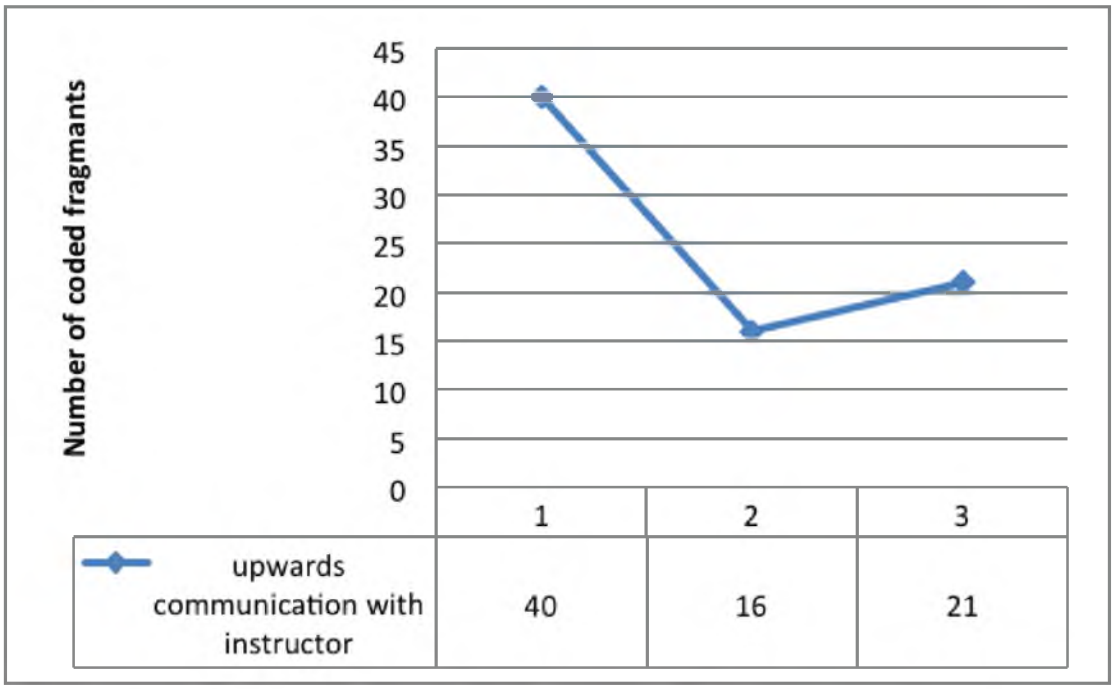


Figure 3.3. Upward communication in each part of the class

first commenting on one of their posts. For example, during Part 1 of the class, a student and I interacted when we discussed what age groups are likely to use certain media. One student commented how it was primarily younger generations that used Facebook, and I pointed out that that was not necessarily an absolute:

> Me (in response to student's post): One exception to the rule (so far anyway) is women in the 50-ish age group—they are increasingly getting online for info and social networking.
>
> Student: So that explains why my aunts are suddenly taking over my Facebook feed. (2)[4]

It also seemed that there were a specific handful of students who were more likely to engage in upward communication with me as the instructor, with most other students interacting only with their peers. This may be due in part to the fact that there is a power

[4] The number 2 represents the reference number of this particular text fragment in NVivo.

dynamic between student and instructor that is difficult to overcome in the college classroom. Not to mention that not every student wants this type of interaction with his or her professor. Likewise, I did not require students to talk to me in their posts as I did with their peers. It is possible "forcing" students to talk to me as a requirement could have merely reinforced this power dynamic.

Learner-Content

A text fragment was coded as learner-content when a student specifically referenced content from the class. This included citations from the books, PowerPoint lectures, or videos in the class. This code was also used when students introduced new content in the class that they had researched, learned about in another class, or opted to share.

Part 1. In Part 1, content focused on science and mass communication, and DBs focused on critical thinking and problem solving around those areas. For example, one student referenced a lecture that discussed the notion of the self-reinforcing echo chamber:

> As one of our lectures covers, there's also the notion of the self-reinforcing echo chamber where people tend to just seek out information/news channels that merely reinforce what they already think or believe—be it on TV or the Internet. In other words, although there might be many options to pick from online, people will still tend to seek out either more liberal or conservative sources depending on which way they lean. So, yes, people have more options online, but I don't think that guarantees they will be exposed to more, different, or varied opinions per se. It depends on what you seek out and what you can find. (21)

Part 2. Part 2 of the class focused on Health Communication. There was less content referenced by students from the books and lectures and more integration of students' own outside research, primarily because of the kinds of DB prompts in the second part

of the class (i.e., more prompts in Part 2 required students to do research). For example, for the group projects on alternatives to Western medicine, students worked in pairs and taught us more about the pluses and minuses of acupuncture, massage therapy, medicinal marijuana, aromatherapy, hypnosis, and visualization (among others). Students also did their own research on celebrities who were involved in some sort of a health cause or issue; health blogs; and pharmaceuticals, cosmeceuticals, and nutraceuticals (e.g., Cymbalta, Revlon Age Defying makeup, and fish oil). Finally, students plugged organizations or health causes they participated in or found out about through research, such as the Susan G. Komen foundation, Autism Speaks, Helping Haitian Angels, and UC's Student Wellness Center.

Part 3. The third part of the class focused on Environmental Communication. Students completed individual DB assignments that asked them to research products and companies that seemed to engage in some sort of greenwashing. Students also completed a second DB group project, wherein they researched and found solutions to various environmental problems. Within their short papers and PowerPoint or Prezi presentations, students were asked to generate solutions to the environmental problems they researched by couching them within the four types of pro-environmental behavior as outlined in Julia Corbett's book *Communicating Nature*. As a result of the students' efforts, we as a class learned more about sustainable agriculture, eutrophication, rising sea levels, deforestation, urban sprawl, the effects of climate change on human health, and other topics that were not in the original purview of the class. Students further interacted with this content during their last quiz for the class, which was based off of the content learned from the second group projects.

Learner-content interactions steadily declined over the course of the class, with a slight surge in the last part of the class due to the outside research required from the DB assignments. At one point, I realized the decline in the integration of content and made a note for how to improve it for the next iteration of the class:

> I need to more strongly emphasize that they need to incorporate examples from lectures/books to be integrated into comments/peer posts—perhaps I could include that in the rubric for the DBs next time and make their grade contingent on it. (3)

Although students were exposed to content in the class in other ways (e.g., PowerPoint lectures, videos, quizzes, tests) this lack of content integration in the DBs was seen as an area for improvement in the class. At the same time, the surge in content in Part 3 could also suggest that students were actually interested in environmental content.

Learner-Interface

Preece (2001) argues that whenever possible, issues with the online interface should be engineered out so as to not disrupt the formation and functioning of the community. Texts were coded as learner-interface when the Blackboard site itself seemed to somehow impede or interrupt the flow of the class, interactivity, and/or understanding of the students or instructor. I used feedback from the students, which I collected using an anonymous SurveyMonkey questionnaire 4 weeks into the class, to make adjustments to the interface. Arguably, this effort to make changes based on student input, as well as the students' increasing familiarity with the structure and flow of the class over time, contributed to the decrease in the number of instances coded as learner-interface interactions. Suggestions for improving interface interactions in an online class are discussed in Chapter 5.

Learner-Learner

Learner-learner interactions remained relatively steady throughout the class, most likely in response to the course requirement for students to respond to a minimum of three peer posts each week. This requirement was designed to facilitate interaction among students as well as encourage them to question, critique, and add to what their peers said in their posts. During weeks when group projects were due, students were instead asked to submit three posts total for the group. This change in the number of required peer comments is noteworthy as it may have also contributed to the decline in the number of learner-learner interactions in Parts 2 and 3 of the class. Although one may expect that interactions between students to increase in frequency over time, the opposite was true in this case: Students interacted more frequently initially and then interaction gradually decreased over time.

Part 1. During the first part of the class, particularly during Week 1, when the students completed their icebreakers, most interactions between students involved some sort of playful small talk that resulted in students finding similarities between themselves and the instructor, as seen in the following example:

Student 1: I work at Skyline Chili when I'm not at school.

Student 2: You should totally get the class Skyline.

Me: I'm personally a bigger fan of Gold Star.

Student 1: Skyline's chili is so much better.

Student 2: I have to agree.

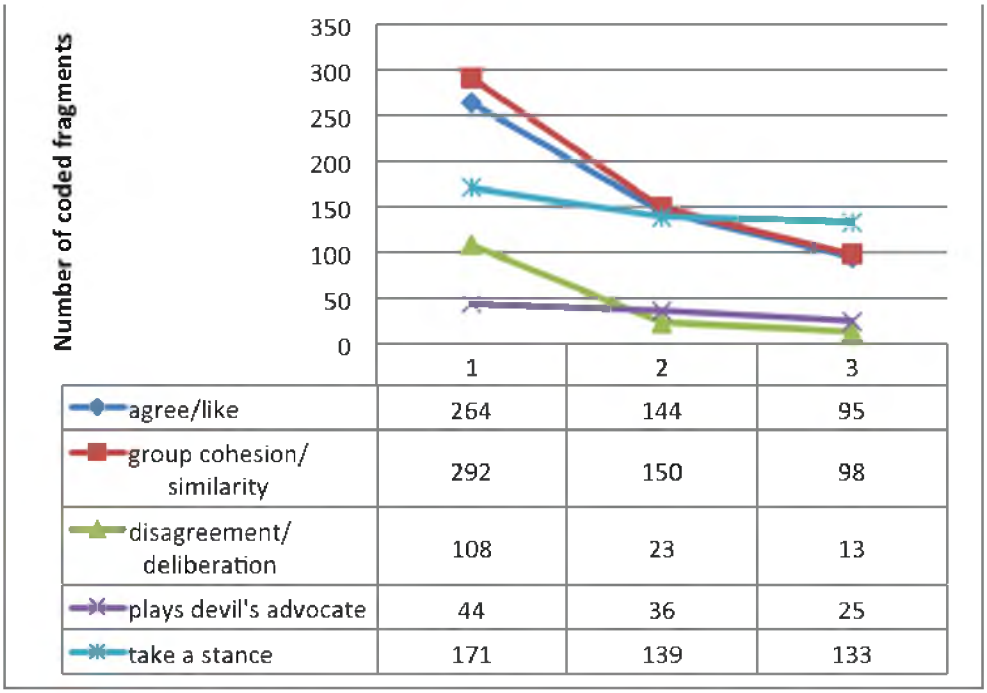
Me: For me, it's not a chili thing—it's a hot dog thing.

Student 1: So the chili wars continue.

According to Kim and Kim (2008), this small talk essentially becomes the "womb for dialogic moments" that makes deeper, deliberative conversation possible (p. 23). In other words, these opportunities to get to know one another may have helped the students feel more comfortable to talk freely about other, deeper issues in future weeks of the class. And in the next few weeks of the class, as prompts shifted away from fun, playful icebreaker activities with a tendency to evoke agreement and similarity, I noticed a decrease in the tendency to agree and an increase in the students' willingness to take a stance as well as play devil's advocate when it came to responding to their peers around Weeks 3 and 4. Figure 3.4 displays the tendencies for students to take stance, play devil's advocate, disagree, agree, and find similarity overtime.

In addition to students possibly feeling more comfortable as a result of icebreaking, this shift toward deliberation may partly be explained by the change in the kinds of questions asked by the prompts. More specifically, at this time, DB prompts elicited students' stances on science, political, and religious issues. Students were also asked to think critically and interrogate several mass communication theories.

Part 2. Toward the end of the first part of the class and increasingly in the second part of class, more students were willing to challenge one another's thinking, and there also seemed to be fewer tendencies to agree with one another. For example, when one student indicated that more science is needed on the news to educate the public, a peer in the class had this as a retort: "I would contest that the 'supposed science' that is often broadcast on TV today doesn't actually help educate as you seem to claim." Another student disagreed when a peer claimed that science majors should be required to take a world religion class:



	1	2	3
agree/like	264	144	95
group cohesion/ similarity	292	150	98
disagreement/ deliberation	108	23	13
plays devil's advocate	44	36	25
take a stance	171	139	133

Figure 3.4. Tendencies for students to take a stance, play devil's advocate, disagree, agree, and find similarity over time

> I disagree I think a world religions course would not be a waste of time for a science major. Religion may not be 'testable' but people who are religious I would think would tell you it IS based on empirical evidence. (1)

More often, however, students used language that did not explicitly express disagreement. Rather, they seemed to gently nudge and make more subtle suggestions. For example, when on student disagreed, she politely added, "Though I respect your points and am intrigued by your opinion, I would love to add a few points to this discussion." When another student criticized the Affordable Care Act, one of his peers responded with the following:

> I must admit that when I first heard about the Affordable Care Act that I thought it was exactly what you said, an extension of welfare benefits. I was surprised later on when I found out more about it and that it is not free and only makes health care accessible to people who might not have access otherwise. (7)

In both of these examples, although students disagreed with their peers, they did not come out and explicitly say so, per se. Rather, they were a bit indirect in their approach for disagreeing. This form of "polite disagreeing" continued throughout the class. It is possible that this emergent netiquette enhanced the level of community experienced in the class and/or discouraged more productive debate.

Part 3. In Part 3 of the class, students continued to push one another in terms of issues regarding the environment, although slightly less deliberating took place than in Parts 1 and 2 of the class. For example, when one student argued that nature would eventually trump humans and may not really need to be "saved," a student had this to say in response:

> I agree with you that nature is more powerful than humans and if someone is hurting the environment; they deserve to be wiped out. But I think it would be great if we could avoid that and make changes now before it's too late. Earth is such a beautiful place that I would hate to see it destroyed. (1)

Another student disagreed with a peer that all endangered species were the result of human activity:

> I think it's irresponsible to generalize so much to say that all endangered species are endangered because of human activity. Natural predation and natural ecological phenomenon that happen have been known to cause species to become endangered or extinct. Look at dinosaurs who went extinct long before man ever grew to be large enough to affect the environment. (1)

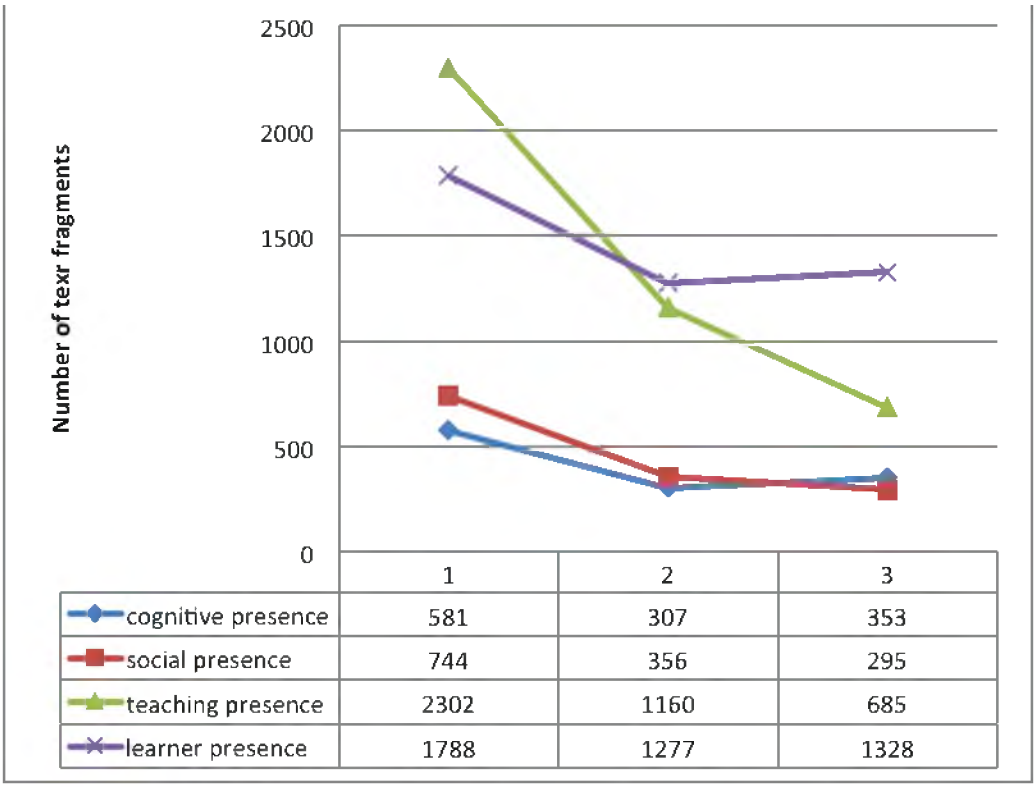
When a student posted about the efforts of the Kroger company to "go green," someone responded, "If Kroger has really gone green we shouldn't be able to see on the shelves products crops grown with toxic pesticides and fertilizers, foods with artificial flavors and preservatives, etc." As these examples show, students demonstrated they were willing to think critically and challenge the comments of their peers at least to some degree.

Types of Presence

I also coded for evidence of four overlapping types of online presence, the first three of which have been previously theorized and empirically observed in research of online learning communities. The fourth emerged during the coding of the data set used for this dissertation: (1) social, (2) cognitive, (3) teaching, and (4) learner. Previous literature indicates that community results from the overlapping of the first three types of presence, often privileging the importance of the teaching presence (i.e., the instructor) in community development.

I additionally discovered that learners themselves played an integral role in the sense of community that developed in COMM 2004 and therefore coded for a fourth type of presence: learner presence. Although there was quite a bit of overlap in the content that was coded for the "four types of online interaction" and the "four types of online presence," there was some distinction as well. For example, I always coded any post from student to student on the DB as learner-learner interaction; however, within each interaction it was possible and highly likely that multiple types of presence emerged. Similarly, any post from me to the students I coded as learner-instructor interaction; however, within those interactions, multiple kinds of teaching presence materialized.

There was evidence of all four types of presence in COMM 2004 (see Figure 3.5). While learner, social, and cognitive presence remained fairly steady in the second and third parts of the class, by pedagogical design, teaching presence was highest during Part 1 of the class and continued to decline. In the next few subsections, a description of each type of presence is given, a rationale for why text fragments were coded as each type of presence is explained and evidence from the text exemplifying presence is provided.



	1	2	3
cognitive presence	581	307	353
social presence	744	356	295
teaching presence	2302	1160	685
learner presence	1788	1277	1328

Figure 3.5. Four types of presence over time

Cognitive Presence

I found evidence of cognitive presence in the data set. A text fragment was coded as cognitive presence when it aligned with an element of the Garrison et al. (2001) explanation of cognitive presence as a heuristic process over time involving several steps: (1) triggering event, (2) exploration, (3) integration, and (4) resolution/application. I also coded when students engaged in creativity, critical thinking, and self-reflection, and when their interest/curiosity seemed to be piqued, as I saw them as additional, distinct types of heuristic processing. There were a total of 1,241 text fragments coded for cognitive presence or 6% of all coded texts. As demonstrated by the line graph in Figure 3.5, cognitive presence occurred most frequently during Part 1 of the class (n = 581), decreased in Part

2 (n = 307), and then increased slightly in Part 3 (n = 353).

There were a few important catalysts or triggers for cognitive processing. First, DB prompts and the content from the class emphasized in them served as important starting points for cognitive processing. Second, students' responses to the DB prompts and subsequent peer comments sparked students to heuristically process, brainstorm, seek out information, and reconsider their own ideas. Third, comments from the instructor appeared to have trigger potential as well. Figure 3.6 depicts how these trigger moments seemed to occur in COMM 2004. Table 3.2 displays some exemplars of these trigger moments.

Triggers were noted each time the gears in the class changed (i.e., the content shifted), and the level of participation in the DB posts increased (see Figure 3.7). These shifts in content and subsequent increases in participation were seen as important moments for community renewal. Likewise, these shifts in content seemed to renew interest in the discussion, thereby maintaining cognitive presence and the sense of community experienced in the class. As will be discussed, there were additional triggers in each part of the class that also seemed to renew and maintain the community.

Texts were coded as "curiosity being piqued" when students seemed intrigued, enlightened, or surprised by content in the class or something one of their peers or instructor said in a post, as seen in the following example, which revolved around the University of Cincinnati Student Wellness Center:

> I had no idea they had over-the-counter medications! That is so helpful to know in case I ever get headaches or something on campus. Before your post, I only knew them as the place that gives out free condoms, but I'm glad they give out other beneficial things. What other programs do they provide? I think they should promote themselves more so more students know about what they have to offer. (2)

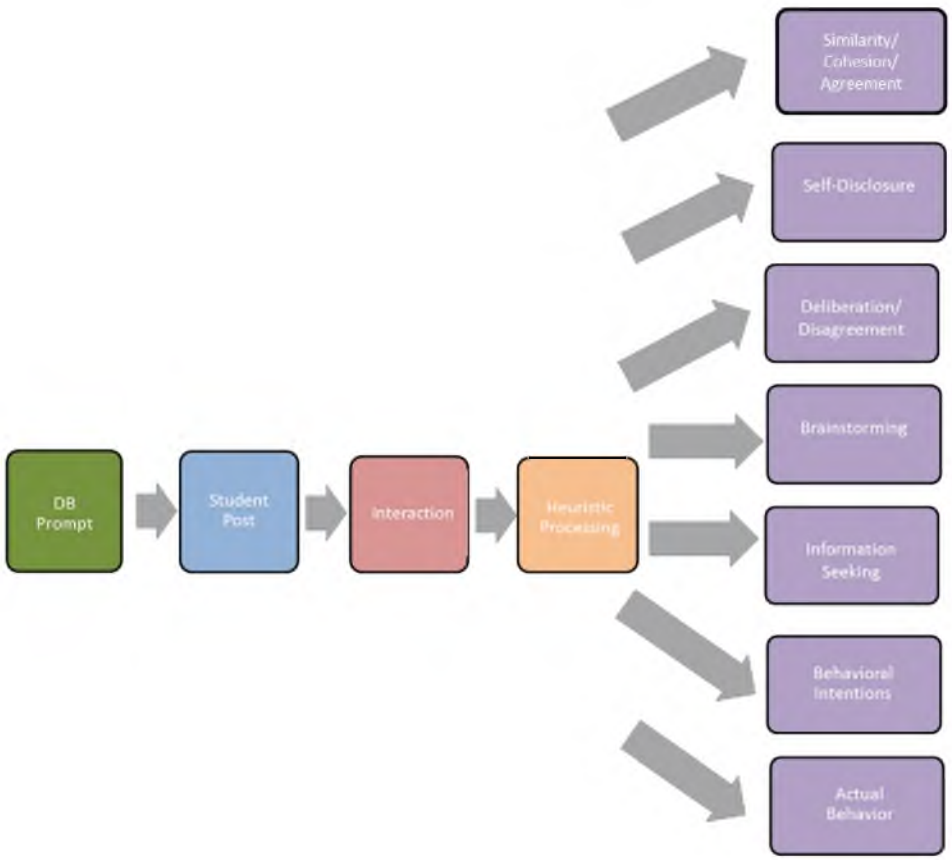


Figure 3.6. Process how trigger events occurred in COMM 2004

The code for "curiosity being piqued" peaked in the third part of the class. Coding suggested that many students had previously not been aware of certain environmental problems and hence became interested and aware of such problems, as seen in the following example:

> I really enjoyed reading your paper. All of this information was new to me, so I was able to learn a lot. One of the most eye opening things about your paper was the information on how you can be affected by the water pollution. Consuming fish that were raised in polluted water is something that I had never put any thought into, but now that I think about it that is something that you have zero control over. After reading everyone's presentations and papers, it is scary to think about how many ways humans can be harmed by all of these environmental issues. It is so important for everyone to educate themselves (7)

Table 3.2. Exemplars for trigger events (i.e., cognitive presence)

1.	I was not sure if I wanted to follow a science blog or not, but after reading what you said I am definitely going to check it out. I'm sure that as long as I find interesting blogs that are creative and entertaining to read then I will not regret it.
2.	I responded to #5 too, but only talked about the negative aspects of the media's use of agenda setting. I didn't think about how this could be beneficial in many ways.
3	Prof. Miller: I have actually talked to my roommates about eating healthy and they agreed with me! We cooked a healthy meal yesterday. It saved me a lot of money! We are thinking about setting a schedule of who will cook during certain days. I appreciate you giving me guidance!

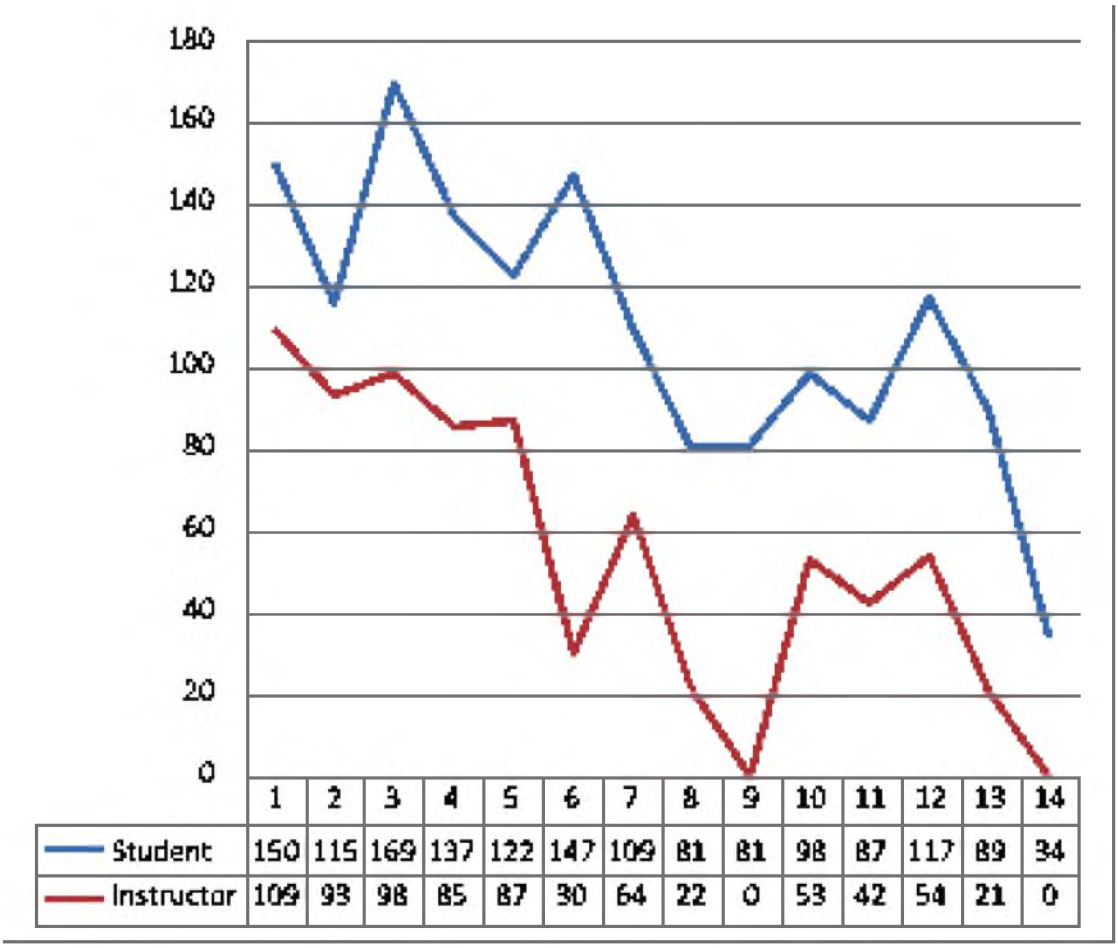


Figure 3.7. Spikes in participation/trigger events in the DB when content shifted in the class.

There were additional opportunities for self-reflection in Part 3. For example, students reflected on where they positioned themselves on Julia Corbett's environmental ideology spectrum:

> I would fall under conservationism according to the environmental ideology spectrum outlined by Corbett because conservationism is the idea that humans are allowed to use Earth's resources but to treat them with care and to not over use them. For example going green and recycling is also an example of conservationism. I would use resources when necessary instead of overusing them and not recycling them. Another example is if I was to buy a water bottle I would reuse it instead of just pitching it right away and when I do I recycle it. (6)

Social Presence

There were several instances when a text was coded as evidence of social presence among participants, including the following: (a) when participants projected aspects of their social identities or seemed like "real people", (b) expressions of emotion, (c) self-disclosure or open-communication (i.e., demonstrations of trust), (d) efforts to build interpersonal relationships, and (e) similarities drawn or group cohesion. There were a total of 1,374 text fragments coded for social presence, comprising 7.6% of all text fragments.

As seen in Figure 3.8, most instances of social presence occurred in Part 1 of the class. However, there was additional evidence of social presence in Parts 2 and 3 as a result of personal self-disclosure about health experiences as well as open reflection about self-reported pro-environmental behavior tendencies. Table 3.3 contains additional exemplars for social presence.

Whether or not social presence is projected or experienced depends on several contextual variables, including the ability for participants to identify with the community in some way and communicate in a trusting environment (Garrison, 2009). Two

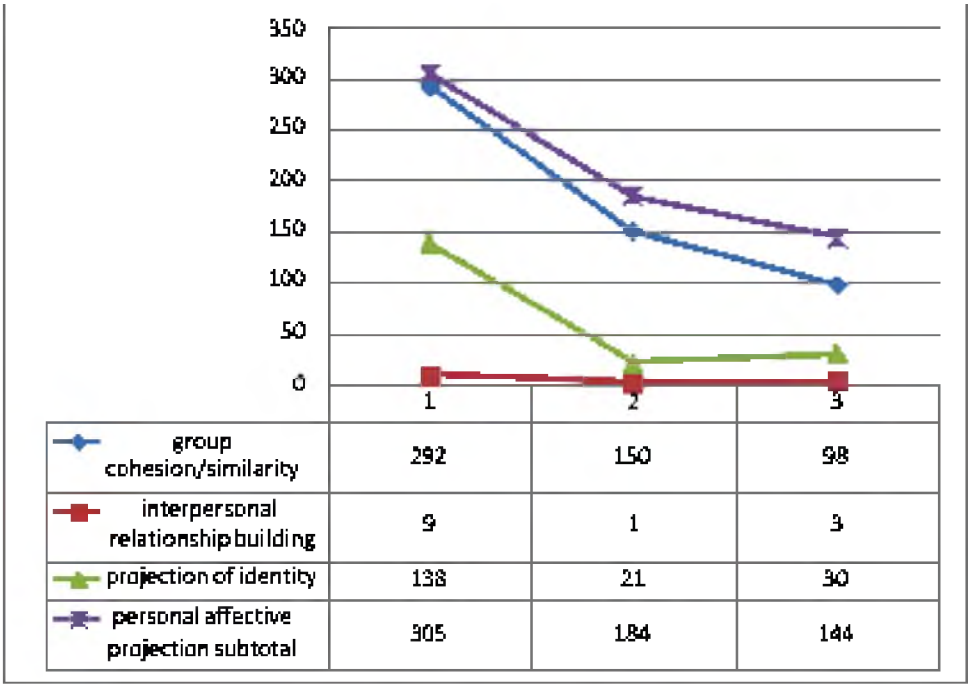


Figure 3.8. Types of social presence coded in each part of the class

ways trust was demonstrated in COMM 2004 were through self-disclosure and expressions of emotion.

In Part 1, students projected their social presence primarily during the icebreaking assignment, when students were able to construct their own identities and disclose more about themselves, hopefully developing a sense of trust. For example, one student used extracurricular activities at the University of Cincinnati to enlarge her own identity:

> I have been skiing ever since I was 5 years old and been going every year. For the past four years, I've been out west with the University of Cincinnati Ski Club. I enjoy very much skiing because I am able to challenge myself physically. The best part is feeling sore after I ski the majority of the day. It feels like I pushed myself as hard as I could and feel rewarded in that aspect. I get an adrenaline rush every time I go down a very steep hill. (1)

Another student discussed her role in her sorority, hobbies, and important people in her life:

Table 3.3. Social presence exemplars

Group cohesion/similarity
1. Yes, it's cool that so many of us are connected through a love of the outdoors.
2. You are a mommy too—yay—me too! It's not easy balancing a family and school and/or work, so good luck and let me know how I can help.
3. I also like country music and Luke Bryan is one of my favorite singers too! I would say Brad Paisley is my second favorite. It's nice to see someone else who likes country music in Cincinnati, you don't get that very often.
Interpersonal Relationship Building
1. Well if you would ever like to discuss course material in person, perhaps we could do it over delicious burritos/bowls (people who get tacos aren't human).
2. Either way, I think it's always good to be thinking of ways to improve our lifestyles. Best wishes to you as well my friend.
3. I hope that I will be able to make great friendships in this class and I hope that you are one of them

> I am very involved in my sorority Theta Phi Alpha. I am Vice President of External Operations, so I spend a lot of my time going to extra meetings for the executive board or the external cabinet. I also go to a lot of our events like social events or formals. When I am not doing that I am spending time with my boyfriend and our kitty, Cooper. My boyfriend and I like to play tennis and racquetball. One of our favorite things to do is to cook. Occasionally I will spend a weekend in Columbus visiting my family and going out to nice restaurants and wine tasting with my parents. (5)

Teaching Presence

The third type of presence I coded for was teaching presence, which was coded whenever I performed some sort of action in the class, thereby making my presence known (e.g., interacting with students, sending out reminders to the class, summarizing themes). There were several a priori and emergent codes with a total of 69 distinct teaching "actions" contained in the data set. Figure 3.9 displays the 38 most prevalent teaching actions that emerged. In sum, there were 4,147 text fragments coded for teaching presence, comprising 23.2% of all coded texts. Table 3.4 displays teaching

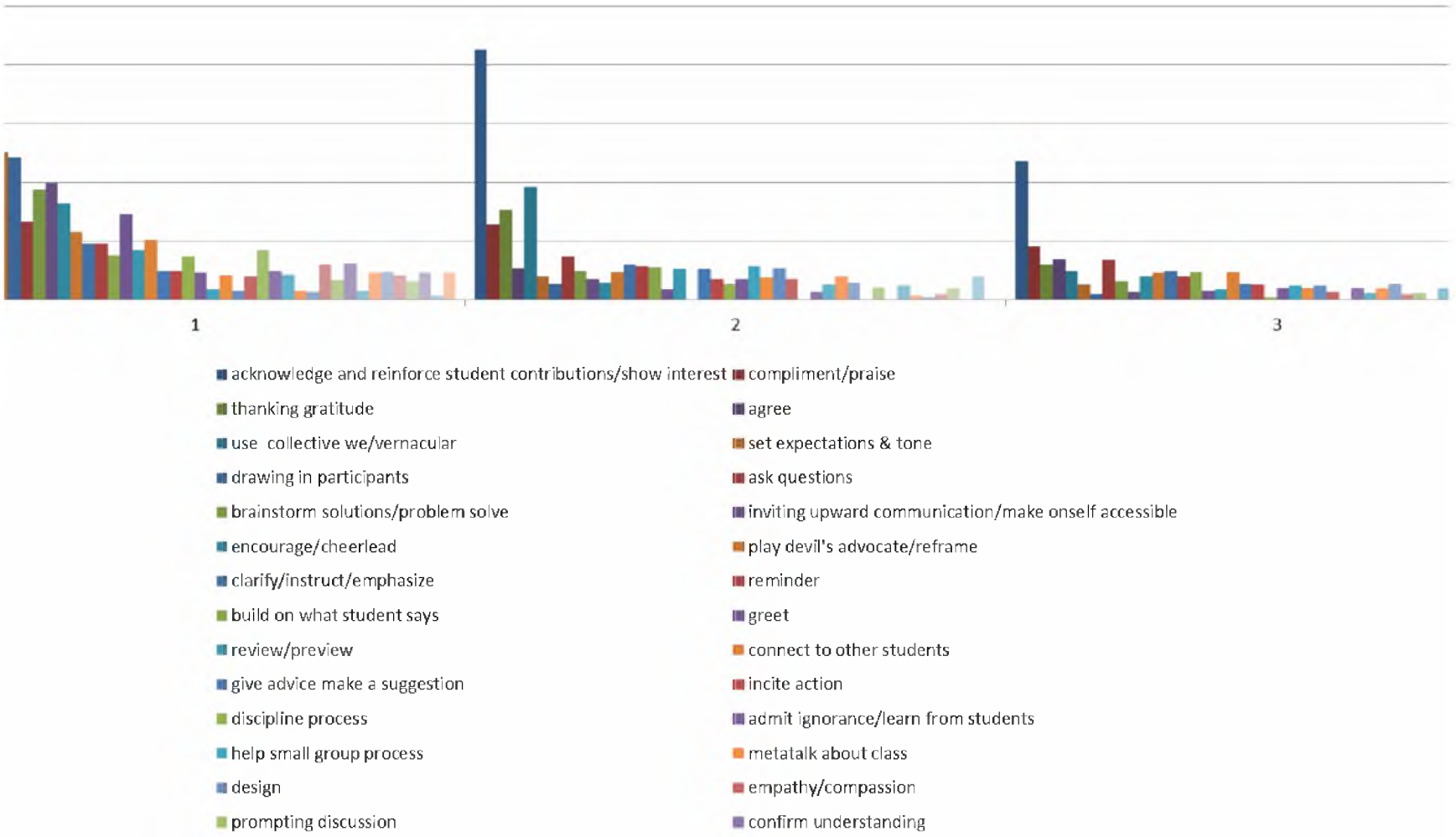


Figure 3.9. Types of teaching presence in each part of the class

Table 3.4: Teaching presence exemplars

Acknowledge/reinforce

1. You all have such unique and important backgrounds/interests. If we keep up the conversation, we can take so much away from all this.
2. Here! Here! Yes! Yes! I think that would be a great slogan/main message for a "slow the population growth" campaign. You're onto something here.
3. It sounds like you are involved in some amazing extracurriculars. What's in a doctors bag sounds amazing! What a great idea. I'd actually love to learn more about it--do you have a link you can post???

Build on what students say

1. **Student:** Pop culture has to be replaced with more important information.
Me: Interesting. I'd go one step further and say that science must be woven into everyday pop culture. That is, we have to meet people where they are. If they don't seek out science info, how can we package it in a way so that it gets to them other ways? In response in to AJ's post, for example, I suggested figuring out ways to put cool science into everyday shows and films, in addition to creating new science-based shows and films.

2. As your post totally points out, awareness isn't the issue per se. It's behavior and habits and culture (i.e., way of life).

Play devil's advocate

1. Interesting. And I wonder to what extent your professor actually doesn't care or just seems like he doesn't care. Mooney & Kirshenbaum argue that the "uncaring scientist" is the worst of all the scientist stereotypes. Your post helps demonstrate why. I wonder if your chemistry professor had a little more COMM training if that would help. In my experience, I have found that oftentimes when speakers are nervous, their nervousness can also come across as disinterest or combativeness. IDK. Worth thinking about though....

2. **Student**: All I can do as an individual is educate myself as much as I can.
Me: What I wonder is, is that all you/we can do? As the class moves forward, I encourage you and everyone else to think about what else you might be able to do. I also think having conversations with other people about such issues is a good addition to getting ourselves educated and informed as well as doing something with the knowledge once we've learned it.

Give advice/make suggestions

1. If it helps, check out the abbreviated schedule and print to keep somewhere. I'd also have a hard copy of the syllabus at your disposal as well.
2. Hectic, yes. It's about slowly integrated small changes into your routine so that even if your schedule is hectic, you still have healthy food options at your disposal (e.g., keeping healthy snacks on you, having at least one day a week where you grocery shop, plan meals out weekly, ask for a juicer or blender).

Incite action

1. Maybe if more of us were willing to be "tour guides" for people in our lives who aren't as science savvy that could help. For example, maybe we could watch a science show with our younger cousins or moms or dads and try to help them be interested and/or make sense of it. Some of the most powerful moments happen with the people we care about most being with us.
2. Do it!!!! I'm going to see if I can find any video footage about it online. I'm really curious what it's all about. Events can be an incredible powerful way to catalyze the energy of folks.

presence exemplars.

As with the coding work for instructor-learner interactions, the number of text fragments coded for teaching presence was highest in Part 1 of the class and gradually decreased in frequency over the length of the course (see Figure 3.9). The same is true for most of the subcategories of teaching presence, with a few caveats. For example, "acknowledge/reinforce" was integral in each part of the class, as was "build on what students say," "play devil's advocate," "give advice/make a suggestion" and "incite action." There were also observable differences in the types and frequency of teaching presence across all three parts of the class (see Figure 3.9).

Part 1. During Part 1, for example, I engaged in more "drawing in participants" than in any other part of the class. These were instances when I tried to make students feel welcomed and valued as well as when I tried to encourage their participation, as seen in the following example:

> Hi, all—
>
> It looks like about 20 of you have done your first DB—thank you and congratulations! We are well on our way to getting to know one another better. There are still about 30 of you who still need to do it. Please be sure you get it in by 11:59 pm tonight. This DB is a very important assignment as it helps us as a class break the ice before we start getting into the "heavy lifting."
>
> Looking forward to your posts! Thanks!
>
> ~Autumn (6)

In addition, I also set expectations, invited upward communication, complimented and praised, thanked the students for their contributions, asked questions, and used the collective we more in Part 1 than in any other part of the class.

Part 2. In Part 2, I drew in participants less. I continued to acknowledge, praise,

compliment, and ask questions as well as brainstorm with students. Most of the expectations and tone had been set, but there was a slight surge in disciplining or orienting activity when the group projects were assigned. At this time, I tried to help students navigate the experience by providing training, tips, and advice. I continued to use the collective we less in Part 2.

Part 3. In Part 3, other than acknowledging or reinforcing student contributions, all teaching actions continued to decrease in Part 3, with one caveat. Previously in the class, although I had disagreed or played devil's advocate, I did not actively find myself "taking a stance" on issues. This tendency changed in the third part of the class, as seen in the following example:

> While we as consumers can use our buying power to get our "voices heard" and promote change, we must do way much more than fix things by "buying more stuff." The stuff (and the culture that thrives on consumption) is arguably a large part to blame for environmental degradation. Someone in another post referred to us as being a "throwable society." If you buy that we are in fact this way as society, what impact do you think that will have on the environment? (6)

Learner Presence

The fourth type of presence, learner presence, I coded similarly to the way I coded teaching presence. More specifically, I coded for it whenever I noticed a student performing various actions during posts (e.g., acknowledging, encouraging, playing devil's advocate, agreeing). I coded a total of 42 distinct learner "actions." Figure 3.10 displays the 38 most prevalent of these learner actions. In sum, there were 4,393 text fragments coded for learner presence, comprising 24.6% of all coded texts.

Some codes for learner presence remained stable over time, while other codes increased or decreased over time. First, there were several codes that remained stable over

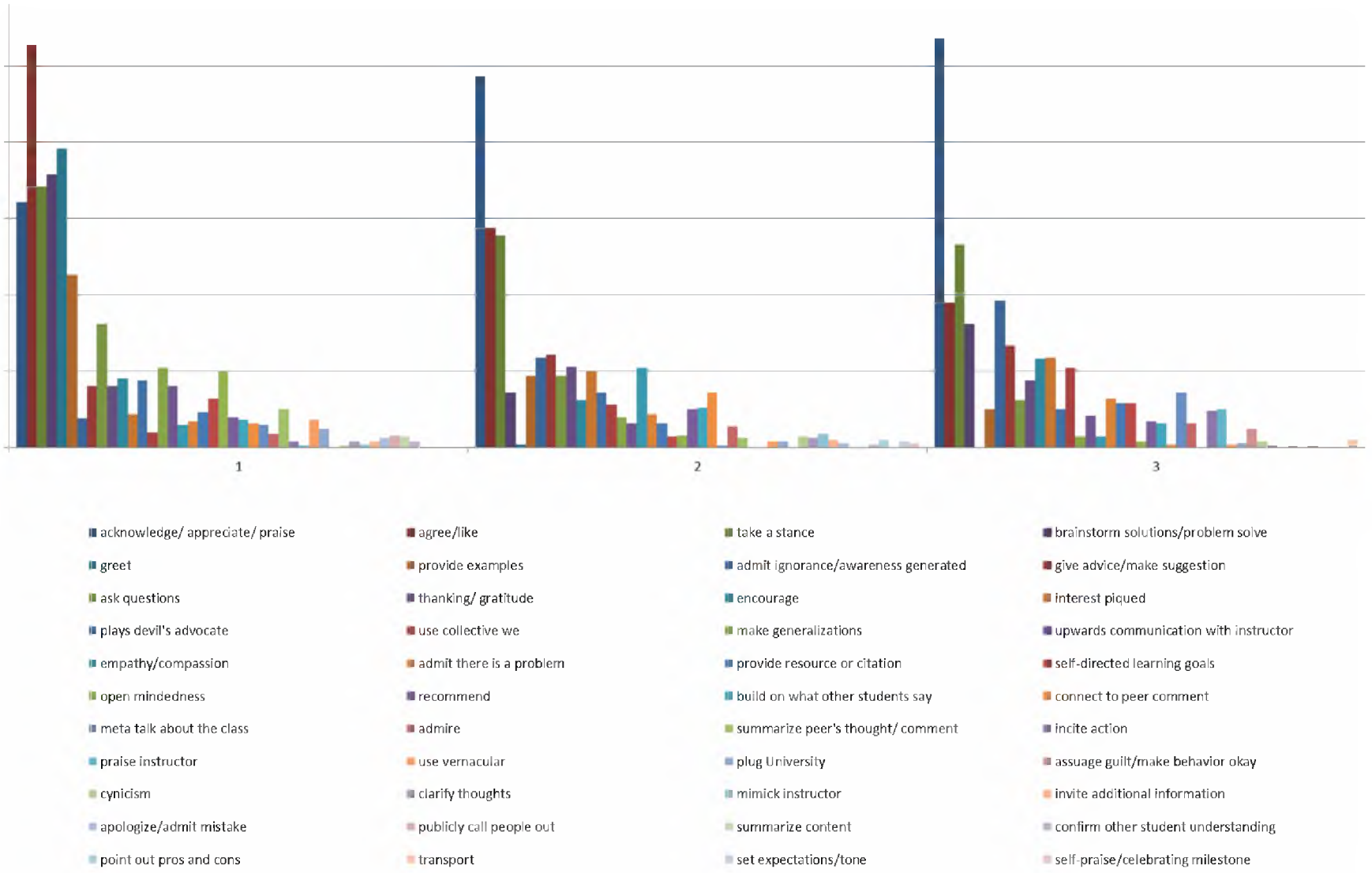


Figure 3.10. Types of learner presence in each part of the class

time. These codes included the following: "acknowledging," "playing devil's advocate," and "taking a stance". In Part 2, there was a slight increase in taking a stance. It also appeared most students were more willing to take a stance regarding health issues than they were with environmental issues. Figure 3.11 displays the tendencies for students to find similarity, agree or like, take a stance, and play devil's advocate or disagree over time.

There were also several codes that gradually decreased over time. These codes included the following: (a) apologize or admit mistakes (e.g., when they accidentally posted before they intended to or did not include a subject), (b) ask questions, (c) build on what other students say, (d) provide examples, and (e) use upward communication with instructor.

There were also several codes for learner presence that gradually increased in frequency. In Part 2, for example, codes for "empathy/compassion" increased: "I understand how it feels to be passed from doctor to doctor and to become overwhelmed with the different diagnoses." The number of fragments increased for the following as well: (a) acknowledge or appreciate praise, (b) admit there is a problem (e.g., prescription drug abuse on college campuses), (c) admit ignorance (e.g., regarding health issues), (d) generate awareness (e.g., about health causes or organizations), (e) give advice/make suggestions (e.g., regarding being more proactive with one's health care provider), (f) interest piqued (e.g., in terms of wanting to try Western medicine alternatives), and (g) use of the collective we. There were several actions taken by students that had their highest occurrence in Part 3 of the class. For example, the tendency for students to acknowledge, appreciate, or praise increased (e.g., peers praised one another for what they did to help the environment), as seen in the following example:

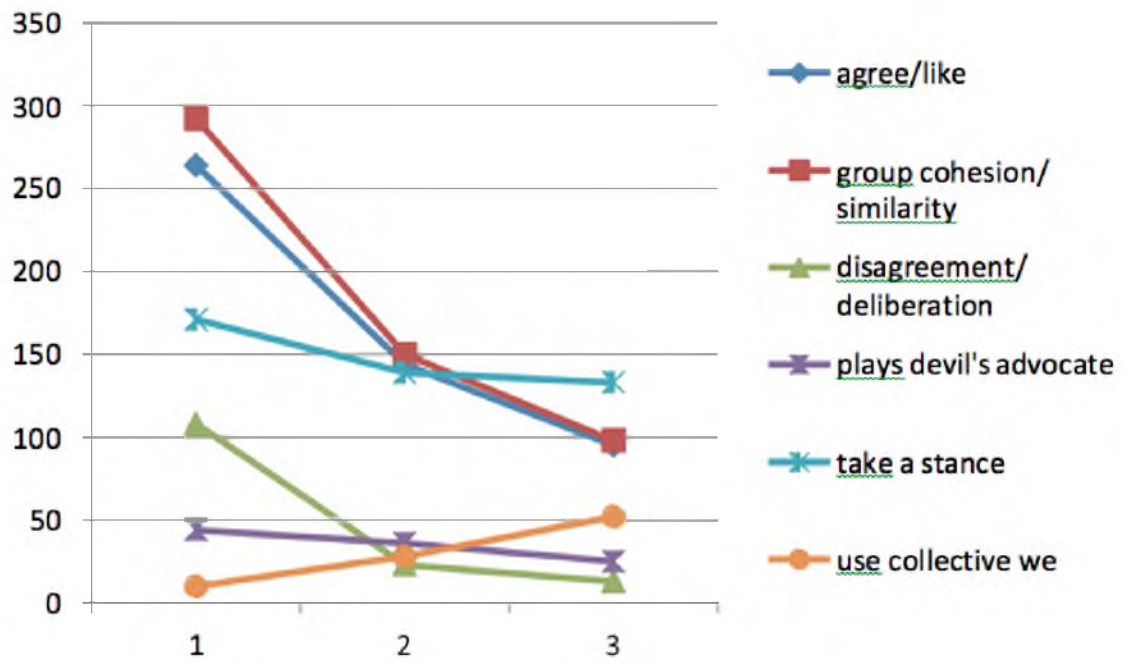


Figure 3.11. Tendencies for students to agree, disagree, take a stance, find similarity, and identify as a collective we over time

> Wow! This is great and I certainly look up to you! You should keep spreading your love for the environment and I think it is wonderful that you want to raise your kids to be environmentally aware. I also love that you think planting trees is one of the best things because I agree with you. (2)

The code for give advice/make suggestions also gradually increased over the course of the semester and peaked in Part 3 (e.g., students gave advice for ways others could help the environment). For example, one student suggested to his peer a way to reduce his water use:

> One way to conserve on water usage is putting a brick or rock in your toilet tank where the water comes from. The way a toilet works is that the tank fills up to a certain level until it raises the handle, if you displaced some of the water, you can "fool" the toilet into thinking that it is more full than it actually is. This could have some negative side effects with leaving some remains in your toilet, so it is not the option for everyone, but when you think about it, you waste ten gallons (sic) of water every time you flush. (4)

As the semester moved forward, the actions initially carried out by the instructor were increasingly carried out by the students (see Figure 3.12). For example, learners eventually did most of the acknowledging/reinforcing of peers' posts (n = 672) as seen in the following example: "You point out through your examples of *Star Trek*, *Star Wars*, and *Lord of the Rings*, not only the powerful nature of film motivation, but also, how film can motivate for education. That's great!" As will be discussed in the next section, this transfer of behaviors from teacher to student may have also indicated that at least some students were adapting to the process of the class.

The Multiphase Development of Community Membership

In COMM 2004, community developed much as the small group process has been theorized as progressing (i.e., forming, storming, norming, performing), with some additions that were unique to this particular online classroom context, as can be seen in Figure 3.13. Depending on the part of the class, prompts for the week, and resulting interactions, certain aspects of social presence increased. For example, self-disclosure increased in Parts 2 and 3 of the class. This effort to self-disclose helped peel back the layers of the onion and enhanced trust within the community. In other words, as time went on, students got to know each other better; hence, trust was built.

There appeared to be a few periods of "disciplining" wherein the instructor attempted to help students adjust to the process of the class and acquire student buy-in, as well as times when students seemed to embrace or resist the disciplining process. There

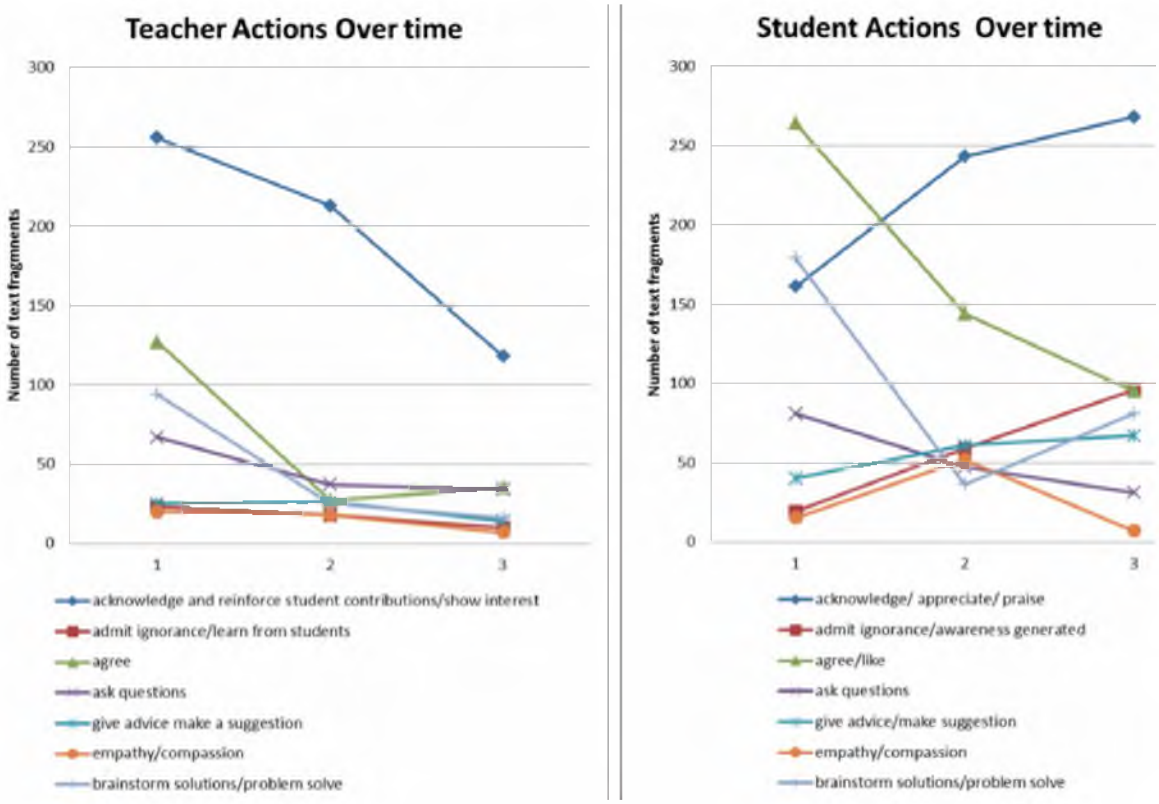


Figure 3.12. Overlap in teacher versus student actions over time

also appeared to be a transformation phase in this particular group during Part 3, when many students vowed to change their behaviors and do more to help the environment, reportedly as a result of their experience in COMM 2004.

Trust

A major factor that impacts community formation is the extent to which a culture of trust is fostered (Cutler, 1996; Moorman et al., 1993; Rovai, 2001). Trust, also included in my coding as a subset of social presence, was coded whenever a student or instructor self-disclosed (i.e., demonstrated that they trusted the community) or when the instructor seemed to show benevolence or understanding.

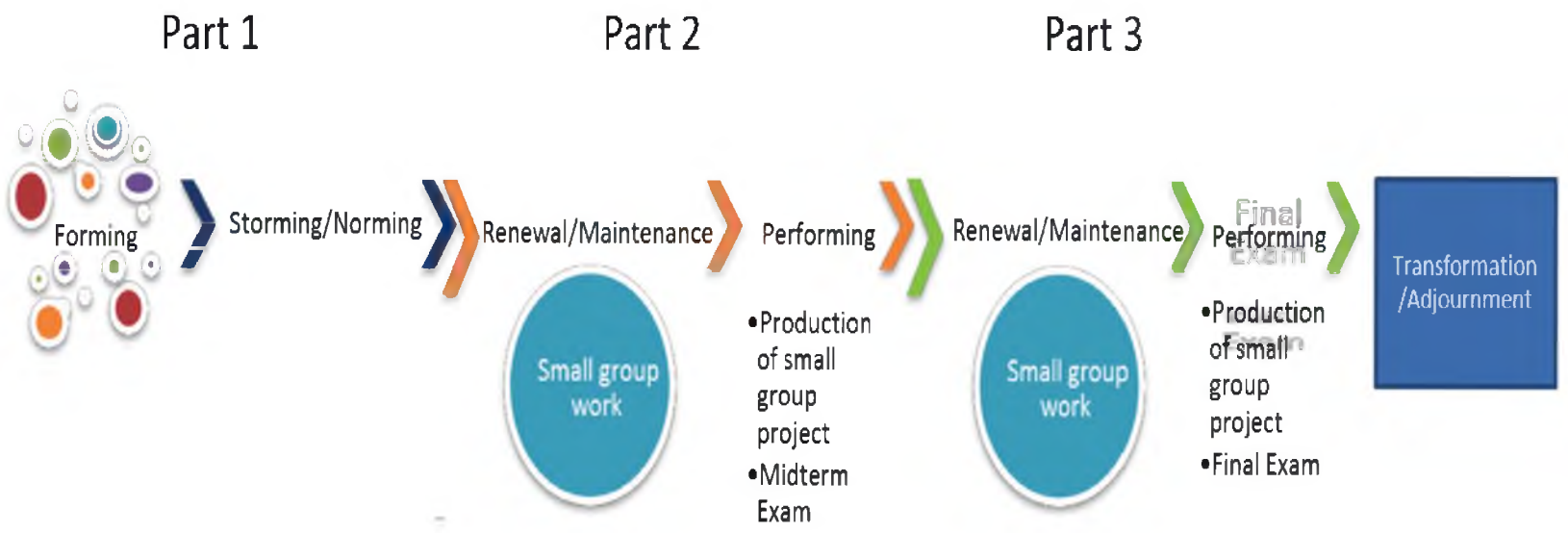


Figure 3.13. Community formation over time

There were 478 text fragments coded for trust, comprising 2.6% of all coded text fragments. As demonstrated by Figure 3.14, there was evidence of trust in each part of the class, with a major spike occurring in Part 2 when students shared their own personal experiences with doctors, medical research, and pro-health behaviors, as demonstrated by the following example:

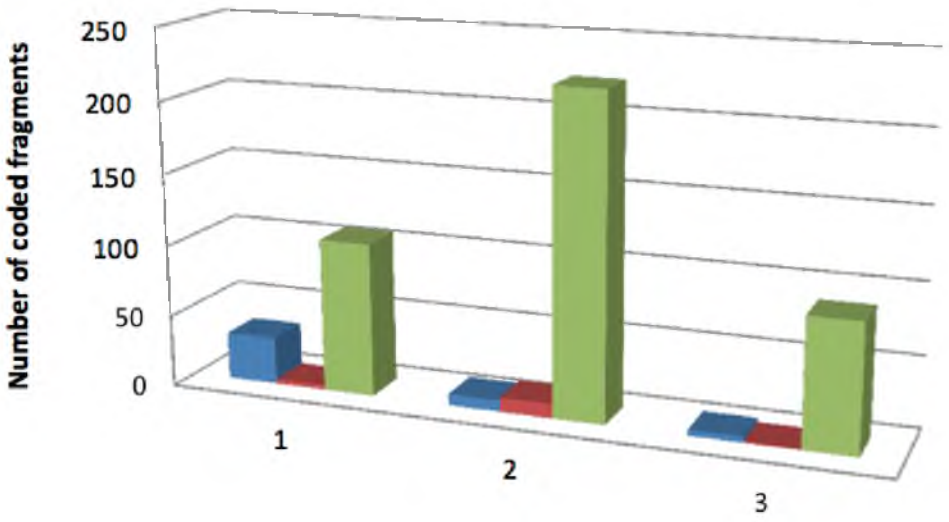
> My family has a history of breast cancer so we are very familiar with this event. My sisters and our church group attend the breast cancer run every year. We own multiples of those ribbon magnets that you can attach to the back of your car. (9)

Other high points occurred in Part 1 when students filled out their icebreaker posts and in Part 3 when students self-disclosed their ecological perspectives and green behaviors.

Part 1: Forming, Norming, Storming

Forming. The main forming stage for the class occurred primarily during the first two weeks of the class (with additional forming periods later during small group projects). During this time, the attempt to create an open, trusting environment began. I had a "Welcome Banner" for students on the main entryway in Blackboard, a "Start here" page to orient them to the class, and I also let them know about their first assignment to complete as a class, the icebreaker. See Appendix B for the Week 1 DB posting prompt. The icebreaker was a crucial assignment for nine reasons: It

- helped establish social presence and made students seem like real people, rather than names on a computer screen,
- created a space where students could declare themselves members of the class and set their own learning goals for taking the class,



	1	2	3
benevolence	33	8	4
credibility	3	10	1
open communication/self disclosure	107	223	89

Figure 3.14. Trust codes

• allowed other students to confer the identities of their peers and solidify membership in the class through peer comments,

• allowed the students to engage in some playful learning and ease into the class before the heavy lifting of course readings and assignments began,

• allowed some disciplining of the process so that students could start getting used to the structure of the class and the way assignments would be posted every week,

• helped students establish their own learning goals for the class and hopefully get more buy-in from them overall,

• helped establish a friendly, open tone for the rest of the semester,

• hopefully, helped reduce the anxiety of starting a new online class by offering extra-credit points for students to get to know their peers, and

• helped jumpstart the community formation process

Declaration of membership. By completing their "Getting to Know Me" ice-breaker profiles, students also declared their membership in the class. They made a public statement about who they were and committed to accomplishing goals in the class. If they completed the assignment, it was also understood they had already read and agreed to the syllabus, thus further cementing their commitment to the class and its goals. All but one student enrolled in the class completed the icebreaker assignment. Three students posted their icebreakers, but did not meet the three-peer-comment minimum for the week, suggesting that not all participants were drawn into the community initially.

In addition to students posting icebreaker profiles, I created my own profile for myself as the instructor. There were several goals of posting my own icebreaker: (1) to help establish my own social presence and declare my role and membership in the class, (2) to make myself seem more accessible and like a real person, (3) to provide a helpful example students could refer to as they constructed their own posts, and (4) to help make it a safer place for students to self-disclose (i.e., cultivate a sense of trust) by sharing more intimate details about myself.

Conferral of membership. Students conferred the membership of their peers by posting responses to their posts: "I believe you'll do awesome in this class since you have already taken it so you know what to expect." Although the minimum response was three peer comments, most students responded to more than the minimum for the first DB assignment. Moreover, they engaged in more two-way or threaded conversations during this time

than any other point in the class. Although one may expect that interactions between students would start off by occurring infrequently and increase over time, this study found the contrary: Students hyper-interacted initially and then interaction gradually decreased.

I further helped construct the participants' identities as members of the class by welcoming each person to the class and discussing some of their interests and goals for the class. If they did not have strong goals, I pushed them to think about and brainstorm additional goals. I was sure to include "welcome" language in my posts—acknowledging and welcoming each student—further confirming their status as a member of the class.

Norming. The first few weeks of the class mimicked a norming phase. During this time, I exerted the most effort to discipline students to the flow and netiquette of the class as well as provide guidelines for how assignments should be posted and would be graded. To help with this norming process, I did the following: (a) outlined proper DB netiquette in the syllabus, (b) reiterated this netiquette in a PowerPoint the 1st week of class, (c) provided a detailed DB rubric, (d) modeled proper DB feedback, and (e) acknowledged and praised early and often. As seen in the following example, my efforts to acknowledge and praise also doubled as a mechanism to encourage students to keep up similar behavior in future weeks of the class, hence attempting to prime or norm them to play certain roles in the class.

> James! Thanks for the link. I appreciate you "gently nudging" here. I checked it out myself--very cool. Perhaps if you have time you can re-post it in the "Other good nuggets" section so more students can see it and check it out???? Dig.
>
> Thanks. (3)

In this example, I was attempting to praise the student for being willing to challenge his peers' thinking as well as his addition of outside information in hopes he would carry

out similar actions in the future. I also primed him for adding new content to the class by suggesting he repost the information for other students to access. As will be discussed, this new content creation is a key component to the development of a Third Space.

I also tried to meta-communicate with students who had no prior experience taking an online class. Perhaps not surprisingly, there was more "meta-talk" about the class in Part 1 than any other. I made additional effort during this time to assuage student concerns, norm the process, and help reduce the uncertainty of students, as seen in the following dialogue:

> Student (in response to another student): I totally agree with one of your goals about checking deadlines. I feel like that will be my biggest struggle in this course because it seems like something is always due.
>
> Me: Hi, Jane! Just a few things to help: Tuesdays we have peer comments due from the last week. Wednesdays your quizzes are due. Fridays your DBs are due. It's all in an effort to help everyone stay on top of the readings and lectures. If it helps, check out the abbreviated schedule and print it to keep somewhere. I'd also have a hard copy of the syllabus at your disposal as well. I imagine in a few weeks you will find your groove. If I can help you in finding that groove, please let me know.
>
> :) (4)

In the 3 weeks of the class that followed, I responded to nearly all student posts on the discussion board, in part to help model the kind of feedback appropriate for DB conversations. I stayed heavily involved in the community, responding to nearly all of the student posts. As a result, teaching presence was also highest during this time. Then, once it appeared that the initial culture and flow of the class was established, I stopped commenting on as many student posts, and interactions with me dropped by more than 50%. I noted this shift in Week 4 of class:

> Grading Week 4 DB and my comments are much shorter now—I feel like I have

> given them enough that at this point the comments can be shorter. It seems like I have been waiting to comment right away less and less—in the first few weeks I was right there at all time posting comments to model what I was looking for/ expecting and now that some roles are starting to emerge and they seem to be "getting it," I have pulled back quite a bit and am waiting to let them talk to each other more before I comment. I have still been checking out posts, sending announcements and responding to emails, I just haven't commented on so many posts and sort of let them take the lead which usually happens about now in this class. (7)

After Part 1, such instances of "disciplining the process" continued to diminish as did my efforts to "encourage/cheerlead." There were also fewer instances of "offering additional resources to help" in Parts 2 and 3 of the class as well as fewer instances of "encourage new knowledge production" and "info about grades." There were also fewer examples of the instructor trying to "level out the playing field" and "give consequences/warnings."

Similarly, students appeared disciplined to the flow of the class and began mimicking some of the behaviors of the instructor. For example, students began to praise and critique their peers in ways formerly done only by me in the grade center comments. In response to one of the group projects on alternatives to Western medicine, a student had this to say:

> I have always thought about using some Chinese remedies for minor ailments. One thing I feel you could have included in the negative aspects is the use of black market animal parts for some of the medicine. I know not all of the medicines contain such things but some of it does use bile from Asian black bear livers, and parts of endangered species. Other than that it was really good. (2)

Storming. After week 2, DB assignments shifted away from fun, playful ice-breaker activities to more opportunities to take a stance and deliberate on science, political, and religious issues. This began a period of storming marked by more students openly disagreeing and deliberating with one another. In fact, there was more disagreement or deliberation during this part of the class than any other.

Of course, this shift to the storming phase could have resulted in part as a response to the change in the kinds of questions asked by the DB prompts, but it is also possible that the chance to break the ice helped students feel more comfortable answering the prompts. The following excerpt from a student's end-of-semester DB suggested that at least for some, the DB assignments helped make future communication easier:

> I am often shy about sharing my work or thoughts, but this class made me realize that everyone has to do it and some people are better than others. I also felt like the DB post prepared me for meeting with my group members. When I met them I was confident and I did not even do my shy giggle laugh.

Part 2: Renewal/Maintenance, Performing

Renewal/maintenance. At the beginning of Part 2, there was an additional spike in the level of participation in the DB posts (see Figure 3.13) marking another renewal phase in community building. During this time, community was primarily maintained by learner-learner interactions and the various types of presence that emerged during those interactions. Likewise, 81% of all text fragments were coded as some subset of community in this part of the class, further evidence that community was maintained during this part of the class.

As demonstrated in Figure 3.4, in Parts 2 and 3 of the class, the tendencies for students to agree and find similarity with other students decreased. At the same time, the tendency to play devil's advocate and take a stance remained about the same. These findings suggest that although students no longer appeared to be community-building based on convergence around similarities and social presence, they were maintaining a sense of community by demonstrating cognitive presence, including critical thinking, deliberating

with other the students, and application or resolution.

Both critical thinking (n = 43) and disagreement or deliberation (n = 23) decreased significantly in Part 2, marking the end of the storming phase. These decreases also could have marked the end of a "honeymoon phase" when students were less engaged for other reasons. For example, students could have become less concerned about impression management or had priorities in other classes, or work or life commitments.

The number of text fragments coded for application/resolution went up (n = 53) as did the number of fragments coded for curiosity being piqued (n = 50). Text fragments were coded for application/resolution when students seemed to connect what they learned in class to something else they had previously learned in this class, another class, or some "real-world" aspect outside of class. I also coded for instances when I as the instructor encouraged students to go beyond the classroom to apply what we were learning (e.g., when I gave them five bonus points for visiting the Student Wellness Center on campus during health content in Part 2). In the following example, a student took what they learned in class (i.e., how art can be used to help promote science) and applied it to something they saw on TV later:

> I'm glad you appreciated it, Professor Miller. I actually saw an example of what I was trying to express this afternoon. I was watching the History Channel's series *The Universe*, and they used ice sculptures to visually explain how Saturn's moon became Saturn's rings. I couldn't find a clip of it online but the entire episode can be found here: http://www.history.com/shows/the-universe/videos# The episode is Catastrophes that Changed the Planets.

Students also had opportunities in Part 2 to apply additional health communication concepts to their own lives. For example, DB prompts asked students to discuss, among others, the following: (1) communication issues they experienced with their own health care providers, (2) one's own tendencies to be more optimistic or fatalistic about

health, and (3) one's own response to reward versus punishment cues.

In addition to an increase in the level of participation in the DB posts when the second part of the class began, there also appeared to be a renewal in trust and self- disclosure in Part 2 of the class. Students were brought closer together as they began to self-disclose more about personal health experiences with doctors and their own pro-health tendencies. In turn, these moments of self-disclosure allowed for students to renew their social presence. By proxy, community was maintained. For example, one student shared about their battle with ADHD:

> The article in the *New York Times* really made me want to tell others a little bit about my battle with ADHD. It is so hard for the people who actually suffer from ADHD to be taken seriously because I feel that a lot of people in college take Adderall and other stimulants just to get more work done in a shorter amount of time (pulling all-nighters before an exam). When you truly have ADHD the medications you take only make it easier to actually finish your work, focus in class, and complete the amount of work a regular person without ADHD is expected to do. This makes me so upset because it's an option for them to take theses pills but I have to take them or I will flunk out of college! I have even seen a student crush and sniff one of his tablets. (23)

Another student reflected on and shared his own personal health tendencies:

> I think that I tend to be more fatalistic when it comes to my health. I am certainly paranoid about my health a lot of the time, especially during the wintertime since it seems that sickness becomes rampant during the winter season. Because of my perceived increase in germs, at any time when I feel like I am catching a cold, I will immediately take many different kinds of immune-boosters and vitamins such as vitamin C and colloidal silver. In truth, I really don't know if the vitamins actually have any benefit or if I am actually getting any form of sickness but I am so paranoid that I just do it now out of habit so I can possibly avoid a cold or the flu. (31)

When I assigned the second group project, I engaged in additional disciplining of the process. I lectured on how to work in dyads, provided detailed instructions on how to pick a topic and post the assignment, and required students to reflect on the process by

completing peer evaluation forms for themselves and their peers. I factored these evaluations into the grades of the groups and used them to determine memberships of the groups for the next group project.

Performing. Students demonstrated their capacity to perform in groups in Part 2 of the class. Students were asked to work in pairs on a research project revolving around alternatives to Western medicine. Other than the performing stage, wherein students posted their final projects to the DB, and the peer evaluation forms students filled out for one another, this small group process was largely unseen by the instructor until end of semester. During the last DB, students were asked to share what they learned about working in groups during this class. Although many students did not anticipate positive group experiences, especially since the class was online, many of them ultimately had positive (synergistic) experiences, as demonstrated by Table 3.5. It is possible these positive group experiences also enhanced the sense of community for some participants. There was also evidence that, despite the class being online, students enjoyed the chance to meet new people and interact in small groups.

One student had this to say about working in groups:

> The thing I learned most from working in groups was combining other group members' ideas along with mine. Online groups can be difficult, but the main thing is communication. If you don't have good communication skills, the group projects can be difficult. I liked how you did the group project by picking our group, so we can meet new people and see what their opinions on the environment are. (15)

Another student echoed similarly positive sentiments about having the opportunity to build interpersonal relationships during the group projects, despite the effort they took to complete:

Table 3.5. Exemplars for working in teams

1.	This was a great class! Even though I HATED the idea of having group projects since this is an online class, I really enjoyed them!
2.	I learned that working in groups online does not have to difficult and is not as scary as it sounds. I would advise students to communicate with partners early and often.
3.	By working in the groups that were assigned this semester I learned that it is possible to interact and learn social skills online. I think that it was very constructive and created a lot of determination having to contact and work without seeing the members of my group in person. I also think that overall it made me understand more about the topic than if I was doing the work in person. If it was an in class group I probably would have put less work into understanding the topic and I would have put more of the
4	I didn't read as much as I should have and I didn't always view the PowerPoints, but I made a great effort with the projects. Because I tried so hard with those, I feel that I learned more because I was working with others- like I would be in a classroom.
5.	The group work was probably the oddest part of the course. Not knowing anybody beyond discussion board posts made me think that it would be nearly impossible to actually do an assignment effectively. But I was proven wrong when I was placed twice with group members who were very good communicators and did excellent work. As long as everyone in the group can communicate on a daily basis and possible meet in person once, there is no reason it can't work just as well as any other in class course.

> Working in groups was a challenge at times because it was hard to match up our schedules to meet. On the flip side, I was able to meet new people and work on the project together. I would definitely advise students to stay organized when working in groups and keeping up with the work. Also working on many group projects at once including other classes can get a little overwhelming at times. I don't think there's anything professors can really do to help make group experiences any different, maybe give us the option if we want to work in a group. (18)

Another student also seemed to experience this synergy and seemed to appreciate being paired up with the same person in the second project as she was in the

first, which enabled her to avoid the whole "norming" and "storming" stages of the group process:

> I learned that group projects can go very smoothly if you have a good group! My two projects were fairly painless. I would definitely recommend lots of communication! It is also nice to try to meet in person if possible, but if you can't, emailing works too. I also enjoyed working with the same person for the two different projects. This allowed us to avoid the whole "getting to know you" small talk and really just get into things. (16)

Not all people experienced synergy working in groups, however. In fact, working in groups may have impeded a developing sense of community for some students, as seen in the following example:

> I personally did not feel that working in groups online was very beneficial. I feel that it made the decision process and planning process slower since there is lag time between responses when using electronic mediums. I think it would be best to use some kind of group chat with scheduled "meeting" times. Group webcam sessions could also serve as meetings. I know based on my own habits that having scheduled times to work would push me to follow through better. (2)

Another student echoed similar sentiments about working in groups:

> I learned that sometimes you really need to actually know who you are working with. I had a pretty bad experience with some of the group work I had to participate in, but I have learned from it. I would tell someone who had to work in a group online to be in constant contact with your group, almost to the point of being annoying. I would say the only thing I would change is letting the group members actually affect each other's grades; we do not know each other and the class is online so it is actually really hard to see how much effort a group member is really putting in. (4)

These small group project posts rounded out the second part of the class just prior to the midterm. Then, gears changed once more to the final part of the class when we covered environmental content. Then, additional renewal and performance began.

Part 3: Renewal/Maintenance, Performing,

Transformation/Adjournment

In Part 3, once again, there was another surge in DB participation when the content of the class shifted for a final time (see Figure 3.7). Although the number of text fragments coded for community decreased slightly from Part 2 to Part 3 of the class, there still seemed to be quite a bit of evidence that community was being experienced in the class with 77% of all text fragments coded as some element of community. Although teaching presence continued to decline, learner presence and cognitive presence remained steady, and a sense of community was maintained.

There were three additional significant trigger events during Part 3 of the class, which seemed to help renew and maintain the sense of community in the class. These triggers also seemed to help transform the way students perceived their relationship with and impact on the environment. The first trigger occurred in Week 12, when students were asked to reflect on their carbon footprint and share their results and reaction with the class (i.e., they exhibited cognitive presence).

In the responses to these prompts, trust seemed to be renewed and people appeared to bond as they openly self-disclosed the extent to which they realized they were single-handedly impacting the planet. For example, 1 student who reflected on her carbon footprint had this to say:

> I had almost five Earths, and I was shocked. If I'm more environmentally conscious than most of my friends, I shudder to imagine what their numbers would look like. And even more frightening when I think about what that means for future generations! Besides improving my own footprint, I feel the need to spread the word so that others are conscious of this too! (50)

Not only was this student surprised to see the impact she had on the planet, but

she was also inspired to tell others about the need to be aware of their own impact. In essence, the DB prompt and the chance to reflect "transformed" her way of thinking. Another student had this to say about his carbon footprint:

> I also found that I used about 4.26 Earths. I was also surprised by how many I used, I thought I was an environmentalist! I agree that it is funny that we use so much, and there are so many people who have nothing. I want to try and do everything I can to reduce my amount of Earths. (51)

Another student sympathized with a peer who had a high carbon footprint score:

> I can definitely relate to your carbon footprint of 4.26 Earths as my test results were 4.64. Even though I do try to be environmentally conscious it was quite a shocker to see how much I use on a daily basis. I had the same thought as you however. I originally thought of myself as somewhat of an environmentalist, but my carbon footprint says otherwise. I guess I need to do more from now on. (9)

All 3 of these students seemed to think similarly: They were shocked that they had such high carbon footprints and wished to do more about them as a result of realizing such.

After the group projects were posted to the DB (i.e., another stage of performing in the class), students were required to peruse the projects of their peers and comment on them, further exposing everyone to new environmental content. This process helped generate awareness about environmental issues and transform the mindsets among some of the students. For example, 1 student had this to say about the group projects:

> By doing my final group project on the sea level rising, I was able to learn more about what causes the sea levels to rise and what we can do to help prevent it.
>
> Prior to the project I never really realized how big the issue was and that humans were part of the cause to why the sea levels were rising. I will continue to learn more about environmental issues and what I can do differently in everyday life to help the environment. (2)

Many students also admitted feeling guilty about what they were doing to the planet in Part 3. As a result, peers came together and tried assuaging the guilt of one another. That

action was coded only in Part 3 of the class. For example, 1 student tried to convince a peer that he was not a "bad person" because he had not changed his environmental ways:

> I don't think that your lack of "change" makes you a bad person, I think it makes you normal. Most people, despite what they may say online, haven't taken many steps to reduce their footprint and personally I don't think it makes them bad people or hypocrites, even if they major in environmental studies. I think its better to educate the people on how to do it than to just expect them to do it. So I applaud you for your honesty and at least you know how you can make those changes. (8)

Another student tried to convince a peer not to be too hard on herself when she claimed she was not a "true environmentalist" for not being more active in protecting the environment. In return, her peer praised her for what she was already doing to help the earth:

> Hi Michelle! When I calculated my carbon footprint it said that we would need 4.3 Earths! It's great that you want to start helping the environment more by recycling and eating out less but it is hard sometimes especially for college students. We may not have the money to buy local, organic food and we may not have time to prepare a meal every night. So I wouldn't be too hard on yourself but you are putting yourself in a good mindset for when you do have the resources to go more "green"! :) (10)

The preceding examples demonstrate the culture of support (i.e., community) that developed as students rallied together after carbon footprint scores were disclosed.

Moreover, they indicate the powerful nature of self-reflection when it comes to transforming how people perceive their relationship with the natural world.

A second important trigger for community formation was during Week 13 when students were asked to watch and react to a video called *The Story of Stuff*. During this week, participation in the DBs spiked once again (see Figure 3.2). It also appeared that awareness about environmental issues was generated and critically thinking was spawned. Many students admitted their ignorance of the impact that consumerism has on the planet. For example, 1 student claimed the following as a result of watching the video:

> This video definitely made me think about how stupid I was thinking that maybe I should get a new laptop. I have had mine almost three years and it can be slow at times, but now I plan on cleaning it out and trying to get another 5 years out of it. The same goes for my cellphone, which I am eligible to upgrade in a few months. I want to try to make it 10 years with one phone. (66)

Another student had this to say about the video:

> I think, however, she did a great job with her research and tying everything together with facts and even experiences in her life. I think you are right, that this video probably will leave a great impression on those who really watch it and soak up what she's trying to say. I know it made a large change for me! Even though, I already agreed with her, this video was kind of an "aha" video for me. It tied ends together and drew connections between aspects of our society that is contributing to harmful behavior. (74)

Finally, a third important trigger for community development in COMM 2004 was the second group project. During the second group project, students collaborated to create an action plan to address an environmental problem of their choosing. During this time, students once again had the chance to make their social presence known by disclosing more about themselves as well as collaborate with peers and develop interpersonal relationships.

As part of the requirements for the assignment, I assigned a team icebreaker intended to once again help discipline and acclimate the students to the group process. Students completed this icebreaker during the Week 9 DB (see Appendix for a copy of this icebreaker). Similar to the first icebreaker, students were asked to post their own unique profiles and respond to the profiles of all their group mates.

In addition to posting information about their majors, interests, and hobbies in their profiles, students were able to voice what type of leadership role they wanted to play in their groups, further making their social presence known. Students also had a chance to discuss their overall goals for the group project and what type of group experience they would ideally like to have, among other prompts. They suggested what they thought

the next step of their group project should be, helping to move them further along in the storming and norming processes. For example, in response to the "leadership scale," students were asked to fill out for their icebreakers, 1 student disclosed the following:

> I feel that I can exhibit qualities of a leader and I could successfully head projects. I like being able to divvy up tasks and getting things accomplished. The reason I put myself at a 6 is, indeed, my workload this semester. I am at maximum credit hours, have a part time job, and play music out on the nights I don't run off to my job after classes (and sometimes even then). I just want to be honest with you guys! I have no problem making decisions though and reaching out and staying in contact frequently. I can feel confident in saying that I am capable of getting tasks completed thoroughly and on time. (1)

There is further evidence that this icebreaking, goal setting, and self-disclosure during the small group process not only helped each individual group move through the group process, but also helped maintain the overall sense of community in the class. For example, 1 student discussed the helpfulness of students setting their own goals during this icebreaking process in his final DB:

> One thing that I learned about working in groups that I found extremely helpful is deciding together what the goals for each group member will be. I have started to apply this to group work for other courses and have found it is a sure-fire way to not get stuck doing all of the work. I can't believe I didn't think of it earlier! I have also found that communicating only over email is not very effective, and that using text message is a really great way to stay connected continuously. Open communication is key in group projects. (1)

Prioritizing Others' Needs

There was evidence that students began to consider the needs and wants of their peers when it came to making plans for the second group project, as seen in the following example: "Let me know when you want to start on this project and we will start making plans! Hope to hear from you soon. Thanks!"

Another student had the realization that putting the needs, desires, and skills of others ahead of oneself would actually help produce a stronger project:

> I learned that when working in a group, it is important to be flexible. Utilizing people's strengths is the best way to produce the most quality product. For example, if you feel that you want to create the presentation but have a gifted person in your group that is very artistic, creative, and experienced with that type of stuff, let them create the presentation. They will be more likely to do their part, and you will probably get a better grade. While being flexible is important, holding yourself accountable is more important. Be willing to contribute to the effort and you will be problem free, most of the time. (13)

Another group member had this to say about his 2 classmates at the end of the project:

> I feel like I did a quality job on my part of the assignment; honestly we all did great work. I tried to make myself available to both Joe and Daci if they needed to contact me, and I got my work finished in a timely manner, as did they. This has been one of the better groups I have been in and everything went very smoothly. I hope Joe and Daci feel the same way! (7)

It is evident that the group member in this example tried to attend to the needs of his group members and experienced the synergy that is possible in groups.

There were also instances when students discussed together their own health problems and brainstormed ways they could improve their health. For example, 2 students disclosed to each other about their poor eating habits. One student suggested: "I notice a lot of students in my classes packing healthy lunches. Maybe we need to try to do this to curb our bad diet habits."

In this example, it appeared that this student not only was concerned for their own health and brainstorming ways they could improve it, but also saw another person in the class struggling and seemed to want to help them as well. In this way, they were brought together by a health problem and were able to brainstorm solutions that resulted from the influence of their classmates.

A Developing Sense of We

Instructor

Part 1. At the front end of the class, I was the primary person who referred to the collective we. As will be discussed later, however, there were a few students who also referred to the collective we during the first part of the class. My use of the collective we was mainly an attempt to showcase similarity among participants and prime and encourage the creation of a community. This priming can be seen in the following example, when I spoke directly to a student during the 1st week of the class in response to their icebreaker post: "To put how this class will benefit you, I will quote from your favorite band Queen: "We will rock you!" :)".

I further emphasized the importance of others in the class beyond myself for helping students achieve their class goals: "BTW, I think your goals are spot-on for the class. We should be able to help you out quite a bit. Awesome." Moreover, I prepped students for the reality that others in the class could become significant interpersonal connections: "It's awesome that now you know you aren't alone at all! You all could end up being really valuable connections for one another. Dig it."

In the weekly notes I posted for the students, I consistently referenced the class as a collective, kept everyone on the same page, and discussed points of similarity and divergence in themes from the DB. Simply put, I used the weekly notes to track our journey as a class and make it publicly known how we were moving along as a community, as seen in the following example from Part 1:

> It seems like one common thread that connected a lot of us was our love of the outdoors. It was great hearing some of the things you all are up to and that while we have lots of different kinds of people and interests in here, we also have some common threads that connect us. (1)

I helped make these connections and found similarities in my DB posts to students as well:

> It sounds like a lot of us are on the same page here: COMM classes could benefit anyone, regardless of the major. The only issue I see with everyone crossing over into a ton of other disciplines is money and time. There is only so much of both of them, even though I heartily agree—variety is the spice of life and it's all about learning from other POV's. Thanks for the post. (10)

As seen in Figure 3.15, as the semester moved forward, I referred us as a collective less and less; at the same time, the frequency of student references to the collective we continued to increase.

Part 2. During Part 2, when I referenced the collective we, I referred to ways we were connected through our own views on health problems as well as our health behaviors and lifestyles, as seen in the following example: "But, I do sincerely appreciate you broaching the topic. It looks like we are two of many in this class concerned about food quality and health in our country."

I continued to make similar references to the collective we in the weekly notes, as seen in the following example:

> We also had some folks teach us more about the 'neuticals.' We learned more about Duloxetine (Cymbalta), Albuterol and spacers for inhalers, SSRIs (selective serotonin re-uptake inhibitors), Neutrogena Purifying Pore scrub, and MSG. Thank you all for teaching us more about the pluses and minuses of all of these products. Of course, all of us should continue thinking critically about the neuticals that are out there impacting our health every day. We will talk more about the marketing that goes into some of these products, green products in particular, in a few weeks. Stay tuned! (6)

In this example, I not only referred to the collective we of the class, but also made an effort to praise and encourage students for helping out their peers and enhancing the learning experience of others in the community as well.

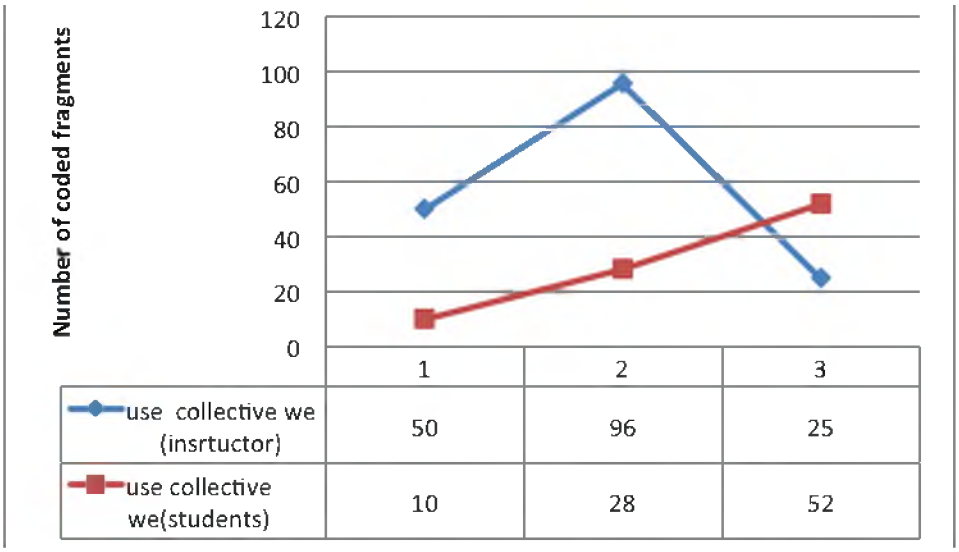


Figure 3.15. Instructor versus student use of collective we over time

Part 3. In Part 3, many of my references to the collective we were instances wherein I posed questions to the students about how we as a collective could make change, or I incited them to action, as seen in the following example: "I wonder what we can do to get our local cities, counties and states to be more bike-friendly. Is it letters to local officials? Attendance to city meetings? Petitions? How could we get our voices heard on the matter? What about UC getting involved as well?" (3).

Additionally, I used the collective we to stress to students that they were not alone in perceiving barriers to becoming more environmentally active. For example, when 1 student admitted his NEP scale score revealed that his stance on the environment was rather neutral, I had this to say: "I don't think you are alone in your 'neutral' stance. I think it's hard for most of us to really take an active interest when we don't see the negative impacts of environmental issues affecting us in our daily lives." In addition, I stressed that it is difficult for most of us to keep the environment in the front of our

minds, particularly when we get out of college: "We get jobs, worry about our bills, our futures, and then the environment slowly fades into the background."

In part, I was assuaging the guilt of those who were not as active in the environment, but I was also attempting to emphasize that none of us are alone in the struggle to be "green." The aim was to further connect us as a community and point out that despite the barriers we experienced, we could potentially care and do more for the environment.

Students

Although the number of times I referred to the collective we decreased over time, the students' use of the collective we increased over time (Figure 3.15). Moreover, there were several different kinds of communities that appeared to emerge on the part of the students (e.g., scientists and nonscientists, college students, American citizens, protectors of the planet, or inhabitants of the Earth). It appeared that the content brought them together first as a class, then as college students, and finally together as citizens of the world—to the point that they thought beyond themselves and were more globally minded.

Part 1. In the first part of class, for example, it seemed as though those who were science majors saw themselves as their own collective, as seen in the following example:

> There are reasons we constructed the jargon that we use in our fields. However, like Sally stated, if we want to create an interest in the subject among the masses, we have to make the material comprehensible to the 'average Joe.' There has to be some give on our side. (3)

Seemingly, in this example, those who were scientists in the class saw themselves as distinct from the nonscientists in the class and beyond. It is worth noting, however, that the student in this example stressed the necessity of himself and others like him to do

more outreach, perhaps to get others to be a part of his more scientific collective.

Another student agreed that we need to try new outreach methods to attract more nonscientists: "It's a very good point that if the past has not worked for us, then why should we practice the same methods now?"

Those who were not science majors also found themselves as similar and coming together, as seen in the following example: "Scientists nowadays seem to forget about the general public, especially those who they think can't fully comprehend what they do, but what about up and comers like us?" Another student also lumped herself into this nonscientist collective after she read some science blogs for one of the DB assignments: "Also, I was surprised that a lot of the blogs are short and straight to the point. This is great for those of us who aren't scientists and therefore may have a short attention span when it comes to science-related articles."

In both of these examples, students seemed to be united by the fact that they themselves were not as scientifically minded as other folks. Notably, they too saw a gap between themselves and scientists and, similar to the thinking of the science majors in class, they also saw a need to close this gap between the science and nonscience community. Seemingly, although the scientists and nonscientists in the class seemed disparate at first, the opportunity to discuss this fact on the DB helped stress the need for this divergence to be rectified, perhaps ultimately drawing the two groups closer together in cause and character.

There were two references in the first part of the class to the world being ours, a larger, grander collective we, which continued to increase as the class moved forward, as seen in the following example: "Our world is built upon communication, be it between individuals, or speaking to the masses." Another student claimed the following: "Our

world is increasingly reliant upon science and technology for our everyday activities, and this trend is only accelerating as time progresses."

In both of these examples, students referenced a world in need beyond them and stressed the importance of communication and science in maintaining it or solving the problems in it.

Part 2. In Part 2, there were several instances when participants in the class saw themselves connected through their place in the college community and the apparent impact their place in that community has on their health. In the following example, 1 student responded to a DB prompt that asked students to reflect on prescription drug abuse on college campuses based on a news article about an overachieving college student named Richard Fee who died as a result of his prescription drug abuse:

> We are all in college so we can easily relate to the stress college life puts on us on a daily basis, but the problem arises when students feel the need to take these pills before every graded assignment. It causes dependence for the drug as you mentioned, which ultimately leads to higher tolerance, which leads to higher and higher doses. It's personally a little disturbing if you ask me. (11)

It appeared that other students empathized with the plight of college life as well. With this empathy, additional concern for the collective emerged. For example, when a DB prompt asked about whether students would be willing to participate in medical research, 1 student explained that the opportunities would be tempting given that college students often do not have as much in terms in cash flow: "As college students many of us our prime targets for research. Many of us are cash-strapped, and those cash rewards can get moderately high."

Members of the class seemed to rally around other health problems as well (e.g., lack of exercise, access to healthy food and water) and expressed concern over the impact

certain choices could have on our collective health in the future, as seen in the following example: "I understand the concept and reason for using GMOs in many of our food products, but my main concern is the fact that there are absolutely no long-term studies that show what it will do to our bodies in the future."

The future with which students were concerned often centered around the children of the next generation, as seen in the next two examples: (1) "It's honestly sad to see so much of our youth eating fast and junk food on a daily basis." (2) "We need to make a change when it comes to treating depression/anxiety in children and young adults."

Moreover, students expressed concern for the future of the globe: "Sometimes we need to get back to the basics by cleaning up our diet and fighting for better food standards because globally we are suffering." In this particular example, not only was the diet of individuals a concern, but the student also asserted that food quality of the global community was a problem that we as a collective should address, again stressing a grander collective beyond the class itself—a more global collective/consciousness.

Students further incited one another to action regarding health issues using the collective we in Part 2 of the class. For example, one student tried to get those in the class to consider new ways to treat their own health problems: "I am just trying to get us to think beyond the pills, diet, treadmill rut." Another student argued the following:

> Why don't we try those alternative forms of treatment? Skeptics are out there to discourage us from trying. Oftentimes they are people who make all the money on the drug selling. They don't endorse an alternative therapy until they make sure it is heavily profitable for them and have taken control of its business. It is up to us to challenge them. (16)

At least for some, opportunities for teamwork and collaboration during Part 2 of the class also helped build community and were coded for analysis. There were a total of

80 text fragments that were coded for team work/group process, with all instances being coded in the second and third parts of the semester. As seen in Table 3.5, it appeared many students enjoyed and/or learned quite a bit from the assignments, despite the effort it took to get there. I also noted an increased use of "we" during the Week 8 group project posts: "I like that you addressed all of the group members and referred to yourselves as "we." It suggests you worked as a team, which is exactly what we're striving for here. Nice job."

In the peer comments during the same week, it was evident that interpersonal relationships had been built and that folks in the class were now seeing themselves as part of a group, even if it were only within their dyads, as seen in the following example:

> We found your project to be very interesting. We have never heard of any therapy that comes in this form. It is nice to find some kind of therapy that is noninvasive. We would also have to agree that the use of conventional medicine would be more effective than the use of energy therapy because energy therapy seems to be a longer process to us. Thanks for the new information. (8)

Another student group also used "we" when commenting on other group's projects:

> We have never really heard anything about progressive muscle relaxation and the benefits that come along with it until we read your post. It was very interesting. The best part about this whole thing is that it doesn't cost a dime, which is so helpful to those who do not have the money. One thing I would have to re-think is the fact that it is not always done by someone who is licensed. This could be tragic because they might not know how to do something entirely and that could be bad. Thanks for informing us on this alternative. (9)

A third student group also demonstrated evidence of interpersonal relationship building and a developing sense of we:

> We both have been to yoga classes and experienced the benefits of increased flexibility, strength and peacefulness you described in your post. We were both surprised to learn that the Catholic Church was the main opposition to the practice of yoga because of religion. (10)

Similarly, the week before the group projects were posted, 1 student signed off on a peer comment during the DB with the following: "your fave dyad partner," further indicating that students were in fact building interpersonal relationships as a result of working in pairs with other students, hence building the sense of community in the class.

Part 3. The most use of collective we from the students emerged in Part 3 of the class. It could be that the sense of we gradually developed as people felt more connected over time. There is also evidence to suggest that environmental content itself, as well as the opportunity to work in groups to solve environmental problems, prompted students to think more collectively.

Students seemed to recognize the impact of the collective we in not only creating environmental problems, but also solving them. Likewise, the interaction between peers during this time often led to brainstorming ways such environmental problems could be solved.

We as part of the problem. Many students expressed, disgust, frustration, and fear when they reflected on and discussed the impacts that we as a collective have on the earth. Two important triggers for this critical reflection were DB prompts: The first prompt asked students to reflect on their own carbon footprint scores. The second prompt asked them to react to the Story of Stuff video, which critiques the impact everyday consumerism has on the planet. Table 3.6 displays some of the examples of times when students saw the collective we contributing to Earth's environmental problems.

We as part of the solution. Despite the fact that students saw us (i.e., Americans, college students) being part of the problem when it comes to environmental degradation, there also seemed to be much hope in the class that we could be part of the solution. For example, one student admitted the need for Americans to step up and lead by example

Table 3.6. Exemplars for we as part of the problem

1.	I agree that if we keep wasting and abusing our Earth's resources at this rate our kids' generation will have major environmental issues and will be asking us what we did to put them in that position.
2	I think as long as there is greed in our hearts, and then there will always be someone out there who is willing to take more than they need and generate a ton of waste.
3.	Because we as Americans are so lazy, I think we refuse to put any effort into research to really figure out if something is actually a problem or not. It's easier to ignore the situation than actually do something about it. I also think that that's one of the biggest problems environmentalists have in the way to creating a healthier and improved environment that we have today because people are simply just too lazy to do anything about what we have brought on ourselves to be an issue.
4.	Not only are we contributing to harming the earth but we are getting in more financial debt because we are in competition to see who can own the best "trash." It is sad. We work and spend on our own killers."

for the rest of the world: "We as Americans setting a terrible example for the rest of the world—I only hope we can come to our senses before it's too late." Another student argued, "Although we may have done a poor job of it in the past, and some still now, I definitely feel like there is a giant shift towards conservationism."

These comments, among others, indicated that despite the negative state of the environment we have contributed to thus far, there still remained hope that we as a collective could change things for the better. In fact, many students took the opportunity on DBs to brainstorm possible solutions to these problems, and added ways that we could actually address them as part of the collective we, as seen in Table 3.7.

Moreover, students seemed indignant about the need for people (i.e., us) to address such problems: "We really need to get pollution under control so that we can begin to fix the problems we've caused and hopefully save some of mother nature's wonders for

Table 3.7. Exemplars for we as part of the solution

1.	We should find a way to better keep track of where our trash is being placed. If we just simply cut each hole of the six-pack bottle holder we can be saving many animals' lives.
2	Also I agree that we should pay attention to what's around us and what goes into our bodies on a daily basis because it can catch up to us in the future. We should start educating kids at young age on what goes into their bodies and the side effects of those chemicals so they can make better food choices.
3.	We should be using our intellect and technology to protect our fellow planet inhabitants, instead of exploiting them and their homes solely for our own gain. Every species is a critical piece of the puzzle, and each has a role to play—even if we can't necessarily see it. Animals were here long before humans and will be here long after we're gone—assuming we don't kill them all off first. If we don't change our ways, we might find ourselves on all alone on our increasingly polluted planet.
4.	I feel we could always just try and encourage people to do the right thing to help protect the environment. I mean we are living in that environment, so it needs to be protected.

our children and grandchildren."

Students expressed concern in Part 2 over the welfare of the collective in terms of health and, when it came to the environment, expressed fear for future generations.

Moreover, it appeared that students saw it as our duty to educate future generations for the sake of the planet, as seen in the following example:

> I was also interested in your comment on raising your children to be greener. I think this is a great idea because the best way for us to work toward a lasting change in the way we live is through educating our children. They are the future, and if we can teach them to be more environmentally conscious, it will have a lasting effect on the world. (23)

Another student stressed the importance for us as the current generation to educate upcoming generations:

> Also I agree that we should pay attention to what's around us and what goes into our bodies on a daily basis because it can catch up to us in the future. We should

> start educating kids at young age on what goes into their bodies and the side effects of those chemicals so they can make better food choices. (27)

The second group project, which asked students to research and develop an action plan to solve environmental problems, seemed to generate additional awareness about environmental problems and further inspired students to want to do something as part of the collective to help solve them, as seen in the following example:

> Your topic is very interesting because it embraces almost all the key environmental problems which threaten us. In fact no one can escape those issues. We are all concerned. They affect our lives on a daily basis. Our globe is in real danger. As you mentioned, each of us can do something to at least limit the consequences. (31)

There also seemed to be an awareness that environmental problems need to be addressed by a larger collective beyond what individuals can do by themselves. For example, 1 student suggested the involvement of larger corporations: "We need all major corporations and companies to get with this movement and help make our world a better place." Another student suggested that we must put our ideological differences aside to address the environmental problems of the world: "Wherever we stand ideologically, whoever we are, each one of us is impacted by the state of the environment we live in. We have to work together." A third student pointed out that we need to be more involved in our government if we want to see environmental changes: "Also remember who helps decide who runs our government and what choices get made—us!"

In these comments, students clearly seemed to grasp that for environmental problems to be addressed, it would take more than efforts by them as individuals.

When 2 students conversed about their high carbon footprint scores, 1 student had this to say: "I hope that we both can improve our bad habits and help out not only

the environment but also others who are less fortunate!" This comment and others stand as evidence that the chance to reflect on one's own impact on the planet may be a powerful tool in motivating students to encourage themselves and each other to change their environmental behaviors and further recognize themselves as part of a collective with the power to make positive environmental change.

There also seemed to be a collective emerging whose members seemed to identify already as being green and more eco-conscious. They seemed to rally around and encourage one another as seen in the following example: "I would also fall under the category of conservationism because I'm big in recycling and going green. We have this in common which is always good. Now we just need to get more people to be like us."

Another environmentally friendly student expressed concern after discovering her high carbon footprint and realizing that others who were not as eco-conscious likely had much higher scores: "I agree—if those of us who are trying to be green have such high scores, I can't imagine how many resources others are using."

In these examples, it is clear that the students viewed one another's ideologies as similar to their own and also saw a need to get more people to think (and behave) as they do. This finding suggests classes such as COMM 2004 might be important spaces for the mobilization and maintenance of various causes. As such, the elements of the Third Space, which also emerged in the class, are discussed next.

Elements of Third Space

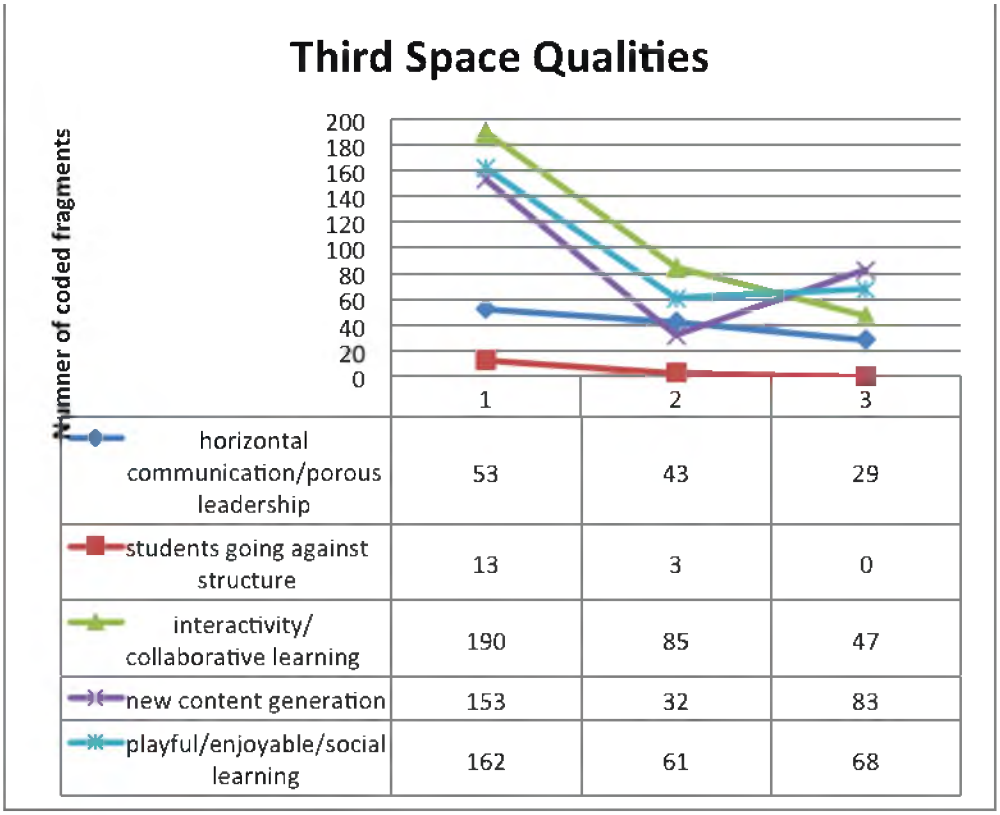
I coded for instances when the class resembled a Third Space. I modeled my codes after several of Gee's (1996) criteria for an affinity space, which Davies (2006) argues are the

cornerstone of Third Spaces. According to Bhabha (1990), these third spaces are nontraditional spaces that have possibilities for deliberation beyond the typical realms of interaction.

There were 1,022 text fragments coded for Third Space—5.7% of all coded text fragments. Figure 3.16 lists all of the codes that emerged as well as the number of text fragments that were coded using those codes. As seen in Figure 3.16, the number of coded fragments for Third Space was highest during the first part of the class, when the initial structure of the Third Space and tone of the class was being set, dropped slightly in Part 2, and remained steady in Part 3, with one additional spike in new content generation in Part 3.

The first part of the class was important for establishing norms and expectations and creating the structure of the Third Space. With the aid of the course documents (e.g.. the course syllabus and DB grading rubric), my modeling of DB etiquette in the initial stages of the class, and the students' willingness to go along with and contribute to the process, it appeared that, at least to some extent, a Third Space developed in COMM 2004. Table 3.8 displays additional Third Space exemplars from the class.

There are several ways I attempted to build the foundation of the Third Space: setting the tone, drawing in participants, and making myself accessible (i.e., making my teaching presence known). First, when students initially logged into the course and any time thereafter, they were greeted by a "Start here" page. On this page, they were met by a friendly headline greeter (see Figure 3.17) that stressed that intellectual abilities of all those who entered the class. Students were oriented to the class, course goals, me as the instructor, and my teaching philosophy. I also provided a friendly photo, again helping to establish my social presence and accessibility. I stressed to students that I considered



	1	2	3
horizontal communication/porous leadership	53	43	29
students going against structure	13	3	0
interactivity/ collaborative learning	190	85	47
new content generation	153	32	83
playful/enjoyable/social learning	162	61	68

Figure 3.16. Third Space qualities

myself the "lead learner" and encouraged them to call me by my first name.

I also stressed to students that in the 8 years I had been teaching college, I tended to learn just as much from students (if not more) as they did from me. My goal was to make myself more accessible, encourage more bottom-up communication, and emphasize the intellectual abilities of all participants right from the start.

I also tried to make myself accessible, providing my email address and cell phone number in case they wanted to call or text message. Additionally, I created a "Virtual Office" DB where anyone could also post questions about the class and receive a response within 24 hours.

There were several Third Space codes that were at their highest frequency during

Table 3.8: Exemplars for Third Space qualities

Horizontal Communication/porous Leadership

1. Have you ever heard of the anthropological demographic transition theory? I am in two classes which have both discussed this theory and it has made me think of this class and all the people concerned about population growths. The theory describes population trends in five stages.

2. In regards to you being interested in classes that largely involve environmental discussion, I just took a class last semester called Conservation Biogeography with Teri Jacobs as the instructor. If you plan on taking any on-campus classes at all in the Fall, I can definitely say that this one sounds right up your alley. It's very heavily discussion based and fairly student led. Just thought I'd throw it out there for you!

3. The organization I am involved in, What's in A Doctor's Bag, was started by Dr. Neil Shulman, a professor of medicine at Emory medical school. It is a program centered around a book he authored in which medical instruments come to life and soothe a scared little boy. We also pass around stuffed toy instruments to pass around as each new characters are introduced. In this way, the students are able to interact with all of the medical instruments in a safe and comfortable environment. The main goal is to ease children's fears of the doctor's office.

4. I know that from my public relations background, it always comes down to how you present things to your audience. When I present things to my sorority chapter, if I am not upbeat and positive about something I will convey a negative perspective to chapter.

5. In an article by Fredric Wagner called "Analysis And/Or Advocacy: What Role(s) for Ecologists?", he describes generic thoughts about scientists. My favorite thought was how people think that the young population wants to learn science because it will put them in a position of power. Thoughts like these do not help build the bridge between science in society. Proper advocacy will help build this bridge. Another article by Peter Brussard and John Tull called "Conservation

Horizontal Communication/porous Leadership

Biology and Four Types of Advocacy" discusses different ways to advocate for science. They make the connection between policy and science, and I think there needs to be more scientists in the political realm. I think this will cause more of society to acknowledge science

Interactivity/Collaborative Learning

1. Thank you for your input! I think the main problem involved when dealing with a climate change issue is democracy. Don't get me wrong, I believe in democracy and completely support it, but it is just a popularity contest. An issue like climate change that is far reaching should be resolved by a majority of independent politicians that are not affiliated with any party. The settlement should also be upheld for a minimum of 10-15 years so neither party feels in power when dealing with the issue once they're elected.

Table 3.8 continued

2. I agree with you just like Prof. Miller does about using ads to promote science. Many times when I surf the web, I see a lot of unnecessary advertisements on the side such as weight loss pills, or how to grow hair "naturally" which is completely useless. Those advertisements could be replaced with something that would be more beneficial than a fake facial cream or false statements about weight loss. Yes, advertising is expensive but it is imperative to get your message across. Simply put, the use of internet makes communication and advertising much easier.

New content generation

1. People feared that some mad scientists were about to create black holes that would swallow the Earth into a bottomless pit. However, years later, we are actually creating tiny black holes in the particle collider. Not only is this perfectly safe, it is ground breaking work allowing scientists to collect data on the time-space continuum. (CBS News http://www.cbsnews.com/news/creating-mini-black-holes-on-earth-easier-than-previously-thought-researchers-say/)

2. Professor Douglas Kellner from the University of California posed the argument that "excessive TV viewing stunts cognitive growth, creates shortened attention spans, and habituates youth to fragmented, segmented, and imagistic cultural experiences and that thus television and other electronic media are a social problem for children." (Kellner:212)

3. Look up, if you haven't already, a professor by the name of Noam Chomsky. He's a professor of linguistics & philosophy at MIT, and critic of the lovable hegemony that you and I live in. One of his books, *Necessary Illusions*, is almost a reflection of your discussion post.

Playful/enjoyable/social learning

1. I'm checking out Muse ... Entrancing, inviting, sometimes raging, sometimes soft,
thoughtful. I like the mix of sounds and instruments. And the dude's voice on the second or third track on *The Second Law* album. I could see how people might
work out to this or jam out to it in the car. I'm diggin it.

2. The kind words mean a lot to me! I hope you do pick knitting up one day; it is very beneficial and not to mention rewarding!

3. I think *Step Brothers* is an awesome movie too, and also mentioned it as one of my favorites. I am a chemistry and education major.

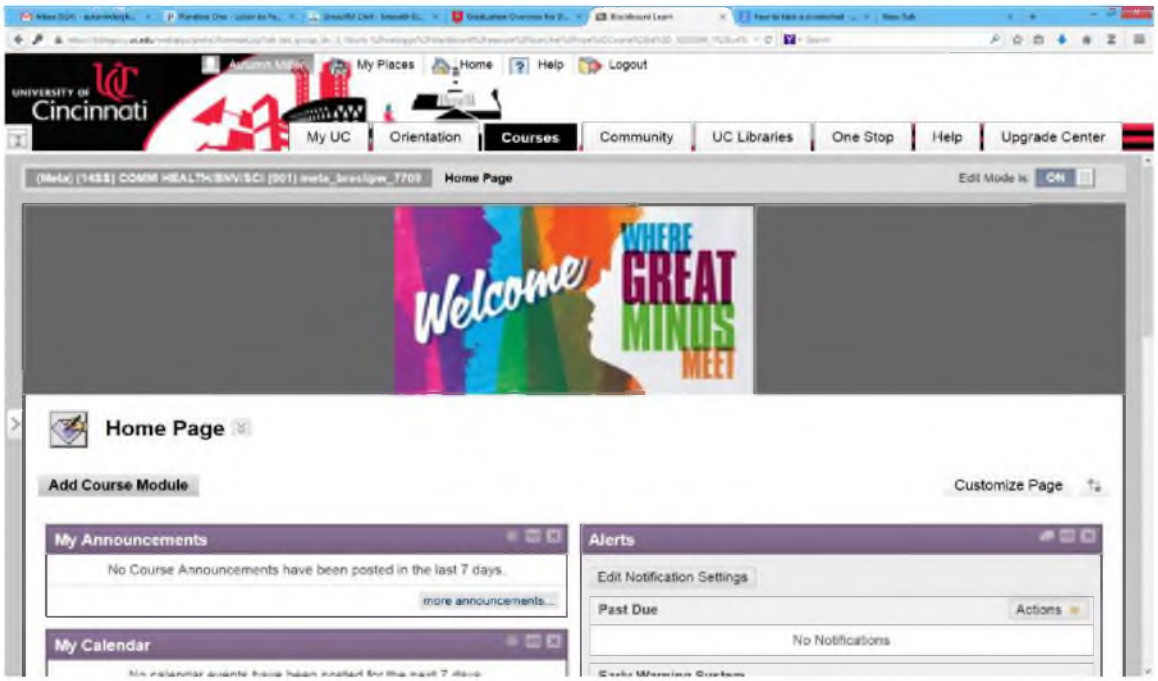


Figure 3.17. Picture of main entryway in Blackboard used for COMM 2004

the first part of the class. More specifically, interactivity/collaborative learning (n = 190), playful/enjoyable/social learning (n = 162), new content generation (n = 153), and students going against the structure (n = 13) peaked during Part 1.

Interactivity/collaborative learning was coded whenever there was two-way (i.e., threaded) communication between 2 or more students or the instructor on the DB and when students brainstormed or problem-solved together, as seen in the following example. Most of these examples took place during the first 2 weeks of class when students expressed interest in one another's hobbies, music and movie interests, and gravitated toward people similar to themselves. For example, the 2 following students interacted when they realized they had similar interests in photography:

Student 1: Major: Environmental Studies and Photojournalism.

> Student 2: Dan, I understand you are a professional photographer. Actually I am just an amateur, and planning to take some photography courses in the future. I have a little Sony digital camera that I use just for family, friends and personal events. I love pictures to trace my life history. You are welcome to send me some clues to go a step further. Thanks.
>
> Student 1: I love music too. I collect vinyl and love to hear the classical sound. It's beautiful. I am a photojournalism double major, I love photography too, where have you traveled to shoot? I just got back from NYC because I wanted to get some cool new photos. I love to take my camera everywhere, especially outdoors. (1)

There was also evidence that COMM 2004 was a unique Third Space where some students felt comfortable breaking the norms and "going against the structure" of the class, as demonstrated by the titles of several posts when students opted to turn in their DB assignments late during the first part of the class: (1) "Late DB post (I know, I know) Week 4: Prompt 3"; (2) "Better Late than NEVER!!! (Question #4)"; (3) "I KNOW I AM TURNING THIS IN LATE BUT YOU SHOULD TOTES READ IT ANYWAY" (4) RE: Be Optimistic ! (Sorry for the Late Post).

For better or worse, these posts demonstrated that at least some students perceived that COMM 2004 was a "safe" space where they could openly participate without being chastised for being late. It also serves as evidence that, despite certain conventions of the class being communicated (i.e., deadlines), not all students were disciplined to this process. Interestingly, despite the fact that I did not penalize these students for turning in their posts late, the late behavior diminished in future parts of the class, further evidence that once the Third Space and flow of the class were established, students became more disciplined to the overall process.

It appeared that once the initial structure of the Third Space was established, it was maintained, at least to some extent, throughout the class. For example, elements of

the course design (e.g., an open DB, named "other gold nuggets" for new bits of user generated content), as well as the DB prompt assignments themselves, encouraged new knowledge creation in each part of the class and helped maintained the Third Space. New content creation and collaboration also surged as a result of the two group projects assigned in the class.

Students themselves increasingly contributed to the development of the Third Space as the class progressed. More specifically, because students contributed to new content creation in DB posts, this knowledge creation shifted around leadership as people with different skillsets and knowledge bases were able to step up and become knowledge leaders in different parts of the class.

Moreover, as indicated by student feedback at the end of the semester, the online format itself allowed students who typically do not speak up in traditional classrooms to become more vocal and opinionated. As 1 student said: "Lastly, it wasn't my original goal, but I realized I feel more inclined to participate in conversations online than in physical classrooms."

In Part 3, there was a surge in both playful/enjoyable/social learning codes as well as new content generation. This increase in new content creation was in part a response to the second group project students posted that discussed environmental problems. More specifically, several students indicated they enjoyed learning from their peers, as seen in the following example:

> I enjoyed your paper and action plan, it's always interesting to hear what people have to say about suburbs especially if you have lived in one. I have always lived in the Oakley community in Cincinnati which is technically considered part of the city of Cincinnati and not really the suburbs, but for my years growing up there, that's how I considered it. (4)

Figure 3.18 depicts one way the Third Space in COMM 2004 can be conceptualized. There are several noteworthy features of this model. First, the formation of the Third Space required interactions between the students, content, instructor, and the online interface itself to materialize. Second, trigger events helped spark discussion to foster cognitive processing and feelings of similarity and trust. Third, a community developed as a result of the Third Space, while it simultaneously also helped to maintain the Third Space. Fourth, the walls of the Third Space were permeable. More specifically, the Third Space was impacted by new content and experiences introduced by the students and the instructor from outside the classroom, and the content and experiences from within the classroom had the potential to amplify and have an influence beyond the classroom.

Course Influence

Because I was interested in the extent to which the class, content, instructor, and peers had an influence or impact on the participants in the class, I also coded for illustrations of influence. There were a total of 317 text fragments coded for influence, comprising 1.7% of all coded text fragments. High points for the number of text fragments coded for influence occurred in Part 1 (n = 127) and Part 3 (n = 123) of the class. Influence was further broken into several different types. Figure 3.19 displays the varieties of influence that emerged in each part of the class. It appears that by the end of the class, some students were more likely to report being willing to talk to others about the content in the class as well as more likely to seek out and share information.

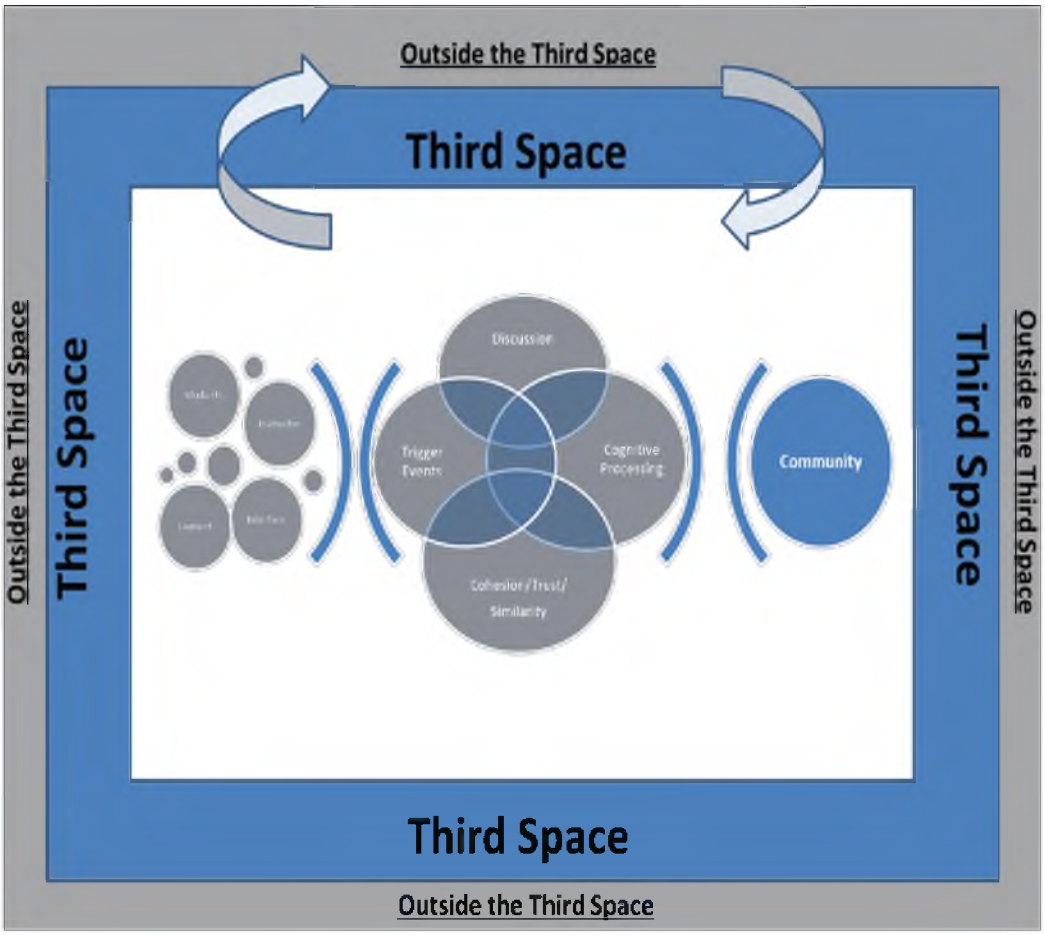
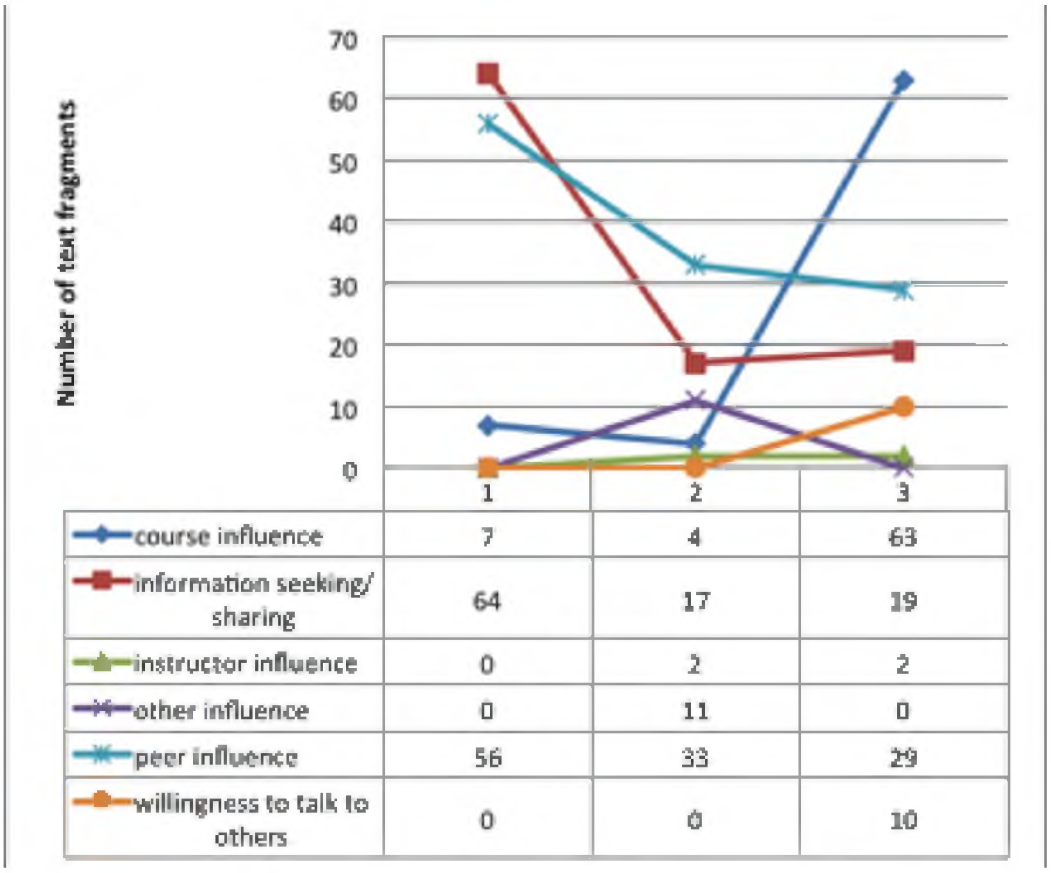


Figure 3.18. Model of how a Third Space developed in COMM 2004

Course Influence

Part 1

In Part 1, the highest frequency of codes for influence occurred for information seeking/sharing (n = 64) and peer influence (n = 56), with frequencies for each of these codes decreasing in the second part of class and leveling out in the third. For example, in Part 1, during the icebreaker DBs, students made many suggestions for various types of movies and music that their peers or the instructor indicated they planned to check out or had actually listened to or watched as a result of students' suggestions. Although



	1	2	3
course influence	7	4	63
information seeking/ sharing	64	17	19
instructor influence	0	2	2
other influence	0	11	0
peer influence	56	33	29
willingness to talk to others	0	0	10

Figure 3.19. Types of influence in each part of the class

suggestions continued to be made by students throughout the semester, the frequency was highest in Part 1 of the class.

Part 2

In Part 2 of the class, "other influence" emerged as students shared about people in their lives who had an impact on their health behaviors (n = 11). For example, several students discussed the impact their parents had on their health choices and lifestyles, as seen in the following example: "I completely agree that my parents have affected me greatly when it comes to my health choices and luckily they have been a pretty good impact on my choices."

Part 3

In Part 3 of the class, codes for course influence spiked (n = 63). This increase in frequency coincided with the point in the class when students were asked to reflect on their experience in the course and asked specifically in the Week 15 DB prompt what the class had done for them (i.e., what influence did the course have on you?).

This also began what I identified as the "transformation" phase of the class, when students disclosed the ways they perceived the class was influencing them. Likewise, several students indicated that they planned on sharing or had already shared what they learned with others: "I have spoken to my friend and gave him advice on how to lower his utility and help the environment out. He has agreed to take my advice and I'm proud of him."

Table 3.9 displays exemplars that demonstrate the influence students perceived the class having on them. As demonstrated by the exemplars in Table 3.10, one way the class seemed to influence students was the extent to which students were willing to talk to others about health or environmental issues (n = 10) in Part 3.

Peer Influence

Students were also influenced by their peers (see Table 3.11). Whether it was indicating that they were taking the advice of a peer to be more vocal with their own doctors, or trying a new movie, restaurant, or green product, students seemed to have an influence on one another in the class. Peers' posts triggered people to look up additional information, do their own research, and brainstorm solutions to problems. Additionally, some students reported sharing information they learned in the class with

Table 3.9. Exemplars for course influence

1.	Since this class started, I have begun following science related Twitter pages and these pages have been the most entertaining ones to view for the last week or so. Whether it has been a video of a baby polar bear seeing snow for the first time, new information on the ways scientists are creating stem cells, or where hot peppers actually get their hotness, I have been well entertained. Science is not always boring and can often be interesting if delivered in an interesting way.
2.	This class has definitely opened my eyes when it comes to being more aware of science/environmental issues. Each week I learned something new and I really enjoyed all the different readings and Power Points that made finding out about this information easy and understandable. I plan on passing what I've learned in this class forward to my peers and possibly even interested strangers. I hope I can continue to be environmentally conscious and practice being green by changing the way I live my daily life. I plan to change my lifestyle and make sacrifices in order to do my part in preserving our planet.
3.	This class has taught me a lot about myself as well as how much I actually do care about the environment. Before taking this class, I knew that I cared about people littering and certain environmental issues. I even thought I had a decent grip about what was going on with climate change. However, this class showed me that I was pretty clueless about what was actually going on in the world. I did not even know that plastic was an issue in the ocean or that intensive farming was a problem.
4.	I am now aware that I am a conservationist. This class has taught me that, and it has taught me that I need to be aware of my "wise use" of natural resources and be careful about what I am buying/using. The class has also taught me how important communication is in getting ideas out to the public and starting movements, spreading knowledge etc.
5.	What this class has done for me is bring subtle changes in the way I communicate with others in general and on my topics of interests as well. I definitely feel like I bore people a lot less now because I know how to actually engage them in conversation rather than just talking at them about what I want.

Table 3.10. Exemplars for influence on information seeking/sharing

1.	Mostly, I find myself telling other people about what I have learned in this class. It isn't exactly doing something, but it is the first step. I can see myself sharing information with other science majors on better communication.
2.	One of the most obvious things that this class has allowed me to do is have a baseline of knowledge regarding many current issues that come up in conversation. I have been able to add to conversations regarding politics and environmental issues for the first time ever!
3.	I hope to communicate my passion for saving the environment in a better manner that the general public will appreciate and learn from. I certainly plan on at least sharing what I have learned with friends and families in hopes that they too will change.
4.	I believe that those are healthier alternatives to quitting than taking a pill such as Chantix. I will definitely make my friends who smoke aware of the potential harsh side effects of Chantix!

Table 3.11. Exemplars for peer influence

1.	I never heard of that app but it sounds interesting! I might have to try it out! I enjoy reading if it's something that sparks my attention. This app seems to give you various types of articles so you can pick and choose which one or ones you want to read. Thank you for pointing that app out to me.
2.	I will now start taking fish oil supplement pills. My dad always takes fish oil pills and I never knew why and I never really bothered to ask. However, now I know and your article has made me want to try to start taking them!
3.	After reading it and the responses, you have piqued my interest in Autism Speaks. I have been looking for a good cause to volunteer with, and I think I will check out this organization. Thank you!
4.	I had no idea that bottled water had these kind of effects on our bodies! I drink it every day because I assume it's better for me than drinking out of my faucet. This is definitely something that I would like to research further. Is there a particular type of water bottle that is safe ?

people outside of the class.

Peers also seemed to have an influence on people's intentions to engage in more environmentally responsible behavior, as seen in the following example:

> That was a great idea for a New Year's resolution, and it makes me feel like I should probably look into doing the same thing. I also think it is great that you found a website that states the health hazards. I know that it isn't always easy to find health hazards that are smaller. I hope that you find another website and I think that I might look into one myself. (3)

To understand more fully the extent to which students in the class attempted to exert influence on one another, three types of learner presence/student actions—incite action, give advice/make suggestions, recommend—were also plotted out and graphed (see Figure 3.20). The number of text fragments that were coded for give advice/make suggestions and incite action increased, with the highest points being in the second and third parts of the class, respectively.

Students' efforts to make recommendations to peers remained fairly steady throughout each part of the class; students giving advice/making suggestions piqued in the second part of the class and leveled out in the third part of class. Additionally, the frequency of codes for students inciting action steadily increased as the class progressed over the semester, with the highest incidence occurring in Part 3 of the class. Exemplars for these attempts to exert influence can be seen in Table 3.12.

Behaviors and Intentions

To learn more about the extent to which the course impacted the behavior and intentions of participants, I incorporated several additional codes. I started by coding intentions toward health and environment, and several other codes also emerged. There were a

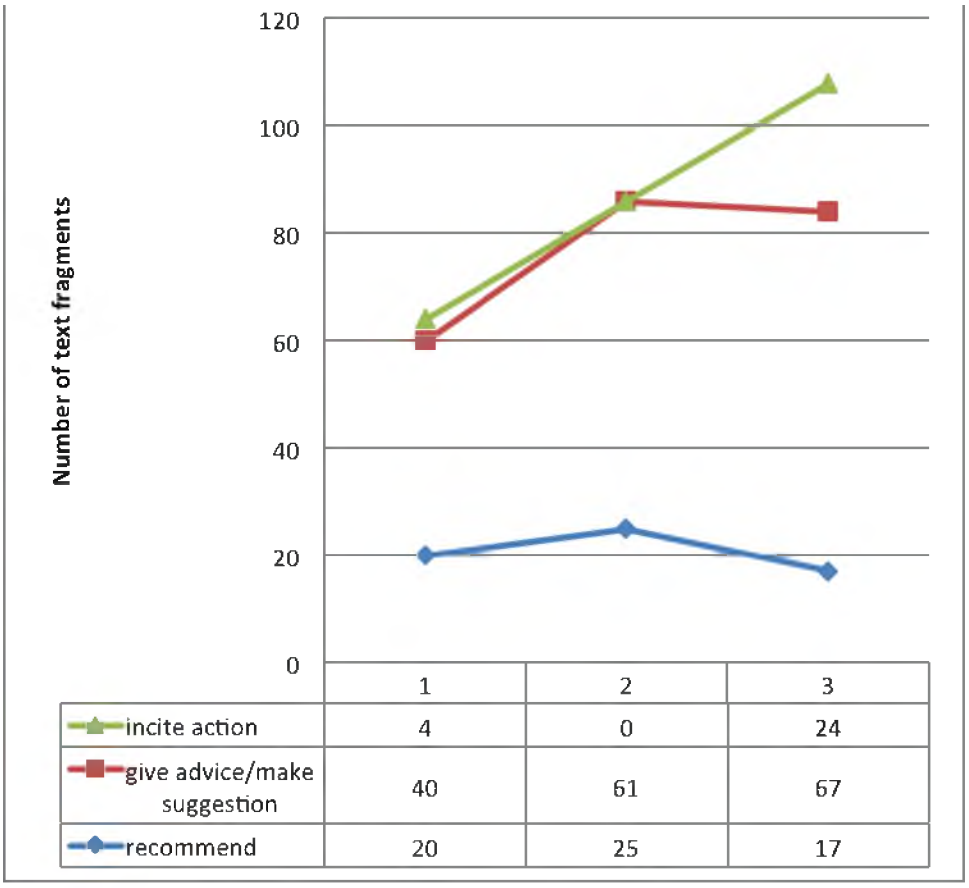


Figure 3.20. Attempts to exert influence

total of 362 text fragments coded for behavior and intentions—2% of the total coded text fragments. Table 3.13 contains a list of codes and subsequent text fragment frequencies for behavior and intentions across each three parts of the class.

COMM 2004 appeared to have had an impact on student's intentions to engage in both pro-health and pro-environmental behaviors. Behavioral intentions increased two-fold in the second part of the class, with students intending to do more in terms of their own health behavior. The number of text fragments coded as behavioral intentions and actual behavior nearly doubled again in Part 3 of the class (see Figure 3.21), with a spike in the number of students intending to do more to help the environment.

Table 3.12. Exemplars for attempts to exert influence

1.	I don't know how much experience you've had with blogs, but I think you should give them another chance! Many times we read blogs without realizing it because not all blogs are created equal. There are so many different forms of them, and they are not all inaccurate. Just like anything from the internet, it is important to know where the information is coming from and whether the "facts" can be or have been substantiated.
2.	My only advice is to not turn your back on science, or be disheartened by mistakes, because you can always work to correct those mistakes yourself! Also, here is a fun link to map climate change. I know you said you don't agree with it completely, but since you mentioned it...
3.	I encourage you to go forward and get your own doctor because of the great experience I had with that decision. I feel that it is especially important for women to hand-pick a doctor that makes them feel comfortable or you may never ask the questions and get the answers you really want to know.
4.	On another note, blood drives are always looking for volunteers, even if you can't donate. There's opportunities like keeping donors company after they're finished or distributing snacks and goodies. It's tons of fun, and you get to meet a lot of interesting people.
5.	The biggest problem with the landfills is the amount of recyclable things, like you said, that are tossed in the trash rather than put back into the system. Thanks for responding, do your part!

Part 1

In Part 1 of the class, the highest incidence of content coded for behaviors and intentions was coded for "other intentions" (n = 40) and "visualization" (n = 28). These instances arose during one of two times: First, during the icebreaker posts in Week 1, students indicated they would try new music, movies, books, or TV shows based on suggestions made by their peers. Second, during Week 3 of the class, students were asked to explore blogs. During this time, several students shared intentions to use blogs.

Table 3.13. Exemplars for behavioral intentions

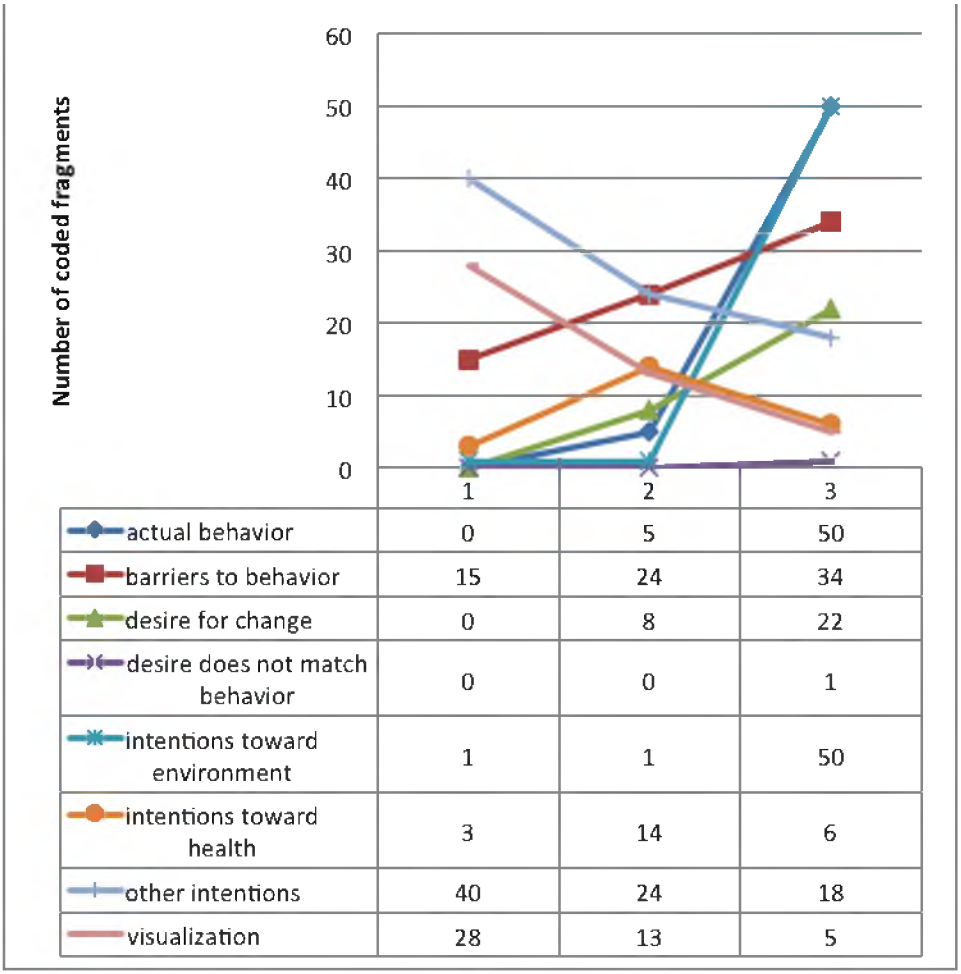
1.	My new goal is to find ways, both big and small, to reduce my ecological footprint. I do not like the fact that I "earned" four earths on the resource usage quizzes, so it's time for me to make some changes.
2.	My family goes through two cases of bottled water a week; we should definitely recycle them if they're 100% recyclable. I'll bring that up at family dinner tomorrow night!
3.	I plan on passing what I've learned in this class forward to my peers and possibly even interested strangers. I hope I can continue to be environmentally conscious and practice being green by changing the way I live my daily life. I plan to change my lifestyle and make sacrifices in order to do my part in preserving our planet.
4.	I do plan on trying to recycle more and eat healthier. Also I will try to walk and car more instead of driving everywhere.
5.	I plan on sharing my newfound environmental knowledge with my friends. I'm also going to make changes in my own life so that my lifestyle is better for the planet.

Another student suggested a peer do more research about making their own cleaning products, which caused several students to intend to follow his advice:

> Hi Louie! I will definitely look into using vinegar as a household cleaner! I've always wanted to try using alternative ingredients as cleaners but I wasn't sure how to go about doing so. I hadn't thought of using essential oils to offset the vinegar smell! Thanks for the tips and the link!

Table 3.11 demonstrates exemplars when students seemed to impact other students in the class, in addition to the trigger moments.

There were also 15 instances of barriers to behavior that emerged in Part 1 of the class. These barriers primarily resulted from a DB prompt that asked students how likely they were to follow a science blog or write a science blog of their own. Many students indicated that they either did not have the time to engage in such an activity or did not have the knowledge or ability to do so. Therefore, students perceived there were barriers



	1	2	3
actual behavior	0	5	50
barriers to behavior	15	24	34
desire for change	0	8	22
desire does not match behavior	0	0	1
intentions toward environment	1	1	50
intentions toward health	3	14	6
other intentions	40	24	18
visualization	28	13	5

Figure 3.21. All codes for behaviors and intentions over time

that kept them from fully engaging in the process of following a blog.

Part 2

In Part 2 of the class, the number of incidences of actual behavior increased from zero to five. These included instances when people reported engaging in some sort of pro-health behavior. For example, 1 participant posted: "I'm currently taking steps to change my unhealthy diet and will surely take your post into consideration. Thank you!"

Another participant wrote: "After reading your post, I went to the gym on Friday." A 3rd participant claimed the following:

> I haven't had a soft drink for over two weeks and I noticed an immense change in the way I feel. I used to feel bloated or have heartburn as a result of drinking carbonated soft drinks. I have only been drinking water and I feel so much better! What are some other things you would suggest for a busy person to do in order to help them eat healthy instead of fast food? (3)

In addition, the number of times people reported intentions toward their health increased in frequency in Part 2 of the class (n = 14). One participant claimed "I am planning on keeping up a steady workout schedule this semester, so we will see how it goes. It just gets so difficult with work, sometimes." Another individual posted, "Sheesh after reading this it makes me want to take my health more seriously." Another person said the following:

> After reading this, I am kind of curious about trying meditation out. Who knows it might actually help me out, and I think that it is worth a try because the negatives you mentioned about it do not concern me. Thank you for helping me out, and nice job!

The number of times barriers to behavior was coded increased from Part 1 (n = 24). Most of these barriers pertained to the health behaviors of students. More specifically, it seemed that many students saw time and apathy as barriers to engaging in more healthy behaviors (e.g., working out). For example, 1 student indicated the following:

> I have great intentions when it comes to working out, but terrible follow through. If I had a buddy to help keep me stay accountable I think that would help. I also like to do physical activities, but kind of loathe going to the gym. I have to figure out my own game plan. (21)

Another student claimed, "If I really put a little more effort forth, I'm sure I could make it into a habit; unfortunately I just don't care enough most days." An additional

student in the class had this to stay about living a healthy lifestyle:

> Giving up a healthy lifestyle seems to be the easiest thing to give up under stress because it takes a lot of time, energy, and planning to be healthy. Working out is stressful on your body and mind, and so is sticking to a strict eating regimen. It's easy to say "screw it" and sit on the couch to study or rest, and eat whatever is available just to save time. I'm with you though, I wish I could keep my health as a higher priority. (16)

There were also several times when students expressed a desire for change in Part 2. These desires for change were either concerning their own individual health or changes in our approach to health care in general. Another student indicated the need for the legalization of marijuana so that people could benefit from its healing properties. Additionally, one student expressed frustration with corporations and wished they cared more about health than they do profits.

Part 3

In Part 3, there were more text fragments coded for behaviors and intentions than any other part of the class (n = 194). The two most frequent codes for behavior and intentions were for actual behavior (n = 50) and intentions toward the environment (n = 50), which both spiked in Part 3 of the class, again coinciding with the "transformation" phase of the class. Table 3.13 displays instances when the course or the participants in it seemed to have an influence on the pro-environmental behavioral intentions of those in the class.

The highest incidence of barriers to behavior also emerged in Part 3 of the class (n = 334). These included barriers students perceived as keeping them from engaging in more pro-environmental behavior. It appeared that many of the barriers

were due to constraints on time and money. For example, one participant claimed the following:

> In today's society, especially being a student, it makes it hard for me to live sustainably. I don't have the money to buy all organic foods like I would like to, and I have to eat foods that are convenient. (3)

Another student indicated the following:

> I definitely feel like we are in the same boat when it comes to the difficulties faced when trying to live green. I also eat out much more than I should. Time is pretty limited when you are a student! Trips to the store and preparing food can take up too much time and be stressful. (8)

Additionally, the code "desire for change" peaked in Part 3 of the class ($n = 22$). Some of this desire stemmed from students wishing they could do more to reduce their own environmental impact. For example, 1 student wished they did not have to drive as much and that Cincinnati was more bike-friendly. Other students simply saw their peers' DB posts in terms of what they were already doing for the environment and admitted, for example, "I wish I was that environmentally aware and conscious." There was also one instance of someone self-reporting that their own behavior did not match their intentions (i.e., they wanted to engage in more environmentally responsible behaviors, but they were not presently doing so). Other students discussed the barriers to being green as a result of the city they lived in:

> Your idea for composting sounds awesome. I wish Cincinnati had a program like New York or San Francisco to collect compost along with regular trash. There's no place to compost when you live in an apartment, and I always feel guilty throwing away so much that could be returned to the earth. Good luck starting your own pile! (11)

There were six examples of students having "intentions toward health" in Part 3 of the class as well as 18 instances of "other intentions." Most of these other intentions

were a result of a DB prompt the last week of the class that asked students to reflect on the goals they'd laid out for themselves at the beginning of the semester and to list any new goals they had developed for themselves along the way.

One student indicated, "I think after this class, my new goal now would be to remain open minded about the other side to an argument. I got to see a lot of different opinions with the discussion board which opened my mind to opinions other than mine." Another student claimed the following:

> A new goal I have for myself is to continue to improve to my communication skills, as they can always be better. Particularly I would like to be less monotone and unemotional, as these are traits that I realized have turned me off from communicating with past professors and scientists I have encountered. (n.p)

There were also five examples of "visualization." For example, 1 student said they could "see themselves" doing more to help the environment, and another indicated they could "see themselves" sharing information from the class with other science majors.

Summary

In this chapter, I highlighted findings from my qualitative analysis. I provided descriptive information about the texts used in the study and indicated the number of codes that were generated for each a priori/emergent theme. I also provided graphical data and exemplars that resulted from the thematic coding process. Text fragments for community comprised 79% of the entire data set, followed by content (10%), Third Space (6%), influence (2%), behavior and intentions (2%), and other codes (1%).

Based on my coding, it appears a sense of community developed and was maintained in the class with 83% of the text fragments coded as such during Part 1,

81% coded in Part 2, and 77% in Part 3. This evidence stemmed from the observation of various types of interaction, presence, trust building, and deliberation, with high points for all but trust occurring in Part 1 of the class. Trust, demonstrated by personal selfdisclosure, peaked in Part 2 when personal health issues and causes were the topic of discussion.

I observed the class followed a multiphase development of community membership that flowed much like Tuckman's (1965) description of the small group formation process with a few additions unique to COMM 2004. For example, students initially went through the forming and norming stages of the process by participating in an icebreaker DB assignment to help students get to know each other, the instructor, and the class. During this assignment, students were able to both declare their membership in the class and have their membership conferred by others.

Following forming and norming, students engaged in storming activities such as disagreeing, playing devil's advocate, and deliberating. After storming subsided, there were two additional phases of community renewal and maintenance facilitated in part by periodic shifts in course content, small group assignments, and opportunities to self- disclose. Self-disclosure also seemed to maintain social presence and trust, two necessary precursors to community formation.

In Part 3 of the class, students moved into a performing stage during which they completed a final group project. As a result of these group projects and various other trigger events in the class, some students seemed to experience a transformation phase. During this time, students reported an increased awareness about health and environmental issues and declared their intentions to change their own behavior. Moreover, many

students had epiphanies during which they recognized a certain collective we as either being part of the problem or part of the solution when it came to health and environmental problems.

COMM 2004 exhibited some qualities of the Third Space. Much like the coding for community, the highest frequency of codes for Third Space occurred during Part 1 of the class when the class initially formed, expectations were set, and the space was created. Following Part 1, there was a sharp decline in the number of codes for Third Space, with a spike in new content creation in Part 3. I developed a model of how I envisioned a Third Space developing in COMM 2004 and proposed that the boundaries are permeable between the class and the outside world; hence, the outside world has the potential to influence the outcomes of the class and vice versa.

There was also evidence that students perceived the class as somehow influencing them, their perceptions, or their behaviors. There were many instances of students reporting re-thinking their ideas based on something they read in class or something a peer said during a DB post. Students also reported seeking out and sharing information they learned from class content or their peers. Less frequent, although present, were instances when the students reported being influenced by the instructor. Students themselves appeared to get more comfortable putting forth effort to influence each other as evidenced by an increase in the tendency to incite action and give advice/make suggestions over time.

Based on the preliminary review of these qualitative results, there is ample evidence to suggest the following about COMM 2004, which supports the Research Questions of the study: (1) A community formed and was maintained, (2) Qualities of a Third Space were exhibited, (3) The course seemed to have an influence on information seeking

and sharing tendencies of participants, (4) The course seemed to impact the behavioral intentions of participants.

Next, the results from this qualitative analysis are further complemented by my quantitative analysis in Chapter 4. Then, I combine these results in Chapter 5.

CHAPTER 4

QUANTITATIVE RESULTS

Chapter 4 presents the results of the quantitative data analysis. The results are divided into six sections: (a) population and descriptive findings, (b) instrumentation constructs and reliability, (c) investigation of assumptions as related to inferential analysis, (d) exploration of Research Questions using quantitative analyses, and (e) summary and analysis of results. SPSS v22.0 was used for all descriptive and inferential analyses.

Given the exploratory nature of the study as well as the small sample size (N = 25), all individual mean differences are reported at .10 level of significance. Any effect appearing in the ANOVA analyses at the 80% confidence level was considered worthy of further investigation. This approach allowed a more widespread view of the data to be seen and explored as well as to lessen the likelihood of Type II error. Put another way, I did not want my small sample size to prevent me from noticing noteworthy findings, which were not necessarily statistically significant and worth further exploration.

Because I did not have a theoretical prescription for what I might find exploring my data, I used my Research Questions to help cast a wider net to examine the data.

Rather than attempting to make hard-fast predictions, I was more interested in paving the way for future exploratory research in similar vein. In short, these results are

more about giving advice to future researchers than in making firm, substantive claim.

I used two primary types of inferential statistics to guide this analysis: repeated measures ANOVAs and Spearman's rank order correlational analyses. The ANOVAs were used to determine whether there were any significant differences between pretest and posttest mean scores among various groups. More specifically, I was interested to see if there were differences across major, grade level, and gender when it came to how students experienced community, changed their environmental attitudes and behaviors, and enjoyed the class. I anticipated that there would be a main effect for the pretest/posttest; in other words, I expected the class intervention to make a difference in posttest scores. I looked at the examination of these various groups as audience research for improving the development of online interventions in future classes. I used a General Liner Model (GLM) Type III design for all measures to answer Research Questions 1, 3, 4, and 5. Spearman's was used to answer Research Question 6. Research Question 2, which examined the notion of Third Space, was not quantitatively explored and was therefore not included in this chapter.

Population and Descriptive Findings

The participants of this study ($N = 25$) included a convenience sample of student volunteers from the University of Cincinnati who were enrolled in COMM 2004. Fifty-six percent were female. The majority of students were in their junior (44%) or senior (36%) year of college. Most students were 18-24 years old (80%). A total of 18 students grew up in a suburban area (72%). For a detailed summary of the population descriptives, see Table 4.1.

Table 4.1. Number and percentages of demographic variables of study

Variable	Number	%
Gender		
Male	11	44.0
Female	14	56.0
Major		
Communication	3	12.0
Environmental Studies	8	32.0
Social Sciences & Humanities	7	28.0
Earth/Biological Sciences	5	20.0
Physical Sciences	2	8.0
Grade Level		
Freshman	1	4.0
Sophomore	4	16.0
Junior	11	44.0
Senior	9	36.0
Age		
18-24	20	80.0
25-35	4	16.0
36-47	1	4.0
Majority of Time Growing Up		
Urban	6	24.0
Suburban	18	72.0
Rural	1	4.0
Political Affiliation		
Democrat	6	24.0
Republican	4	16.0
Libertarian	1	4.0
Independent	5	20.0
Do Not Have/Not Reported	9	36.0

Note: *Collected During the Pretest Assessment (N = 25)*

Instrumentation Constructs and Reliability

A total of six instruments were utilized in this study: (a) Community of Inquiry instrument (CoI) (Arbaugh et al., 2008), (b) A Sense of Virtual Community measure (SOVC) (Blanchard, 2007), (c) New Ecological Paradigm scale (NEP) (Cordano et al., 2008), (d) The Children's Environmental Attitudes and Knowledge Scale (CHEAKS) (Leeming et al., 1995), (e) Net Promoter Scores (NPS) (Reichheld, 2003), and (f) the Course Influence Scale (CIS1 and CIS2)—created by the researcher. In total, these instruments produced 15 dependent variable constructs.

Community of Inquiry Instrument (CoI)

The CoI contained 34 items that assessed the multiple interrelated presences that work together to help form an online learning community. Each of the items of the CoI was scored on a 5-point Likert scale from 1 = strongly disagree to 5 = strongly agree. None of the items were reverse coded. The CoI was split into three constructs of (a) Teaching Presence (the average of questions 1-11 of the scale), (b) Social Presence (the average of questions 12-20 of the scale), and (c) Cognitive Presence (the average of questions 21-32 of the scale). A total score was also calculated by averaging all 34 items. Higher scores for each of the three constructs and total score of the CoI were indicative of a more effective conduct for online learning.

Sense of Virtual Community Measure (SOVC)

The SOVC contained 18 items that assessed each participant's sense of community. Each of the items of the SOVC instrument was scored on a 5-point Likert scale

from 1 = strongly disagree to 5 = strongly agree, with items 5, 7, and 10 reverse coded. The items were averaged to calculate a single Virtual Community score for each student. Higher scores indicated a stronger sense of virtual community.

The New Ecological Paradigm (NEP) Scale

The NEP contained 7 items that tested participants' environmental attitudes. Items were scored on a 5-point Likert scale from 1 = strongly disagree to 5 = strongly agree with items 4, 6, and 7 reverse coded. The NEP was factored into two constructs, (a) Balance (questions 1, 2, 3, and 5 from the scale) and (b) Human Domination (questions 4, 6, and 7 from the scale). This two-factor approach was chosen based on previous research using the revised NEP scale, which showed the scale to be comprised of two (e.g., Cordano et al., 2008; Garrison, 2006). The two NEP constructs measured opposing dynamics of environmental attitudes. Therefore, in order to have uniformity in the direction of measure for the two constructs, the entire Human Domination construct was reverse coded. Higher scores within the constructs of the NEP indicated higher levels of environmentally-friendly behavior. Prior to analysis, average scores were created for the constructs of the NEP instrumentation.

Children's Environmental Attitudes and Knowledge Scale (CHEAKS)

The revised version of the CHEAKS contained 30 items that identified and measured each student's knowledge and attitude about the environment, willingness to engage in environmentally responsible behavior (ERB), and actual ERB. Each of the

items of the CHEAKS instrument was scored on a 5-point Likert scale from 1 = strongly disagree to 5 = strongly agree, with items 5, 7, 10, 17, and 28 reverse coded. The scores were summed to create a total score. The total scores for the participants of this study ranged from 60-129. The CHEAKS scale can also be split into three-factor constructs of (a) Verbal Commitment (questions 4-16 from the scale), (b) Actual Commitment (questions 17-28 from the scale), and (c) Affect (questions 29-33 from the scale). As with the total score, the scores for each of the constructs were summed to create a total score. The total score and all three constructs were calculated on a continuous scale. Higher scores indicated greater positive attitudes and increased knowledge of the environment. Prior to analysis, average scores were created for the constructs of the CHEAKS instrumentation.

Net Promoter Score

At the posttest assessment time, each student was asked to give a rating of the class on a scale of 1-10 (where 1 = "You definitely would not recommend this class" and 10 = "You most certainly would recommend this class"). Students who rated the class 0-6 were classified as Detractors, while students who rated the class 9-10 were classified as Promoters. The Net Promoter Score (NPS) was created to measure customer satisfaction and loyalty. In this study, it was used to measure the satisfaction level of the students after participating in an online learning community. The NPS was calculated by subtracting the number of detractors (2) from the number of promoters (13), dividing it by the number of respondents (24), and multiplying that number by 100.

The Students also used the NPS to rate their peers at the end of each small group project. These results were not reported in the findings of this dissertation, however.

Rather, I used the NPS scores from the first project to determine if students would stay in the same group for the second group project. If students scored their peers any lower than an 8 on the NPS, they were moved to a new group for the second project.

Course Influence Scale (CIS)

I designed the Course Influence Scale. The original instrument included 27 questions. I developed these questions based on my previous experience teaching COMM 2004. More specifically, because I had previously seen qualitative evidence during DB conversations that peers, the instructor and content seemed to create trigger moments for participants that inspired critical thinking, self-reflection, and behavioral intentions, I aimed to create quantitative questions that tapped into these qualitative experiences.

Additionally, because I had seen qualitative evidence that the class inspired students to seek out information and talk to others about what they learned, I developed additional questions about information seeking and sharing. I essentially used my qualitative experience in the class to develop a way to test if such qualitative experiences might be replicable in future iterations of the class.

I hypothesized that these questions could be divided into two scales: (a) the CIS1, which assessed the extent to which students perceived the class having an influence on them; and (b) the CIS2, which assessed the students' perceptions on information seeking and sharing. The large number of scales and small number of respondents meant that the typically advised subject to scales ratio of 10:1 or better

was not met. Nonetheless, an exploratory Principal Components analysis (PCA) was conducted. It indicated that the CISI consisted of three constructs: (a) Peer Influence (questions 1, 2, 4, 5, 7, 9, 10, and 13); (b) Instructor Influence (questions 3, 6, 8, 12, and 15); and (c) Content Influence (questions 11, 14, 16, and 17). The PCA findings further indicated that the CIS2 also consisted of three constructs: (a) Seeking Information (questions 18, 19, and 20), (b) Sharing Information (questions 21, 22, 23, and 24), and (c) Willingness to Communicate Information (questions 25, 26, and 27).

Each of the items of the CIS was scored on a 5-point Likert scale from 1 = strongly disagree to 5 = strongly agree. None of the items were reverse coded. Each construct was averaged to calculate a total score for each student. Higher scores were indicative of greater course influence (CIS1 constructs) and greater perceptions of information seeking and sharing (CIS2 constructs).

Tables 4.2 and 4.3 present the measures of central tendency and the Cronbach's alpha coefficients for the 15 constructs derived from the CoI, SOVC, CHEAKS, NEP, and CIS instrumentation along with the total scores for each instrument. Cronbach's coefficient alpha is a measure of internal consistency reliability. A Cronbach's coefficient alpha value of .70 or greater indicates good reliability of an instrument with the data collected (Tabachnick & Fidell, 2007).

With the exception of the CIS, the instruments used in this study have been used previously and reported in literature. Because all of the constructs are supported by extensive literature they are retained for analysis in this study despite some of them having lower than generally accepted reliability.

Table 4.2. Measures of central tendency and cronbach's alpha coefficients for pretest assessment

Instrument/Construct	*N*	*M*	*SD*	*Mdn*	Sample Range	α
Community of Inquiry (CoI)						
Teaching Presence	24	4.60	0.49	4.82	3.55-5.00	.935
Social Presence	24	4.33	0.62	4.39	2.78-5.00	.907
Cognitive Presence	24	4.17	0.64	4.17	2.75-5.00	.937
Sense of Virtual Community Measure (SOVC)	24	3.50	0.41	3.57	2.57-4.29	.832
Children's Environmental Attitude and Knowledge Scale (CHEAKS)						
Verbal Commitment	24	3.27	0.60	3.19	2.00-4.38	.750
Actual Commitment	24	3.59	0.60	3.63	1.92-4.42	.619
Affect	24	3.88	0.84	4.00	1.40-5.00	.860
New Ecological Paradigm (NEP)						
Balance	24	3.86	0.70	4.00	1.75-4.75	.748
Human Domination	24	3.67	0.88	3.67	1.33- 5.00	.734
Course Influence Scale (CIS1)						
Peer Influence	24	3.96	0.63	3.94	2.50-5.00	.892
Instructor Influence	24	3.90	0.85	4.00	1.75-4.75	.916
Content Influence	24	4.24	0.70	4.30	1.80-5.00	.895
Course Information Scale (CIS2)						
Seeking Information	24	3.44	0.61	3.50	2.00-4.00	.816
Sharing Information	24	3.30	0.56	3.25	2.00-4.00	.740
Willingness to Communicate Information	24	3.76	0.59	4.00	2.33-4.33	.708

Note. *N* = Sample Size; *M* = Mean; *SD* = Standard Deviation; *Mdn* = Median.

Table 4.3. Measures of central tendency and cronbach's alpha coefficients for posttest assessment

Instrument/Construct	*N*	*M*	*SD*	*Mdn*	Sample Range	α
Community of Inquiry (CoI)						
Teaching Presence	24	4.46	0.68	4.73	2.82-5.00	.958
Social Presence	24	4.17	0.72	4.06	2.89-5.00	.914
Cognitive Presence	24	4.17	0.70	4.17	2.25-5.00	.963
Sense of Virtual Community Measure (SOVC)	24	3.54	0.57	3.61	2.24-4.48	.919
Children's Environmental Attitude and Knowledge Scale (CHEAKS)						
Verbal Commitment	24	3.20	0.55	3.31	1.62-4.23	.544
Actual Commitment	24	3.79	0.56	3.92	2.17-4.50	.667
Affect	24	4.01	0.71	4.10	2.20-5.00	.831
New Ecological Paradigm (NEP)						
Balance	24	3.98	0.77	4.00	2.00-5.00	.873
Human Domination	24	3.89	0.85	4.00	1.67-5.00	.610
Course Influence Scale (CIS1)						
Peer Influence	24	3.95	0.81	4.06	2.13-5.00	.935
Instructor Influence	24	3.89	0.88	3.88	2.00-4.75	.915
Content Influence	24	4.10	0.87	4.30	2.00-5.00	.911
Course Information Scale (CIS2)						
Seeking Information	25	3.35	0.64	3.33	2.00-4.00	.893
Sharing Information	25	3.23	0.68	3.25	1.75-4.00	.867
Willingness to Communicate Information	25	3.71	0.75	4.00	1.67-4.33	.920

Note. *N* = Sample Size; *M* = Mean; *SD* = Standard Deviation; *Mdn* = Median.

Assumptions

The data set was investigated to ensure that it satisfied the assumptions of the ANOVA and correlational analyses: absence of missing data, absence of outliers, normality, linearity, homoscedasticity, and homogeneity of variances as relates to the 15 dependent variables derived from the CoI, SOVC, CHEAKS, NEP, and CIS instrumentation. No systematic evidence of violations was found.

Examination of the Research Questions

The examination of the research questions approached by ANOVA was conducted to compare the groups of gender, grade level, and major. These variables were coded as: (a) gender, 1 = Female and 0 = Male; (b) Grade Level, 1 = Senior, 0 = Other; and (b) Major was coded as 1 = Environmental Studies and 0 = Other Major. The results are presented according to each research question.

In this writeup, I present the interaction effects followed by an explanation of the main effects. Pallant (2013) argues that "If you find a significant interaction effect, you cannot easily and simply interpret the main effects. This is because, in order to describe the influence of one of the independent variables, you need to specify the level of the other independent variable" (p. 266). In other words, when there is a significant interaction effect, the interpretation of the main effects needs to be more carefully interpreted because the interaction effect can blanket or hide the main effects. Therefore, I first discuss the interaction. Then, if there is a significant interaction effect and a significant main effect, then the main effect was already investigated via the interaction effect. A summary table of means for all constructs for the pre- and posttest can be found in Appendix D.

RQ 1: Does an Online Learning Community Appear to Form in COMM 2004?

Evidence for the presence or absence of an online learning community (OLC) was derived from a pre- and posttest administration of the COI and SOVC. The CoI has three constructs: teaching presence, cognitive presence, and social presence. The SOVC is an overall score that measures sense of virtual community. From the literature, I expected the posttest means of each of these constructs to be higher than the pretest means with no interaction among the constructs.

Community of Inquiry (CoI) by Gender

Table 4.4 presents the mean scores, standard error of the means, and confidence intervals for the data across all factors. The repeated measures ANOVA analysis showed that there was not a significant two-factor (Pretest/Posttest*Constructs*Gender) interaction ($F = 0.05$, $p = .950$); no significant two-factor interaction between pretest/posttest and constructs ($F = 1.42$, $p = 253$); no significant interaction between pretest/posttest and gender ($F = 0.47$, $p = .499$). The two-factor interaction between constructs and gender ($F = 2.29$, $p = .114$) warranted further analysis. The significant interaction between constructs and gender indicated that males and females had significantly different mean scores over the three CoI constructs of Teaching Presence, Social Presence, and Cognitive Presence. The main effects of pretest/posttest reached the level for further comment ($F = 1.75$, $p = .200$), but that of gender did not ($F = 0.02$, $p = .884$). Because this study is exploratory, I looked for additional insights by examining gender, grade level, and major. The main effect of constructs was statistically significant ($F = 8.39$, $p = .001$), indicating

Table 4.4. Descriptive information for data across gender, pretest/posttest administration, and dependent variable constructs

				90% Confidence Interval	
Gender	Constructs	*M*	*SE*	Lower Bound	Upper Bound
Male	Pretest				
	Teaching Presence	4.61	0.16	4.34	4.88
	Social Presence	4.50	0.20	4.16	4.84
	Cognitive Presence	4.10	0.21	3.74	4.45
	Posttest				
	Teaching Presence	4.43	0.22	4.04	4.81
	Social Presence	4.24	0.24	3.84	4.65
	Cognitive Presence	4.03	0.23	3.64	4.43
Female	Pretest				
	Teaching Presence	4.56	0.14	4.32	4.80
	Social Presence	4.19	0.18	3.89	4.49
	Cognitive Presence	4.19	0.18	3.88	4.50
	Posttest				
	Teaching Presence	4.45	0.20	4.11	4.78
	Social Presence	4.08	0.21	3.72	4.43
	Cognitive Presence	4.25	0.20	3.90	4.60

Note. *M* = Mean; *SE* = Standard error of the mean.

that the means of the three CoI constructs were significantly different from each other. Table 4.5 presents the results from the repeated measures mixed ANOVA performed.

Table 4.6 presents the pairwise comparisons for the within-groups variable of constructs. To help understand how to interpret this table, I chose 1 of the 3 constructs and set the mean value for that construct as "I" (column 1). Then, I set the mean value for the other 2 constructs as "J" (column 2). I then subtracted the mean "I - J" (column 3). If the difference is positive, it means that I was greater than J — or the mean value for the first construct was greater than the mean value for the second construct (i.e., participants had higher mean scores for the first construct than they did for the second construct). It was

Table 4.5. Repeated measures ANOVA table for gender over the dependent variable constructs of the CoI instrumentation

Source	Sum of Squares	*df*	Mean Square	*F*	*p*	η_p^2	Power
Interaction Effect							
Pretest/Posttest*Gender	0.11	1	0.11	0.47	.499	.022	.174
Constructs*Gender	0.88	2	0.44	2.29	.114	.098	.572
Pretest/Posttest*Constructs	0.21	2	0.11	1.42	.253	.063	.411
Pretest/Posttest*Constructs*Gender	0.01	2	<0.005	0.05	.950	.002	.111
Within Groups Effect							
Pretest/Posttest	0.41	1	0.41	1.75	.200	.077	.360
Constructs	3.23	2	1.62	8.39	.001	.286	.978
Error (Pretest/Posttest)	4.91	21	0.23	---	---	---	---
Error (Constructs)	8.09	42	0.19	---	---	---	---
Between Groups Effect							
Gender	0.04	1	0.04	0.02	.884	.001	.103
Error (Between groups)	39.51	21	1.88	---	---	---	---

Note. *df* = Degrees of Freedom; *F* = test statistic; *p* = *p*-value; η_p^2 = partial eta squared.

Table 4.6. Pairwise comparisons for all three constructs of the CoI Instrumentation

(I)) Constructs	(J) Constructs	Mean Difference (I-J)	*SE*	*p*	90% Confidence Interval for Difference	
					Lower Bound	Upper Bound
Teaching Presence	Social Presence	0.26	0.10	.021	0.08	0.44
	Cognitive Presence	0.37	0.08	<.0005	0.28	0.51
Social Presence	Teaching Presence	-0.26	0.10	.021	-0.44	-0.08
	Cognitive Presence	0.11	0.09	.233	-0.04	0.27
Cognitive Presence	Teaching Presence	-.037	0.08	<.0005	-0.51	-0.23
	Social Presence	-0.11	0.09	.233	-0.27	0.04

Note. *SE* = Standard error of the mean difference; *p* = *p*-value.

vice versa for the negative differences. For this table and all similar tables, if the finding is significant, then mean values for the first construct (column I) were significantly higher (if positive)/lower (if negative) than mean values for the second construct (column J).

The table shows that scores for the CoI Teaching Presence construct were significantly higher than scores for both CoI Social Presence and CoI Cognitive Presence constructs. These findings indicate that teaching presence was significantly and substantively more important by the respondents than either social or cognitive presence.

Community of Inquiry (CoI) by Grade Level

The pretest and posttest mean scores for the three CoI constructs of Teaching Presence, Social Presence, and Cognitive Presence over grade level were entered into a GLM repeated measures, Type III design. Table 4.7 presents the mean scores, standard error of the means, and confidence intervals for the data across all factors.

Table 4.8 presents the results from the repeated measures mixed ANOVA performed. The repeated measures ANOVA analysis showed that the three-factor interaction was in the range for three-factor (Pretest/Posttest*Constructs*Grade Level) interaction ($F = 2.08$, $p = .137$), indicating that mean pretest and posttest scores for seniors and participants in other grade levels were significantly different across the three CoI constructs. Further investigation of this significant interaction indicated that seniors had higher pretest and posttest mean scores than participants in other grade levels.

Table 4.9 presents the pairwise comparisons for the within-groups variable of constructs. The table shows that mean scores for the CoI Teaching Presence construct were significantly higher than mean scores for both the CoI Social Presence and CoI Cognitive

Table 4.7. Descriptive information for data across grade Level, pretest/posttest administration, and dependent variable construct

Grade Level	Constructs	*M*	*SE*	90% Confidence Interval Lower Bound	90% Confidence Interval Upper Bound
Senior	Pretest				
	Teaching Presence	4.80	0.16	4.53	5.07
	Social Presence	4.37	0.22	4.00	4.74
	Cognitive Presence	4.49	0.20	4.15	4.83
	Posttest				
	Teaching Presence	4.74	0.22	4.36	5.11
	Social Presence	4.47	0.23	4.07	4.87
	Cognitive Presence	4.50	0.23	4.11	4.89
Other	Pretest				
	Teaching Presence	4.44	0.13	4.22	4.65
	Social Presence	4.29	0.17	4.00	4.59
	Cognitive Presence	3.93	0.16	3.66	4.20
	Posttest				
	Teaching Presence	4.25	0.18	3.94	4.55
	Social Presence	3.94	0.19	3.62	4.26
	Cognitive Presence	3.94	0.18	3.62	4.25

Note. *M* = Mean; *SE* = Standard error of the mean.

Presence constructs. These findings indicate that teaching presence was significantly and substantively experienced more by the respondents than either social or cognitive presence.

The main effect of pretest/posttest was not statistically significant ($F = 0.97$, $p = .337$). However, the main effect of constructs was statistically significant ($F = 7.22$, $p = .2$), indicating that the mean scores of the three CoI constructs were significantly different from each other. Furthermore, the main effect of grade level was statistically significant ($F = 3.81$, $p = .065$), indicating the CoI mean scores were significantly different for

Table 4.8. Repeated measures ANOVA table for grade level over the dependent variable constructs of the CoI instrumentation

Source	Sum of Squares	*df*	Mean Square	*F*	*p*	η_p^2	Power
Interaction Effect							
Pretest/Posttest*Grade Level	0.32	1	0.32	1.41	.248	.063	.313
Constructs*Grade Level	0.37	2	0.19	0.91	.411	.041	.302
Pretest/Posttest*Constructs	0.13	2	0.07	0.98	.384	.045	.318
Pretest/Post-test*Constructs*Grade Level	0.29	2	0.14	2.08	.137	.090	.537
Within Groups Effect							
Pretest/Posttest	0.22	1	0.22	0.97	.337	.044	.249
Constructs	2.96	2	1.48	7.22	.002	.256	.958
Error (Pretest/Posttest)	4.70	21	0.22	---	---	---	---
Error (Constructs)	8.60	42	0.21	---	---	---	---
Between Groups Effect							
Grade Level	6.07	1	6.07	3.81	.065	.153	.596
Error (Between groups)	33.48	21	1.59	---	---	---	---

Note. *df* = Degrees of Freedom; *F* = test statistic; *p* = *p*-value; η_p^2 = partial eta squared.

Table 4.9. Pairwise comparisons for all three Constructs of the CoI instrumentation

					90% Confidence Interval for Difference	
(I) Constructs	(J) Constructs	Mean Difference (I-J)	*SE*	*p*	Lower Bound	Upper Bound
Teaching Presence	Social Presence	0.29	0.11	.014	0.10	0.47
	Cognitive Presence	0.34	0.08	.001	0.20	0.49
Social Presence	Teaching Presence	-0.29	0.11	.014	-0.47	-0.10
	Cognitive Presence	0.06	0.10	.568	-0.11	0.22
Cognitive Presence	Teaching Presence	-0.34	0.08	.001	-0.49	-0.20
	Social Presence	-0.06	0.10	.568	-0.22	0.11

Note. *SE* = Standard error of the mean difference; *p* = *p*-value; η_p^2 = partial eta squared.

seniors as compared to participants in other grade levels.

Table 4.10 presents the pairwise comparisons for the between-groups variable of Grade Level. The table shows that mean scores for seniors were significantly higher than mean scores for participants in other grade levels. These findings indicate that seniors felt a stronger sense of online learning community than participants in other grade levels.

As a result, future researchers may want to study grade level more in depth to discover why grade level may be a mitigating factor in the experience of community. For example, seniors may feel more comfortable in COMM 2004, a discussion-based class, having had more opportunities in college than their peers to get comfortable in online discussion.

Community of Inquiry (CoI) by Major

The pretest and posttest mean scores for the three CoI constructs of Teaching Presence, Social Presence, and Cognitive Presence over major were entered into a GLM repeated measures, Type III design. Table 4.11 presents the mean scores, standard error of the means and confidence intervals for the data across all factors.

The repeated measures ANOVA analysis showed that there was not a significant three-factor (Pretest/Posttest*Constructs*Major) interaction ($F = 1.00, p = .378$); and no significant two-factor interaction between pretest/posttest and constructs ($F = 1.47, p = .242$).

There was a significant interaction between pretest/posttest and major ($F = 5.95$, $p = .024$), indicating significant differences between mean pretest and posttest scores for the two major groups (environmental studies and other majors).

There was also a significant two-factor interaction between constructs and major

Table 4.10. Pairwise comparisons for grade level categories

(I) Grade Level	(J) Grade Level	Mean Difference (I-J)	*SE*	*p*	90% Confidence Interval for Difference	
					Lower Bound	Upper Bound
Other	Senior	-0.43	0.22	.065	-0.81	-0.05
Senior	Other	0.43	0.22	.065	-0.05	0.81

Note. *SE* = Standard error of the mean difference; p = p-value; η_p^2 = partial eta squared.

($F = 3.50$, $p = .039$), indicating significant differences between mean scores for the two major groups across the three CoI constructs. The main effects of pretest/posttest and major were not statistically significant ($F = 0.34$, $p = .564$ and $F = 0.01$, $p = .935$; respectively). The main effect of constructs was statistically significant ($F = 10.79$, $p < .0005$), indicating that mean scores were significantly different across the three CoI constructs. Table 4.12 presents the results from the repeated measures mixed ANOVA performed.

Table 4.13 presents the estimated marginal means, standard errors, and confidence intervals for the significant Pretest/Posttest*Major interaction. Table 4.13 reveals that mean posttest scores were higher than mean pretest scores for environmental studies majors. Conversely, mean pretest scores were higher than mean posttest scores for participants with other majors.

Table 4.14 presents the estimated marginal means, standard errors, and confidence intervals for the significant Constructs*Major interaction. Table 4.14 reveals that mean scores for environmental studies majors were higher than mean scores for other majors in the CoI construct of Teaching Presence. Mean scores for environmental studies majors were lower than mean scores for other majors in the remaining CoI constructs of Social

Table 4.11. Descriptive information for data across major, pretest/posttest administration, and dependent variable constructs

				90% Confidence Interval	
Major	Test / Constructs	*M*	*SE*	Lower Bound	Upper Bound
Environmental Studies	Pretest				
	Teaching Presence	4.67	0.18	4.37	4.97
	Social Presence	3.99	0.21	3.62	4.35
	Cognitive Presence	3.99	0.23	3.60	4.38
	Posttest				
	Teaching Presence	4.66	0.24	4.24	5.07
	Social Presence	4.15	0.27	3.70	4.61
	Cognitive Presence	4.26	0.26	3.82	4.70
Other	Pretest				
	Teaching Presence	4.53	0.13	4.31	4.75
	Social Presence	4.50	0.15	4.24	4.77
	Cognitive Presence	4.23	0.17	3.95	4.52
	Posttest				
	Teaching Presence	4.32	0.18	4.02	4.63
	Social Presence	4.15	0.19	3.81	4.48
	Cognitive Presence	4.10	0.19	3.78	4.42

Note. *M* = Mean; *SE* = Standard error of the mean.

4.12. Repeated measures ANOVA table for major over the dependent variable constructs of the CoI instrumentation

Source	Sum of Squares	*df*	Mean Square	*F*	*p*	η_p^2	Power
Interaction Effect							
Pretest/Posttest*Major	1.11	1	1.11	5.95	.024	.221	.763
Constructs* Major	1.28	2	0.64	3.50	.039	.143	.741
Pretest/Posttest*Constructs	0.21	2	0.11	1.47	.242	.065	.420
Pretest/Post-test*Constructs*Major	0.14	2	0.07	1.00	.378	.045	.321
Within Groups Effect							
Pretest/Posttest	0.06	1	0.06	0.34	.564	.016	.154
Constructs	3.95	2	1.98	10.79	<.0005	.339	.994
Error (Pretest/Posttest)	3.91	21	0.19	---	---	---	---
Error (Constructs)	7.69	42	0.18	---	---	---	---
Between Groups Effect							
Major	0.01	1	0.01	0.01	.935	<.0005	.101
Error (Between groups)	39.54	21	1.88	---	---	---	---

Note. *df* = Degrees of Freedom; *F* = test statistic; *p* = *p*-value; η_p^2 = partial eta squared.

Table 4.13. Estimated marginal means of CoI scores for each major across pretest/ posttest administration

			90% Confidence Interval	
Major / Pretest/Posttest	M_{Est}	*SE*	Lower Bound	Upper Bound
Environmental Studies				
Pretest	4.21	0.17	3.92	4.51
Posttest	4.36	0.24	3.95	4.77
Other				
Pretest	4.42	0.13	4.21	4.64
Posttest	4.19	0.17	3.89	4.49

Note. M_{Est} = Estimated marginal mean; *SE* = Standard error of the estimated marginal mean.

Table 4.14. Estimated marginal means for data for major across the three coi constructs

			90% Confidence Interval	
Major / Pretest/Posttest	M_{Est}	*SE*	Lower Bound	Upper Bound
Environmental Studies				
Teaching Presence	4.66	0.19	4.34	4.99
Social Presence	4.07	0.22	3.69	4.45
Cognitive Presence	4.12	0.24	3.72	4.53
Other				
Teaching Presence	4.43	0.14	4.19	4.66
Social Presence	4.33	0.16	4.05	4.60
Cognitive Presence	4.17	0.17	3.87	4.46

Note. M_{Est} = Estimated marginal mean; *SE* = Standard error of the estimated marginal mean.

Presence and Cognitive Presence. These results indicate that for environmental studies majors, teaching presence is felt more than either social presence or cognitive presence.

In order to have a better understanding of the significant two-factor interactions of Pretest/Posttest*Major and Constructs*Major, the pretest/posttest differences between environmental studies majors and other majors constituted the CoI constructs of Teaching Presence (11 items), Social Presence (9 items), and Cognitive Presence (12 items).

Figures 4.1-4.3 present those plots. Mean pretest/posttest scores for environmental studies majors and other majors are similar in the CoI Teaching Presence construct. In the two remaining CoI constructs of Social Presence and Cognitive Presence, mean pretest/posttest scores for environmental studies majors appear to have more variation than mean pretest/posttest scores for participants majoring in other subjects. These findings relate to the differences found in the ANOVA over construct means and pretest/posttest means.

The observation of note is that mean pretest scores were higher than mean posttest scores for teaching and cognitive presence, and mean posttest scores were higher than mean pretest scores for social presence. However, these effects were not statistically significant for pretest/posttest administration across the CoI constructs.

Sense of Virtual Community (SOVC) by Gender

The pretest and posttest mean scores for the SOVC instrument over gender were entered into a general linear model (GLM) repeated measures, Type III design. Table 4.15 presents the mean scores, standard error of the means, and confidence intervals for the data across gender and pretest/posttest administration.

The repeated measures ANOVA analysis showed that there was not a significant two-factor interaction between pretest/posttest and gender ($F = 0.18$, $p = .680$). The main effects of pretest/posttest and gender were not statistically significant ($F = 0.25$, $p = .626$ and $F = 0.01$, $p = .910$; respectively). Table 4.16 presents the results from the repeated measures mixed ANOVA performed. Since none of the effects in this model were statistically significant, results were not further examined.

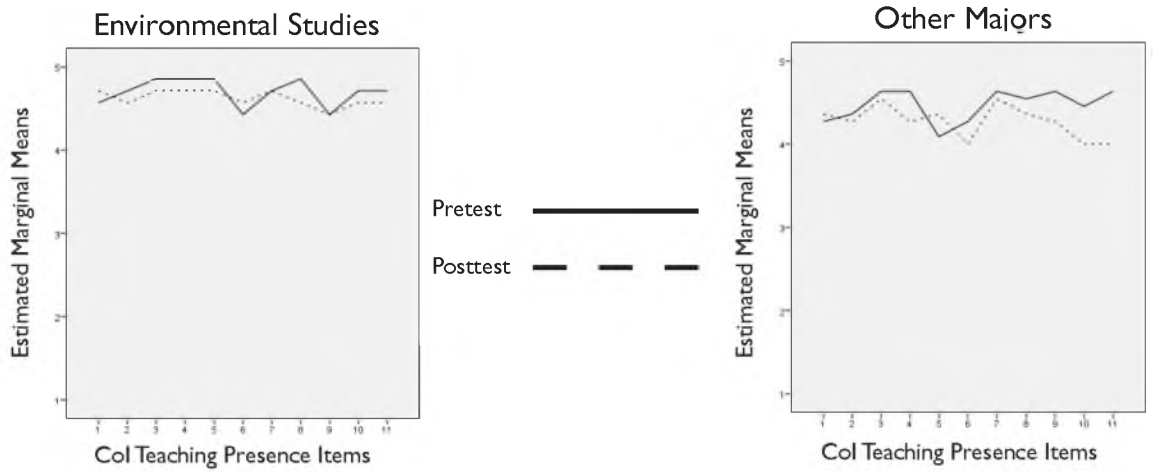


Figure 4.1: Representation of the two-way interaction effect: plots of the estimated marginal means for pretest/posttest over CoI: Teaching Presence items for each major group.

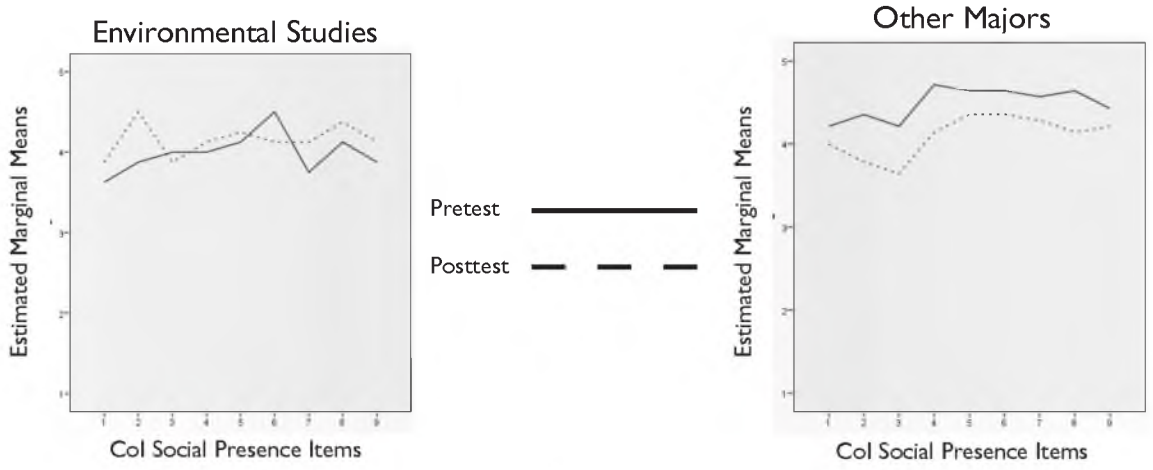


Figure 4.2. Representation of the two-way interaction effect: plots of the estimated marginal means for pretest/posttest over CoI: Social Presence items for each major group.

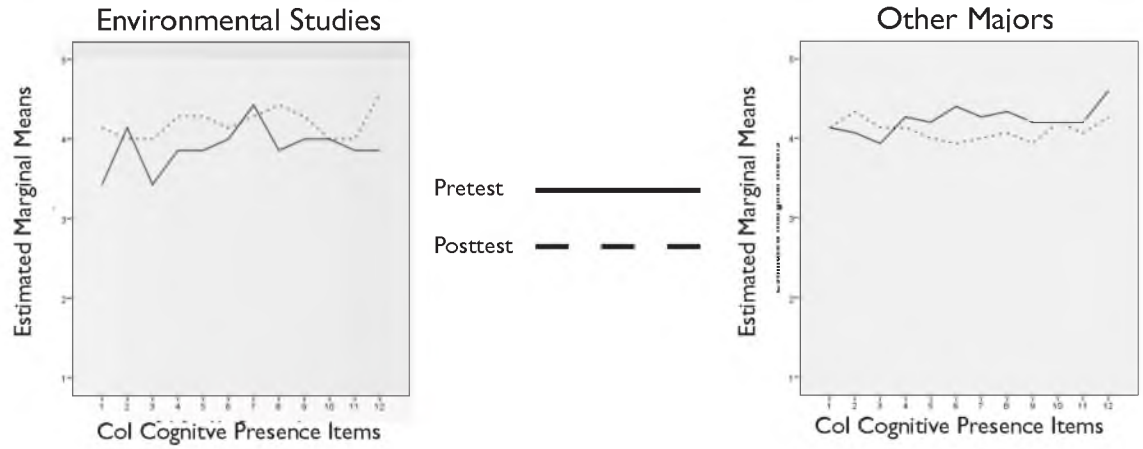


Figure 4.3. Representation of the two-way interaction effect: plots of the estimated marginal means for pretest/posttest over CoI: Cognitive Presence items for each major group.

Table 4.15. Descriptive information for data across gender and pretest/posttest administration over the averaged SOVC construct

			90% Confidence Interval	
Gender / Pretest/Posttest	*M*	*SE*	Lower Bound	Upper Bound
Male				
Pretest	3.53	0.14	3.29	3.76
Posttest	3.53	0.19	3.21	3.86
Female				
Pretest	3.47	0.12	3.27	3.68
Posttest	3.54	0.17	3.25	3.83

Note. *M* = Mean; *SE* = Standard error of the mean.

Table 4.16. Results of the repeated measures ANOVA performed for gender over the dependent variable of SOVC

Source	Sum of Squares	*df*	Mean Square	*F*	*p*	η_p^2	Power
Interaction Effect							
Pretest/Posttest*Gender	0.01	1	0.01	0.18	.680	.008	.128
Within Groups Effect							
Pretest/Posttest	0.02	1	0.02	0.25	.626	.012	.139
Error (Pretest/Posttest)	1.29	21	0.06	---	---	---	---
Between Groups Effect							
Gender	0.01	1	0.01	0.01	.910	.001	.102
Error (Between groups)	10.13	21	0.48	---	---	---	---

Note. *df* = Degrees of Freedom; *F* = test statistic; *p* = *p*-value; η_p^2 = partial eta squared

Sense of Virtual Community (SOVC) by Grade Level

The pretest and posttest mean scores for the SOVC instrument over grade level were entered into a GLM repeated measures, Type III design. Table 4.17 presents the mean scores, standard error of the means and confidence intervals for the data across grade level and pretest/posttest administration.

Table 4.17. Descriptive information for data across grade level, pretest/posttest administration, and dependent variable constructs

			90% Confidence Interval	
Grade Level / Pretest/Posttest	*M*	*SE*	Lower Bound	Upper Bound
Senior				
Pretest	3.76	0.12	3.55	3.97
Posttest	3.86	0.18	3.56	4.17
Other				
Pretest	3.32	0.10	3.15	3.49
Posttest	3.32	0.14	3.08	3.57

Note. *M* = Mean; *SE* = Standard error of the mean.

Table 4.18. Repeated measures ANOVA table for grade level over the dependent variable of SOVC

Source	Sum of Squares	*df*	Mean Square	*F*	*p*	η_p^2	Power
Interaction Effect							
Pretest/Posttest*Grade Level	0.03	1	0.03	0.43	.518	.020	.168
Within Groups Effect							
Pretest/Posttest	0.03	1	0.03	0.47	.499	.022	.174
Error (Pretest/Posttest)	1.28	21	0.06	---	---	---	---
Between Groups Effect							
Grade Level	2.63	1	2.63	7.37	.013	.260	.837
Error (Between groups)	7.50	21	0.36	---	---	---	---

Note. *df* = Degrees of Freedom; *F* = test statistic; *p* = *p*-value; η_p^2 = partial eta squared.

The repeated measures ANOVA analysis showed that there was not a significant two-factor interaction between pretest/posttest and grade level ($F = 0.43$, $p = .518$). The main effect of pretest/posttest was not statistically significant ($F = 0.47$, $p = .499$). The main effect of grade level was statistically significant ($F = 7.37$, $p = .013$), indicating differences in mean SOVC scores between seniors and participants in other grade levels. Table 4.18 presents the results from the repeated measures mixed ANOVA performed.

Table 4.19 presents the pairwise comparisons for the between groups variable of Grade Level. The table indicates that mean scores for the SOVC instrument were significantly higher for seniors than for participants in other grade levels. These findings indicate that seniors felt a stronger sense of virtual community than participants in other grade levels. These findings are similar to the findings of the CoI, wherein seniors also seemed to experience community more readily than their counterparts.

Sense of Virtual Community (SOVC) by Major

The pretest and posttest mean scores for the SOVC instrument over major were entered into a GLM repeated measures, Type III design. Table 4.20 presents the mean scores, standard error of the means, and confidence intervals for the data across major and pretest/posttest administration.

The repeated measures ANOVA analysis showed that there was not a significant two-factor interaction between pretest/posttest and major ($F = 0.42$, $p = .524$). The main effects of pretest/posttest and major were not statistically significant ($F = 0.53$, $p = .474$ and $F = 0.02$, $p = .878$; respectively). In Table 4.20, mean scores were very similar for both major groups

Table 4.19. Pairwise comparisons for grade level

(I) Grade Level	(J) Grade Level	Mean Difference (I-J)	*SE*	*p*	90% Confidence Interval for Difference	
					Lower Bound	Upper Bound
Other	Senior	-0.49	0.18	.013	-0.80	-0.18
Senior	Other					
		0.49	0.18	.013	0.18	0.80

Note. *SE* = Standard error of the mean difference; *p* = *p*-value.

Table 4.20. Descriptive information for data across major, pretest/posttest administration, and dependent variable constructs

Gender / Pretest/Posttest	*M*	*SE*	90% Confidence Interval	
			Lower Bound	Upper Bound
Environmental Studies				
Pretest	3.48	0.15	3.22	3.75
Posttest	3.59	0.21	3.23	3.95
Other				
Pretest	3.50	0.11	3.31	3.69
Posttest	3.51	0.15	3.24	3.77

Note. *M* = Mean; *SE* = Standard error of the mean.

over both pretest and posttest administrations, so these results were not surprising. Table 4.21 presents the results from the repeated measures mixed ANOVA performed. Since none of the effects in this model were statistically significant, results were not further examined.

Although mean posttest scores were higher than mean pretest scores for the SOVC instrumentation, these effects were not statistically significant. They do, however, follow the pattern of other measures.

Table 4.21. Repeated measures ANOVA table for major over the dependent variable of SOVC

Source	Sum of Squares	*df*	Mean Square	*F*	*p*	η_p^2	Power
Interaction Effect							
Pretest/Posttest*Major	0.03	1	0.03	0.42	.524	.020	.166
Within Groups Effect							
Pretest/Posttest	0.03	1	0.03	0.53	.474	.025	.183
Error (Pretest/Posttest)	1.28	21	0.06	---	---	---	---
Between Groups Effect							
Major	0.01	1	0.01	0.02	.878	.001	.104
Error (Between groups)	10.12	21	0.48	---	---	---	---

Note. *df* = Degrees of Freedom; *F* = test statistic; *p* = *p*-value; η_p^2 = partial eta squared.

RQ 2: To What Extent Does COMM 2004 Embody Qualities of a Third Space?

There were no hypotheses or statistical analyses used to answer this RQ. It was only analyzed qualitatively.

RQ 3: To What Extent Does Participation in COMM 2004 Affect Participants' Environmental Attitudes and Behaviors?

I used two measures to examine environmental attitudes and behaviors. The first instrument was the CHEAKS. It contains three constructs: verbal commitment, actual commitment, and affect. The second instrument was the NEP. It contained two constructs: balance and human domination. I expected the posttest means of each of these constructs to be higher than the pretest means with no interaction among the constructs.

Children's Environmental Attitude and Knowledge Scale (CHEAKS) by Gender

The pretest and posttest mean scores for the three CHEAKS constructs of Verbal Commitment, Actual Commitment, and Affect over gender were entered into a general linear model (GLM) repeated measures, Type III design. This analytical method was used for all measures. Table 4.22 presents the mean scores, standard error of the means, and confidence intervals for the data across all factors.

The repeated measures ANOVA analysis showed that the three-factor (Pretest/Posttest*Constructs*Gender) interaction ($F = 2.20$, $p = .123$) and the two-factor interaction between pretest/posttest and constructs ($F = 0.77$, $p = .183$) warranted further comment. The three-factor interaction indicated that male and females had significantly different pretest and posttest mean scores across the three CHEAKS constructs of Verbal Commitment, Actual Commitment, and Affect. Table 4.22 shows that males had higher Verbal Commitment pretest and posttest scores, while females had higher Actual Commitment and Affect pretest and posttest scores. Furthermore, the two-factor interaction between pretest/posttest and constructs indicated that mean pretest and posttest scores were significantly different across the three CHEAKS constructs.

Further investigation of this significant interaction effect indicated that mean pretest scores were higher for the Verbal Commitment construct, while mean posttest scores were higher for the other two constructs of Actual Commitment and Affect. Essentially, there were two within-groups effects: pretest/posttest and constructs.[5]

---

[5] This sentence describes the significant two-way interaction between pretest/posttest and constructs.

Table 4.22. Descriptive information for data across gender, pretest/posttest administration, and dependent variable constructs

Gender	Pretest/Posttest / Constructs	*M*	*SE*	90% Confidence Interval Lower Bound	90% Confidence Interval Upper Bound
Male	Pretest				
	Verbal Commitment	3.26	0.18	2.95	3.58
	Actual Commitment	3.52	0.20	3.18	3.86
	Affect	3.48	0.24	3.06	3.90
	Posttest				
	Verbal Commitment	3.17	0.18	2.86	3.48
	Actual Commitment	3.58	0.18	3.28	3.89
	Affect	3.76	0.22	3.39	4.13
Female	Pretest				
	Verbal Commitment	3.19	0.16	2.91	3.47
	Actual Commitment	3.65	0.17	3.36	3.95
	Affect	4.11	0.21	3.74	4.48
	Posttest				
	Verbal Commitment	3.21	0.16	2.94	3.49
	Actual Commitment	3.93	0.15	3.67	4.19
	Affect	4.12	0.19	3.80	4.45

Note. *M* = Mean; *SE* = Standard error of the mean.

The main effects of pretest/posttest and constructs (confounded by gender) were statistically significant ($F = 5.49$, $p = .029$ and $F = 26.83$, $p < .0005$; respectively).

Although females scored higher than males in both pretest and posttest administrations of the Actual Commitment and Affect constructs, the main effect of gender was not statistically significant ($F = 1.08$, $p = .310$). Table 4.23 presents the results from the repeated measures mixed ANOVA performed.

Table 4.24 presents the estimated marginal means, standard errors, and confidence

Table 4.23. Repeated measures ANOVA table for gender over the dependent variable constructs of the CHEAKS instrumentation

Source	Sum of Squares	*df*	Mean Square	*F*	*p*	η_p^2	Power
Interaction Effect							
Pretest/Posttest*Gender	<0.005	1	<0.005	0.06	.806	.003	.110
Constructs*Gender	1.47	2	0.73	3.80	.030	.153	.773
Pretest/Posttest*Constructs	0.29	2	0.14	0.77	.183	.078	.479
Pretest/Post-test*Constructs*Gender	0.36	2	0.18	2.20	.123	.095	.557
Within Groups Effect							
Pretest/Posttest	0.31	1	0.31	5.49	.029	.207	.733
Constructs	10.36	2	5.18	26.83	<.0005	.561	1.000
Error (Pretest/Posttest)	1.17	21	0.06	---	---	---	---
Error (Constructs)	8.11	42	0.19	---	---	---	---
Between Groups Effect							
Gender	1.97	1	1.97	1.08	.310	.049	.266
Error (Between groups)	38.13	21	1.82	---	---	---	---

Note. *df* = Degrees of Freedom; *F* = test statistic; *p* = *p*-value; η_p^2 = partial eta squared.

Table 4.24. Estimated marginal means for data for each gender across the dependent variable constructs

			90% Confidence Interval	
Gender / Constructs	M_{Est}	*SE*	Lower Bound	Upper Bound
Male				
Verbal Commitment	3.22	0.17	2.92	3.51
Actual Commitment	3.55	0.18	3.24	3.86
Affect	3.62	0.22	3.24	4.00
Female				
Verbal Commitment	3.20	0.15	2.94	3.46
Actual Commitment	3.79	0.16	3.52	4.06
Affect	4.16	0.20	3.78	4.45

Note. M_{Est} = Estimated marginal mean; *SE* = Standard error of the estimated marginal mean

intervals for the significant interaction between gender and constructs. Table 4.24 reveals that males scored slightly higher than females in the CHEAKS construct of Verbal Commitment, while females had slightly higher mean scores than males in the remaining CHEAKS constructs, Actual Commitment, and Affect.

In order to gain a better understanding of the significant interaction between gender and constructs, the pretest and posttest differences between males and females were plotted across the items that constituted the three CHEAKS constructs: Verbal Commitment (13 items), Actual Commitment (12 items), and Affect (5 items). Figures 4.4-4.6 present those plots. The plots of the estimated marginal means indicate consistency of position across the items for the pretest and posttest administrations. The patterns of the estimated marginal means are similar for the first two constructs with noticeable variations across 3 of the 25 items. The mean posttest scores for females show a heightened difference across items. The levels for females appear higher on the vertical scale indicating the difference found in the ANOVA over construct means.

Children's Environmental Attitude and Knowledge Scale (CHEAKS) by Grade Level

The pretest and posttest mean scores for the three CHEAKS constructs of Verbal Commitment, Actual Commitment, and Affect over grade level were entered into a general linear model (GLM) repeated measures, Type III design. This analytical method was used for all measures. Table 4.25 presents the mean scores, standard error of the means, and confidence intervals for the data across all factors.

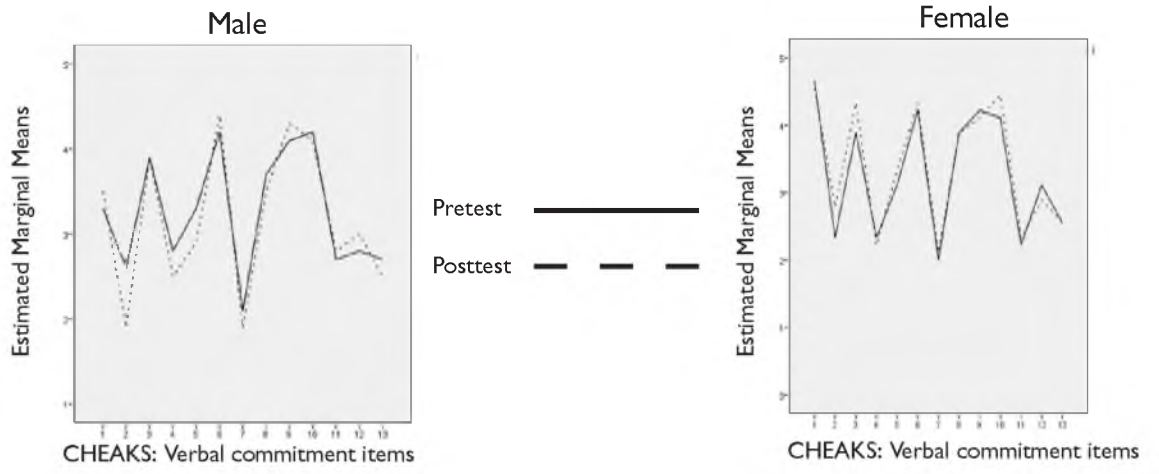


Figure 4.4. Representation of the two-way interaction effect: plots of the estimated marginal means for pretest/posttest over CHEAKS: Verbal Commitment items for each gender.

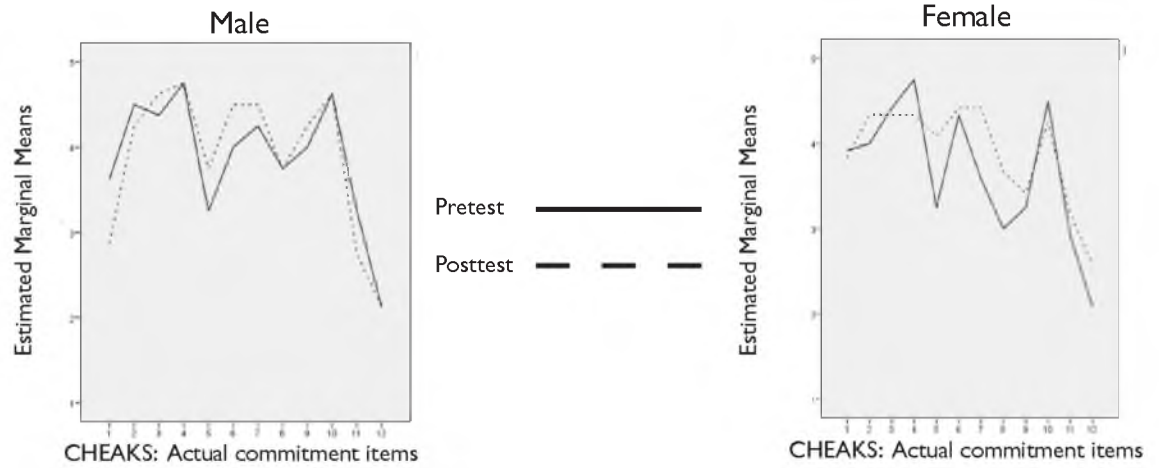


Figure 4.5. Representation of the two-way interaction effect: plots of the estimated marginal means for pretest/posttest over CHEAKS: Actual Commitment items for each gender.

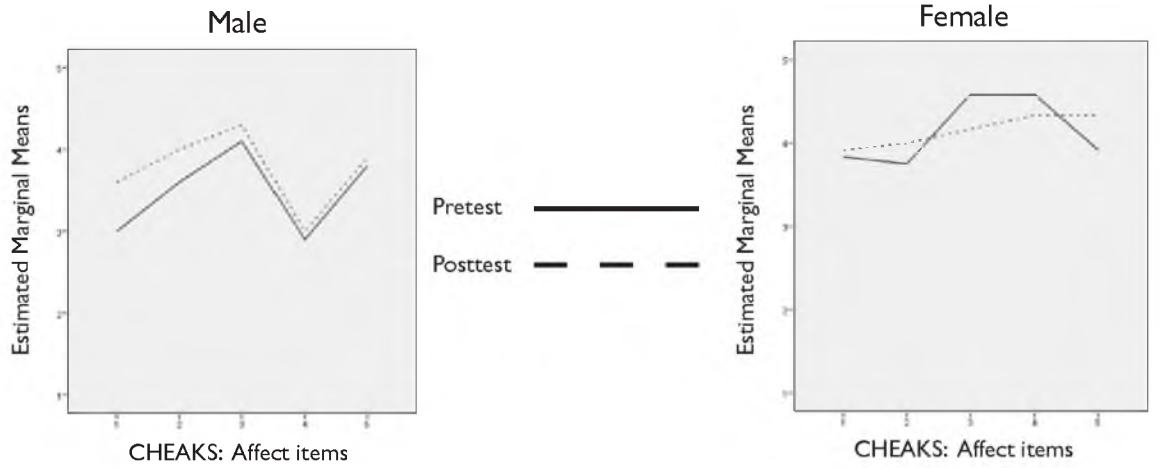


Figure 4.6. Representation of the two-way interaction effect: plots of the estimated marginal means for pretest/posttest over CHEAKS: Affect items for each gender.

Table 4.25. Descriptive information for data across grade level, pretest/posttest administration, and dependent variable constructs

Grade Level	Pretest/Posttest / Constructs	*M*	*SE*	90% Confidence Interval	
				Lower Bound	Upper Bound
Senior	Pretest				
	Verbal Commitment	3.46	0.18	3.15	3.77
	Actual Commitment	3.74	0.21	3.39	4.10
	Affect	4.07	0.27	3.60	4.54
	Posttest				
	Verbal Commitment	3.50	0.17	3.20	3.79
	Actual Commitment	3.76	0.19	3.43	4.09
	Affect	4.36	0.21	4.00	4.71
Other	Pretest				
	Verbal Commitment	3.07	0.15	2.82	3.32
	Actual Commitment	3.50	0.17	3.22	3.78
	Affect	3.69	0.22	3.31	4.06
	Posttest				
	Verbal Commitment	3.00	0.14	2.77	3.24
	Actual Commitment	3.79	0.16	3.52	4.06
	Affect	3.71	0.17	3.43	4.00

Note. *M* = Mean; *SE* = Standard error of the mean.

The repeated measures ANOVA analysis showed that there was a significant three-factor (Pretest/Posttest*Constructs*Grade Level) interaction ($F = 2.58$, $p = .088$), indicating that seniors and participants in other grade levels had significantly different pretest and posttest scores across the three constructs. The significant three-factor interaction confounds all other effects.[6] They are given here for complete reporting.

There was no significant two-factor interaction between pretest/posttest and constructs ($F= 1.37$, $p = .265$) and no significant interaction between pretest/posttest and grade level ($F = 0.13$, $p = .727$).There was a significant two-factor interaction between constructs and grade level ($F = 2.58$, $p = .088$), indicating that seniors and participants in

[6] In other words, all main effects should be interpreted with the interaction effect in mind.

other grade levels had significantly different scores across the three constructs, but scores were parallel across pretest and posttest administrations. The main effects of pretest/posttest and constructs were statistically significant ($F = 5.85$, $p = .025$ and $F = 27.02$, $p < .0005$; respectively).

Additionally, the main effect of grade level was statistically significant ($F = 2.40$, $p = .136$), indicating that seniors had significantly different mean scores than participants in other grade levels. Further review of the significant main effect of grade level indicated that seniors had higher mean scores than other grade levels in almost all pretest and posttest administrations of the three CHEAKS constructs. Table 4.26 presents the results from the repeated measures mixed ANOVA performed.

In order to have a better understanding of the three-factor (pre/post x constructs x grade level) interaction, the pretest/posttest differences between seniors and other grade levels were plotted across the items that constituted the three CHEAKS constructs: Verbal Commitment (13 items), Actual Commitment (12 items), and Affect (5 items). Figures 4.7-4.9 present those plots.

The plots of the estimated marginal means indicate consistency of position across the items for the two administrations. The patterns of the estimated marginal means are similar for seniors and other grade levels for all three constructs. The mean scores for seniors show a heightened difference across items in the Verbal Commitment construct of the CHEAKS instrument when compared to participants in other grade levels. It could be the case that there were additional variables that impacted the extent to which seniors would verbally commit to helping the environment, more so than other grade levels (e.g., time or money factors). Seniors may have also been a bit more

Table 4.26. Repeated measures ANOVA table for grade level over the dependent variable constructs of the CHEAKS instrumentation

Source	Sum of Squares	*df*	Mean Square	*F*	*p*	η_p^2	Power
Interaction Effect							
Pretest/Posttest*Grade Level	0.01	1	0.01	0.13	.727	.006	.120
Constructs*Grade Level	1.05	2	0.52	2.58	.088	.109	.618
Pretest/Posttest*Constructs	0.22	2	0.11	1.37	.265	.061	.401
Pretest/Post-test*Constructs*Grade Level	0.41	2	0.21	2.58	.088	.109	.619
Within Groups Effect							
Pretest/Posttest	0.32	1	0.32	5.85	.025	.218	.756
Constructs	10.98	2	5.49	27.02	<.0005	.563	1.000
Error (Pretest/Posttest)	1.16	21	0.06	---	---	---	---
Error (Constructs)	8.53	42	0.20	---	---	---	---
Between Groups Effect							
Grade Level	4.11	1	4.11	2.40	.136	.103	.443
Error (Between groups)	35.99	21	1.71	---	---	---	---

Note. *df* = Degrees of Freedom; *F* = test statistic; *p* = *p*-value; η_p^2 = partial eta squared.

seasoned, mature, and/or realistic about what they were willing to do verbally commit to than folks in other grades. Future research should look more closely at the extent to which time in college and difference grade level can impact environmental ideologies, attitudes, behaviors.

Children's Environmental Attitude and Knowledge Scale (CHEAKS) by Major

The pretest and posttest mean scores for the three CHEAKS constructs of Verbal Commitment, Actual Commitment, and Affect over major were entered into a general linear model (GLM) repeated measures, Type III design. Table 4.27 presents the mean scores, standard error of the means, and confidence intervals for the data

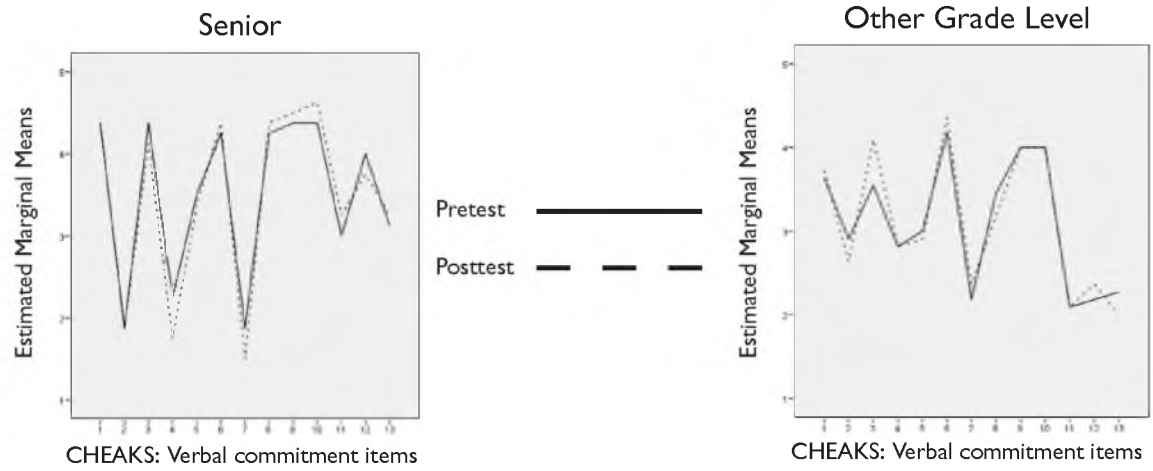


Figure 4.7. Representation of the three-factor interaction effect: plots of the estimated marginal means for pretest/posttest over CHEAKS: Verbal Commitment items for each grade level.

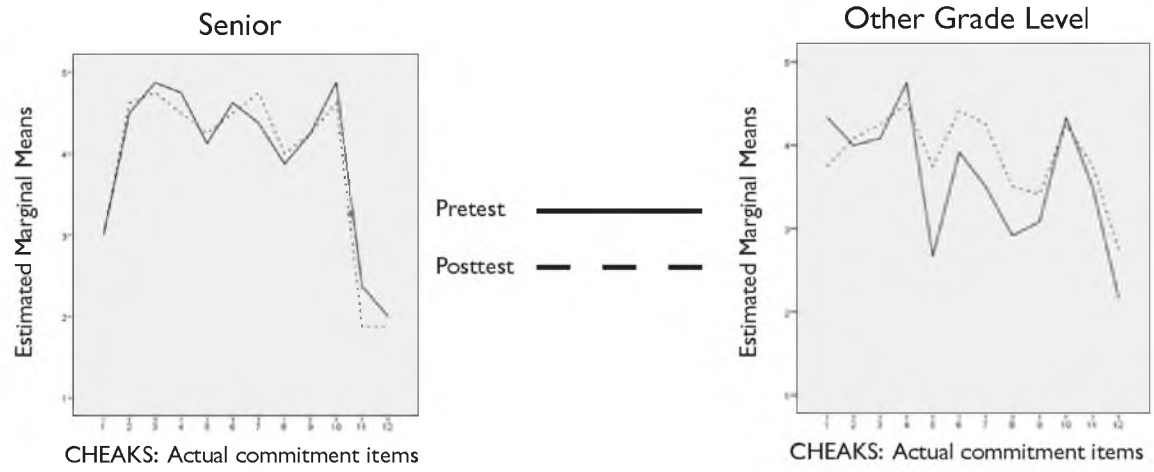


Figure 4.8. Representation of the three-factor interaction effect: plots of the estimated marginal means for pretest/posttest over CHEAKS: Actual Commitment items for each grade level.

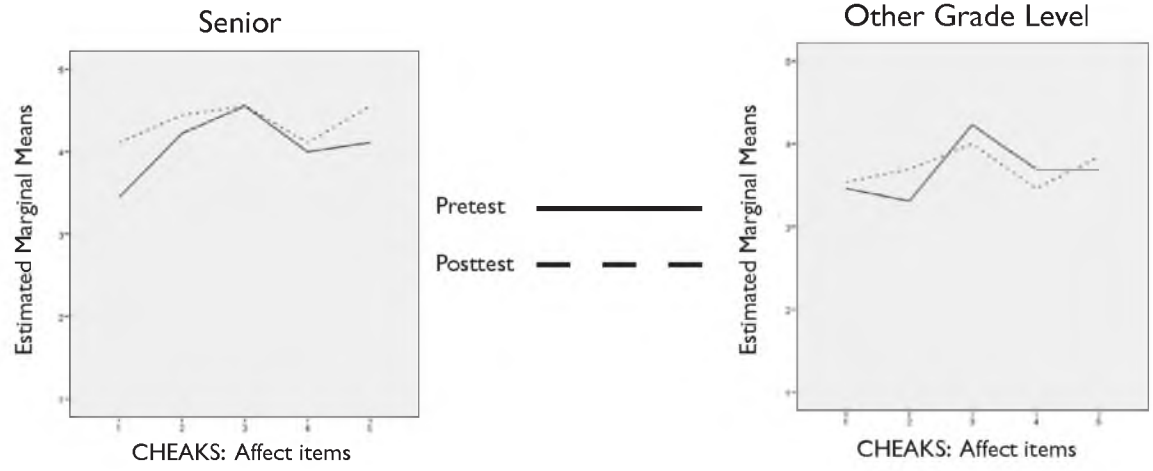


Figure 4.9. Representation of the three-factor interaction effect: plots of the estimated marginal means for pretest/posttest over CHEAKS: Affect items for each grade level.

Table 4.27. Descriptive information for data across major, pretest/posttest administration, and dependent variable constructs

Major	Pretest/Posttest / Constructs	*M*	*SE*	90% Confidence Interval Lower Bound	90% Confidence Interval Upper Bound
Environmental Studies	Pretest				
	Verbal Commitment	3.59	0.18	3.28	3.90
	Actual Commitment	3.89	0.21	3.53	4.24
	Affect	4.13	0.29	3.63	4.62
	Posttest				
	Verbal Commitment	3.37	0.20	3.03	3.70
	Actual Commitment	4.02	0.20	3.69	4.36
	Affect	4.40	0.22	4.02	4.78
Other	Pretest				
	Verbal Commitment	3.03	0.13	2.80	3.25
	Actual Commitment	3.44	0.15	3.18	3.70
	Affect	3.68	0.21	3.32	4.04
	Posttest				
	Verbal Commitment	3.10	0.14	2.86	3.35
	Actual				

Note. *M* = Mean; *SE* = Standard error of the mean.

across all factors.

The repeated measures ANOVA analysis showed that the three-factor (Pre-test/Posttest*Constructs*Major) interaction ($F = 2.19$, $p = .124$) warranted further explanation. There was no significant two-factor interaction between pretest/posttest and major ($F = 0.37$, $p = .551$); and no significant interaction between constructs and major ($F = 0.33$, p= .722). There was a significant two-factor interaction between pretest/posttest and constructs ($F = 2.50$, $p = .094$), indicating that mean scores for pretest and posttest administrations were significantly different across the three constructs, but scores were parallel across the different major groups (environmental studies and other majors). The main effects of pretest/posttest and constructs were statistically significant ($F = 4.47$, $p = .047$ and $F = 24.64$, $p < .0005$; respectively). Additionally, the main effect of major was statistically significant ($F = 4.13$, $p = .055$). A close examination of Table 4.27 shows that the potential three-factor interaction appears as Environmental Studies majors had lower posttest scores on Verbal Commitment.

Posttest scores for the other two constructs, Actual Commitment and Affect, were higher. The significant main effects were further investigated via the significant interaction effect. Table 4.28 presents the results from the repeated measures mixed ANOVA performed. Table 4.29 presents the estimated marginal means, standard errors, and confidence intervals for the significant interaction between pretest/posttest administration and constructs. Table 4.29 reveals that mean pretest scores were higher than mean posttest scores in the CHEAKS construct of Verbal Commitment, while mean pretest scores were lower than mean posttest scores in the remaining

Table 4.28. Repeated measures ANOVA table for major over the dependent variable constructs of the CHEAKS

Source	Sum of Squares	*df*	Mean Square	*F*	*p*	η_p^2	Power
Interaction Effect							
Pretest/Posttest*Major	0.02	1	0.02	0.37	.551	.017	.158
Constructs* Major	0.15	2	0.07	0.33	.722	.015	.173
Pretest/Posttest*Constructs	0.40	2	0.20	2.50	.094	.106	.606
Pretest/Posttest*Constructs* Major	0.36	2	0.18	2.19	.124	.095	.556
Within Groups Effect							
Pretest/Posttest	0.25	1	0.25	4.47	.047	.175	.655
Constructs	11.07	2	5.53	24.64	<.0005	.540	1.000
Error (Pretest/Posttest)	1.15	21	0.06	---	---	---	---
Error (Constructs)	9.43	42	0.23	---	---	---	---
Between Groups Effect							
Major	6.59	1	6.59	4.13	.055	.164	.626
Error (Between groups)	33.51	21	1.60	---	---	---	---

Note. *df* = Degrees of Freedom; *F* = test statistic; *p* = *p*-value; η_p^2 = partial eta squared.

Table 4.29. Estimated marginal means for data for pretest/posttest administration across the dependent variable constructs

			90% Confidence Interval	
Pretest/Posttest / Constructs	*M*	*SE*	Lower Bound	Upper Bound
Pretest				
Verbal Commitment	3.31	0.11	3.12	3.50
Actual Commitment	3.66	0.13	3.44	3.88
Affect	3.90	0.18	3.60	4.21
Posttest				
Verbal Commitment	3.23	0.12	3.03	3.44
Actual Commitment	3.84	0.12	3.63	4.04
Affect	4.07	0.14	3.83	4.30

CHEAKS constructs, Actual Commitment and Affect. One way to explain this result is that the class gave Environmental Studies students a persuasive boost, moving them along in the process from verbal commitment to actual commitment.

In order to gain a better understanding of the significant interaction between pretest/posttest administration and constructs, the pretest and posttest differences between major groups (environmental studies and other majors) were plotted across the items that constituted the three CHEAKS constructs: Verbal Commitment (13 items), Actual Commitment (12 items), and Affect (5 items). Figures 4.10-4.12 present those plots.

The mean scores for environmental studies majors appear to be slightly higher than mean scores for participants majoring in other subjects. Mean pretest scores appear to be higher than mean posttest scores for the Verbal Commitment construct. Conversely, mean pretest scores appear to be lower than mean posttest scores for the Actual Commitment and Affect constructs. Furthermore, environmental studies majors had significantly higher mean scores than other majors. These findings relate to the difference found in the ANOVA over construct means.

There were also interesting findings at the item level of analysis. It appears that there were certain environmentally responsible behaviors this population was likely to do more than others. For example, many students were willing to recycle and do more to conserve electricity or water. Interestingly, at the time of the posttest (in May) even fewer students said they would be willing to give up air conditioning than at the time of the posttest (February), suggesting that context is an important factor that mitigates behavior in environmental decision making.

Students also did not seem likely to use the bus for public transportation.

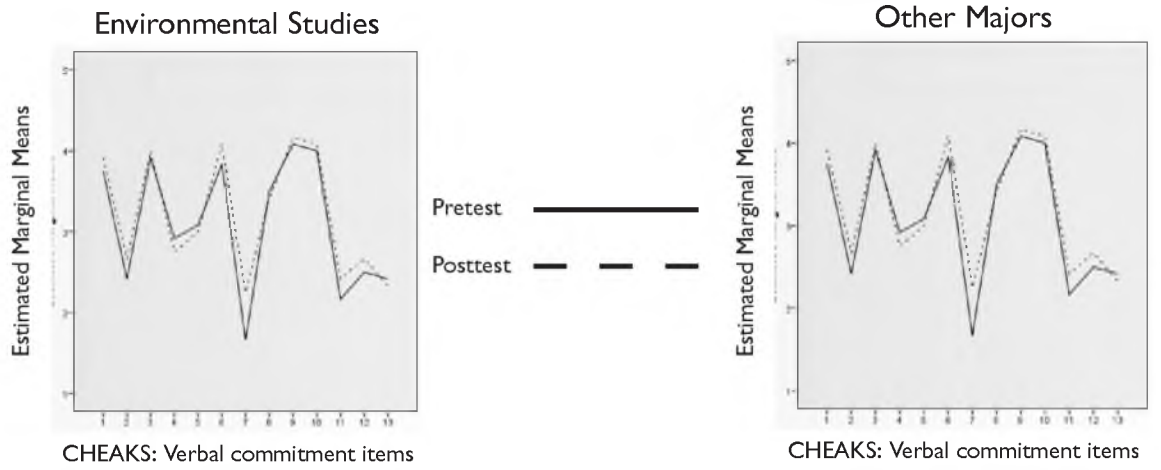


Figure 4.10. Representation of the two-way interaction effect: plots of the estimated marginal means for pretest/posttest over CHEAKS Verbal Commitment items for each major group.

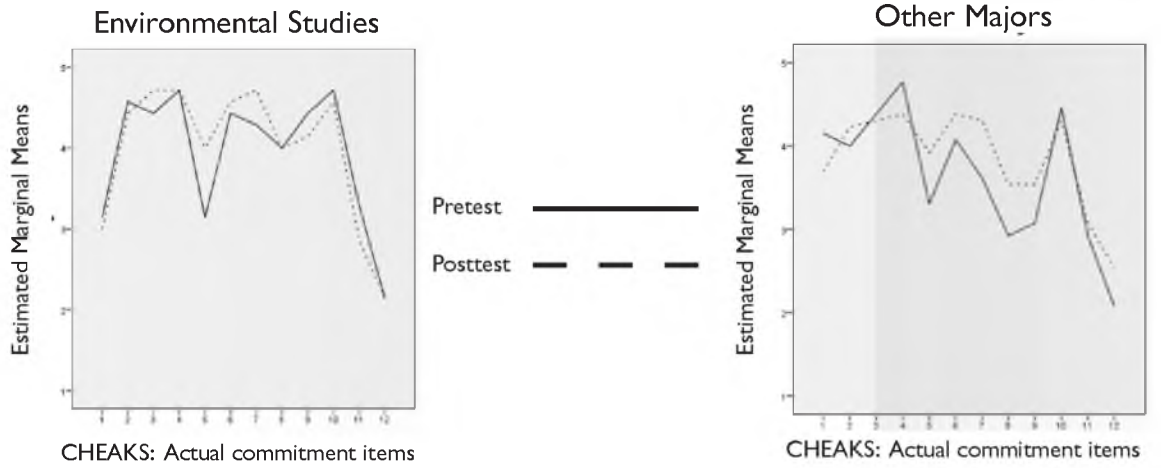


Figure 4.11. Representation of the two-way interaction effect: plots of the estimated marginal means for pretest/posttest over CHEAKS Actual Commitment items for each major group.

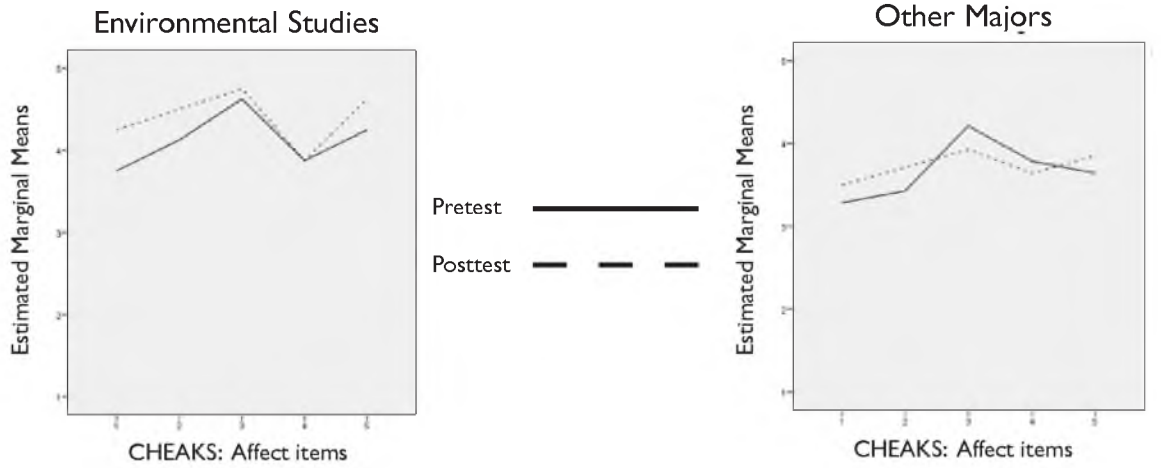


Figure 4.12. Representation of the two-way interaction effect: plots of the estimated marginal means for pretest/posttest over CHEAKS Affect items for each major group.

There are likely local, cultural, and convenience issues at play here. For example, anecdotally, I have had students in the past tell me they would not ride the bus in Cincinnati for fear of their safety or because taking a bus where they live is not an option. At the same time, students more frequently cited willingness to car pool than take the bus and the willingness to carpool increased in the posttest for some students.

There were also a few students who during the pretest had never written a public official about an environmental issue and at the time of the posttest they had. Although not confirmable, this finding suggests that class may have inspired students to engage in the democratic process. Conversely, they were less likely to want to go door-to-door to canvass about environmental issues than other ERB options.

More students seemed willing to give their money to environmental organizations after the class as well. One exception was for some of the seniors who were actually less likely to give money to environmental organizations at the time of the posttest. These sorts of differences might be important for movement organizers to know when targeting certain demographics with their campaigns

In summary, there was a significant effect for pretest/posttest administration across the CHEAKS constructs. Contradictory to my expectations, mean pretest scores were higher than mean posttest scores for the CHEAKS verbal commitment construct. As expected, mean posttest scores were higher than mean pretest scores for the CHEAKS actual commitment construct. As predicted, mean posttest scores were higher than mean pretest scores for the CHEAKS affect construct.

The New Environmental Paradigm Scale (NEP) by Gender

The pretest and posttest mean scores for the two NEP constructs of Balance and Human Domination over gender were entered into a GLM repeated measures, Type III design. Table 4.30 presents the mean scores, standard error of the means, and confidence intervals for the data across all factors.

The repeated measures ANOVA analysis showed that there was not a significant three-factor (Pretest/Posttest*Constructs*Gender) interaction ($F = 1.48$, $p = .237$); and no significant two-factor interaction between pretest/posttest and gender ($F = 1.00$, $p = .328$); and no significant interaction between pretest/posttest and constructs ($F = 0.58$, $p = .456$). There was a significant two-factor interaction between constructs and gender ($F = 3.55$, $p = .073$), indicating that males and females had significantly different mean scores across the three constructs, but scores were parallel across pretest/posttest administration.

The main effect of gender was not statistically significant ($F = 1.55$, $p = .226$). However, both main effects of constructs and pretest/posttest administration were significant ($F = 3.67$, $p = .069$ and $F = 3.86$, $p = .063$; respectively). These results indicate that scores from the NEP Balance construct were significantly different from scores from the Human Domination construct. Additionally, NEP pretest scores were significantly different from NEP posttest scores. Table 4.31 presents the results from the repeated measures mixed ANOVA performed.

Table 4.32 presents the estimated marginal means, standard errors, and confidence intervals for the significant Constructs*Gender interaction. As seen in Table 4.32, females

Table 4.30. Descriptive information for data across gender, pretest/posttest Administration, and dependent variable constructs

Gender	Pretest/Posttest / Constructs	*M*	*SE*	90% Confidence Interval	
				Lower Bound	Upper Bound
Male	Pretest				
	Balance	3.68	0.22	3.29	4.06
	Human Domination	3.30	0.27	2.84	3.76
	Posttest				
	Balance	3.98	0.26	3.54	4.41
	Human Domination	3.53	0.26	3.09	3.98
Female	Pretest				
	Balance	4.02	0.20	3.68	4.36
	Human Domination	3.87	0.23	3.47	4.27
	Posttest				
	Balance	3.96	0.22	3.58	4.35
	Human Domination	4.10	0.23	3.71	4.49

Note. *M* = Mean; *SE* = Standard error of the mean.

had higher mean scores than males on both constructs of the NEP.

In order to have a better understanding of the significant interaction between gender and constructs, the male and female differences between pretest and posttest scores were plotted across the items that constituted the NEP constructs: Balance (4 items) and Human Domination (3 items). Figures 4.13-4.14 present those plots.

The plots of the estimated marginal means indicate that males and females scored higher similarly on posttest NEP Balance items, whereas there was more variation between the two genders on pretest NEP Balance items. Additionally, mean scores for males and females moved in a similar fashion for both pretest and posttest administrations for the NEP Human Domination construct, although females had consistently higher mean scores across all items.

Table 4.31. Repeated measures ANOVA table for gender over the dependent variable constructs of the NEP instrumentation

Source	Sum of Squares	*df*	Mean Square	*F*	*p*	η_p^2
Interaction Effect						
Pretest/Posttest*Gender	0.18	1	0.18	1.00	.328	.046
Constructs*Gender	0.93	1	0.93	3.55	.073	.145
Pretest/Posttest*Constructs	0.07	1	0.07	0.58	.456	.027
Pretest/Posttest*Constructs*Gender	0.18	1	0.18	1.48	.237	.066
Within Groups Effect						
Pretest/Posttest	0.70	1	0.70	3.86	.063	.155
Constructs	0.96	1	0.96	3.67	.069	.149
Error (Pretest/Posttest)	3.84	21	0.18	---	---	---
Error (Constructs)	5.48	21	0.26	---	---	---
Between Groups Effect						
Gender	3.06	1	3.06	1.55	.226	.069
Error (Between groups)	41.39	21	1.97	---	---	---

Note. *df* = Degrees of Freedom; *F* = test statistic; *p* = *p*-value; η_p^2 = partial eta squared.

Table 4.32. Estimated marginal means for data for each gender across the dependent variable constructs

			90% Confidence Interval	
Pretest/Posttest/Constructs	*M*	*SE*	Lower Bound	Upper Bound
Male				
Balance	3.83	0.22	3.45	4.20
Human Domination	3.42	0.25	2.98	3.85
Female				
Balance	3.99	0.19	3.66	4.32
Human Domination	3.99	0.22	3.61	4.37

Note. *SE* = Standard error of the mean difference; *p* = *p*-value.

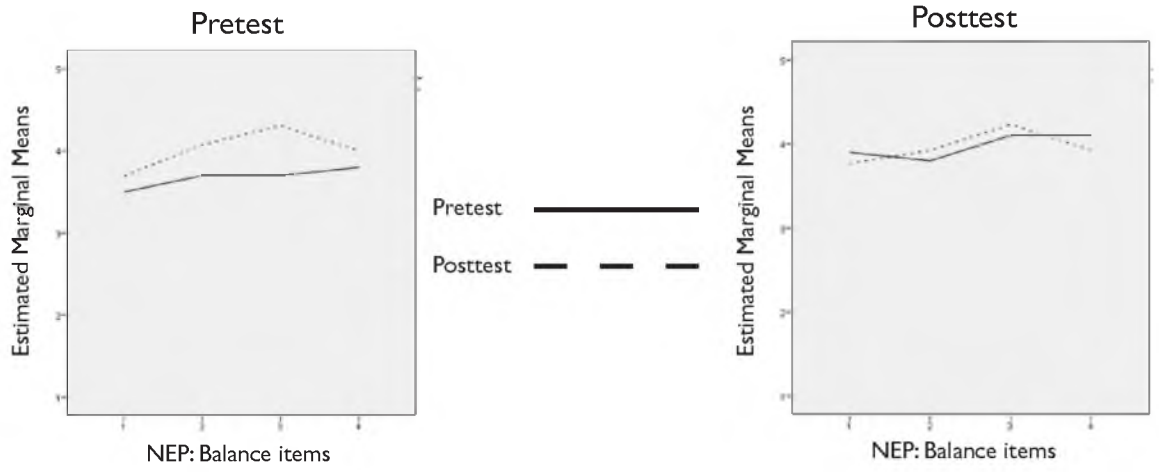


Figure 4.13. Representation of the two-way interaction effect: plots of the estimated marginal means for pretest/posttest over NEP: Balance items for each gender.

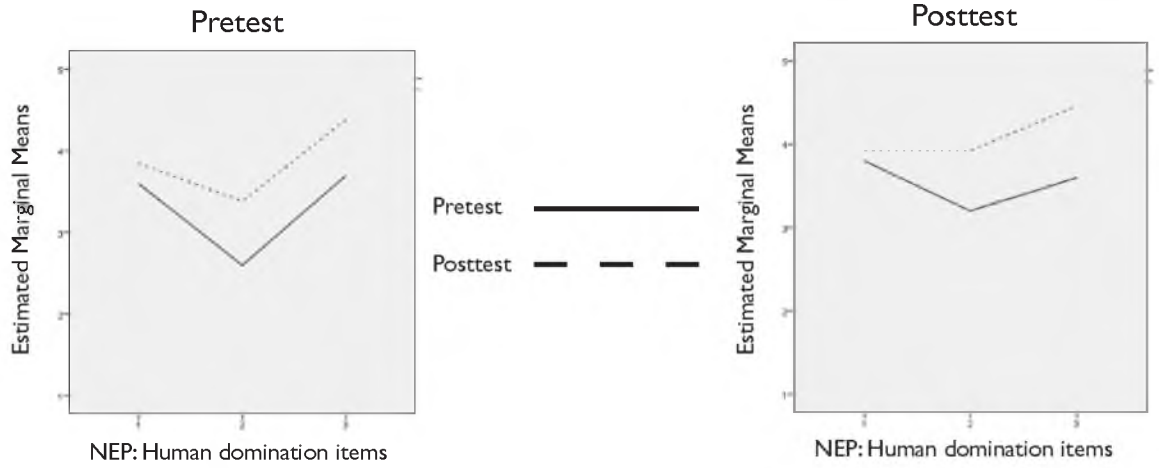


Figure 4.14. Representation of the two-way interaction effect: plots of the estimated marginal means for pretest/posttest over NEP: Human Domination items for each gender.

The New Environmental Paradigm Scale (NEP) by Grade Level

The pretest and posttest mean scores for the two NEP constructs of Balance and Human Domination over grade level were entered into a GLM repeated measures, Type III design. Table 4.33 presents the mean scores, standard error of the means, and confidence intervals for the data across all factors.

The repeated measures ANOVA analysis showed that there was a significant three-factor (Pretest/Posttest*Constructs*Grade Level) interaction ($F = 2.04$, $p = .168$),

Table 4.33. Descriptive information for data across grade level, pretest/posttest administration, and dependent variable constructs

Grade Level	Pretest/Posttest / Constructs	*M*	*SE*	90% Confidence Interval Lower Bound	90% Confidence Interval Upper Bound
Senior	Pretest				
	Balance	4.08	0.24	3.68	4.49
	Human Domination	3.93	0.29	3.44	4.42
	Posttest				
	Balance	4.50	0.22	4.12	4.89
	Human Domination	4.22	0.27	3.75	4.69
Other	Pretest				
	Balance	3.73	0.19	3.41	4.06
	Human Domination	3.43	0.23	3.04	3.82
	Posttest				
	Balance	3.63	0.18	3.32	3.93
	Human Domination	3.62	0.22	3.24	3.99

Note. *M* = Mean; *SE* = Standard error of the mean.

indicating that seniors and participants in other grade levels had significantly different pretest and posttest scores across the three constructs. Again, the three-factor interaction confounds all other tests, but they are reported for completeness. There was a significant two-factor interaction between pretest/posttest and grade level ($F = 3.28$, $p = .084$), indicating that seniors had higher mean pretest scores and posttest scores for the NEP constructs than participants in other grade levels.

There was not a significant interaction between constructs and grade level ($F = 0.07$, $p = .792$) or pretest/posttest and constructs ($F = 0.37$, $p = .552$). The main effect of pretest/posttest was statistically significant ($F = 5.25$, $p = .032$), indicating that mean pretest scores were significantly different than mean posttest scores.

A review of this significant finding revealed that mean posttest scores were significantly higher than mean pretest scores. Additionally, the main effect of constructs was statistically significant ($F = 2.50$, $p = .129$), indicating that mean scores from the Balance construct were significantly different from scores from the Human Domination construct. A review of this significant finding revealed that mean scores for the Balance

Furthermore, the main effect of grade level was significant ($F = 4.20$, $p = .053$), indicating that mean scores were significantly different for seniors when compared to participants in other grade levels. A review of this significant finding revealed that seniors had higher mean scores than participants in other grade levels. Table 4.34 presents the results from the repeated measures mixed ANOVA performed.

In order to have a better understanding of the three-factor (pre/post x constructs x grade level) interaction and the significant two-factor interaction, the pretest/posttest differences between seniors and other grade levels were plotted across the items that constituted the NEP constructs of Balance (4 items) and Human Domination (3 items).

Figures 4.15-4.16 present those plots. The mean pretest and posttest scores are similar for seniors on the Human Domination construct, while mean pretest and posttest scores are similar for participants in other grade levels on the Balance construct. Mean pretest and posttest scores appear to contradict each other for seniors on the Balance construct and participants in other grade levels on the Human Domination construct. These findings support the significant findings from the ANOVA performed.

Table 4.34. Repeated measures ANOVA table for grade level over the dependent variable constructs of the NEP instrumentation

Source	Sum of Squares	*df*	Mean Square	*F*	*p*	η^2	Power
Interaction Effect							
Pretest/Posttest*Grade level	0.54	1	0.54	3.28	.084	.135	.543
Constructs*Grade level	0.02	1	0.02	0.07	.792	.003	.111
Pretest/Posttest*Constructs	0.04	1	0.04	0.37	.552	.017	.158
Pretest/Posttest*Constructs*Grade Level	0.24	1	0.24	2.04	.168	.088	.397
Within Groups Effect							
Pretest/Posttest	0.87	1	0.87	5.25	.032	.200	.716
Constructs	0.76	1	0.76	2.50	.129	.106	.455
Error (Pretest/Posttest)	3.48	21	0.17	---	---	---	---
Error (Constructs)	6.39	21	0.30	---	---	---	---
Between Groups Effect							
Grade level	7.41	1	7.41	4.20	.053	.167	.633
Error (Between groups)	37.04	21	1.76	---	---	---	---

Note. df = Degrees of Freedom; *F* = test statistic; *p* =*p*-value; η_p^2 = partial eta squared.

The New Environmental Paradigm Scale (NEP) by Major

The pretest and posttest mean scores for the two NEP constructs of Balance and Human Domination over major were entered into a GLM repeated measures, Type III design. Table 4.35 presents the mean scores, standard error of the means, and confidence intervals for the data across all factors.

The repeated measures ANOVA analysis showed that there was a significant three-factor (Pretest/Posttest*Constructs*Major) interaction ($F = 2.05$, $p = .167$), indicating that pretest and posttest mean scores were different for Environmental Studies majors and other majors across both NEP constructs. There were no

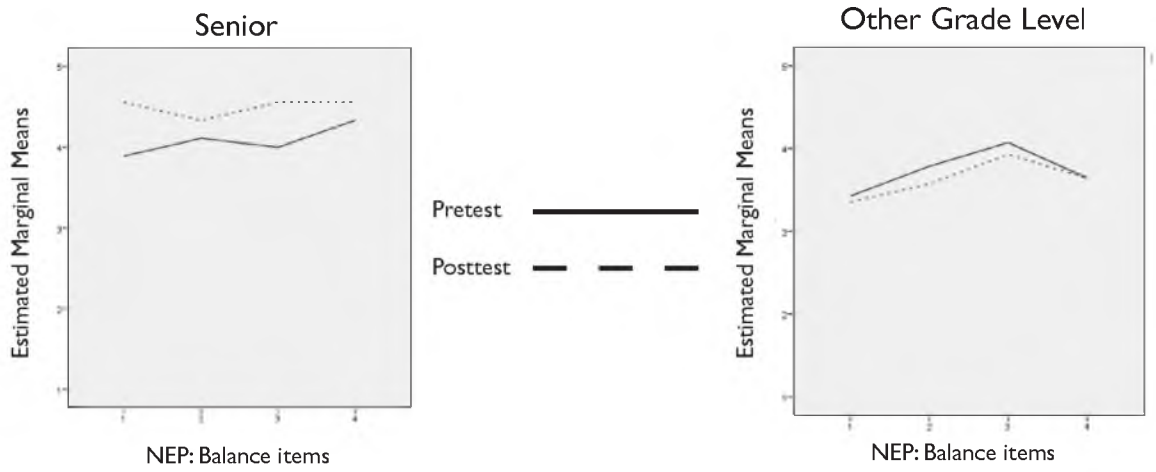


Figure 4.15. Representation of the three-factor interaction effect: plots of the estimated marginal means for pretest/posttest over NEP: Balance items for each grade level.

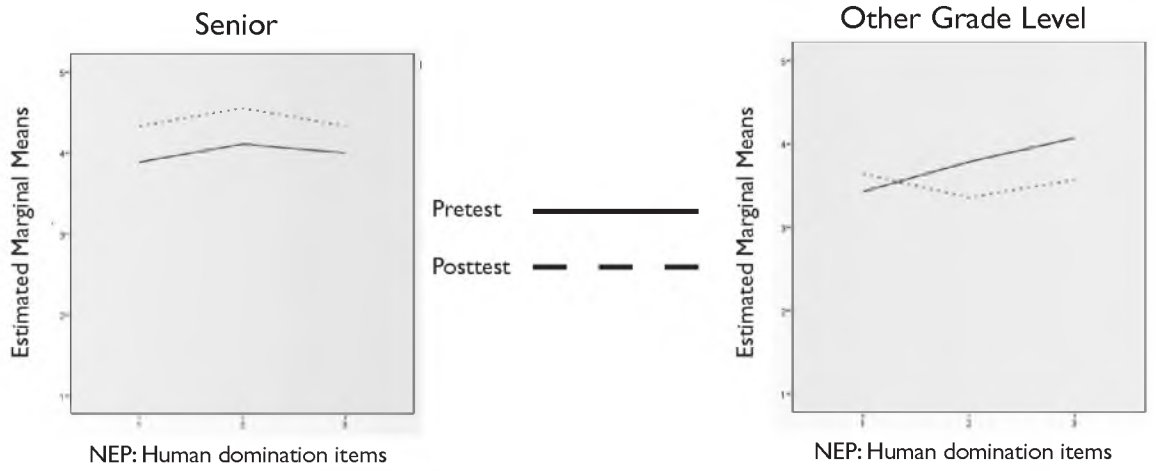


Figure 4.16. Representation of the three-factor interaction effect: plots of the estimated marginal means for pretest/posttest over NEP: Human Domination items for each grade level.

significant two-factor interactions between pretest/posttest and major ($F = 0.16$, $p = .690$); pretest/posttest and constructs ($F = 0.21$, $p = .652$); or constructs and major ($F = 0.56$, $p = .461$).The main effect of constructs was not statistically significant ($F = 1.62$, $p = .217$).

However, the main effect of pretest/posttest was significant ($F = 2.58$, $p = .123$). These results indicate that mean pretest scores were significantly different than mean

Table 4.35. Descriptive Information for Data across Major, Pretest/Posttest Administration, and Dependent Variable Constructs

Major	Pretest/Posttest / Constructs	*M*	*SE*	90% Confidence Interval Lower Bound	90% Confidence Interval Upper Bound
Environmental Studies	Pretest				
	Balance	4.28	0.23	3.88	4.68
	Human Domination	4.29	0.26	3.85	4.74
	Posttest				
	Balance	4.47	0.25	4.04	4.90
	Human Domination	4.33	0.28	3.85	4.82
Other	Pretest				
	Balance	3.65	0.17	3.36	3.94
	Human Domination	3.27	0.19	2.94	3.59
	Posttest				
	Balance	3.70	0.18	3.39	4.02
	Human Domination	3.60	0.20	3.25	3.95

Note. *M* = Mean; *SE* = Standard error of the mean.

posttest scores. Further review of this significant effect revealed that posttest scores were significantly higher than pretest scores. The main effect of major was also statistically significant ($F = 8.69$, $p = .008$), indicating that overall mean scores for the two major groups were significantly different. Further review of Table 4.36 presents the results from the repeated measures mixed ANOVA performed.

Table 4.37 presents the pairwise comparisons for the between groups variable of Major. The table indicates that mean scores for Environmental Studies majors were significantly higher than mean scores for participants in other majors.

Table 4.36. Repeated measures ANOVA table for major over the dependent variable constructs of the NEP instrumentation

Source	Sum of Squares	*df*	Mean Square	*F*	*p*	η_p^2	Power
Interaction Effect							
Pretest/Posttest*Major	0.03	1	0.03	0.16	.690	.008	.126
Constructs* Major	0.17	1	0.17	0.56	.461	.026	.188
Pretest/Posttest*Constructs	0.03	1	0.03	0.21	.652	.010	.133
Pretest/Posttest*Constructs* Major	0.24	1	0.24	2.05	.167	.089	.398
Within Groups Effect							
Pretest/Posttest	0.49	1	0.49	2.58	.123	.109	.464
Constructs	0.48	1	0.48	1.62	.217	.072	.342
Error (Pretest/Posttest)	3.99	21	0.19	---	---	---	---
Error (Constructs)	6.24	21	0.30	---	---	---	---
Between Groups Effect							
Major	13.01	1	13.01	8.69	.008	.293	.886
Error (Between groups)	31.44	21	1.50	---	---	---	---

Note. *df* = Degrees of Freedom; *F* = test statistic; *p* = *p*-value; η_p^2 = partial eta squared.

In order to have a better understanding of the significant Pretest/Posttest*Constructs*Major interaction, the differences in major groups between pretest and posttest scores were plotted across the items that constituted the NEP constructs: Balance (4 items) and Human Domination (3 items). Figures 4.17-4.18 present those plots. The mean scores for environmental studies majors are higher than the mean scores for participants majoring in other subjects for items in both NEP constructs. Additionally, it appears that pretest and posttest mean scores for environmental studies majors in the NEP Balance items are opposing (as pretest scores go up, posttest scores go down, and vice versa). In all other graphs, pretest and posttest mean scores move in a similar manner. Put simply, and perhaps not surprisingly, Environmental studies students had

Table 4.37. Pairwise Comparisons for Major

(I)) Major	(J) Major	Mean Difference (I-J)	*SE*	*p*	90% Confidence Interval for Difference	
					Lower Bound	Upper Bound
Other	Environmental Studies	-0.79	0.27	.008	-1.25	-0.33
Environmental Studies	Other	0.79	0.27	.008	0.33	1.25

Note. *SE* = Standard error of the mean difference; *p* =*p*-value.

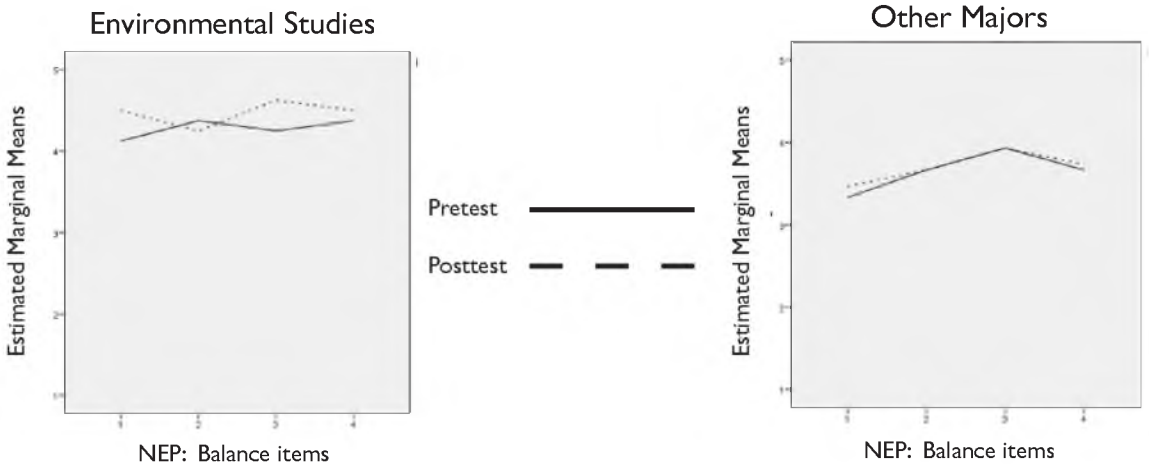


Figure 4.17. Representation of the two-way interaction effect: plots of the estimated marginal means for pretest/posttest over NEP: Balance items for each major group.

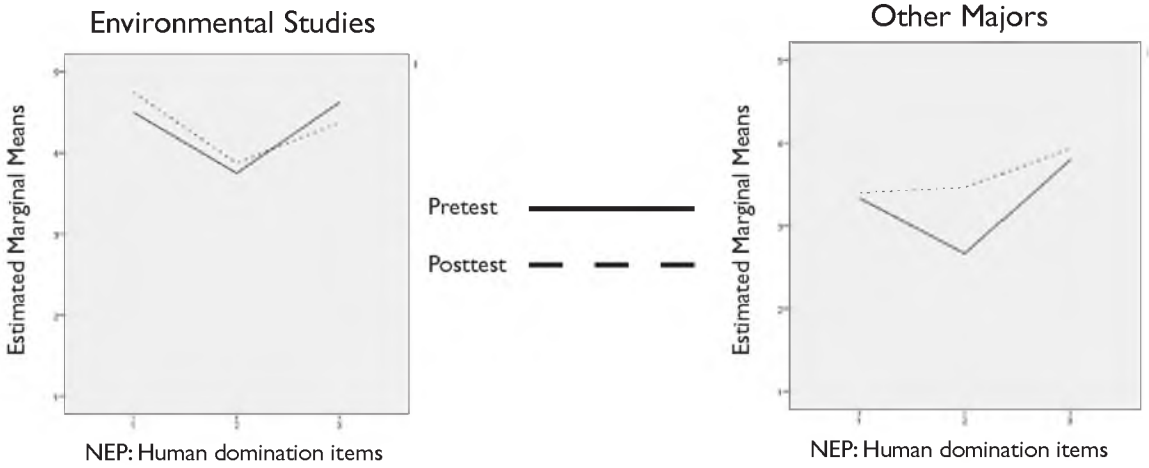


Figure 4.18. Representation of the two-way interaction effect: plots of the estimated marginal means for pretest/posttest over NEP: Human Domination items for each major group.

higher NEP scores than other majors.

In summary and in accord with my expectations, posttest mean scores were higher than pretest mean scores on both NEP constructs of Balance and Human Domination.

RQ 4: To What Extent Does Participation in COMM 2004 Seem to Influence Participants?

RQ 5: How Does Participation in COMM 2004 Affect the Students' Desire to Seek Out and Share Information?

Evidence of influence stemmed from a pre- and posttest administration of a scale I created, the CIS (Course Influence Scale). The CIS consisted of two subscales. First, the CIS1 (Course Influence Scale) consisted of the three constructs: Instructor Influence, Peer Influence, and Content Influence. Second, The CIS2 (Course Information Scale) consisted of two constructs: seeking information and sharing information. Because I developed this scale myself based on previous experience teaching the class, and this was the first time using the scale, it was truly an exploratory analysis. The same is true of Research Question 5.

Course Influence Scale (CIS1) by Gender

The pretest and posttest mean scores for the three CIS1 constructs: Peer Influence, Content Influence, and Instructor Influence over gender were entered into a GLM repeated measures, Type III design. Table 4.38 presents the mean scores, standard error of the means, and confidence intervals for the data across all factors.

The repeated measures ANOVA analysis showed no three-factor (pre/post x

Table 4.38. Descriptive information for data across gender, pretest/posttest administration, and dependent variable constructs

				90% Confidence Interval	
Gender	Test / Constructs	*M*	*SE*	Lower Bound	Upper Bound
Male	Pretest				
	Peer Influence	3.80	0.20	3.45	4.15
	Content Influence	3.78	0.27	3.31	4.24
	Instructor Influence	4.04	0.22	3.66	4.42
	Posttest				
	Peer Influence	3.85	0.26	3.39	4.30
	Content Influence	3.78	0.29	3.28	4.27
	Instructor Influence	3.94	0.28	3.46	4.42
Female	Pretest				
	Peer Influence	4.10	0.18	3.79	4.40
	Content Influence	3.92	0.24	3.51	4.33
	Instructor Influence	4.34	0.19	4.01	4.67
	Posttest				
	Peer Influence	4.00	0.23	3.60	4.40
	Content Influence	3.94	0.25	3.51	4.38
	Instructor Influence	4.15	0.25	3.73	4.58

Note. *M* = Mean; *SE* = Standard error of the mean.

constructs x gender) interaction ($F = 0.57$, $p = .570$). The two-factor interaction between pretest/posttest values and constructs ($F = 2.05$, $p = .141$) suggested that the constructs were not linear across administrations. In other words, there were significant differences between the means of the three constructs (they were not similar in value, they were not linear). Further examination of this interaction revealed that pretest scores were higher for the CIS1 constructs of Peer Influence and Instructor Influence, while pretest scores were lower for Content Influence. Put another way, posttest scores were higher for Content Influence, so this would suggest the material to which they were exposed influenced them but that the instructor and their peers did not.

The two-factor interaction between pretest/posttest values and gender ($F = 0.09$, p

= .771) and constructs and gender ($F = 0.17$, $p = .841$) were not statistically significant. The main effect of pretest/posttest was not significant ($F = 0.18$, $p = .672$). Although females had consistently higher mean scores than males in both pretest and posttest administrations across all constructs, the main effect of gender was not statistically significant ($F = 0.50$, $p = .488$). However, the main effect of constructs was statistically significant ($F = 5.23$, $p = .009$), indicating that CIS1 mean scores were significantly different across the three constructs. Table 4.39 presents the results from the repeated measures mixed ANOVA performed.

Table 4.40 presents the pairwise comparisons for the within groups variable of Constructs. The table shows that scores for the CIS1 Instructor Influence construct were significantly higher than scores for both CIS1 Peer Influence and CIS1 Content Influence constructs. These findings indicate that the instructor was reported as significantly and substantively more influential by participants than either peer or content influence. This finding is similar to the findings for the CoI factor Teaching Presence.

Course Influence Scale (CIS1) by Grade Level

The pretest and posttest mean scores for the three CIS1 constructs: Peer Influence, Content Influence, and Instructor Influence over grade level were entered into a GLM repeated measures, Type III design. Table 4.41 presents the mean scores, standard error of the means, and confidence intervals for the data across all factors.

The repeated measures ANOVA analysis showed a significant three-factor (pre/post x constructs x grade level) interaction ($F = 1.69$, $p = .196$) warranting comment. Inspection of Table 4.41 shows considerable variation across pre and post results by grade level. The constructs do not appear to be linear in effect. There were no significant

Table 4.39. Repeated measures ANOVA table for gender over the dependent variable constructs of the CIS1 instrumentation

Source	Sum of Squares	*df*	Mean Square	*F*	*p*	η_p^2
Interaction Effect						
Pretest/Posttest*Gender	0.04	1	0.04	0.09	.771	.004
Constructs*Gender	0.06	2	0.03	0.17	.841	.008
Pretest/Posttest*Constructs	0.14	2	0.07	2.05	.141	.089
Pretest/Posttest*Constructs*Gender	0.04	2	0.02	0.57	.570	.026
Within Groups Effect						
Pretest/Posttest	0.09	1	0.09	0.18	.672	.009
Constructs	1.67	2	0.83	5.23	.009	.199
Error (Pretest/Posttest)	10.33	21	0.49	---	---	---
Error (Constructs)	6.69	42	0.16	---	---	---
Between Groups Effect						
Gender	1.53	1	1.53	0.50	.488	.023
Error (Between groups)	64.20	21	3.06	---	---	---

Note. *df* = Degrees of Freedom; *F* = test statistic; *p* =*p*-value; η_p^2 = partial eta squared.

Table 4.40. Pairwise comparisons for all three constructs of the CIS1 instrumentation

(I) Constructs	(J) Constructs	Mean Difference (I-J)	*SE*	*p*	90% Confidence Interval for Difference	
					Lower Bound	Upper Bound
Peer Influence	Content Influence	0.08	0.10	.420	-0.09	0.25
	Instructor Influence	-0.18	0.08	.034	-0.32	-0.04
Content Influence	Peer Influence	-0.08	0.10	.420	-0.25	0.09
	Instructor Influence	-0.27	0.07	.002	-0.38	-0.15
Instructor Influence	Peer Influence	0.18	0.08	.034	0.04	0.32
	Content Influence	0.27	0.07	.001	0.15	0.38

Note. *SE* = Standard error of the mean difference; *p* =*p*-value; η_p^2 = partial eta squared.

Table 4.41. Descriptive information for data across grade level, pretest/posttest administration, and dependent variable constructs

				90% Confidence Interval	
Grade Level	Test / Constructs	*M*	*SE*	Lower Bound	Upper Bound
Senior	Pretest				
	Peer Influence	4.15	0.21	3.78	4.52
	Content Influence	4.08	0.28	3.60	4.57
	Instructor Influence	4.42	0.23	4.03	4.81
	Posttest				
	Peer Influence	4.39	0.25	3.96	4.82
	Content Influence	4.19	0.29	3.69	4.69
	Instructor Influence	4.42	0.28	3.94	4.90
Other	Pretest				
	Peer Influence	3.85	0.17	3.55	4.14
	Content Influence	3.71	0.23	3.33	4.10
	Instructor Influence	4.07	0.18	3.76	4.39
	Posttest				
	Peer Influence	3.64	0.20	3.30	3.99
	Content Influence	3.66	0.23	3.26	4.06
	Instructor Influence	3.83	0.22	3.45	4.22

Note. *M* = Mean; *SE* = Standard error of the mean.

two-factor interactions between pretest/posttest values and grade level ($F = 1.41$, $p = .249$); or constructs and grade level ($F = 0.10$, $p = .907$). However, there was a significant interaction between pretest/posttest values and constructs ($F = 2.27$, $p = .116$). See the comment above concerning the three-factor interaction.

The main effect of pretest/posttest was not significant ($F = 0.05$, $p = .831$). The main effect of grade level was not statistically significant ($F = 2.76$, $p = .111$), indicating that seniors had significantly different mean scores than participants in other grade levels (based on the significance level of 80%). Further examination of this significant main effect revealed that seniors had consistently higher mean scores than

participants in other grade levels in both pretest and posttest administrations across all constructs. However, the main effect of constructs was statistically significant ($F = 5.29$, $p = .009$), indicating that CIS1 mean scores were significantly different across the three constructs. Table 4.42 presents the results from the repeated measures mixed ANOVA performed.

Table 4.43 presents the pairwise comparisons for the within groups variable of constructs. The table shows that mean scores for the CIS1 Instructor Influence construct were significantly higher than mean scores for both CIS1 Peer Influence and CIS1 Content Influence constructs. These findings indicate instructor influence was significantly and substantively more important to respondents than peers or content.

Course Influence Scale (CIS1) by Major

The pretest and posttest mean scores for the three CIS1 constructs: Peer Influence, Content Influence, and Instructor Influence over major were entered into a GLM repeated measures, Type III design. Table 4.44 presents the mean scores, standard error of the means, and confidence intervals for the data across all factors.

The repeated measures ANOVA analysis showed no three-factor (pre/post x constructs x gender) interaction ($F = 0.64$, $p = .532$). Additionally, there was no significant two-factor interaction between constructs and major ($F = 1.13$, $p = .333$). There were significant two-factor interactions between pretest/posttest values and major ($F = 4.77$, $p = .040$); and pretest/posttest values and constructs ($F = 2.62$, $p = .085$). These findings indicate that mean scores for pretest and posttest administrations were significantly different over the two major groups and the three CIS1 constructs.

Table 4.42. Repeated measures ANOVA table for grade level over the dependent variable constructs of the CIS1 instrumentation

Source	Sum of Squares	*df*	Mean Square	*F*	*p*	η_p^2	Power
Interaction Effect							
Pretest/Posttest*Grade Level	0.65	1	0.65	1.41	.249	.063	.312
Constructs* Grade Level	0.03	2	0.02	0.10	.907	.005	.121
Pretest/Posttest*Constructs	0.15	2	0.07	2.27	.116	.098	.569
Pretest/Posttest*Constructs* Grade Level	0.11	2	0.06	1.69	.196	.075	.465
Within Groups Effect							
Pretest/Posttest	0.02	1	0.02	0.05	.831	.002	.107
Constructs	1.69	2	0.85	5.29	.009	.201	.888
Error (Pretest/Posttest)	9.72	2 1	.463	---	---	---	---
Error (Constructs)	6.71	4 2	.160	---	---	---	---
Between Groups Effect							
Grade Level	7.64	1	7.64	2.76	.111	.116	.486
Error (Between groups)				---	---	---	---

Note. *df* = Degrees of Freedom; *F* = test statistic; *p* = *p*-value; η_p^2 = partial eta squared.

Table 4.43 Pairwise Comparisons for all Three Constructs of the CIS1 Instrumentation

(I) Constructs	(J) Constructs	Mean Difference (I-J)	*SE*	*p*	90% Confidence Interval for Difference Lower Bound	Upper Bound
Peer Influence	Content Influence	0.09	0.10	.363	-0.08	0.27
	Instructor Influence	-0.18	0.08	.040	-0.32	-0.04
Content Influence	Peer Influence	-0.09	0.10	.363	-0.27	0.08
	Instructor Influence	-0.27	0.07	.001	-0.39	-0.15
Instructor Influence	Peer Influence	0.18	0.08	.040	0.04	0.32
	Content Influence	0.27	0.07	.001	0.15	0.39

Note. *SE* = Standard error of the mean difference; *p* = *p*-value.

Table 4.44. Descriptive information for data across major, pretest/posttest administration, and dependent variable constructs

				90% Confidence Interval	
Major	Test / Constructs	*M*	*SE*	Lower Bound	Upper Bound
Environmental Studies	Pretest				
	Peer Influence	3.81	0.23	3.42	4.21
	Content Influence	3.84	0.31	3.32	4.37
	Instructor Influence	4.28	0.25	3.85	4.70
	Posttest				
	Peer Influence	4.16	0.29	3.66	4.66
	Content Influence	4.19	0.31	3.65	4.72
	Instructor Influence	4.39	0.30	3.87	4.91
Other	Pretest				
	Peer Influence	4.05	0.17	3.76	4.34
	Content Influence	3.87	0.22	3.48	4.25
	Instructor Influence	4.17	0.18	3.86	4.49
	Post--test				
	Peer Influence	3.82	0.21	3.45	4.18
	Content Influence	3.70	0.23	3.31	4.09
	Instructor Influence	3.89	0.22	3.51	4.27

Note. *M* = Mean; *SE* = Standard error of the mean.

The main effect of pretest/posttest was not significant ($F = 0.03, p = .868$). However, the main effect of constructs was statistically significant ($F = 6.05, p = .005$), indicating that mean scores were significantly different across the three CIS1 constructs. The main effect of major was not statistically significant ($F = 0.50, p = .488$), indicating that mean scores were not significantly different for the two major groups (environmental studies and other). Table 4.44 presents the results from the repeated measures mixed ANOVA performed.

Table 4.45 presents the estimated marginal means, standard errors, and confidence intervals for the significant interaction between pretest/posttest administration and major interaction. Table 4.45 reveals that mean posttest scores were higher than mean pretest scores for environmental studies majors. Conversely, mean pretest scores were higher

Table 4.45. Estimated marginal means for data for each major across pretest/posttest administration

			90% Confidence Interval	
Major / Pretest/Posttest	M_{Est}	*SE*	Lower Bound	Upper Bound
Environmental Studies				
Pretest	3.98	0.25	3.55	4.41
Posttest	4.24	0.29	3.75	4.74
Other				
Pretest	4.03	0.18	3.72	4.34
Posttest	3.80	0.21	3.44	4.16

Note. M_{Est} = Estimated marginal mean; *SE* = Standard error of the estimated marginal mean.

than mean posttest scores for participants with other majors. In other words, at the end of the class, after environmental content, Environmental Studies saw the class as more influential than at the time of the pretest. Likewise, non-Environmental studies majors saw the first part of the class, prior to the environmental content, as more influential than the latter part of the class when compared to their counterparts.

Table 4.46 presents the estimated marginal means, standard errors, and confidence intervals for the significant interaction between pretest/posttest administration and constructs. Table 4.46 reveals that mean pretest scores were lower than mean posttest scores in the CIS1 constructs of Peer Influence and Content Influence. Mean pretest scores were higher than mean posttest scores in the remaining CIS1 construct of Instructor Influence. These results indicate students perceived their peers and course content as having more influence during the posttest, while they perceived the instructor as having more influence during the pretest.

Table 4.46. Estimated marginal means for data for each major across pretest/posttest administration

Pretest/Posttest / Construct	M_{Est}	*SE*	90% Confidence Interval	
			Lower Bound	Upper Bound
Environmental Studies				
Peer Influence	3.93	0.14	3.69	4.18
Content Influence	3.86	0.19	3.53	4.18
Instructor Influence	4.22	0.16	3.96	4.49
Other				
Peer Influence	3.99	0.18	3.68	4.30
Content Influence	3.94	0.19	3.61	4.28
Instructor Influence	4.14	0.19	3.82	4.46

Note. M_{Est} = Estimated marginal mean; *SE* = Standard error of the estimated marginal mean.

In order to have a better understanding of the significant two-factor interactions of Pretest/Posttest*Major and Pretest/Posttest*Constructs, the pretest/posttest differences between environmental studies majors and other majors were plotted across the items that constituted the CIS1 constructs of Peer Influence (8 items), Content Influence (4 items), and Instructor Influence (5 items). Figures 4.19-4.21 present those plots. Mean pretest/ posttest scores for environmental studies majors and other majors are similar in the CIS1 constructs of Content Influence and Instructor Influence, but there is a lot more variation in mean scores for the CIS1 construct of Peer Influence. Additionally, mean scores appear slightly higher in the CIS1 construct of Instructor Influence when compared to the other CIS1 constructs. These findings relate to the pretest/posttest differences found in the ANOVA over major and construct means.

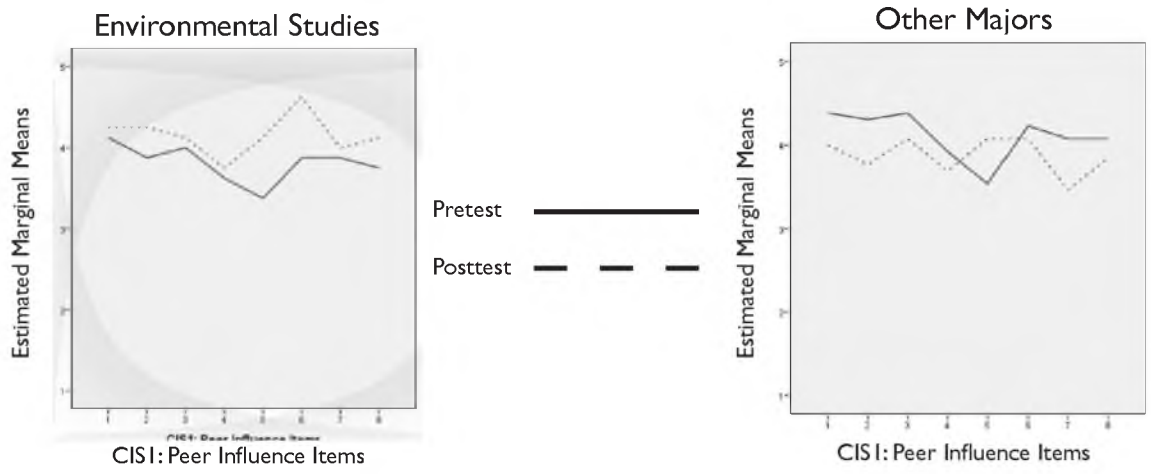


Figure 4.19. Representation of the two-way interaction effect: plots of the estimated marginal means for pretest/posttest over CIS1: Peer Influence items for each major group.

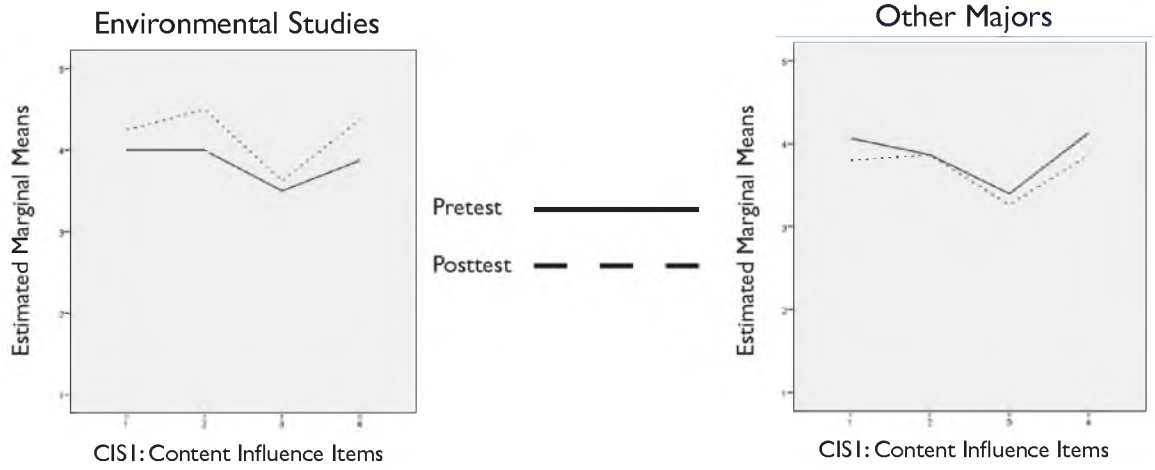


Figure 4.20. Representation of the two-way interaction effect: plots of the estimated marginal means for pretest/posttest over CIS1: Content Influence items for each major group.

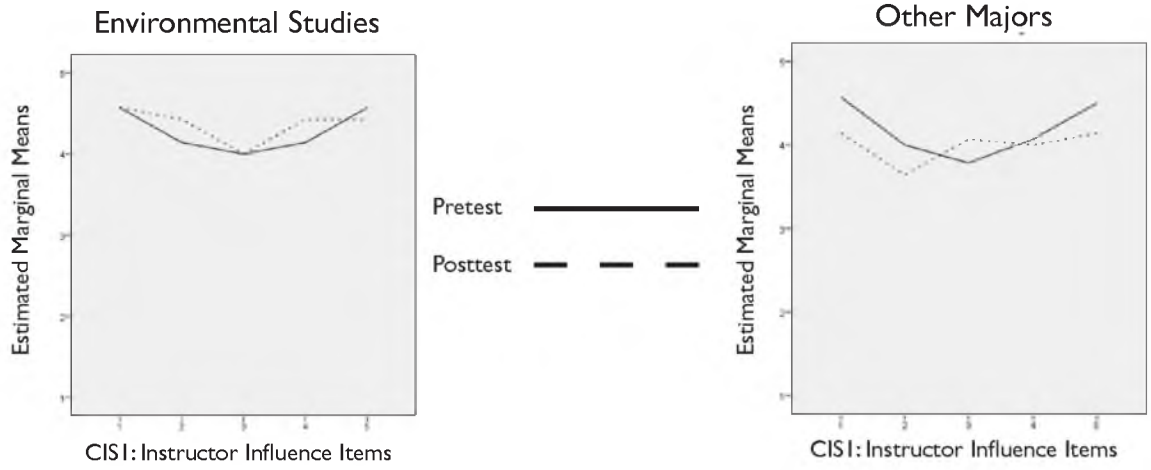


Figure 4.21. Representation of the two-way interaction effect: plots of the estimated marginal means for pretest/posttest over CIS1: Instructor Influence items for each major group.

Course Influence Scale (CIS2) by Gender

The pretest and posttest mean scores for the three CIS2 constructs: Seeking Information, Sharing Information, and Willingness to Communicate Information over gender were entered into a GLM repeated measures, Type III design. Table 4.47 presents the mean scores, standard error of the means, and confidence intervals for the data across all factors.

The repeated measures ANOVA analysis showed a significant three-factor (pre/post x constructs x gender) interaction ($F = 2.56, p = .089$), indicating that males and females had significantly different pretest and posttest scores across the three constructs. The confounding effect of the three-factor interaction is noted. There were no significant two-factor interactions between pretest/posttest values and constructs ($F = 0.01, p = .988$); pretest/posttest values and gender ($F = 0.02, p = .899$); and constructs and gender ($F = 0.49, p = .617$).

The main effect of pretest/posttest was not significant ($F = 0.67, p = .423$). Although males almost always had higher mean scores than females in both pretest and posttest administrations across all constructs, the main effect of gender was not statistically significant ($F = 0.18, p = .673$). However, the main effect of constructs was statistically significant ($F = 22.51, p < .0005$), indicating that CIS2 mean scores were significantly different across the three constructs. Table 4.48 presents the results from the repeated measures mixed ANOVA performed.

In order to have a better understanding of the three-factor (pre/post x constructs x gender) interaction, the pretest/posttest differences between males and females were plotted across the items that constituted Seeking Information (3 items), Sharing Information (4 items), and Willingness to Communicate Information (3 items). Figures 4.22-4.24 present those plots.

The plot of the estimated marginal means for the CIS2: Seeking Information construct indicates a slight peak in female pretest scores for item 2, while male pretest scores were

Table 4.47. Descriptive information for data across gender, pretest/posttest administration, and dependent variable constructs

				90% Confidence Interval	
Gender	Test / Constructs	*M*	*SE*	Lower Bound	Upper Bound
Male	Pretest				
	Seeking Information	3.52	0.19	3.19	3.84
	Sharing Information	3.39	0.17	3.09	3.68
	Willingness to Communicate Information	3.79	0.18	3.48	4.10
	Posttest				
	Seeking Information	3.36	0.20	3.02	3.71
	Sharing Information	3.20	0.21	2.84	3.57
	Willingness to Communicate Information	3.85	0.23	3.46	4.24
Female	Pretest				
	Seeking Information	3.38	0.17	3.09	3.68
	Sharing Information	3.23	0.16	2.96	3.50
	Willingness to Communicate Information	3.74	0.17	3.46	4.03
	Posttest				
	Seeking Information	3.36	0.18	3.04	3.68
	Sharing Information	3.26	0.20	2.93	3.60
	Willingness to Communicate Information	3.54	0.21	3.18	3.90

Note. *M* = Mean; *SE* = Standard error of the mean.

consistent for the first two items and dropped slightly for the third item. Male posttest scores remained consistent across all items. Similar results were found in the plot of the estimated marginal means for the CIS2: Sharing Information, in which mean scores for males were consistent across the first three items and dropped slightly for item 4. The plot of the estimated marginal means for the CIS2: Willingness to Communicate Information construct indicates consistency of position across the items for the two administrations for both males and females. Plots for CIS2: Sharing Information and CIS2: Willingness to Communicate Information indicate that mean scores for females moved in a similar manner across both pretest and posttest administrations.

Table 4.48. Repeated measures ANOVA table for gender over the dependent variable constructs of the CIS2 instrumentation

Source	Sum of Squares	*df*	Mean Square	*F*	*p*	η_p^2	Power
Interaction Effect							
Pretest/Posttest*Gender	0.01	1	0.01	0.02	.899	.001	.103
Constructs*Gender	0.12	2	0.06	0.49	.617	.022	.209
Pretest/Posttest*Constructs	<0.005	2	<0.005	0.01	.988	.001	.103
Pretest/Post-test*Constructs*Gender	0.39	2	0.19	2.56	.089	.104	.616
Within Groups Effect							
Pretest/Posttest	0.22	1	0.22	0.67	.423	.029	.204
Constructs	5.30	2	2.65	22.51	<.0005	.506	1.000
Error (Pretest/Posttest)	7.30	22	0.33	---	---	---	---
Error (Constructs)	5.18	44	0.12	---	---	---	---
Between Groups Effect							
Gender	0.34	1	0.34	0.18	.673	.008	.129
Error (Between groups)	41.02	22	1.86	---	---	---	---

Note. *df* = Degrees of Freedom; *F* = test statistic; *p* = *p*-value; η_p^2 = partial eta squared.

Course Influence Scale (CIS1) by Grade Level

The pretest and posttest mean scores for the three CIS2 constructs: Seeking Information, Sharing Information, and Willingness to Communicate Information over grade level were entered into a GLM repeated measures, Type III design. Table 4.49 presents the mean scores, standard error of the means, and confidence intervals for the data across all factors.

The repeated measures ANOVA analysis showed no three-factor (pre/post x constructs x grade level) interaction ($F = 0.32, p = .725$). Additionally, there were no significant two-factor interactions between pretest/posttest values and grade level ($F = 1.26, p = .273$); constructs and grade level ($F = 0.40, p = .672$); and pretest/posttest values and constructs ($F = 0.02, p = .980$). The main effect of pretest/posttest was not significant ($F = 1.18, p = .290$). Mean scores for seniors were very similar to mean scores for participants in other grade levels in both pretest

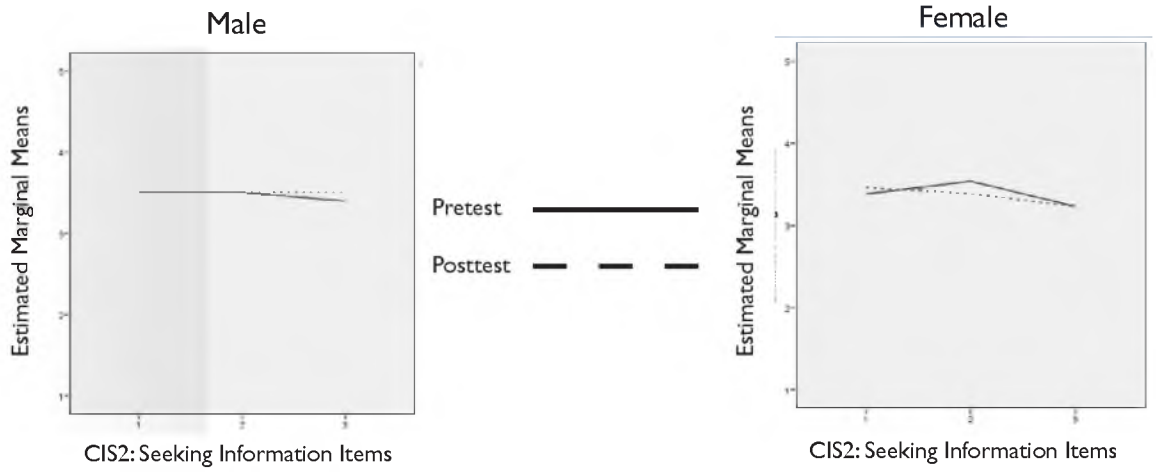


Figure 4.22. Representation of the three-factor interaction effect: plots of the estimated marginal means for pretest/posttest over CIS2: Seeking Information items for each gender.

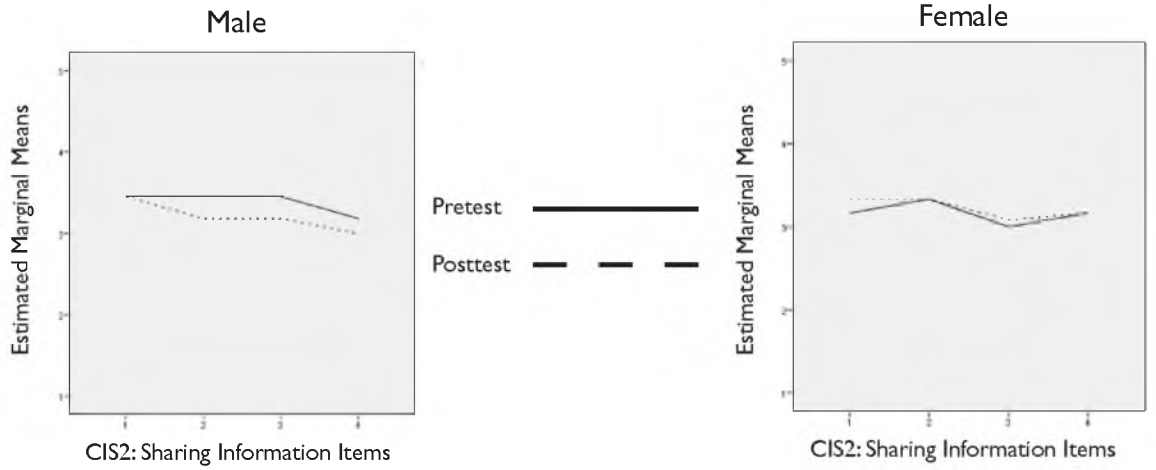


Figure 4.23. Representation of the three-factor interaction effect: plots of the estimated marginal means for pretest/posttest over CIS2: Sharing Information items for each gender.

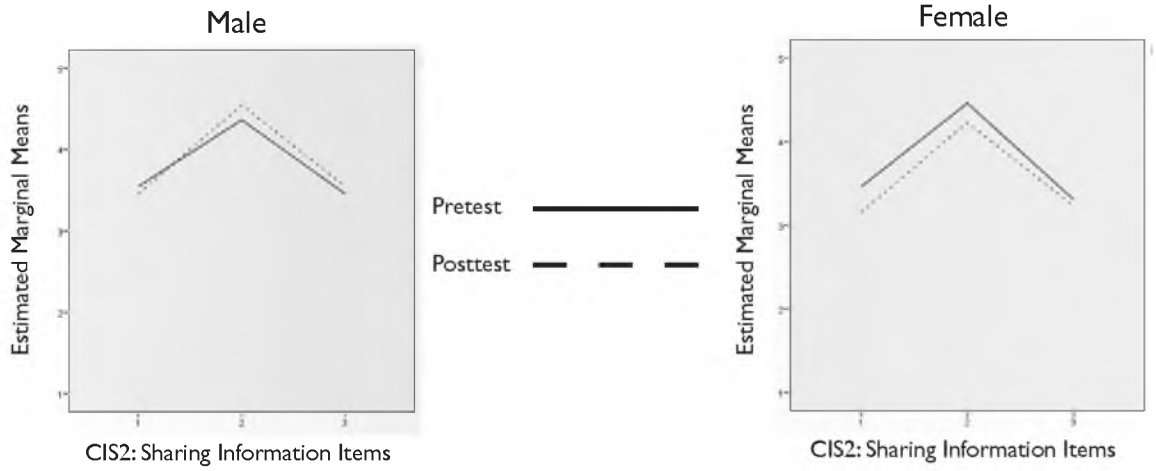


Figure 4.24. Representation of the three-factor interaction effect: plots of the estimated marginal means for pretest/posttest over CIS2: Willingness to Communicate Information items for each gender.

Table 4.49. Descriptive information for data across grade level, pretest/posttest administration, and dependent variable constructs

Grade Level	Test / Constructs	*M*	*SE*	90% Confidence Interval Lower Bound	90% Confidence Interval Upper Bound
Senior	Pretest				
	Seeking Information	3.59	0.20	3.24	3.94
	Sharing Information	3.44	0.19	3.12	3.77
	Willingness to Communicate Information	3.89	0.20	3.55	4.23
	Posttest				
	Seeking Information	3.44	0.22	3.07	3.82
	Sharing Information	3.21	0.24	2.81	3.62
	Willingness to Communicate Information	3.63	0.26	3.19	4.07
Other	Pretest				
	Seeking Information	3.36	0.16	3.08	3.63
	Sharing Information	3.22	0.15	2.97	3.47
	Willingness to Communicate Information	3.69	0.15	3.43	3.95
	Posttest				
	Seeking Information	3.31	0.17	3.02	3.60
	Sharing Information	3.25	0.18	2.94	3.56
	Willingness to Communicate Information	3.71	0.20	3.37	4.05

Note. *M* = Mean; *SE* = Standard error of the mean.

and posttest administrations across all CIS2 constructs. Therefore, the main effect of grade level was not statistically significant ($F = 0.23$, $p = .634$). However, the main effect of constructs was statistically significant ($F = 19.98$, $p < .0005$), indicating that CIS2 mean scores were significantly different across the three constructs. Table 4.50 presents the results from the repeated measures mixed ANOVA performed.

Table 4.51 presents the pairwise comparisons for the within groups variable of Constructs. The table indicates that mean scores for the CIS2 Willingness to Communicate Information construct were significantly higher than mean scores for both CIS2

Table 4.50. Repeated measures anova table for grade level over the dependent variable constructs of the CIS2 instrumentation

Source	Sum of Squares	*df*	Mean Square	*F*	*p*	η_p^2	Power
Interaction Effect							
Pretest/Posttest*Grade Level						.05	
	0.40	1	0.40	1.26	.273	4	.292
Constructs* Grade Level						.01	
	0.10	2	0.05	0.40	.672	8	.189
Pretest/Posttest*Constructs						.00	
	<0.005	2	<0.005	0.02	.980	1	.104
Pretest/Posttest*Constructs* Grade Level	0.05	2	0.03	0.32	.725	.01 5	.172
Within Groups Effect							
Pretest/Posttest						.05	
	0.37	1	0.37	1.18	.290	1	.280
Constructs				19.9		.47	
	4.72	2	2.36	8	<.0005	6	1.000
Error (Pretest/Posttest)	6.91	22	0.31	---	---	---	---
Error (Constructs)	5.20	44	0.12	---	---	---	---
Between Groups Effect							
Grade Level						.01	
	0.43	1	0.43	0.23	.634	0	.137
Error (Between groups)	40.93	22	1.86	---	---	---	---

Note. *df* = Degrees of Freedom; *F* = test statistic; *p* = *p*-value; η_p^2 = partial eta squared

Seeking Information and CIS2 Sharing Information constructs. Furthermore, mean scores for the CIS2 Seeking Information construct were significantly higher than mean scores for the CIS2 Sharing Information construct.

These findings indicate that students self-reported being willing to communicate information more so than seeking or sharing information. Additionally, students were more likely to seek information than share information.

Table 4.51. Pairwise comparisons for all three constructs of the CIS2 instrumentation

(I) Constructs	(J) Constructs	Mean Difference (I-J)	*SE*	*p*	90% Confidence Interval for Difference	
					Lower Bound	Upper Bound
Seeking Information	Sharing Information	0.15	0.06	.021	0.04	0.25
	Willingness to Communicate Information	-0.30	0.08	.001	-0.44	-0.16
Sharing Information	Seeking Information	-0.15	0.06	.021	-0.25	-0.04
	Willingness to Communicate Information	-0.45	0.08	<.0005	-0.58	-0.32
Willingness to Communicate Information	Seeking Information	0.30	0.08	.001	0.16	0.44
	Sharing Information	0.45	0.08	<.0005	0.32	0.58

Note. *SE* = Standard error of the mean difference; *p* = *p*-value.

Course Influence Scale (CIS2) by Major

The pretest and posttest mean scores for the three CIS2 constructs: Seeking Information, Sharing Information, and Willingness to Communicate Information over major were entered into a GLM repeated measures, Type III design. Table 4.52 presents the mean scores, standard error of the means and confidence intervals for the data across all factors.

The repeated measures ANOVA analysis showed that the three-factor (Pretest/Posttest*Constructs*Major) interaction ($F = 1.68$, $p = .199$) justified additional comment. Inspection of Table 4.54 shows Environmental Studies majors had varied mean scores in their pretest/posttest results but Other majors had uniformly lower mean scores.

There were no significant two-factor interactions between pretest/posttest and constructs ($F = 0.10$, $p = .906$); no significant interaction between pretest/posttest and

Table 4.52. Descriptive information for data across major, pretest/posttest administration, and dependent variable constructs

Major	Pretest/Posttest / Constructs	*M*	*SE*	90% Confidence Interval Lower Bound	90% Confidence Interval Upper Bound
Environmental Studies	Pretest				
	Seeking Information	3.46	0.22	3.08	3.84
	Sharing Information	3.50	0.20	3.16	3.84
	Willingness to Communicate Information	3.88	0.21	3.51	4.24
	Posttest				
	Seeking Information	3.63	0.23	3.24	4.01
	Sharing Information	3.43	0.24	3.01	3.85
	Willingness to Communicate Information	4.04	0.26	3.60	4.48
Other	Pretest				
	Seeking Information	3.44	0.16	3.17	3.71
	Sharing Information	3.20	0.14	2.96	3.44
	Willingness to Communicate Information	3.71	0.15	3.45	3.96
	Posttest				
	Seeking Information	3.23	0.16	2.96	3.50
	Sharing Information	3.14	0.17	2.84	3.44
	Willingness to Communicate Information	3.50	0.18	3.19	3.81

Note. *M* = Mean; *SE* = Standard error of the mean.

major ($F = 1.57$, $p = .223$); and no significant two-factor interaction between constructs and major ($F = 0.49$, $p = .619$). The main effects of pretest/posttest and major were not statistically significant ($F = 0.14$, $p = .715$ and $F = 1.47$, $p = .238$; respectively).

The main effect of constructs was statistically significant ($F = 21.00$, $p < .0005$), indicating that the mean scores of the three CIS2 constructs were significantly different from each other. Table 4.53 presents the results from the repeated measures mixed ANOVA performed.

Table 4.53. Repeated measures ANOVA table for major over the dependent variable constructs of the CIS2 instrumentation

Source	Sum of Squares	*df*	Mean Square	*F*	*p*	η_p^2	Power
Interaction Effect							
Pretest/Posttest*Major	0.49	1	0.49	1.57	.223	.067	.335
Constructs* Major	0.11	2	0.06	0.49	.619	.022	.208
Pretest/Posttest*Constructs	0.02	2	0.01	0.10	.906	.004	.122
Pretest/Posttest*Constructs* Major	0.26	2	0.13	1.68	.199	.071	.462
Within Groups Effect							
Pretest/Posttest	0.04	1	0.04	0.14	.715	.006	.122
Constructs	4.94	2	2.47	21.00	<.0005	.488	1.000
Error (Pretest/Posttest)	6.82	22	0.31	---	---	---	---
Error (Constructs)	5.18	44	0.12	---	---	---	---
Between Groups Effect							
Major	2.59	1	2.59	1.47	.238	.063	.322
Error (Between groups)	38.77	22	1.76	---	---	---	---

Note. *df* = Degrees of Freedom; *F* = test statistic; *p* = *p*-value; η_p^2 = partial eta squared.

Table 4.54 presents the pairwise comparisons for the within groups variable of Constructs. The table indicates that mean scores for the CIS2 Willingness to Communicate Information construct were significantly higher than mean scores for both CIS2 Seeking Information and CIS2 Sharing Information constructs. Furthermore, mean scores for the CIS2 Seeking Information construct were significantly higher than mean scores for the CIS2 Sharing Information construct. These findings indicate that willingness to communicate information was significantly and substantively more important by the respondents than either seeking or sharing information. Additionally, seeking information was significantly more important to the respondents than sharing it.

Table 4.54. Pairwise comparisons for all three constructs of the CIS2 instrumentation

(I) Constructs	(J) Constructs	Mean Difference (I-J)	*SE*	*p*	90% Confidence Interval for Difference	
					Lower Bound	Upper Bound
Seeking Information	Sharing Information	0.12	0.06	.059	0.02	0.22
	Willingness to Communicate Information	-0.34	0.08	<.0005	-0.49	-0.20
Sharing Information	Seeking Information	-0.12	0.06	.059	-0.22	-0.02
	Willingness to Communicate Information	-0.46	0.08	<.0005	-0.60	-0.33
Willingness to Communicate Information	Seeking Information	0.34	0.08	<.0005	0.20	0.49
	Sharing Information	0.46	0.08	<.0005	0.33	0.60

Note. *SE* = Standard error of the mean difference; *p* =*p*-value.

RQ 6: Is There a Relationship Between Participation in an OLC and Students' Overall Satisfaction with COMM 2004?

To answer this question, I used a series of Spearman's rank order correlational analyses. Spearman's rank order correlational analysis is appropriate for variables with ordinal, or ranked, data. The Net Promoter Score (NPS) variable was ordinal, scored on a scale of 1 to 10; therefore, Spearman's rank order correlational analysis was used. I was exploring to see if there were correlations between the Net Promoter Score (NPS) and the variable constructs of (a) CHEAKS: Verbal Commitment; (b) CoI: Teaching Presence; (c) CoI: Social Presence; (d) CoI: Cognitive Presence; (e) SOVC; (f) CIS1; (g) CIS1: Peer Influence; (h) CIS1: Content

Influence; and (i) CIS2: Seeking Information. Prior to this dissertation, I had not seen the NPS used in conjunction with these other constructs; therefore, this analysis was also considered exploratory and no hypotheses were developed.

A series of Spearman's rank order correlational analyses were performed to address Research Question 6. Table 4.55 presents the results of the correlational analyses. Significant correlations were found between the students' class ratings and the variable constructs of: (a) CHEAKS: Verbal Commitment ($\rho = .426$, $p = .038$); (b) CoI: Teaching Presence ($\rho = .413$, $p = .045$); (c) CoI: Social Presence ($\rho = .688$, $p < .0005$); (d) CoI: Cognitive Presence ($\rho = .733$, $p < .0005$); (e) SOVC ($\rho = .707$, $p < .0005$); (f) CIS1: Instructor Influence ($\rho = .630$, $p = .001$); (g) CIS1: Peer Influence ($\rho = .627$, $p = .001$); (h) CIS1: Content Influence ($\rho = .670$, $p < .0005$); and (i) CIS2: Seeking Information ($\rho = .421$, $p = .040$). All significant correlations were moderate to strong and positive, implying that students who scored higher on these constructs were more likely to give the class a higher rating, and vice versa. Next, Chapter 5 will summarize the findings from the quantitative and qualitative data, discuss the implications, limitations, and make recommendations for future research.

Summary

In this section, I summarize and interpret the meaning of the quantitative results to help answer the Research Questions of my study. I approached this interpretation by posing five questions: (a) Did community form?; (b) Did being a part of COMM 2004 impact environmental attitudes and behaviors?; (c) Did the Course have an Influence on Students?; (d) Did the Course have an influence on information seeking, sharing, and willingness to communicate with others?; and (e) Is there a relationship between being a

Table 4.55. Spearman's rank order correlation coefficients for variable constructs used for inferential analysis

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. Class Rating	---														
2. CoI: Teaching Presence	.413*	---													
3. CoI: Social Presence	.688**	.786**	---												
4. CoI: Cognitive Presence	.733**	.794**	.829**	---											
5. SOVC	.707**	.721**	.822**	.843**	---										
6. CHEAKS: Verbal Commitment	.426*	.492*	.561**	.675**	.642**	---									
7. CHEAKS: Actual Commitment	.380	.249	.121	.447*	.158	.191	---								
8. CHEAKS: Affect	.233	.317	.204	.376	.335	.725**	.283	---							
9. NEP: Balance	.362	.371	.271	.493*	.402	.628**	.463*	.706**	---						
10. NEP: Human Domination	.-.112	-.335	-.152	-.340	-.402	-.591**	-.140	-.704**	-.538**	---					
11. CIS1: Instructor Influence	.630**	.675**	.614**	.774**	.729**	.475*	.358	.371	.550*	-.491*	---				
12. CIS1: Peer Influence	.627**	.781**	.681**	.845**	.848**	.567**	.384	.374	.516**	-.462*	.821**	---			
13. CIS1: Content Influence	.670**	.620**	.658**	.858**	.723**	.620**	.607**	.437*	.659**	-.363	.855**	.790**	---		
14. CIS2: Seeking Information	.421*	.519*	.456*	.689**	.476*	.633**	.673**	.456*	.667**	-.329	.638**	.663**	.860**	---	
15. CIS2: Sharing Information	.329	.515*	.479*	.643**	.457*	.521**	.620**	.287	.477*	-.241	.608**	.620**	.823**	.905**	---
16. CIS2: Willingness to Communicate Information	.313	.646**	.499*	.633**	.474*	.482*	.494*	.367	.481*	-.306	.663**	.611**	.755**	.804**	.834**

* $p < .05$; ** $p < .0$

part of an OLC and students' overall satisfaction with the class? I provide insight to the answers to these questions by summarizing and interpreting the findings in their light.

Did Community Form?

Two measures were used to explore the extent to which students experienced feeling like a part of an OLC in COMM 2004: the CoI and the SOVC. Based on an examination of the mean scores of both scales, it appears that there was community experienced throughout the class. Both the pre- and posttest scores were high for both measures, indicating a sense of community existed early in the course and remained throughout. Although the COI went down slightly, the SOVC went up slightly, and there was no significant change in either scale. In terms of the types of presence that comprised the CoI scale, teaching presence and social presence went down slightly overtime and cognitive presence remained about the same from pre- to posttest.

Teaching presence was significantly higher than social and cognitive presence. That means students reported experiencing teaching presence more so than any other type of presence in class. These findings collaborate qualitative findings as well.

CoI

Gender

In terms of the CoI, there were no significant results for gender. There may not be specific gender differences when it comes to the CoI in this sample for a few reasons: 1) men and women may not have significantly different experiences of community in general, 2) the online medium itself mitigates or influences the manifestation

of gender differences, 3) this particular sample, mostly 18-25 years olds could arguably be more comfortable forming communities, particularly in online environments, and the age and tech-savviness of the sample could therefore supersede any potential gender differences.

A close examination of mean scores across gender and pre- and posttest reveals a few interesting findings, however. First, female's report of cognitive presence was higher in the posttest than males, indicating females were possibly more cognitively engaged by environmental content in the last part of the class than males. This makes sense given the finding that in terms of information seeking, females seemed more likely than males to seek environmental information. Second, during both the pre- and posttests, males had higher mean scores for social presence. Third, males had higher scores for teaching presence during the pre- and posttests.

Grade Level

The COI mean scores were significantly higher for seniors than other grade levels. In other words, seniors appeared to feel a stronger sense of community than their counterparts. It is possible that seniors are more comfortable engaging in discussion, critical thinking, group work, and community building required for COMM 2004. Seniors may have more advanced knowledge and skills making COMM 2004 more manageable and easier to enjoy. Because of this level of comfort, it is also possible that seniors moved more quickly to the center of COMM 2004 and therefore experienced community more readily.

Conversely, it may also be more difficult for underclassman to integrate into a

community with less experience in the type of online discussion-based class that COMM 2004 is, which forms primarily through interaction with peers and group projects. Future research should further investigate the relationship between class level and the level of community experienced in a class. Administrators should further explore what kinds of online classes should be developed for target specific grade levels/audiences.

Major

The CoI was significantly higher for EVST majors than other majors in the posttest. This can partly be explained by the shift in the last part of the class to environmental content. The shift in content may have triggered additional cognitive processing for EVST majors, hence more cognitive presence, hence community, was experienced. Moreover, the chance to interact with peers on the DB regarding environmental content could have impacted social presence, hence feelings of community.

EVST majors also had significantly higher means for social presence in the posttest than other majors. The environmentally themed assignments and prompts may have helped EVST majors feel more comfortable voicing their opinions and interacting with their peers about topics with which they were comfortable (i.e., experts). Hence, more social presence (i.e., community) may have been experienced.

Social presence for EVST majors may have also been enhanced by the second small group project where students had to research and solve and develop an action plan to solve an environmental problem. In essence, this opportunity to collaborate with peers about something they were passionate and knowledgeable about may have brought the EVST majors out of their shells. The environmental content itself may have also helped

EVST majors feel more in a comfort zone where they could vocalize about their own area of expertise, hence helping them feel more social.

Teaching presence was significantly higher for EVST majors than other majors. It could be that since I was the teacher of an environmentally-themed class, EVST majors felt somehow more aligned with me, hence experiencing my presence more. This may be in part due to my coming out as caring about environmental issues. It could also be simply a sign that EVST majors perceived us as kindred spirits or as sharing the same eco-centric values.

Teaching presence was also significantly higher for EVST majors than cognitive presence or social presence. Moreover, cognitive presence and social presence were significantly lower for EVST than other majors, indicating that EVST majors may not have been as engaged cognitively by the material and/or interactions in the class until the latter part of the class. Anecdotally, on course evaluations, I have had EVST majors report that COMM 2004 is not a very difficult class. When juxtaposed against some of their weightier or more rigorous science classes, I can understand why the content could be easier or seen as less challenging for EVST students. I have also learned from EVST faculty meetings that some EVST students see the curriculum across the major as redundant.

It is also possible that EVST students feel more comfortable socially engaging when the content pertains to their area of expertise. As a Communication class, perhaps EVST students felt more like outsiders at the beginning of the class, were less socially and cognitively engaged, and then when environmental content occurred, it became a trigger that helped them re-engage.

SOVC

The second measure used to explore the sense of community experienced in the class was the SOVC. Although the SOVC also measures community, it behaved differently than the COI, further illuminating more about how online communities behave. Findings support past researchers contentions that the two scales, despite having some overlap, (i.e., they measure community), they are also measuring something different (i.e., online versus offline communities). Moreover, the SOVC may be better at tapping into the virtual nature of online experiences.

From pretest to posttest, the mean score of the SOVC went up slightly, although not statistically significantly. There were no significant findings in terms of gender and the SOVC. There also were no differences across majors. However, there were differences in terms of grade level.

Grade Level

Similar to how the mean scores behaved for the CoI, there were significant differences in means for seniors. Seniors felt more a sense of virtual community than other majors. This could relate to the level of comfort seniors have with discussion, voicing their opinions, debate, and the BB/technological system itself. Previous research suggests the platform can impact sense of community and so can usability and user friendliness of the site itself (e.g., Preece, 2001). Perhaps seniors had a level of comfort because of their previous experiences taking college classes in general and working with the BB system more specifically.

If discussion-based online classes require a unique skill set, instructors might consider strategies for drawing in and preparing underclassman for such classes. Alternately, instructors

could deploy seniors strategically as conversation leaders and encourage them to play certain roles in the class. It also points to the reality that this type of format may not be optimal for all preferred learning styles and may also be more suited for use in upper division classroom settings. More research should use this and the CoI together to further explore their uses.

Major

In contrast to the CoI, the mean scores of SOVC did not seem to be affected by major. This difference in the outcomes between the two scales serves as additional evidence that the CoI and SOVC are similar in design and character. Moreover, someone's major (particularly if the course content aligns with their major) may impact someone's overall sense of community, but be less important when it comes to community being experienced virtually. More research will need to be conducted to understand if the SOVC is better at capturing the online context and the impact it makes on the experiences of community.

Did Being a Part Of Comm 2004 Impact Environmental Attitudes and Behaviors?

Two measures were used to explore the environmental attitudes and behaviors of COMM 2004 students, each with its own unique constructs: the NEP and the CHEAKS. First, I discuss NEP, then, I discuss the CHEAKS.

NEP

Two subscales comprised the NEP: balance and human domination. The balance construct tapped in to the extent to which students believed there should be a degree of ecological

balance. The human domination component teased out to the extent to which students believed humans have the right to dominate or modify the environment to suit their own needs.

Gender

There was a significant difference between males and females in how they scored on the NEP. More specifically, females scored significantly higher across administrations on both NEP constructs than males. Females had consistently higher mean scores across all items.

This finding was not surprising based on previous work on the NEP, which has found females to score higher than men on the NEP. It is worth noting, however, that male mean scores increased from pretest to posttest and the gap between the mean scores of males and females decreased.

Both male and female mean for balance and human domination went up from pre- to posttest. In other words, students in this class were more likely to think there should be more ecological balance and more likely to think that humans should not dominate (or have a right to modify) the environment after experiencing the course material and assignments. Therefore, it's possible that the intervention may have impacted the overall environmental attitudes/environmental worldview of some participants.

Grade Level

Mean pretest and posttest scores were significantly different for seniors than for participants in other grade levels. More specifically, seniors had higher mean pretest scores and posttest scores for the NEP constructs compared with participants in other

grade levels. The overall mean score for human domination went up for both seniors and nonseniors, although there was not a significant difference between administrations.

It could be that seniors are more likely to score higher on the NEP simply because of their education level. Previous research indicates that those who are more educated and liberal (e.g., college students) tend to be more pro-environmental. Perhaps the independent variable of grade level is helping to tap into education level or even critical thinking ability. Seniors have had more time to be educated, more time to learn about environmental degradation during their college tenure, and therefore may be more likely to think humans are destroying the environment than those who have not been in college as long.

Alternately, this difference between grade level could mean there is a potential generational difference such that younger classes are just not as environmentally aware, savvy, or concerned as upper classmen. Further research will need to be done to further understand the relationship between grade level and environmental worldview and attitudes.

Major

Pretest and posttest mean scores were significantly different for Environmental Studies majors and other majors across both NEP constructs. Perhaps not surprisingly, EVST majors scored significantly higher on the NEP than other majors. EVST means were higher on both constructs across time periods.

Posttest scores on the NEP were also significantly higher for EVST majors. EVST majors also had significantly lower human domination scores than other majors overall. Given their interest in Environmental studies and their propensity toward protecting the environment, these two findings from the NEP are not surprising.

CHEAKS

In terms of the CHEAKS scale from pre- to posttest, student's verbal commitment (i.e., behavioral intentions) to do more for the environment went down from 42.5 to 41.58. At the same time, the students reported more actual commitment to the environment with mean scores going up from 43.04 to 45.56. Students' overall affect scores toward the environment also went up, with EVST majors scoring higher than their counterparts on affect in the posttest than their peers.

Overall, the mean posttest scores were significantly higher than the mean pretest scores for the CHEAKS constructs. The overall CHEAKS mean scores went up for the class 104.96 to 107.08 after the intervention, indicating that at least to an extent in the short term, the intervention had an impact on students' affective feelings toward the environment and/or their intentions to engage in ERB and/or actual behavior as measured by the three respective constructs of the CHEAKS.

The mean scores for the CHEAKS Affect construct were significantly higher than the mean scores for both CHEAKS verbal commitment and actual commitment In other words, students were more likely to care about the environment overall than they were to verbally commit or actually commit to doing something to help it in the pre- and posttest administrations. This finding also demonstrates that at least within this population, the majority of folks do care about the environment, some more than others (even if they don't consciously engage in ERB).

Interestingly, the CHEAKS actual commitment construct means were significantly higher than the mean scores for the CHEAKS verbal commitment construct. In essence, students were more likely to self-report actively engaging in certain kinds of ERB (e.g., carpooling, recycling, reducing water use) than they were to verbally commit to doing so

in the future. This result could be the result of social desirability bias or it could be this particular sample, educated college students, many of whom are science or environmental studies majors, are just more likely to engage in ERB than the majority of the population.

From pretest to posttest, the mean scores for actual commitment went up for both males and females. For females, verbal commitment also went up slightly. However, verbal commitment went down slightly for males.

Gender

Males and females had significantly different scores on all three constructs of the CHEAKS, but scores were parallel across administrations. In other words, although there may be differences across individual items, there was no significant difference between means overall. Although females' mean scores were higher than males in both the pre- and posttests in terms of actual commitment and affect, the main effect of gender was not statistically significant.

Males scored slightly higher than females in the CHEAKS construct of Verbal Commitment, while females had slightly higher mean scores than males in the remaining CHEAKS constructs, Actual Commitment and Affect. In other words, in this sample females were more likely than males to report caring about the environment and engaging in ERB. They were also more likely to engage in ERB than verbally commit to it.

Past researchers have theorized that women typically score higher on environmental measures because of some innate or essential biological tendency to mother or nurture or empathize. Of course, this sort of essentialism is criticized as archaic and inappropriate, but perhaps it is worth at least a nod as we attempt to understand more about what impact gender might have on pro-environmental tendencies and behaviors.

Grade Level

Seniors scored higher than other grade levels in pretest and posttest administrations of almost all of the three CHEAKS constructs, but the main effect of grade level was not statistically significant. Seniors and participants in other grade levels had significantly different scores across the three constructs, but scores were parallel across pretest and posttest administrations. A closer examination of the plots for individual scale items helps interpret these findings.

It appears that seniors were already engaged in more pro-environmental behaviors than other majors at the time of the pretest. At the time of the posttest, students of other grade levels reported engaging in several environmentally friendly behaviors that they were not engaged in prior to the class. Interestingly, at the time of the pretest, seniors were less likely to want to give money to environmental groups. And most students seemed less likely to give up air conditioning.

The interaction between grade level and constructs had a significant effect on the mean scores, but the interaction between grade level and pretest/posttest administration was not significant. Put another way, the class itself may have not made a difference in the scores; rather the difference may have been explained by the grade level itself.

Major

The main effect of major was statistically significant. The mean scores for environmental studies majors were significantly higher than mean scores of participants majoring in other subjects. In other words, EVST majors scored higher overall on the CHEAKS.

CHEAKS mean pretest scores appear to be higher than mean posttest scores for

the Verbal Commitment construct for EVST majors. One way to interpret this finding is that as the verbal commitment went down for EVST students, they moved more toward actual behavior. The means for actual commitment to ERB and affect (i.e., students admitting caring about the environment) also increased in the posttest. Although these findings may be the result of social desirability bias, because these findings are all based on self-report, the class may have also actually made a difference. Based on the decrease in verbal commitment and the increase in actual commitment from pre- to posttest, the class may have acted as a catalyst or mobilizing mechanism for EVST majors to engage in ERB moving from awareness to intentions to actual behavior. The intervention also might have helped students move through the process of behavioral change during (or as a result of the class). Future research should follow up and explore the impact such EE interventions can have on movement membership, maintenance, and mobilization.

Did the Course Have an Influence on Students?

The scores for the CIS1 Instructor Influence construct were significantly higher than scores for both CIS1 Peer Influence and CIS1 Content Influence constructs. These findings indicate that instructor influence was significantly and substantively experienced more by the respondents than either peer or content influence.

Mean pretest scores were lower than mean posttest scores in the CIS1 constructs of Peer Influence and Content Influence. In other words, some students perceived peers and content as more influential after the intervention. This could be evidence that students started to trust their peers as sources of knowledge. It is also

possible that some students perceived the environmental content of the class as more influential than the other elements of the class.

Although not statistically significant, the mean pretest scores were higher than mean posttest scores in the remaining CIS1 construct of Instructor Influence. In other words, students seemed to perceive the instructor as having more influence at the time of the pretest than at the time of the posttest.

These findings also corroborate the qualitative findings. More specifically, qualitative coding indicated that teaching presence gradually decreased as the class moved forward. Likewise, students perceived the instructor as having a greater impact at the time of the pretest than at the time of the posttest, further indicating a decrease in teaching presence /influence over time.

Gender

Although females had consistently higher mean scores than males in both pre-test and posttest administrations across all constructs of the CIS1, the main effect of gender was not statistically significant. Given the tech-savvy age of most the participants, this finding is not surprising. Many young people today, both men and women, are keen to being a part of virtual communities and perhaps may not experience many of the technological barriers or learning curves that can impact someone's experience of virtual community. Moreover, this age group may more quickly gravitate toward the center when it comes to communicating online. Future research with larger samples should further explore other variables such as age, digital literacy, and political affiliation in relation to people's sense of virtual community.

The mean scores for males and females were the highest for the instructor influence component of the CIS1, indicating that both males and females saw the instructor as the aspect of the class with the most influence. This findings corroborate the findings of the CoI; more specifically, of the three components of the scale, teaching presence had the highest mean for both male and females across administrations.

Females seemed to perceive their instructor, peers, and course content as more influential than males. One potential reason for the difference between mean scores of males and females on the CIS1 in terms of instructor influence may have to do with the perceived similarity or relatability of me as the instructor. More specifically, since I am a female, females in the class may find me more relatable, and hence listen to and are more readily influenced by my teaching presence and the content of the class.

Grade Level

Although seniors had consistently higher mean scores than participants in other grade levels in both pretest and posttest administrations across all constructs of the CIS1, the main effect of grade level was not statistically significant.

Major

Although not statistically significant, the mean posttest scores of the CIS1 were higher than mean pretest scores for environmental studies majors. Conversely, mean pretest scores of the CIS1 were higher than mean posttest scores for participants with other majors. Therefore, it seems that some participants of other majors saw the class

as more influential at the time of the pretest and EVST majors saw the class as more influential at the time of the posttest. This result could point to the fact that EVST students find content related to their own field more interesting, engaging, and hence more influential. It could also mean that non-EVST majors were less influenced by the environmental content in the class.

For EVST majors, mean scores appear slightly higher in the CIS1 construct of Instructor Influence when compared to the other CIS1 constructs. In other words, EVST seemed more influenced by the instructor than other majors. These results are similar to the results from the CoI in that EVST majors experienced teaching presence more than any other major. Again, there may be something about the similarity of values of EVST majors and the instructor that made teaching presence resonate more for EVST majors. This finding relates to the relationship between gender and CoI (i.e., females' means score for teaching presence were higher than males perhaps because they could relate to me as a teacher). Perhaps EVST majors related to me since I was teaching a class with an environmental component and students perceived me as a kindred spirit or at least as sharing a similar sort of environmental ethos with them.

Does the Course Have an Influence on Information Seeking, Sharing, and Willingness to Communicate With Others?

The mean scores of the researcher created CIS2 Course Information scale indicate that students were willing to seek or share information and talk to others in both the pretest and posttest. The mean scores for all CIS2 constructs decreased from

pretest to posttest, although there was not a significant change across administrations. With mean scores on all constructs of the CIS2 ranging from 3.23 to 3.7, it appeared that at least to some extent there were students engaging in information seeking and sharing activities while in the class. The extent to which the class actually influenced that cannot be determined through my analyses. Despite a slight decrease in the overall mean scores from pre to post, it appears that students were willing to engage in all three aspects of the information scale.

Mean scores for the CIS2 Willingness to Communicate Information construct were significantly higher than mean scores for both CIS2 Seeking Information and CIS2 Sharing Information constructs. In all pre- and posttest administrations, means for willingness to communicate were higher than seeking or sharing information for both environmental studies majors and participants in other majors. In other words, students were more likely to report being willing to communicate with others than they would be to seek out or share information. Additionally, students perceived themselves as more willing to seek out information than share information. Mean scores for the CIS2 Seeking Information construct were significantly higher than mean scores for the CIS2 Sharing Information construct.

Gender

Males and females had significantly different pretest and posttest scores across the three constructs. Although males almost always had higher mean scores than females in both pretest and posttest administrations across all constructs, the main effect of gender was not statistically significant. However, mean scores indicate males in the class may

have felt more willing to talk to others about class content, as well as seek and share information with others than females.

The plot of the estimated marginal means for the CIS2: Seeking Information construct indicates a slight peak in female pretest scores for item 2 (i.e., seeking information about health) while male pretest scores were consistent for the first (i.e., seeking information about science) and second items and dropped slightly for the third item (i.e., seeking information about the environment). These results indicate that women may have been more likely to seek out health information at the time of the pretest (which occurred right after the health portion of the class) just prior to the pretest administration). Moreover, men seemed less likely to seek out environmental information than women. Similar results were found in the plot of the estimated marginal means for the CIS2: Sharing Information, in which mean scores for males were consistent across the first three items and dropped slightly for item 4 (i.e., sharing information about science).

When it came to being willing to communicate with others, the plot of estimated marginal means for CIS2 indicates consistency of position across the items of the administrations for both males and females. In other words, there was no significant difference between the means of males and females where being willing to talk to others is concerned. However, the means for willingness to share information were higher for men than women in the pretest and the posttest. Moreover, the means for men went up and the means for women went down from pretest to posttest.

These findings are particularly intriguing when juxtaposed with the findings from the CIS1. More specifically, in the CIS1, females' mean scores were higher than

male scores when it came to the influence they perceived the class or one of its components having on them; however, it is men in this sample who may be more willing to exert influence beyond the class themselves (i.e., by talking to others). It could also be that during the pretest, just after the health content, women believed they would be willing to talk to others about issues pertaining to health. However, women may have less willingness to talk to others about environmental issues at the time of the posttest, just after the environmental content of the class. Moreover, it could be men feel more comfortable than women talking about environmental issues than women. The possibility that females are not as likely as males to talk to other, environmental issue notwithstanding is worth future exploration.

Grade

Mean scores for seniors were very similar to mean scores for participants in other grade levels in both pretest and posttest administrations across all CIS2 constructs. The main effect of grade level was not statistically significant. Although not statistically significant, seniors' means were higher on every construct of the CIS2 except the posttest means score sharing information when students of other majors' means for sharing information was higher than seniors.

All constructs means of CIS2 decreased from pretest to posttest administrations except for the willingness of other majors to share information, which increased from pre- to posttest slightly. Furthermore, mean scores for the CIS2 Seeking Information construct were significantly higher than mean scores for the CIS2 Sharing Information construct. These findings indicate that students self-reported being willing to communicate

information more so than seeking or sharing information. Perhaps because the last part of the class covered environmental content possibly not familiar to those in lower grades, students were more likely to share what they had learned after the class.

CHAPTER 5

IMPLICATIONS, LIMITATIONS, FUTURE RESEARCH, AND PRACTICAL ADVICE

This dissertation explored the impact participation in an Online Learning Community (OLC) can have on the following: a) environmental attitudes and behaviors, b) information seeking and sharing tendencies, and c) overall student satisfaction with online courses. In Chapter 1, I explained the impetus for my study and reviewed the literature relevant for carrying it out. I discussed what an Online Learning Community (OLC) is, how one forms, and how to go about measuring its success. I identified three typologies or ways we can examine the communicative processes of OLCs: 1) types of online interaction, 2) types of online presence, and 3) spirit, trust, learning, and interaction.

I also unpacked the notion of Third Space: an ideal, nonconventional (online) space that simultaneously helps form and is formed by a group's sense of community. I argued that the creation of Third Spaces in online classes may help enhance the sense of community experienced by students. Then, I gave a sense of how to go about measuring the success of OLCs particularly in the context of Environmental Education (EE) interventions. Based on my review of the literature, I proposed the current study and also laid out my Research Questions.

RQ 1: Does an OLC appear to form in COMM 2004?

RQ 2: To what extent does COMM 2004 embody qualities of a Third Space?

RQ 3: To what extent does participation in COMM 2004 affect participants environmental attitudes and behaviors?

RQ 4: To what extent does participation in COMM 2004 seem to influence participants?

RQ 5: How does participation in COMM 2004 affect the students' desire to seek out and share information?

RQ 6: Is there a relationship between participation in an OLC and students' overall satisfaction with COMM 2004?

These research questions were investigated using an exploratory multimethod case study approach, which I described in Chapter 2. I used both qualitative and quantitative data collections. In terms of qualitative data, I analyzed discussion board posts, email reminders, course documents, and field notes. I incorporated both a priori and emergent codes. Then, I used NVivo software to code and thematize my data.

My quantitative data set was comprised of several previously used scales including the CHEAKS (Children's Environmental Attitudes and Knowledge Scale), NEP (New Ecological Paradigm), CoI (Community of Inquiry), and SOVC (Sense of Virtual Community). I developed an additional scale called the Course Influence Scale (CIS), which I piloted in this study. These data were collected in pre/post administrations and analyzed in General Linear Model repeated measures designs.

In this chapter, I first provide a synopsis of the findings from the quantitative and qualitative data over the topics of community, Third Space, change in environmental attitudes and behaviors, course influence, and satisfaction with the course. Second, I discuss the significance and implications of the research findings. Third, I explain the limitations

of the current study and make recommendations for future research. Fourth, I offer some practical advice for future instructors and finally conclude.

Summary of Findings From Qualitative and Quantitative Data

Community

Qualitative Data

There is qualitative evidence to suggest that a community formed and was maintained throughout the semester in COMM 2004. First, there was evidence of four types of presence: social, cognitive, teaching, and learner. The highest frequency of online presence occurred in the first third of the class.

As teaching presence decreased, learner presence leveled off and remained consistent. There was an eventual shift in communicative work from the instructor to the students, and the students began to take on some of the roles initially carried out by the instructor. There was an additional spike for social presence/trust experienced in part two of the class seemingly as a result of self-disclosure during DBs about health issues. Students shared comments about their own health tendencies, researched and discussed health causes, and gave recommendations of alternative treatments to western medicine.

The membership process of the class resembled a revised version of Tuckman's (1965) small group model with modifications unique to the class. During the first week or so, there was a forming stage where students filled out icebreaker profiles, talked more about themselves, set goals for the class, and established their positions as members

of the community. During the same period, I set the tone for the class by using course documents and modeling feedback and netiquette on the discussion board (DB). Shortly after this introduction/socialization phase, during weeks 2 and 3 of the class, there was a storming/norming phase wherein students began to move away from icebreaking activities and engage in more debating and disagreeing. These storming activities decreased just prior to the start of health content in the class.

In addition to the forming, storming, and norming that occurred in COMM 2004, there were two additional periods of renewal and maintenance, two opportunities to "perform" in small group projects and a transformation stage that occurred in the last part of the class. During this final stage, students self-disclosed the extent to which the class influenced their perceptions and their information seeking/sharing tendencies. Some students also reported becoming more environmentally aware and either verbally committed to doing more ERB or self-reported already engaging in actual ERB during this transformation stage.

Students found they identified with others in the class. This tendency toward similarity or likeness spiked in part 1 of the class, and manifested throughout the class. There was also an initial tendency toward agreement. As a result, over time, multiple subcommunities formed. For example, students related to others as college students, U.S. citizens, scientists, and nonscientists as well citizens of the world.

There was evidence during the small group team work process as well as in the ice breaker assignment that students began to consider the needs of others in the class. For example, students asked other people when they preferred to meet, if certain options would work for them, and expressed the desire to find topic choices everyone in the

group could feel passionate about. It appeared many of the groups experienced the synergy of working in groups online.

The small group process was not positive for everyone, however. There is qualitative evidence to suggest that some people disdained online group work and experienced difficulty navigating the experience. In turn, although small group work may have enhanced the sense of community for many in the class, it also may have impaired the sense of community for others.

There was also evidence the students' sense of "we" increased over time. Initially, I was the one who referred to the collective "we" the most. Most of these attempts were in the first few weeks of the class when I was drawing in participants and setting the tone of the class.

I referred to the collective we less frequently as the class moved forward while students referred to it increasingly more. In the last third of the class, students reported identifying as being a part of a larger, grander collective "we" more so than any other part of the class. Many of them identified not only as part of a collective "we" that causes environmental problems, but they also identified as part of a collective "we" who can be part of the solution.

There also seemed to be concern for the collective "we" in terms of health. Students gave advice to each other about living a healthier lifestyle, encouraged their peers' voices to be heard when interacting with doctors, and made recommendations for pharmaceutical drugs they researched. The concern of some students extended beyond their own individual health, to also include the global health of the world.

Quantitative Data

Quantitative data corroborated that a community formed and was maintained in COMM 2004. Means from both scales used to examine community, the CoI and the SOVC, indicated there was a sense of community experienced by participants across administrations. There were no significant changes in means from pre- to posttest on either scale, further indicating that feelings of community were consistent over time.

While the means for the CoI went down slightly from pre- to posttest, the SOVC went up slightly.

CoI

Mean scores for the CoI Teaching Presence construct were significantly higher than mean scores for both the CoI Social Presence and CoI Cognitive Presence constructs. These findings indicate that teaching presence was significantly and substantively experienced more by the respondents than either social or cognitive presence. This finding supports past research claims that Teaching Presence may be the most important type of presence in an online community (Garrison et al., 2002). It could also point to the power dynamics that are at play between instructor and student.

Grade. Seniors seemed to experience community more than students in other grade levels. The CoI mean scores were significantly different for seniors as compared to participants in other grade levels. Seniors had significantly higher pretest and posttest mean scores than participants in other grade levels when it came to measures of community. Seniors may have had more advanced knowledge and skills (e.g., writing, discussing, working in groups, navigating Blackboard) that made COMM 2004 more

manageable and easier to enjoy. It also may have been more difficult for underclassmen to assimilate into the community if they had less experience in the type of discussion-based/group project-based/online class that COMM 2004 was. Therefore, administrators may want to consider classes such as COMM 2004 more appropriate for upper grade levels and/or do more to help students in lower grade levels to assimilate.

Major. Environmental Studies (EVST) majors experienced teaching presence significantly more than they did social or cognitive presence. Additionally, after the intervention, EVST majors reported significantly higher social presence means (i.e., they experienced more community) than participants in other grade levels. Combined, these findings suggest that EVST majors may have been less cognitively and socially engaged in the class when compared to their peers overall, but they were likely more socially engaged than their peers after the intervention.

SOVC

The overall mean scores were high across administrations on the SOVC, going up slightly post intervention. These findings indicate that virtual sense of community may have increased over time for some students even when their overall sense of community (tapped by the CoI) went down slightly. These results further suggest that although there is overlap in what each scale measures (i.e., community), the SOVC might be capturing the difference experiencing community in a virtual/mediated environment can make. For example, it may take students who are less familiar navigating the Blackboard site more time to experience community virtually (even though they may experience various types of online presence throughout the class). Moreover, it could be that lack of experience in

online classes can impede the overall experience of community. This supports the argument of Preece (2001) and others that the online interface should be an element of interaction that is studied, considered and developed to help the formation of OLCs. Future research may also want to include some sort of "comfortability scale" to tap into the extent to which students feel competent in the sites that house their online classes.

The only demographic variable that seemed to interact with the SOVC measure was grade level. Similar to the findings of the CoI, seniors seemed to feel more a sense of virtual community than other grade levels. Mean scores for the SOVC instrument were significantly higher for seniors than for participants in other grade levels. SOVC outcomes did not seem affected by major or gender.

Third Space

There was qualitative evidence to suggest that while COMM 2004 exhibited some of the Third Space characteristics outlined by Davies (2006), it failed to exhibit others. In terms of the Third Space qualities COMM 2004 actually exhibited, there were four primary characteristics: a) interactivity and collaboration; b) new content generation; c) porous leadership (i.e., different students/majors seemed to be leaders each week depending on the topic); d) social/enjoyable/playful learning.

There were some notable absences of Third Space qualities, which made COMM 2004 a less than ideal Third Space. First, although there were multiple choices for DB assignments each week, the two main ways students expressed their status were through DB assignments and the creation of new content; there were no other public ways to express one's status in the class. Second, there was a minimal amount of upward communication with the

instructor during the class, suggesting that novices and experts may not have been on the same level or there may have been a power imbalance between students and instructor.

This possibility seems more likely when viewed in conjunction with quantitative findings that teaching presence seemed to be felt more than any other type of presence. It is possible that the presence or power of the instructor likely has a big influence on how one's status is conferred, leadership is enacted, and knowledge is distributed in classes. There arguably need to be other opportunities to perform status in online classes (e.g., visually, creatively). Perhaps just as important, classroom interventions could benefit from additional critical self-reflexivity on the part of instructors to critique potential power imbalances that impact the learning process.

Similar to the results from the qualitative coding for community, the highest point for Third Space coding was in the first part of the class and leveled off in the second and third parts of the class. This finding suggests there is much (communicative) work that goes into the initial building of a Third Space.

Change in Environmental Attitudes and Behaviors

Qualitative Evidence

Interaction with peers (and me) during DB posts, small groups assignments and DB prompts themselves seemed to help trigger moments of self-reflection, heuristic processing, and critical thinking, which led to intentions to engage in (or actual engagement in) ERB. Particularly during the last third of the class, students expressed desires to change their own or others' thinking in terms of environmental behaviors and carbon footprints. Students also expressed intentions to do more for the environment and/or

shared what they were already doing to help the environment.

There also appeared to be more overall awareness about environmental issues. This is an area not originally anticipated in the initial research process. In total, there were 96 instances in the last section of the class when students admitted previous ignorance about the existence of various environmental problems. There is additional evidence to suggest the actual process of carrying out the group projects and reading other people's group projects helped generate awareness about and concern for environmental issues.

Quantitative Evidence

NEP

Pretest scores were significantly different from NEP posttest scores. More specifically, the mean scores for the NEP went up on both the balance and human domination constructs from pre- to posttest. This finding can be interpreted as students in the class more strongly believing after the intervention that there should be environmental balance and students being less likely to think humans should be dominating or abusing the earth.

Gender. Females had consistently higher mean scores across all items, supporting previous research on the NEP. Although males and females scored higher similarly on posttest NEP Balance items, there was more variation between the two genders on pretest NEP Balance items. Put another way, although females may have initially had higher NEP scores than males in the pretest, after the intervention, males' means went up and the gap between males' and females' mean scores became smaller. Additionally, mean scores for males and females moved in a similar fashion for both pretest and posttest administrations for the NEP Human Domination construct; both male and female means increased between administrations.

Grade. Although the overall means for balance and human domination went up for both seniors and nonseniors, seniors had significantly higher mean pretest and posttest scores for the NEP constructs compared with participants in other grade levels. One way to interpret this finding is that seniors may be more likely to think we face ecological disaster than students in other grades, particularly prior to the intervention. Put another way, prior to the intervention, students who were not seniors were less likely to think that we would soon face a major ecological tragedy. After the class, however, students in other grade levels were more likely to think we will face ecological disaster if humans do not do more to protect the environment.

Major. Perhaps not surprisingly, EVST majors scored significantly higher on the NEP than other majors across administrations. In addition, EVST majors' pro- environmental attitudes and worldviews appeared to be galvanized by the class when compared to other majors, with means of EVST majors significantly higher than other majors during the posttest.

The CHEAKS

Overall, the mean posttest scores were significantly higher than the mean pretest scores for the CHEAKS constructs. The overall CHEAKS mean scores went up for the class 104.96 to 107.08. Means for the constructs Affect toward the environment and Actual commitment to do more for the environment went up from pretest to posttest.

Contrastingly, Verbal Commitment went down from pre- to posttest. Based on these findings, it is possible the class helped some students move from verbal commitment to actual commitment.

The mean scores for the CHEAKS Affect construct were significantly higher than the mean scores for both CHEAKS verbal commitment and actual commitment. One way to interpret this finding is that this population generally seemed to care about the environment. Additionally, students were more likely to care about the environment overall than they were to verbally commit or actually commit to doing something to help it. If we are to interpret these findings in the context of broader human behavior, they make sense. More specifically, it is arguably far easier for someone to experience affect and care about something than it is to form intentions to act or actually engage in behaviors.

The CHEAKS Actual Commitment construct means were significantly higher than the mean scores for the CHEAKS Verbal Commitment construct. In essence, students were more likely to self-report actively engaging in certain kinds of ERB than intending to do so. Of course, social desirability bias was possible in these findings and is common for environmental measures. There were also some behaviors students in this sample seemed likely to engage in more than others. For example, students were more likely to do more to reduce their water usage than use less air-conditioning or take public transit.

Gender. Females' mean scores were higher than males in both the pre- and posttests in terms of Actual Commitment and Affect, but the main effect of gender was not statistically significant. From pretest to posttest, the mean scores for Actual Commitment went up for both males and females. For females, Verbal Commitment also went up slightly in the posttest. For males, Verbal Commitment went down slightly in the posttest.

Grade. Seniors scored higher than other grade levels in pretest and posttest administrations of almost all of the three CHEAKS constructs, but the main effect of grade level was not statistically significant. Seniors were also already engaged in more

pro-environmental behaviors than other majors at the time of the pretest. After the intervention, students in other grade levels reported engaging in several environmentally-friendly behaviors that they were not doing prior to the class.

Major. EVST majors scored significantly higher than their counterparts on the Affect construct of the CHEAKS in the posttest. Similar to the results of the NEP, this finding suggests that the experience of COMM 2004 may have helped galvanize the emotions/feelings/attitudes of those who already had pro-environmental tendencies in the class.

Evidence of Course Influence

Qualitative Evidence

There are several pieces of qualitative evidence that suggest some students were influenced by the class, the instructor, the content, and their peers. There is also evidence that students themselves attempted to exert influence while in the class. The highest frequency of codes for influence occurred for information seeking/sharing (n = 64) and peer influence (n = 56), with frequencies for each of these codes decreasing in the second part of class and leveling out in the third. "Other influence" emerged in part 2 as students shared about people in their lives (e.g., parents, relatives, and friends) who had an impact on their health behaviors.

There were also instances when students attempted exerting influence on their peers during the DBs. First, students indicated that they were taking the advice of a peer to be more vocal with their own doctors, try a new movie or restaurant. Second, peers' posts triggered people to look up additional information, do their own research, and brainstorm solutions to problems. Third, peers also seemed to influence people's intentions to engage in

more environmentally responsible behavior, including buying/trying more green products.

Over time, students were more likely to give advice/make suggestions and incite action than they were initially in the class. High points for all these behaviors occurred in the second and third parts of the class, respectively.

In Part 3 of the class, codes for course influence spiked (n = 63), coinciding with the point in the class when students were asked to reflect on their experience in the course and asked specifically what the class had done for them (i.e., what influence did the course have on you?). Responses to this question helped mark the "transformation phase" when several students disclosed that the class actually had an impact on them in some way, and they admitted they were planning on sharing or had already shared what they learned in the class with others.

In terms of the influence the class had on students' information seeking and sharing tendencies, students self-reported talking to others (or feeling more comfortable talking to others) about health and environmental topics as a result of the class. Some students also reported being more likely to check out blogs for science and health information reportedly as a result of what they experienced and were exposed to in COMM 2004.

Quantitative Evidence

CIS1

Means for the three constructs of CIS1 during the pretest ranged from 3.90-4.24 on a 5-point scale. During the posttest, means on the three constructs ranged from 3.89 to 4.10. An examination of these means suggests the means for the CIS1 were very high to begin with when the pretest was administered. Consequently, it appeared there were students who

perceived various aspects of the class as having an influence on them across administrations.

The means for Instructor Influence were higher at the time of the pretest than at the time of the posttest. Some students may have seen the instructor as more influential during the first part of the class than the latter part of the class. This finding parallels the qualitative evidence that instances of teaching presence decreased over time.

The scores for the CIS1 Instructor Influence construct were significantly higher than scores for both CIS1 Peer Influence and CIS1 Content Influence constructs. In other words, despite a slight decrease on means for Instructor Influence over time, the instructor may have still been perceived as the most influential part of the class when compared to the actual content and peers in the class. These findings corroborate the qualitative and quantitative findings regarding Teaching Presence as well.

The mean pretest scores for the CIS1 were lower than mean posttest scores in the CIS1 constructs of Peer Influence and Content Influence. In other words, some students likely perceived their peers and course content as more influential after the intervention. This could be evidence that students started to trust their peers as sources of knowledge. It is also possible that some students perceived the environmental content of the class as more influential than the other elements of the class.

Gender. Females had consistently higher mean scores than males in both pretest and posttest administrations across all constructs of the CIS1. Females were more likely to perceive their instructor, peers, and course content as more influential than males. The mean scores for the instructor influence component of the CIS1 were the highest of the three concepts, indicating that both males and females saw the instructor as the aspect of the class with the most influence.

Grade. Seniors had consistently higher mean scores than participants in other grade levels in both pretest and posttest administrations across all constructs of the CIS1. As with the findings from the CoI, it is possible that seniors may have more readily experienced influence than other grade levels.

Major. EVST majors had higher means for the CIS1 during the posttest; all other majors had higher means for the CIS1 during the pretest; EVST majors may have seen the course as more influential compared to other majors. The instructor appeared to be the most influential element.

CIS2

In spite of the slight regression of means, the overall strength of the means suggest information seeking and sharing activities. The extent to which the class directly impacted these behaviors, however, cannot be determined.

Mean scores for the CIS2 Willingness to Communicate Information construct were significantly higher than mean scores for both CIS2 Seeking Information and CIS2 Sharing Information constructs. Students were more likely to report being willing to talk to others than they were to seek out or share information. Similarly, mean scores for the CIS2 Seeking Information construct were significantly higher than mean scores for the CIS2 Sharing Information construct. Students reported being more likely to seek information than share information.

Gender. Males almost always had higher mean scores than females in both pretest and posttest administrations across all constructs of the CIS2, but the main effect of gender was not statistically significant. Based on the higher mean scores of males in this sample, males in

COMM 2004 may have felt more willing to talk to others about class content than females. In addition, males' means for Willingness to share information went up from pre- to posttest while the means for females went down, indicating that males may have also been more likely than females to share information post-intervention.

Females also reported seeking health information more during the pretest compared to males. Conversely, males were less likely than females in the posttest to seek out environmental information.

Grade. Mean scores for seniors were very similar to mean scores for participants in other grade levels in both pretest and posttest administrations across all CIS2 constructs. In the posttest, however, means suggested students of other grades were more likely to share information than seniors. It is possible that because underclassmen were less familiar with environmental issue prior to the class that they were more likely to spread their new-found knowledge after the class. There could also be other reasons why seniors in this course were less likely to share information.

Course Satisfaction

This analysis suggests that students who experience being a part of a community also enjoyed and would recommend the class to their peers. There also appears to be a relationship between the influence students perceive their instructor, peer, and class content having on them and their overall rating of the class. Students who enjoy the class may also be more likely to seek out new information and verbally commit to engaging in pro-environmental behaviors.

Significance of Findings

Community

Community, and the extent to which students experience it, could be an important contributing factor to overall class satisfaction. In this class, students who experienced high levels of community also rated the class high on the NPS. We should learn more about how we can build OLCs effectively to increase student satisfaction, create the most positive learning environment, and increase positive word of mouth about our classes. We should also consider incorporating more widespread use of the NPS in our course evaluations. It is a trusted tool that can help educators tweak and adjust courses based on its outcomes, particularly when used in conjunction with other data in mixed methods research. The NPS could also potentially help us get better at understanding what elements of our classes (or lack thereof) make students more likely to recommend them to others.

Environmental Attitudes and Behaviors

At least in the short term, it appears that COMM 2004 had an impact on students' perceptions of the relationship between humans and the environment and the extent to which environmental degradation is a problem. There is evidence to suggest the class encouraged students to consider and actually engage in environmental behaviors that perhaps they were not engaging in before the class. Because the NEP has been designated as a tool for measuring both environmental attitudes and environmental worldviews, it is possible that the findings from this dissertation indicate that COMM 2004 results in some play and shifting in people's environmental worldviews.

The Course Influence Scale (The CIS1) and The Course Information Scale (CIS2)

Ultimately, the CIS helped corroborate the findings of the CoI. The construct teaching presence of the CoI and the construct instructor influence in the CIS behaved very similarly across administrations. Furthermore, the CIS had strong reliabilities and shows promise as an evaluation tool for online classes in general and environmental education (EE) interventions more specifically. Future research should continue to experiment with and test the CIS.

Community could play a part in students' overall perceptions of course influence. Similar courses may have the ability to influence students' information seeking and sharing tendencies, promoting classroom agendas beyond the walls of the university.

Gender

There could be important relationships between gender and one's environmental ideology, affective feelings toward the environment, verbal commitment to the environment, and willingness to engage in ERB. Females may be more willing to seek out environmental information, but males might be more willing to broadcast it and communicate about it to others. Women may be important influencers, but are not voicing their opinions as strongly or often as men. The impact of gender should be further explored and used to develop environmental (and health) education appeals and campaigns. Opportunities for young people—perhaps women in particular— to get their voices heard and feel confident voicing their opinions regarding health and environmental issues should be investigated.

Grade Level

Seniors could be important role models and resources for building OLCs. Seniors in this class more readily experienced community as evidenced by results of the CoI and corroborated by the SOVC. Future research should explore three potential possibilities: a) deploying seniors strategically as role models and playing various other roles in OLCs, b) using COMM 2004-type classes in upper division classrooms and c) more effectively integrating and preparing underclassman for group project-based/discussion-based OLCs.

There could be an important relationship between someone's grade level and their awareness of environmental problems and willingness to commit to or engage in ERB. Seniors seemed to be in engaging in more ERB at the time of the pretest than students in other grade levels. Therefore, seniors could be important role models and resources for promoting responsible environmental behaviors and essentially become environmental "brand ambassadors."

Students in this sample seemed willing to engage in some ERB more than others. Future research should explore what groups of people are willing to engage in what types of ERB and strategically communicate with them accordingly.

Major

Classes like COMM 2004 may be important opportunities for galvanizing and mobilizing individuals who already have strong pro-environmental tendencies. Compared to other majors, EVST majors scored higher on environmental measures. More importantly, after the intervention, the mean scores for EVST majors' NEP scores, affection toward the environment and actual pro-environmental behaviors increased and were

significantly higher than other majors. Courses like COMM 2004 may help motivate those who already care about the environment to do more to protect it.

Opportunities for EVST majors to collaborate with peers in their area of expertise to solve problems may help further galvanize students and promote community. The last third of the class seemed to be particularly important for impacting the sense of community EVST majors felt in the class.

Utility of the Measures Used in This Study

Community of Inquiry (CoI) and SOVC

(Sense of Virtual Community)

The CoI and SOVC were both helpful measures to understand more about community in the online version of COMM 2004. The CoI was useful for teasing out different types of presence that occur in communities (both in persona and online), which also helped explain and corroborate the coding from the qualitative data. At the same time, the findings from the SOVC helped strengthen the findings from the CoI. More specifically, the means for the SOVC and the CoI behaved similarly in that both were high in the pre- and posttests.

Although means were high for both scales, the means for SOVC measure went slightly up in the posttest and means for the CoI went slightly down. Additionally, upperclassman had higher SOVC means than underclassmen. These findings suggests, as previous researchers have also suggested, that the SOVC may be capturing something slightly different than the CoI, or can better tease out some of the nuances of online communities. It is also possible that students further along in the higher education process

may more readily experience community virtually. Future research should continue to use both scales in tandem.

NEP (New Environmental Paradigm) and CHEAKS (Children's Environmental Attitudes and Knowledge Scale)

In past research as well as in the current study, the NEP proved a consistently reliable measure for tapping into environmental attitudes and worldviews. It was good to couple it with the CHEAKS, a less studied scale. In essence, it helped me trust the findings from the CHEAKS more. The results from the CHEAKS and NEP were similar with EVST majors scoring higher on most factors than their counterparts.

The CHEAKS scale was helpful for its ability to tease out all three—attitudes, emotions, and behaviors—in one scale. I was able to see that some folks in the class were willing to engage in certain environmental behaviors more so than others (e.g., carpooling versus public transit). It also provided quantitative evidence that context (e.g., the season of the year) plays a role in commitment to and engagement in pro- environmental behaviors with some college students from this sample being more likely to engage in certain pro-environmental behaviors during different parts of the year (e.g., air conditioning).

At the same time, the CHEAKS was originally designed for grade school children, not college students. The wording and images evoked by the instrument may not be the most appropriate for a college audience and make need to be tweaked. Moreover, new scales should be developed which also can capture multiple factors and is tailored to the higher education audience (online).

NPS (Net Promoter Score)

It was valuable to see how the NPS correlated with other measures used in this study. For example, those who experienced high levels of community also scored higher on the NPS. This finding gives credence to the argument that we must do more in online classes to build community. If students are more likely to enjoy and recommend a class when they experience community, why would there not be a concerted effort made to build community? For the findings of the NPS to be more meaningful, however, future studies of similar higher education courses should be done using the NPS so that comparisons can be made and results can be used for the purposes of strategic planning and curriculum development.

Third Space

Examining COMM 2004 as a Third Space was advantageous for me as an instructor to help me remain critically reflexive about my own role in the classroom. It helped me develop a framework to guide the way I designed the classroom, but its elements also served as a helpful checklist or auditing process of my own teaching so I can see my strengths, deficiencies, and ways to improve.

Implications for Methods

This is a helpful case study for how to go about using multiple methods to evaluate online environmental education interventions. It was certainly messy, cumbersome, and time consuming but, it painted a vivid picture of the potential impacts a course such as COMM 2004 could have on students' overall satisfaction with their

course, perceptions of community, and tendency toward pro-environmental attitudes and behavior. This type of work should continue, and may be strengthened with team teaching/researching.

Limitations

There are several limitations to this study. First, it is one case that is not replicable. The sample size was small and affected the extent to which findings can be generalized. Because every class is unique in how it proceeds, these findings should be seen as the beginning of our exploration into how OLCs can impact pro-environmental outcomes of students. More research should be done to move beyond a single case study so theory and best practices can be derived.

Second, interactions and self-report data are not actual behaviors themselves. There is no way to know if the students' claims to intend to engage in ERB or actual ERB are true or will come to fruition. Students may have felt pressure to answer a certain way due to their position as students of the principal investigator in the class. There is also a tendency to answer more positively when it comes to environmental measures in general; therefore, social desirability bias was possible.

Third, the timing of the pretest during week 9 affected the extent to which I could see differences between pre- and posttest. Future research could include an additional pretest/earlier pretest. Alternately, there could be an additional posttest sometime after the intervention. The study would also benefit from a control group to better understand how the outcomes of these online pedagogical techniques compare to what unfolds in a traditional classroom.

Fourth, participants may have experienced exhaustion when filling out the survey since there were so many questions being asked. Considering strategies that might have ameliorated this problem would have been appropriate.

Future Research

There are several ways this study can be extended. First, we need additional in- depth qualitative and mixed methods research approaches for studying the development and mobilization of communities in online learning spaces, which include case studies and multiple scales. Mixed methods approaches help us understand more about how community is formed and perhaps more importantly, how such communities can be maintained in higher education classrooms. We also need more longitudinal approaches so we can track our progress over time and use the results to strategically plan and carry out similar initiatives campus-wide.

The mixed methods approach used in this dissertation could be used as a helpful auditing process to study our online teaching efforts. We should continue similar efforts so we can streamline and improve how we are teaching both online and in traditional classrooms. We should also stay open to more hybrid class approaches, particularly if students feel more comfortable discussing complex health and environmental issues in the online environment.

The scales used in this study need to be further tested and refined using larger and multi-institutional samples. All six of these scales and others like them could be revised, abbreviated, or developed for use in the evaluation of online and hybrid classes and higher education sustainability campaigns. The SOVC and CoI in particular would

benefit from additional exploration.

The CIS, which I developed for this study, will need further refinement based on what is learned about its deployment in this first iteration. It shows promise as an instrument for being used in the evaluation of online learning efforts. Moreover, the CIS could possibly be used to measure students' perceived influence of higher education. Although the Cronbach's alphas were more than acceptable (with most being higher than.8), this study will need to be repeated with much larger samples to know more about the utility of the CIS instrument.

Future studies and course evaluations should incorporate the NetPromoter Score (NPS). NPS can help determine what changes in college courses improve learning outcomes, overall student satisfaction, and positive word of mouth communication.

Although NPS has been used to look at the extent to which people will use products, services, or brands, we have not used it much in higher education course evaluations. It also has not been used in partnership with an EE intervention. The known exception to this rule at the time of this study was the University of Utah Marketing department, where the NPS is a standard question asked of students on course evaluations.

Future researchers should consider exploring the relationship between identity, emotions, and pro-environmental tendencies. Qualitative and quantitative results suggest that participants' emotions as they relate to the environment are complex and might be influenced by online interventions. Qualitative findings suggest that the frequency and types of emotions peaked in the last part of the class when environmental content was covered. Quantitatively, we learned that the level of affect toward the environment and pro-environmental behaviors of EVST majors likely increased as a result of the

intervention. On a practical level, organizers of future environmental and sustainability campaigns should be aware of and tap into such emotions as they select appeals and design campaigns accordingly.

Future research should continue exploring the impact of Community and Third Space in the realm of health more specifically. Health content seemed to inspire more self-disclosure and empathy and may have enhanced the overall sense of trust in the class. Hence, the overall sense of community may have benefited from the inclusion of health content. Opportunities for students to discuss health content online asynchronously might be an important precursor to trust building. It could also serve as a helpful bridge for later discussing environmental issues.

Practical Advice

Based on my experience teaching COMM 2004, there are several pieces of practical advice I offer instructors. This is intended neither to be an exhaustive list nor a perfect prescription for how to teach classes online. It is also not a blueprint for how to go about "saving" the world. Rather, my goal is to provide ideas for building Third Spaces, OLCs and extending the influence of curriculum beyond the higher education classroom walls. The results from this study are intended only to shine light on one case study that could possibly serve as an example for future instructors wishing to carry out EE interventions online, although other uses for it may also be found.

- **Start off strong-**It is crucial to spend the extra time at the front end of a course setting tone, building expectations, and drawing in participants. Provide an icebreaker for everyone to complete to help students project their identities and get to

know one another. Greet every student and provide a welcome page with a picture and/ or video to introduce you.

• **Be immediate with feedback and be accessible-**Get back to students no later than 24 hours. Use a smartphone so you are more accessible. Provide additional contact information such as a cell phone number so students can easily reach you through text. Provide them with multiple ways to reach you, and resolve technical issues right away.

• **Acknowledge and appreciate student contributions-**Publicly acknowledge students frequently in the DB and let them know when they do well. Praise them for their efforts and model this behavior for other students. Acknowledge people are real by giving them feedback. Make them feel integral to the community. Encourage people to share their expertise.

• **Use the grade center as another opportunity for feedback and encouragement-**Further encourage participation through the use of the grade center. It is one of the places students frequently check. Give them advice for improving performance, encourage them to get their voices heard, and check in when they seem to have "checked out" in the class.

• **Build trust-**Be willing to disclose information about yourself and admit when you make mistakes. Show you are human so it is okay that they are human too. Admit ignorance and openly admit when you have learned from the expertise of your students.

• **Provide opportunities for self-disclosure-**Provide times when you and your students are able to disclose to encourage closeness and community. The health content in COMM 2004 in particular seemed to encourage students to self-disclose and be empathetic of others. These opportunities and the health content itself may have helped

maintain the sense of community in the class.

• **Let go of some of the power-**For students to become leaders and knowledge creators themselves, instructors must be willing to move from the all-knowing- professor role to more of a facilitation role. Students should also be given ways create some of the knowledge; in part, this involves opening up the class to outside research and information that students bring in (made easier in online environments). It also involves admitting we do not have all the answers as instructors and praising students when they contribute new knowledge to the class.

• **Show benevolence-**Help increase satisfaction and reduce stress by offering extra credit and allowing for occasional quiz retakes and flexibility in deadline when personal issues arise for students.

• **Encourage small talk, socialization, and playful learning-**Students enjoy learning more when it's fun. Have options for assignments, allow room for creativity, and give them chances to interact, and have small talk. Have conversation-worthy content and fun graphics and videos.

• **Guide the small group process-**Although students may find group work online a daunting task at first, with certain training and tools, many people find the experience manageable, if not pleasant. You can minimize discord and promote community by providing lectures on small group interaction, strategically picking groups, allowing peers to impact one another's grade and reflect on their own performance using peer evaluation forms, making assignments manageable, yet interesting and fun, and being available as a consultant when problems arise.

• **Engage in social listening-**Be an active member of the class and read all DB

posts. Be there to draw themes, clarify meanings, diffuse conflicts, ask questions, and encourage.

• **Help students become experts-**Get to know your students so that you can help them capitalize on and share their strengths. Everyone has something to add.

• **Vary the content-**Provide multiple opportunities for students to engage content and be strategic about what you choose: PowerPoint lectures with narration, videos, podcasts, blogs, articles, books, group projects, and discussion boards are all helpful to accommodate multiple learning styles, and variety is the spice of life.

• **Incorporate opportunities for self-reflection-**Some of the most pivotal learning moments happen when students get to think about what they think. Self-reflection can be a trigger for behavioral change.

• **Be strategic about multimedia opportunities-**Videos and other multimedia can serve as triggers for change as well. Choose clips that drive home key concepts from class and encourage self-reflection, critical thinking, and debate.

• **Set guidelines for DB to promote discussion-**Encourage participation by setting expectations such as minimums on the amount of words and comments as well as grading criteria for how DB's will be evaluated. Make DB's comprise a large portion of the grade in the class.

Conclusion

Social media gurus, professionals in public relations and marketing, and most teenagers in the developed, internet-savvy world, are hip enough to know that to promote a brand, product, or idea, one must master the art of relationship building. The same is

true if one is trying to spread awareness about endangered species or encouraging people to be more health conscious. Communities (increasingly online) are the new social movement; we can make use of them to keep important issues such as science, health, and environment on the top of people's minds.

Given the impact of COMM 2004 on environmental attitudes and behaviors of participants, we arguably need to do more EE interventions online. It is possible that classes like COMM 2004, among other qualities, can move students through a process of self-persuasion, where identities (e.g., lifestyles, behaviors, habits) can be critically explored, expanded, and changed. COMM 2004 seemed to be an important space for creating awareness about health and environmental issues and a catalyzer and mobilizer for those who were already personally invested in or care about the environment.

It is highly likely that, for there to be continued awareness and influence after the class ends and its community dissipates, there will need to be some kind of follow- up/ reminder advertising (i.e., membership maintenance) to keep issues fresh, relevant, and meaningful in students' minds. Hence, there is a need for more strategic, integrated sustainability initiatives on college campuses.

The traditional EE paradigm gives precedence to experiential education and relies on getting participants outdoors interacting with nature in some way, to generate awareness, increase knowledge, or change behavior. We should also consider experimenting more with online spaces for EE and health interventions, especially as we continue to see more and more time spent online, particularly for younger generations.

We need to secure the resources we need from our Universities to carry out similar interventions. Staying aware of the most effective tools for teaching (let al.one

teaching the ever-changing areas of science, health, and environment) is an onerous task. Moreover, teaching online with the goal of Third space and community creation takes copious amounts of work and time. The effort may not be properly compensated; the risk may outweigh the reward.

Much like any successful strategic communication campaign, we should examine our teaching processes and use the results from our research to improve our campaigns (i.e., courses). We should consider revising some of our old tools and measures in terms of course evaluation and best practices, particularly with the advent and increased use of online, hybrid, and "flipped" classrooms. Finally, we should continue to do what we can to help our students make the most out of their higher education so they themselves can go out into the world, make ripples, and influence the agenda.

APPENDIX A

COURSE SYLLABUS AND GUIDELINES

COMM 2004-001/EVST 2004-001: Communicating About Health, Science & the Environment
Course Guidelines
spring | 2014 | online

Professor Contact Information:

Instructor: Autumn L. Miller
Email: autumnleighmiller@gmail.com
Office: Available via text message, phone call, email or Virtual Office Discussion Board on Blackboard
Mailbox: 137 McMicken Hall; Department of Communication Office
Cell Phone: 513-340-3650 (please text first if possible ☺)

***If you need support in accessing anything in Blackboard, call 513-556-1602 or via blackboard@uc.edu.

Required Texts
-Corbett, J. B. (2006). *Communicating nature: How we create and understand environmental messages*. Island Press.
-Mooney, C., & Kirshenbaum, S. (2009). *Unscientific America: How scientific illiteracy threatens our future.* Perseus Books Group.
-Olson, R. (2009). *Don't be such a scientist: Talking substance in an age of style*. Island Press.
-Parrott, R. (2009). *Talking about health: Why communication matters*. Wiley Blackwell.

Support Materials
-Mooney & Kirshenbaum Blog, *The Intersection*, http://scienceprogressaction.org/intersection/
-Parrott's Blog, *Talking About Health*, http://whyhealthcommunication.com/whc_blog/
-http://grist.org/

-Additional videos, articles, and blogs as the semester progresses

Course Overview

In the areas of science, health and the environment, communication plays a fundamental role. Whether it's the technical journals we rely on for the latest scientific findings of the day, messages we glean from the mass media, words exchanged with others in chat rooms, or face-to-face conversations with our doctors, we use communication to define and help make sense of our world and the problems that arise in it for us. In this class, students will learn about the everyday symbolic and material consequences of a variety of science, health and environmental issues as well as ways in which we evaluate and communicate about such issues in a variety of contexts. Whether it is talking with one of your peers about how you feel regarding a video we viewed in class, working with a partner to learn more about an area of health you are both interested in, or brainstorming solutions to environmental problems in small groups, in this class, you are asked to interact with your peers, critically engage material, and actively apply what you learn.

Course Objectives

- To recognize some of the historical and contemporary influences on the public's understanding, enthusiasm and overall literacy in the areas of science, health, and the environment
- To recognize ways in which communication can serve as both a barrier to and vehicle for the public's understanding, enthusiasm and overall literacy in the areas of science, health, and the environment
- To learn some of the fundamental theories and concepts from the field of Communication that can inform how we communicate in the areas of science, health, and environment
- To apply some of these fundamental theories and principles to real-life examples and case studies
- To bolster students' understanding, critical thinking skills and overall media literacy
- To take part in meaningful conversations with peers that get us thinking, talking, and applying course concepts to our respective areas of study and lives.
- To generate a community of interested individuals that can learn from, interrogate and critique each other's ideas
- To gain a better sense of (and develop a vocabulary for) one's own and others' ideological worldviews
- To practice communication skills in small groups to research and problem-solve
- To learn about ways we can become more informed citizens and better advocates for our own health, environment and society

Classroom Expectations: Your end

- As an online course, it should be no surprise that you need reliable computer access for this class, and it's readily available on campus if you don't have it where you live. Therefore, indicating that you had a "computer", "Internet", or "router" issue from home is not an excuse for late submissions.
- If you need support in accessing anything in Blackboard, call 513-556-1602 or via blackboard@uc.edu.
- This course is best viewed using Mozilla Firefox as your web browser. Please download Firefox for FREE and access Blackboard and this course using Firefox (vs. Explorer, Chrome, Opera, or other browsers).
- Install Microsoft Office Compatibility Pack for Word, Excel and Power Point if you would like to open, edit, and save documents, workbooks, and presentations that were created in the newer versions of Word, Excel, and PowerPoint. For this class, I will use Microsoft Office 2010, including PowerPoint 2010. Many of its features (e.g., the voice narration feature) are not available in older versions. If you want to listen to the PowerPoint lectures, get the 2010 version or download the compatibility pack (see the link below). http://www.microsoft.com/downloads/details.aspx?FamilyId=941B3470-3AE9-4AEE-8F43-C6BB74CD1466&displaylang=en

- Your participation is evaluated by active engagement with the course material via discussion board posts and the feedback you give your peers on discussion board posts and peer evaluation forms. You will also be quizzed and tested on course material.
- To help you study for your midterm and final exam, you will receive a review sheet and flashcards.

Online Netiquette Guidelines:

- Use **the golden rule** when communicating with your peers—do unto others as you would have done unto you—constructive feedback is great, but no need to get rude or nasty with one another. Share your opinions and justify your rationale without getting too "cray." When possible, use our readings or related material to support your points. **Remember that there are human beings at the other end of these computer screens.**

- Respect people's time (e.g., if the assignment is to write 250 words—don't write 1000). Although we'd love to hear every thought in your head, we all have other things going on besides this class!

- When it comes to **group projects** (there are two in this class), be as readily available to your peers as possible and communicate regularly. Exchange email

addresses, phone numbers, and get back to people ASAP)—nobody likes dealing with the difficult group member or having to pull the weight of others. Also, be aware that sometimes, a group text is much better than email when working as a group online.

- Keep in mind that part of your group project grade will come from your peers' evaluations of your performance, so **what they think about your performance matters**. Likewise, the evaluations you will fill out will also impact the final grade of your peers.

- Emoticons are okay on DB's and email as long as they are used appropriately and not overdone—use your best judgment and don't have **:)** or **lol** after every sentence and you should be okay here.

- **Use spell check and correct grammar on the Discussion Boards** and for when you are emailing the professor—you should be practicing professional habits now.

- **For more a more extensive list on netiquette guidelines, visit http://www.albion.com/netiquette/rule1.html**

- Any announcements posted on Blackboard will also be emailed to your UC email account; make sure to check the school email consistently (at least every 48 hours).

- **With regard to sending emails to instructor**. in the subject line, be sure to enter the course title, COMM 2004, and include identifying information in the email after the salutation/greeting (e.g., Hi, Autumn. It's Mandy Smith from COMM 2004. I had a question about X . . .).

- **If you are unsure of proper email etiquette**. you can follow Susie Newday's advice found here: http://12most.com/2012/08/17/rules-for-email-etiquette/. You can also talk to me if you have questions.

Course Culture

- Ideally, each of us will aim to create a space that encourages others to share their ideas and personal experiences. As a class, we must conscientiously stay open and challenge ourselves to consider new ideas and be willing to share our own. Ultimately, we must strive to foster a respectful, yet inquisitive environment—I will do my best to help in this effort, but I will need your assistance as well.
- While it may be tempting to advocate our own position by belittling someone, in this class, we shall seek to express ourselves and understand others. To cultivate a

safe space, we must prepare, participate, and keep an open mind.

- Discriminatory comments or behaviors towards others **will not** be tolerated. If something in class makes you feel uncomfortable, please talk to me about it.
- I take your learning experience incredibly seriously, so I am open to hearing your feedback and questions at any time. Likewise, please talk to me and your peers when you have a question or need an open ear.
- Please know going into this class that just because it takes place online doesn't mean that it will be easy or takes less time than a regular class in a traditional classroom. On the contrary, because online classes often require more reading and writing in order to replace the verbal communication that you get in a face-to-face class, they can often take more time. Therefore, they also require you to effectively time manage and be self-disciplined to get the most out of the learning experience.
- I try to make assignments fair, yet fun and challenging, stagger deadlines, send reminders, and be as accessible as I can be to help you be successful. If you ever need help or advice managing this class, please let me know.
- If you find cool nuggets of knowledge while you're out there on the information superhighway (e.g., cool links, news stories, videos, etc.), please feel free to contribute them to class. Share them with your peers when relevant and post them in the "More Good Nuggets" discussion board.

<<<**Bottom Line**>>>>>>>>>>>>>>>>>>>>>>>>>
In many ways, you get out of this class what you actively decide to put in. If you don't join the conversation in the discussion boards, opt not to read, or skip a lot of lectures and quizzes, you won't get nearly as much out of this class as the people who actively decide to be more engaged. The more you actively participate, frequently interact with your peers, and interrogate class material, the more you will take away from this learning experience and the more satisfied with the class you will be. If this does not sound like what you are looking for, this may not be the class for you. If this sounds like something you could enjoy, please stay and play with us! Either way, GOOD LUCK!

Academic Honesty

- Students will be held accountable to the **University of Cincinnati's Student Code of Conduct**. With this guideline in mind, any student who plagiarizes or cheats will fail the course. Students need to familiarize themselves with the university's policies and student code of conduct: http://www.uc.edu/conduct/Code_of_Conduct.html

- Not knowing what plagiarism or cheating are is not a viable excuse for engaging in the activities. If you want to check your own work for possible plagiarism, the following two sites are helpful: http://plagiarism.com/self.detect.htm and http://turnitin.com/static/index.html

Classroom Expectations: My end

- I will try to make this course as fun and interesting as possible. If you notice the material is too easy, boring or difficult, let me know. If you have ideas and find supplemental materials, share them. If you'd like to give me your feedback, share it. I don't always know what's working for you or what you need unless you have a conversation with me. Feel free to also seek out the help of your peers.
- Get your voice heard in the learning process as much as possible. Talk to your peers and talk to me. I take your feedback seriously and will use it to make adjustments to the course wherever possible. A few weeks into the semester, you will be asked for your feedback through an anonymous survey on how the course is going for you so far. **Please participate**!
- I will generally respond to emails within 24 hours; however, sometimes unexpected situations arise and this turnaround time may not be possible. Therefore, try to combat any issues that might come up last minute by asking me questions about assignments early. The less stress you cause yourself and those you work with in teams, the better!

- **If the matter is urgent**: Send me a text—you will get a faster response that way. As with email, in your initial text, be sure to tell me who you are and that you're from COMM 2004. Other ways you can reach me, if we can't resolve an issue via text: 1) talk by phone 2) Post questions to the Virtual Office Discussion Board on Blackboard.

- I will strive to turnaround grades for all assignments and discussions within one week of each deadline.

Deadlines

- To help us stay organized and keep on task, this class will flow much like it has a Tuesday/Thursday schedule. The abbreviated schedule below will give you a sense of when things are posted and due every week. Use it to help you figure out when working on this class will fit in your schedule. Be sure to stay on top of the weekly readings, lectures, discussion boards and other assignments to ensure you don't fall too far behind. Talk to your peers, indulge in the conversation and enjoy your time!

- On Sunday nights, by 11:59pm, your Weekly Modules will appear under the Weekly Modules tab in BB. Each module will include "Weekly Notes" from Autumn, a weekly to-do list, links to assignments for the week (e.g., Quizzes and Discussion Board Assignments) and links to any additional materials you will need for the week. Be sure to look over the content in each module carefully, and let me know if you have questions.

- Just about every week, you will have a short Discussion Board assignment, three peer comments, and a weekly reading quiz. Some weeks you have off from these activities—check the full course schedule and weekly modules for more detail on such instances. Your weekly discussion board posts will be due Friday nights by 11:59pm. Your three peer responses are due by the following Tuesday @11:59pm.

you view *and* listen to the lectures. Then, once you get a feel for the lectures and how the class goes, you can choose your own adventure after that. I personally like to both view and listen to the lectures. I tend to skip through the narration when I already understand the point the slide is trying to make, the text and words give me enough information, or it gets too tedious or boring.

- As long as you are complementing the lectures by reading, doing the quizzes, and conversing during the Discussion Board posts, you should have what you need to do well on the exams.

Assignments

Discussion Board (the DB!)

● Online discussions are an integral component of this course. You are expected to participate regularly and contribute substantively to online discussions. They are worth 200/600 points total for the class.

●Our use of the Blackboard DB has five primary purposes: 1) to provide a space for your participation in class discussion and build community, 2) to encourage your critical reflection on and interrogation of course material (i.e., so you can think and talk about what you and others think and talk about), 3) to provide an avenue where you can simultaneously learn from and teach your peers and instructor, 4) to give you chances to apply ideas and concepts to real life examples and case studies, and 5) to create a tool kit of resources you can use to learn more about science, health, media and the environment

● Approximately each week, you will create a response to an instructor posed discussion question. You will have at least three options to choose from for each assignment. In most cases, these responses will need to be 300-500 words in length.

● You should be checking the DB at least every 2 or 3 days so you can stay a part of the conversation and check to see if people have left comments for you.

● Our online class discussions are meant to be interactive (i.e., threaded). Put another way, it's expected you talk to other people in this class about what they think. For this reason, each week you must also post at least three responses to others' commentaries. These responses will generally be 50-75 words in length and should critique, interrogate and supplement what your fellow students write.

● You should do your best to incorporate course readings and concepts where applicable, and feel free to tie in your other classes and own expertise and knowledge as well.

● If someone comments on your post or asks you a question, you should respond back to them. For example, if someone disagrees with something you said in your post, you should make an effort to read their comment, consider what they said, and decide what you should say in response. Put another way, don't leave people hanging.

● Consider using Microsoft Word to write drafts of your messages: 1) It will allow you to easily and quickly count words using the "word count feature,"2) You can use the "grammar and spelling check" features 3) you can save your posts as a back-up copy in

Deadlines (cont.)

- Your weekly-ish quizzes will be due every Wednesday night by 11:59pm. They will cover material from the **previous week's readings**. This deadline is to help encourage you to keep up with weekly readings, not fall too far behind, and stay a part of the conversation. I will send you one reminder a week about remembering to take your quizzes. However, it's easy for some folks to forget about taking them, so be sure to set your own reminders through BB, a calendar or smartphone if you find you need them.

What happens when?						
Sun	**Mon**	**Tues**	**Wed**	**Thurs**	**Fri**	**Sat**
-Weekly Module, weekly Notes & To-Do List appears -Weekly quiz appears		-New Lecture/ Video(s) Posted **-Peer comments due** on previous week's DB	**-Weekly quiz due** on the previous week's readings	-New lecture/Video (s) Posted	**-DB posts due**	

Rights, Responsibilities & Accommodations for Students with Disabilities
The University of Cincinnati, under the guidelines of ADA and Section 508 of the Rehabilitation Act of 1973, is required to make reasonable accommodations to persons with disabilities who are otherwise qualified students. To provide the best service to students, faculty and staff, UC's Disability Resource Office is available to assist with questions about accommodations provided as well as the rights and responsibilities defined by the Americans with Disabilities Act.

Class lectures

- You will receive "lectures" several ways: 1) PowerPoint slides (with and without narration), 2) conversations and feedback on the discussion board, 3) weekly notes, 4) videos from me or guest lecturers.
- New lectures will appear no later than the day listed on the course schedule, typically on Tuesdays or Thursdays, by 11:59pm.
- Sometimes lectures will have narration, and sometimes they won't. I try to give you options to accommodate different learning styles. Some people only need to see the visuals on the slides to help complement their own reading and emphasize and retain important information. Some people like to hear the professor's voice and "the feel" of the real classroom. Others like to do both. Depending on what you prefer, you can choose to listen to the lectures or just view them. It is up to you. Do whatever helps you learn the best. I suggest as you first start the class that

case something malfunctions in BB, and 4) you have a personal record of your own progress and participation in the class.

● **DB posts are due by Friday evenings at 11:59 p.m**. on the date listed in the syllabus. Then, **your 3 peer comments are due on the following Tuesday by 11:59 p.m EST**. Late posts or comments will not be accepted and will result in a zero. See BB for a more detailed rubric to help you understand how your DB's will be evaluated.

Quizzes

● Quizzes are designed to ensure you are keeping up on the reading. For example, Quiz # 1 will pull from all of the **readings we have covered prior to** Tuesday 1/27, excluding the readings listed for that day. You will have 10 quizzes total. Each quiz will be available on Blackboard beginning at 8 p.m. on Sunday evenings, up until 11:59pm on Wednesday evenings. Quizzes are timed—after opening a quiz, you will need to complete it within 1 HOUR, and Quizzes cannot be made up.

***Special note: Technical difficulties do not excuse you from the responsibility of participation in discussion boards, quizzes, exams and other assigned work. Plan your week accordingly so you have plenty of time to do the quizzes and avoid any "hiccups." Likewise, avoid starting your quizzes Wednesday nights at 7:45pm the night they are due.

Tests

● The midterm and final exams are designed to test reading, class lecture and class discussion material in depth (including any guest lecturers and supplemental videos). Exams will be comprised of matching, multiple choice, true-false, and/or short answer/essay questions. Before each test, you will receive a review sheet and a set of PowerPoint review flash cards to help supplement your studying. I will also be available for any questions you have. You will have at least a 72 hour window to complete each exam. Once opened, you will have 2 hours to finish. Use the time you are given! If you are given 2 hours to do the exam, chances are, you cannot do a good job in fifteen minutes.

● Tests cannot be made up, unless the student provides prior email notification, and provides documentation of the university-excused absence. The midterm exam is worth 50 points; the final exam is worth 100 points.

Group Projects & Peer Feedback

● As more and more classes are offered online and the professional work place continues to incorporate more virtual spaces for team work and collaboration, it behooves today's University students to have experience working in teams in both the traditional and online classroom environment.

● In this class, you will have an opportunity to work with other students for two small

projects. In the first project, you will work with one other person (i.e., a dyad) to learn more about a health issue. In the second project, you will work in a group of three to learn more about an environmental issue. More details about these assignments will be provided as we get closer in the semester.

● While every team experience has its own unique ups and downs, be it in person or online, there are several ways the instruction in this class aims to assist you in your teamwork efforts so you have more positive outcomes: 1) clear assignment descriptions and instructions to make the work as straightforward as possible 2) clear-cut grading criteria so you know what is expected of you and what you need to do well on the assignment, 3) Ample time to complete the assigned work without feeling like you have to rush 4) Time will be provided for you and your group members to "break the ice" and get to know one another.

● Opportunities to rate your peers' performances so your voice is heard in the grading and evaluation process and you are impacted by one another's feedback 6) Lectures and tools provided to assist you in small group communication 7) Instructor Assistance and advice at any point when any problems or conflicts arise (I'm usually just a text away).

● I understand working with other people can be difficult, and no matter how much training and preparation you have, sometimes people have less than perfect group experiences (e.g., someone doesn't pull their weight or can't be reached or someone wants to do everything themselves without any help or someone doesn't have the written or technical skills needed for the work). Knowing these facts going in, we must work together to ensure you have the best group experiences possible in this class. I will do my best to help train and prepare you, and I expect you will do your part as well.

Extra Credit Point Opportunities

-There will be several extra credit opportunities throughout the semester (e.g., bonus points on quizzes and exams, additional assignments or short quizzes on current events/videos related to the class, and/or other possible relevant opportunities that may arise). You will be alerted when these opportunities are available, and you and cannot make these points up once the deadline for them has passed. You're also invited to share your own ideas about possible additional extra credit opportunities for this class.

Grading Scale
A: 561-600; A- 537-560; B+ 519-536; B 501-518; B- 477-500; C+ dix b459-476;

Calculate your own grade: Point Breakdown	
Assignments	**Points Possible**
Weekly-ish Individual DB's (Discussion Board Posts) a.k.a. participation: 10 @ 20 points each (one post per assignment plus 3 peer comments)	200
Reading Quizzes: 10 @ 10 points each	100
DB Project #1 (Dyad)	25
***Peer Feedback* on Dyad DB**	10
DB Project # 2 (Small Group)	75
***Peer Feedback* on Small Group DB**	25
Final Individual DB Post	15
Midterm	50
Final	100
!!!Extra Credit Points!!!	
Total	600

C: 435-458; C- 417-434; D+ 399-416; D 381-398; D- 357-380; F 356-0

Course Schedule				
		=science =health =environment		
Week	Day	Going's on	TO READ prior to next week	DUE
1	T 1/7	• Course overview & syllabus • Course Objectives • What You Can Expect from this class	-Peruse the Syllabus & Blackboard Site→let me know if you have questions or post them on the Virtual Office DB **-Review links & PowerPoint slides**	
	TH 1/9	***Science: Why should we care?*** • A little science history • The science/society divide • Rethinking the Problem of Scientific Illiteracy • Some Mass Communication Theory Basics	-M&K Chs. 1, 2, & 3 (PDF available in Weekly Modules)	**-Post "About me" Profile (DB 1)** due by Friday @11:59pm
2	T 1/14	***Third Culture or Nerd Culture?*** • How is Science at odds with the media, politics, academia and religion? •The (Un)importance of Communication instruction for scientists	-M&K Chs. 4, 6, & 8	**!!!Extra Credit Quiz!!!** on "Getting to Know You" DB & Syllabus due by Wednesday @ 11:59pm -3 peer comments due by @ 11:59 pm
	TH 1/16	***Bridging the cultural divide between science & Hollywood*** •More Mass Communication Theory basics • Is Science Communication Important? A Scientist Turned Film Maker's Point of View	-M & K Ch. 7 -Olson Introduction	**-Post DB 2** by Friday @11:59pm
3	T 1/21	**The Science "no no's":** ***"Don't be so Cerebral"*** •The Value of not Thinking Things Through • Connecting with the "mass" audience • Basic Principles of Science Communication	-Olson Ch. 1	**Quiz # 1** due by Wednesday @11:59pm  -3 peer comments due by @ 11:59
	TH 1/23	**More on the Science "no no's:** ***"Don't be so literal minded"*** • The Information Spectrum • Do ads still work? Combatting "Science Think"	-Olson Ch. 2	**-Post DB 3** by Friday @ 11:59pm
		with Communication, Marketing & Film •The Elusive Art of "Science Talk" •The "Pre-Aroused Audience"		
4	T 1/28	**More on the Science "no no's:** ***"Don't be so unlikeable"*** • The Scientist's Persona • Using Negativity vs. Positivity • The Pluses and Minuses of Science Blogs & the Internet • The Scientist's Makeover	-Olson Ch. 4 - M&K Ch. 9	**Quiz # 2** due by Wednesday @ 11:59pm -3 peer comments due by 11:59pm 
	TH 1/30	**A Science "Yes":** ***"Be the Voice of Science"*** • Adjusting to the Changing Audience & New Media Environment • An Ode to Carl Sagan • Science Debate 2008 • Getting over the Blind Obsession with the "Truth" • Finding your Voice & Becoming "Bilingual"	-Olson Ch. 5	**-Post DB 4** by Friday @ 11:59pm

5	T **2/4**	**Changing Gears: Talking about Communicating about Health W*hy Communicating About health Matters***	-Parrott Ch. 1 -View "working in Dyads" lecture in Weekly	**Quiz # 3** due by Wednesday @11:59pm
		• How our Identities Impact our health choices • The Self Vs. Society Continuum of Blame • Communication's Impact on Health Resources & (Mis)Understanding ***-Assign Dyad Discussion Board Project due 2/20***	Module 	-3 peer comments due by 11:59pm 
	TH **2/6**	***Who profits from my health?*** • Pharma-, Cosme- & Neutri-ceuticals • The News & Entertainment Industries • Health Products & Services • Health Illiteracy Profiteers	-Parrott Ch. 6 	**-Post DB 5** by Friday @ 11:59pm **-Post topic for Dyad DB Project 1** by Sunday @ 11:59pm
6	T **2/11**	***What's Politics got to do with it?*** • Medical Research and Disparities • The IRB • Political Agenda Setting & Priorities • Medical Associations & Lobbyists • Patient Advocacy	-Parrott Ch. 7	**Quiz # 4** due by Wednesday @ 11:59pm -3 peer comments due by 11:59pm 
	TH **2/13**	***How normal am I? Comparing myself with the numbers*** • Comparing Oneself to the Statistics & Stories & Normalizing Poor Health • Complementary and Alternative Options	-Parrott Ch. 2	**-Post DB 6** by Friday @ 11:59pm
7	T **2/18**	***What are my risk factors?*** • Our Responses to Reward versus punishment cues • The pluses & minuses of novelty seeking	-Parrott Ch. 3	**- Quiz # 5 due by Wednesday @11:59pm**

		• The problems with procrastination • Impacts of faith and religion on health decisions		 -3 peer comments due @ 11:59pm
	TH **2/20**	***Why don't we get care?*** • Doctors' (lack of) Recommendations • Peer & Family Pressure • Saving Face & embarrassment • The problem of positive and/or fatalistic thinking **Guest Speaker TBA**	-Parrott Ch. 4 ***-Midterm Review Sheet & Review Flashcards Available***	-**Post DB 7** by Friday @ 11:59pm
8	T **2/25**	***Is the "public good" good for me?*** • Why Public Health Matters • Giving Up Our Freedoms to Support the Public Good • The Safety of Products, Food, Water, & Air • The Impact of Nonprofits on Public Health	-Parrott Ch. 5	**Quiz # 6** due Wednesday @ 11:59pm  -3 peer comments due by @ 11:59pm
	TH **2/27**	***Health Agenda for the 21st Century:*** • What are important health issues of 21st c.? • Making medicine more personal • Keeping Track of your own health report • Being an active citizen in healthcare decisions	 -Parrott Ch. 8	**-Post DYAD DB Project #1** **by Friday @11:59pm**
9	T **3/4**	***Midterm* available starting Friday 2/28 @8am until Wednesday 3/5@ 11:59pm**		**3 peer comments for DYAD DB PROJECT # 1** due by 11:59pm

	TH **3/6**	**More on Working in Small Groups** -Group DB Project # 2 assigned , Due 4/3	- "Introduction to Working in small groups" 	-Find your Group, share contact information & complete **Team ice breaker activity** by Sunday @ 8:00pm
10	T **3/11**	**Changing Gears: Linking Science, Health & the Environment** -Science & Technology's Impact on the Environment -Becoming aware of the health risks in your environment	-News article links available in weekly module	**!!!Extra Credit Quiz!!!** Due by Wednesday @ 11:59PM
	TH **3/13**	***The Formation of Environmental Beliefs*** • Childhood, Perceptions of Place & Nature • Historical & Cultural Impacts on your Environmental self	-Corbett Ch. 1 	**-Post DB 8** by Friday @ 11:59pm **-Post topic** for your Group DB Project # 2 by Friday @ 11:59pm
11	T **3/18** TH **3/20**	**Spring break—enjoy!!!!**		
12	T **3/25**	***A Spectrum of Environmental Ideologies***	-Corbett Ch. 2	**Quiz # 7** due Wednesday @ 11:59pm

		• Unrestrained Instrumentalism • Conservationism • Animal Rights & Land-based ethics • Transformative Ideologies		 **-3 peer comments** due @ 11:59pm
	TH **3/27**	***The Links Between Environmental Attitudes & Behaviors*** • People who tend to have pro- environmental attitudes • Influences on attitudes • Types of Pro-environmental behavior	-Corbett Ch. 3	**-Post DB #9** by Friday @11:59pm
13	T **4/1**	***Work & Consumer Culture*** • Why do We Buy? • Consumption & the "buyosphere" • The Story of Stuff	-Corbett Ch. 4	**-Quiz # 8** due Wednesday @ 11:59pm  **-3 peer comments** due @ 11:59pm
	TH **4/3**	***Faint green: Advertising and the Natural World*** • Types of Ads Featuring the Environment • The Oxymoron of "Green Advertising" • How to recognize Greenwashing	-Corbett Ch. 6	**-Post DB #10** by Friday @11:59pm
14	T **4/8**	***Communication and Social Change*** • Kinds of Environmental Groups	-Corbett Ch. 10	**Quiz # 9** due by Wednesday @11:59pm

		• Tactical Communication Choices • A new Vision for the Environmental Movement • Social Media & the Environment • Participating in environmental decision-making		
	TH **4/10**	**Guest Speaker(s) TBA** ***-Final Exam review sheet & Review Flashcards available*** ***-Put Finishing Touches ON GROUP DB PROJECT # 2!!!***		**Post Group DB Project #2** **by Friday @ 11:59pm**
15	T **4/15**	***Semester wrap up:*** -Themes from Group Projects -Where have we been? -Our goals re-visited -Bringing it back to Science -Final Exam Review & Tips	See Weekly Module for links	**Quiz # 10 due** Wednesday @ **11:59pm**  **-5 peer comments** due @ 11:59pm **-Peer evaluation forms** due @11:59pm
	TH **4/17**			**-Final Individual DB due by Friday @ 11:59pm**

APPENDIX B

DISCUSSION BOARD ASSIGNMENTS AND PROMPTS

Week 1 Discussion Board Assignment:

In this first discussion board, you will help us as a class get to know you a little better. Use the following form below to create a profile about yourself. You can just copy & paste the items directly into your discussion board post and type in your responses. Please write in complete sentences and proofread what you post. See my posted example for help.

Develop a Profile: Cut & Paste Form

1. **Name**: (First, Last):
2. **Major**:
3. **Interests/Hobbies**:(50-75 words)

-This can include anything from hunting, swimming, knitting, blogging, cooking, painting, listening to music, watching sports, organizations you are a part of or volunteer for (e.g., your sorority/fraternity, Habitat for Humanity, etc.) You can also look at this as your chance to get a "plug" in about an organization you care about. Feel free to provide links.

4.**Tweet Message**: In 50 words or less, write what one message you would tell/tweet the world if you knew they were listening.

5.**Song title/artist**: Name a song title & the artist/group it is by that you have come to strongly identify with, that holds special meaning to you in some way and/or effectively describes you and/or your life.

6. **Movie/movie Quote**: Are there any movies that really speak to you or are just hilarious, nostalgic, or worth seeing, in your opinion? Is there a one-liner from it you'd like us to hear?

7. **This class**: Based on what you know about this class so far, list 1-2 goals for the class/something you hope to get out this class.

Week 2: Discussion Board Assignment

Pick one of the five following options for your DB posts this week. The instructions and Grading Rubric are after your options.

1) Do you think we live in an anti-intellectual or anti-science culture? Yes or no? What evidence do you see to support your argument? Provide examples from your own personal life, the media, internet, etc. If you do think so, does it concern you? Why or why not?

2) Do you agree or disagree with Mooney that scientists need to make more of an effort to reach out to the public? Why or why not? How do you envision this type of outreach looking?

3) If outreach by scientists is not the answer, how else might we go about creating a more pro-science culture? (**HINT** One idea is to think about some of the communication tactics discussed in the first lecture)

4) Why would college-educated Democrats be two times more likely than college-educated Republicans to believe global warming is caused by human activity?

5) In our first lecture, we covered the mass communication theory called *agenda setting*. If you recall, this theory claims that rather than telling the public what to think, the media only tell the public *what to think about* (i.e., they set the agenda for what people are exposed to). Do you buy/agree with this theory? Why or why not? Put another way, do you think the media controls what people think or just what they are exposed to? What evidence do you see to support your argument?

6) To what extent can the internet help promote a more pro-science culture? Put another way, what are the pluses and minuses of using the internet to create a more pro-science culture?

Week 3: Discussion Board Assignment

Pick one of the five following options:

1) Should science majors be required to take public speaking or another communication course? What about a world religions course? Why or why not? What about vice-versa: Should communication majors be required to take science courses? Why or why not?

2) This week we learn about the mass communication theory two step flow, which claims that rather than the media having an effect on us per se, we are influenced most by the people in our lives that become our opinion leaders or trend setters, who themselves consume the media. Do you believe in/buy this theory? Why or why not? What evidence do you see in your own life to support your point?

3) After Watching the video "Talking Science: The Elusive art of science talk " (http://www.youtube.com/watch?v=QmAUad9U8-8) (18:36mins),

you should have a better sense of what makes a "good" versus "bad" science talk. Based on what you learn, can you identify someone in your life as a good science talker? Who are they? Where did you hear them talk? And what made them a good speaker?

4) In what ways can you see science partnering with art, besides through the use of film (i.e., what other ways can art help science?)?

5) Do you agree with Olson's argument that film works as a tool of motivation but not as a tool for education? Can you think of any films you've seen that were used effectively as educational tools? What about ineffectively? What made them so?

Week 4: Discussion Board Assignment

Pick one of the five options for your DB posts this week. Instructions are below. TRY COMING UP WITH A CATCHY TITLE FOR YOUR POST TO ENTICE US TO READ IT.

1) From the metablog http://scienceblogs.com/, browse through the blogs provided and select a blog that appeals to you. In this class, one of the goals is to try and expose you to a lot of different sources, so **please do not select a blog that's already been chosen**. Be keeping up on your peers' posts and what they are talking about.***Make sure to include the blog's url address***!

For this choice, answer the following questions in your post: 1) From what you can tell, what's the purpose or goal of the blog? 2) Does it seem to use emotional or logical appeals or both? How can you tell? 3) Who is/are the author(s) and what are their credentials? 3) Pitch/sell why others should check out this blog.

Ideas for how to respond to your peers' posts: 1) Visit the blog and indicate whether or not you believe the blog is worth your (or others'!) time. 2) Do you trust the information? Why or why not?

2) In Ch. 4, Olson advises that science communicators should avoid "rising above" their audiences. In the blogs for this week's DB assignment (or other blogs you happen to follow or sources you use for information), do you notice them "rising above" atall? What gives it away?
3) Both Mooney & Kirshenbaum and Olson argue that science blogs are not the "cure- all" for an anti-science culture. What do you think? (***Keep in mind our conversations about audience analysis and the digital divide). Another way to answer this question is, do you think new technologies (e.g., the internet) will close or widen the gap between scientists and the rest of society? Why?
4) Can you see yourself *following* a science blog regularly? Why or why not? What about you *writing* a blog that is science/health/communication/your field related?

5) Are there any scientists out there today that compare to Carl Sagan in their ability to reach out to the public? What about another "science ambassador" you know of? Tell us who they are and all about why you think they are so awesome. Feel free to provide a link to their website/blog and/or a video that demonstrates their awesome-ness.

Week 5: Discussion Board Assignment

Pick one of the following five options for your posts this week (instructions below post) FEEL FREE TO PROVIDE LINKS WHERE RELEVANT and DON'T FORGET YOUR CATCHY TITLE!!!! ☺

1. Health issues are complex, to say the least. In the Parrot book and our class lecture, the self-society continuum of responsibility was discussed.Two of the examples given that tended to be more of society's responsibility included Fernald and lead poisoning (i.e., plumbism) from toys. What other health issues do you know of or can you find out about through research that appear to be "society's" responsibility? Explain the health issue and illustrate why you think the responsibility errs on the side of needing to be addressed by society as a whole rather than just being addressed on an individual basis?

2. Describe a personal experience you've had with a healthcare provider/doctor and answer the following questions: Was it a positive or negative experience? Why? What did the provider say or do that promoted (mis)understanding? What, if anything, did you do to combat/make up for any misunderstanding/confusion/frustration you experienced? Looking back on it now, is there anything you would have done differently? What, if any advice, would you offer someone in a similar situation?

3. Research a pharma-, cosme- or neutri-ceutical that you either use or are interested in learning more about. Tell us what the product is, what its intended use is for, what audience it is intended to be used by (e.g., young teens, pregnant women, men with erectile dysfunction, arthritic elderly, etc.) and what possible negative side effects it may cause. Once you describe your research, indicate whether or not you are surprised by your findings and why. Finally, make a recommendation as to whether or not people should use this product and whether or not you believe the the benefits outweigh the costs (i.e., negative side effects).

4. Sometimes, when individuals have no frame of reference for a health issue, they turn to those who are in the entertainment industry for information; for example, Christopher Reeves and spinal cord injury, Michael J Fox and Parkinson's, Lance Armstrong with testicular and brain cancer, Richard Pryor and MS. Provide your own example of a celebrity that has made their way into the limelight as a result of some kind of health issue, describe the issue & the celebrity's involvement, & why you think getting health information in this way can be a positive and/or negative.

5. For Tuesday, we read a New York Times article about Richard Fee and his problem with prescription meds. As a college student yourself, do you see prescription medications as an epidemic that hits close to home? Why or why not? If not, what other "epidemics" or health problems do you see as particularly important or worth tuning into? Give personal examples and/or other evidence to back up your point.

Week 6: Discussion Board Assignment

1. Discuss a health cause that you support –OR- research a cause/organization. For example, maybe you or someone you know was a premature baby. As a result, you support the March of Dimes by walking in one of its events to raise money and awareness. Describe the issue and how it affects you. What do you do to raise awareness about it? What can others do to help (here's your chance to plug the cause)? What role does communication play? If you don't actually support a cause, but are curious about what's out there, you can research a cause/organization. Tell us about the cause and what sorts of activities they are involved in and/or how they seem to promote themselves. Also, tell the class what opportunities they have to get involved. Please be sure to include a link to the website of organization/cause.

2. From the metablog about public health, browse through the blogs provided and select one that appeals to you http://mastersinhealthscience.com/2010/top-50-public-health-blogs/. After you have selected one of the 50 listed blog options, read one (or more!) of the posts on that blog (NOTE: some of the posts/discussion on some of the blogs are brief, make sure to choose a story that is well-developed). Again, a goal of this class is to expose you to a variety of sources, so try to avoid selecting a blog (and post) that's already been discussed. That means looking at the DB to see what's already been done BEFORE you post.

Answer the following questions in the response to this post (make sure to include the blog's url address): 1) From what you can tell, what's the purpose or goal of the blog, overall, 2) Summarize the story you selected... paraphrase! Don't just copy and paste, 3) Pitch/sell why others should check out this blog (remember, the blog is one rooted in public health).

3. What role should government have in health? Should government use society's resources to fund health?

4. Have you ever participated in medical research? Would you now? Why or why not?

5. Research a pharma-, cosme- or neutri-ceutical that you either use or are interested in learning more about. Tell us what the product is, what its intended use is for, what audience it is intended to be used by (e.g., young teens, pregnant women, men with erectile dysfunction, arthritic elderly, etc.) and what possible negative side effects it may cause. Once you describe your research, indicate whether or not you are surprised by your findings and why. Finally, make a recommendation as to whether or not people should use this product and whether or not you believe the benefits outweigh the costs (i.e., negative side effects).

Week 7: Discussion Board Assignment

Pick one of the five following options.

1. This week, we learn more about UC's Student Wellness Center. You have an opportunity to earn 5 extra credit points for visiting the Wellness Center on campus, and on Tuesday, we will see a video they put together for our class (Watch it here: http://www.youtube.com/watch?v=BDf5ab2e718). Based on your visit there and/ or what you can glean from your own observation, this video and their website http://www.uc.edu/wellness.html , what does the Student Wellness Center appear to be doing to reach out to UC students (i.e., How are they promoting themselves)? Do you think it's effective? Why or why not? What suggestions for improvement can you make?

2. Do you tend to be more fatalistic or optimistic when it comes to your health? How do you see it impacting your health behavior and/or decisions?

3. Who (or what?) has the biggest impact on the choices you make about your health? Is it your mom? Dad? Grandma? Sister? Brother? Cousin? The mainstream news? Your online communities you are a part of ? The stuff you find on the internet? Your friends? Does it depend on the health issue? Put another way, walk us through how you might go about finding more information on or making an important decision about your health. Consider providing a specific example from your own life to illustrate this process.

4. This week, we look at several examples of communication campaigns that have used both reward and punishment appeals in their approaches to changing people's health behavior. According to Parrott, while some people respond better to rewards, others respond better to punishment. Where do you fall? What appeals would work best on you? In what situations? Why? Put another way, if someone was trying to persuade you to change your behavior to better your health, what approach would work best? Consider

using a specific health issue relevant to you to demonstrate your point.

5) How do you see the culture (or cultures!) you are a part of impacting the way you make decisions about your health? For example, when I was younger, it was a part of my family culture to smoke cigarettes, eat fast food, drinking Coke and lay out for hours at a time in the sun without sunscreen to get tan as possible. All of these behaviors were essentially "normalized" in my family. Later, when I moved away from home and started getting college educated, I realized there were better ways to take care of myself. Have you had any similar sort of experiences? That is, when those you have been around and/or currently spend time with seem to influence your health own behavior, be it good or bad? Share with us about them.

Week 8: Discussion Board Assignment

Dyad Discussion Board Project: Alternatives to Western Medicine

Assignment Description

This week you will have the opportunity to collaborate with one of your peers on your DB posts. You will choose from one of the two options below. Length requirements and grading criteria appear below the post options.

Before you begin, find out who your partner is (list appears in the weekly module) and contact them via email in your group site that has been set up under the groups tab in BB. **CONTACT YOUR PARTNER NO LATER THAN SATURDAY 2/8/14** so you have ample time to work on the assignment. **This assignment will be due by Friday 2/28/14@11:59pm**

Your Options:

Option 1: For most of us, the health care approach we are most familiar with (and likewise most comfortable with) is traditional western medicine. In Chapter 2 of *Talking About Health*, Parrott scratches the surface of the alternative approaches to healthcare that are available to us out there. In this post, you will have the opportunity to do some additional research on one of the alternative approaches below and tell the class about it.

1. Yoga
2. Traditional Chinese Medicine

3. Ayurvedic Medicine
4. Homeopathy
5. Magnetic Healing
6. Herbalism/Herbal Therapy
7. Progressive Relaxation
8. Naturopathy
9. Hydropathy
10. Energy Therapies
11. Reiki
12. Visualization/Guided Imagery
13. Bioelectromagentic-based therapies
14. Mind-body medicine
15. Hypnotherapy
16. Tai Chi
17. Reflexology
18. Aromatherapy
19. Shiatsu
20. Meditation
21. Spinal Manipulation
22. Medicinal Marijuana
23. Massage Therapy
24. Acupuncture
25. Any additional option you'd like to research that does not appear on the list

In this post, you should cover the following: 1) Briefly describe this approach to healthcare in a nutshell for those who may not be familiar with it (e.g., what the process entails, what it's used to treat, etc.) 2) Describe the pluses/ potential positive outcomes of such an approach 3) Discuss the negatives of such an approach and/or any controversy surrounding this approach (e.g., what do critics/skeptics of this approach say?) 4) Based on your research, would you recommend people use this approach? Why or why not? 5) Provide a Bibliography of your resources in APA format (minimum of 5 resources, one of which should be an academic journal); Include hyperlinks to any internet sites you use

Option 2: Over the years, many advances in the medical field have improved the treatment options and products available to us as patients. Whether it is a change in the way we approach a disease or chronic ailment or a new device that improves our mobility, our lives have been forever changed (and sometimes elongated!) because of scientific breakthroughs and innovations. In this post, research a medical breakthrough/innovation and tell us about it. It can be a new drug that has come along, a new technology that has been invented or whatever else you are able to discover and research. Whatever you decide, you should cover the following: 1) Briefly describe the advancement (e.g., who came up with it, when, and what it does), 2) Discuss how it is an

improvement upon the available options, or lack thereof, that came before it; 3) Discuss any possible negative outcomes or controversy surrounding this new innovation (e.g., what do critics/skeptics of this approach say?), 4) Based on your research, discuss whether or not you would recommend this new treatment/innovation. 5) Provide a Bibliography of your resources in APA format (minimum of 5 resources, one of which should be an academic journal); Include hyperlinks to any internet sites you use

Instructions, Grading Criteria & Length Requirements

Instructions:

Once you have had your initial communication with your partner via the email options in the groups page, please feel free to communicate in whatever manner you deem appropriate (e.g., phone, email, text, etc.). You are not required to use your group page or the resources available to you on it; rather, both are merely to serve as aids for you in your process. Feel free to use any, all, or none at your discretion (e.g., blogs, wikis, journals, etc).

Decide with your partner which question you'd like to answer and "stake your claim" to it on the Dyad DB located in the same place you post your usual DB posts: It is called **DB Week 8, part 1: Stake Your claim on your Dyad Project**. The idea here is to expose you to many different perspectives & resources, so there should be no more than two duplicates on this DB. For example, we should not have more than two groups talking about Yoga. This "claim staking" should also encourage you to get working on this project right away. To stake your claim, just put in the subject line "Group 2: Miley Cyrus and Channing Tatum: Yoga" or "Group 3: Bill Nye and Carl Sagan: Changes in cancer treatment technology."

Once you stake your claim, decide with your partner how you will divvy up the work and write your post. Your final post will go under **DB Week 8, part 2: Alternative Treatments & Medical Breakthroughs.** You will **submit only one post** for the two of you. Similar to "staking your claim," in the subject line for your final post, indicate what group you are and what option you chose (e.g., Group 5: Medical Breakthrough: Hip Replacements)

Week 9: Discussion Board Assignment (to help prepare for Week 14's DB on solving an environmental problem):

GROUP DB Project # 2, Ice Breaker Assignment

-In this short icebreaker assignment, you will help your group get to know you a little better. This is in an effort to help you as you move through the forming and norming stages of the group process (to be discussed in our Tuesday lecture). It should also help you start thinking about what roles you will play in your group projects this time around as well as what kind of experience you want to have overall.

-Use the following form below to create a profile about yourself. You can just copy & paste the items directly into your discussion board post and type in your responses. Please write in complete sentences and proofread what you post. **See my posted example for help**.

Develop a Profile: Cut & Paste Form

1. **Name**: (First, Last):
2. **Major**:
3. **Interests/Hobbies**:(50-75 words)
   -This can include anything from hunting, swimming, knitting, blogging, cooking, painting, listening to music, watching sports, organizations you are a part of or volunteer for (e.g., your sorority/fraternity, Habitat for Humanity, etc.)

4. **Best Group Experience**: Describe a group experience you've had that was AWESOME. What made it so? If you've never had an awesome group experience, describe what the ideal group experience would look like for you.

5. **Worst Group Experience**: Describe the worst group experience you've ever had. What made it so? If you've never had a bad group experience, talk about things that you'd like to avoid if possible working in a group

6. **Reflection your leadership qualities (use the scale below)**. Hopefully, this will help you establish some roles in your group. On a scale from 1-10, with one being "least likely to want to be the boss" and 10 being "absolutely prefer to be the one in charge," where would you rank yourself? Why? Be sure to figure your score based on what role you'd like to play FOR THIS GROUP EXPERIENCE, rather than how you are in general. For example, you may often find yourself being a leader and ranking a 10 (e.g., at your job), but given your workload for the semester, you may not be a 10 for this project. Just be realistic so your group knows what to expect.

Week 10: Discussion Board Assignment

1. Share about a memorable experience you have had with nature. Before answering this question, RELAX and let your mind wander for a few moments so you can be thoughtful about your response. Be as detailed as possible. What did you see, what did you hear, what did you smell? What did you do? Who were you with? How did you feel? Tell us about it and really try to take us there. *Once you have written about your experience, decide whether you think it is a direct, indirect or vicarious/symbolic experience and why, per Corbett's discussion in Ch. 1*

2. Share your reaction to either one or all of the articles we read for Tuesday this week (i.e., the "problem with tin," "C8" and "air pollution and mental health." (POSTED IN THE WEEK 10 MODULE). Questions to consider addressing in your post include (but are not limited to!): 1) Are you surprised by what you learn about in the article(s)? Why or why not? 2) Do you "buy" that the issues raised in the article(s) are ones we should be concerned about/are a big deal? Why or why not? 3) Do you think the issues raised are ones we can actually address/solve? Any ideas how?

3. Do you identify as an environmentalist? Why or why not?

4. In this class, we've talked about several examples of when what we do to the environment negatively impacts human health (e.g., DDT, CFC's, lead paint, Fernald, contaminated water in Hinckley California, lung issues from coal power). Are there any other environmental problems that you see impacting human health that you'd like to share with the class? Tell us about the issue/give us some background and explain how it seems to be impacting human health. Feel free to do your own research and see what you can find—if it's something local or has personally impacted you, EVEN BETTER.

Week 12: Discussion Board Assignment

<u>Pick one</u> of the four following options for your posts this week.

1) Where do you think you fall on the environmental ideology spectrum as outlined by Corbett (e.g., unrestrained instrumentalism, conservationism, animal rights/land based ethics, or one of the transformative ideologies)? What makes you say that? What gives it away?

2. Complete the two scales below and reflect on your scores. The first is the NEP scale. We discuss the NEP quite a bit in chapters 1-3 of the Corbett text. Some of you have already filled out this scale if you are participating in my research. What the NEP essentially measures is your overall level of concern with the environment or the extent to which your ideology is in line with the NEP. The second scale, the CNS (connectedness to nature scale) is used to gauge a person's overall feeling of "we-ness" with nature or to what extent someone feels connected to nature. Figure out your scores (add up your columns and divide by 8). Does your score surprise you? Why or why not? How does it compare with your NEP score? What do you think these scores reveal about your

environmental ideology/ belief system? [see downloadable version of the CNS & NEP in your week 12 module]

3. Reflect on and interrogate your own carbon footprint. Here are two different links where you can calculate your carbon footprint score: 1) http://myfootprint.org/en/visitor_information/ or 2) http://www.footprintnetwork.org/en/index.php/GFN/page/calculators/ Does your score surprise you? Why or why not? Any intentions to reduce your footprint? How?

4.) What are some ways you can envision helping the environment? These could be things that you already do, plan to do and/or have merely heard of or seen others do. Which one of Corbett's realms of Pro-Environmental Behavior (Ch. 3) does it fall into (i.e., environmental activism, non-activist behavior in the public sphere, private sphere environmentalism, actions within organizations)? Do you have any intentions to carry out these actions? Why or why not? What are some potential barriers you perceive in carrying out these actions?

Week 13: Discussion Board Assignment

Choose one of the following three options for your posts this week.

1. What is your reaction to the "Story of Stuff?" http://www.storyofstuff.org/movies-all/story-of-stuff/ Do you agree with Lou Dobbes that it should not be played in our schools? (View the response here: http://www.youtube.com/watch?v=9vTJdpbUYhY&feature=youtube_gdata_player)Why or why not? (You will be asked to watch the "Story of Stuff" in our lecture of Corbett, Ch. 4, but feel free to check it out at your leisure).

2. Research a product that makes some kind of green claim. Perhaps it is a product you have actually purchased yourself or just one you have seen advertised or on the shelf. If you've bought it, what sold you? Find out as much as you can about the product and then discuss how genuine the "greening" of the product is. Be sure to discuss any of the 7 sins of greenwashing you think the product is demonstrating. We will discuss the 7 sins when we cover Corbett Ch. 6, but you can find them here in the meantime: http://sinsofgreenwashing.org/findings/the-seven-sins/index.html

3. Research a company that has proclaimed itself in the mass media or on the internet as "going green" or has somehow done more to reduce their carbon footprint or lessen their impact on the environment (e.g., UPS is just one example we will discuss in class, but there are plenty more out there) . Many organizations nowadays have a special section especially devoted to "going green" or "sustainable business practices" on their websites. If there is a particular company that interests you, consider starting with their website and see what you are able to uncover from there. Tell us the name of the

Week 14: Discussion Board Assignment

How will you try to save the world? Post your plans here.

Week 15: Discussion Board Assignment

Please complete all the options this week. This post is worth 15 points. There is no minimum or maximum requirement. No peer comments required. Just be thoughtful in your responses--thanks!

1. Look back at **your goals you originally laid out** for yourself in this class from your first DB post, "Getting to know you." Do you think you met those goals? Why or why not? Are there any additional goals you achieved beyond your originals or any new ones you have now? Tell us about them.

2. What, if anything, did you learn about working in groups/online this semester that you found most helpful? What advice would you offer students who take this class in the future about working on the group projects in this class? Is there anything else the instructor can do to make group experiences more pleasant? Please explain.

3. What, if anything, has this class done for you? Put another way, do you plan on doing anything with what you learned in this class (be it from your peers, the instructor, the content, or whatever)? If you're not actually planning on doing anything, is there anything you can imagine yourself doing? Tell us about it.

4. What would you tell your peers about this class? Would you recommend it? Why or why not?

5. Please share anything else you'd like to say or conclude with.

APPENDIX C

PRETEST/POSTTEST MEASURES

Community of Inquiry Instrument, Arbaugh et al. (2008)

The instructor clearly communicated important course topics*	SD D N/NS A SA
The instructor clearly communicated important course goals.	SD D N/NS A SA
The instructor provided clear instructions on how to participate in course learning activities.	SD D N/NS A SA
The instructor clearly communicated important due dates/times frames for learning activities	SD D N/NS A SA
The instructor was helpful in identifying areas of agreement and disagreement on course topics that helped me to learn.	SD D N/NS A SA
The instructor was helpful in guiding the class toward understanding course topics in a way that helped clarify my understanding.	SD D N/NS A SA
The instructor helped to keep the course participants engaged and participating in productive dialogue.	SD D N/NS A SA
The instructor encouraged course participants to explore new concepts in this course.	SD D N/NS A SA
Instructor actions reinforced the development of a sense of community among course participants.	SD D N/NS A SA
The instructor helped to focus discussion on relevant issues in a way that helped me to learn.	SD D N/NS A SA
The instructor provided feedback that helped me understand my strengths and weaknesses relative the course goals and objectives.**	SD D N/NS A SA
Getting to know the course participants gave me a sense of belonging in the course	SD D N/NS A SA
I was able to form distinct impressions of some course participants.	SD D N/NS A SA
Online or wen-based communication is an excellent medium for social interaction.	SD D N/NS A SA
I felt comfortable conversing through the online medium.	SD D N/NS A SA
I felt comfortable participating in the course discussions/	SD D N/NS A SA
I felt comfortable interacting with other course participants.	SD D N/NS A SA
I felt comfortable disagreeing with other course participants while still maintaining a sense of trust.	SD D N/NS A SA

Community of Inquiry Instrument

I felt my point of view as acknowledged by other participants.	SD D N/NS A SA
Online discussions helped me to develop a sense of collaboration.	SD D N/NS A SA
Problems posed increased my interest in course issues.	SD D N/NS A SA
Course activities piqued my curiosity.	SD D N/NS A SA
I felt motivated to explored content related questions.	SD D N/NS A SA
I utilized a variety of information sources to explore problems posed in this course	SD D N/NS A SA
Brainstorming and finding relevant information helps me resolve content related questions.	SD D N/NS A SA
Online discussions were valuable in helping me appreciate different perspectives.	SD D N/NS A SA
Combining new information helped me answer questions raised in course activities.	SD D N/NS A SA
Learning activities helped me construct explanations/solutions.	SD D N/NS A SA
Reflection on course content and discussion helped me understand fundamental concepts in this class.	SD D N/NS A SA
I can describe ways to test and apply the knowledge in this course	SD D N/NS A SA
I have developed solutions to course problems that can be applied in practice	SD D N/NS A SA
I can apply the knowledge create in this course to my work pot other non-class related activities	SD D N/NS A SA

A sense of virtual community measure (SOVC), Blanchard (2007)	
I think this group is a good place for me to be a member.	SD D N/NS A SA
Other members and I want the same thing from this group.	SD D N/NS A SA
I can recognize the names of most/ many member in this group.	SD D N/NS A SA
I feel at home in this group.	SD D N/NS A SA
Very few other group members know me.	SD D N/NS A SA
I care about what other group member think about my actions.	SD D N/NS A SA
I have no influence over what this group is like.	SD D N/NS A SA
If there is a problem in this group, there are member who solve it.	SD D N/NS A SA
It is very important to me to be member of this group.	SD D N/NS A SA
Members of this group generally don't get al.ong with each other	SD D N/NS A SA
I expect to stay a part of this group for a long time.	SD D N/NS A SA
I anticipate how some members will react to certain questions or issues in this group.	SD D N/NS A SA
I get a lot out of being a part of this group.	SD D N/NS A SA
I've had questions that have been answered by this group.	SD D N/NS A SA
I've gotten support from this group.	SD D N/NS A SA
Some members of this group have friendships with each other.	SD D N/NS A SA
I have friends in this group.	SD D N/NS A SA
Some members of this group can be counted on to help others.	SD D N/NS A SA
I feel obligated to help others in this group.	SD D N/NS A SA
I really like this group.	SD D N/NS A SA
This group means a lot to me.	SD D N/NS A SA

Revised NEP (New ecological paradigm) scale Cordano et al. (2003)	
The balance of nature is easily upset	SD D N/NS A SA
When humans interfere with the environment it often produces disastrous consequences.	SD D N/NS A SA
Humans are severely abusing the environment.	SD D N/NS A SA
The so-called ecological crisis facing humankind is being greatly exaggerated.	SD D N/NS A SA
If things continue on their present course, we will soon experience a major ecological catastrophe.	SD D N/NS A SA
Humans have the right to modify the natural environment to suit their needs.	SD D N/NS A SA
Humans were meant to rule over the rest of nature.	SD D N/NS A SA
Plants and animals exist primarily to be used by humans.	SD D N/NS A SA

Revised Version of Children's Environmental Attitudes (and Knowledge) Scale (CHEAKS) Leeming et al. (1995)	
Verbal Commitment	
I would be willing to stop buying some products to save animal's lives	SD D N/NS A SA
I would not be willing to save energy by using less air conditioning.	SD D N/NS A SA
To save water, I would be willing to use less water when I bathe	SD D N/NS A SA
I would not give $15 dollars of my own money to help the environment	SD D N/NS A SA
I would be willing to ride the bus to more places in order to reduce air pollution	SD D N/NS A SA
I would be willing to car pool more to reduce air pollution*	SD D N/NS A SA
I would not be willing to separate my family's/household's trash for recycling.	SD D N/NS A SA
I would give $15 of my own money to help protect wild animals	SD D N/NS A SA
To save energy, I would be willing to use dimmer light bulbs	SD D N/NS A SA
To save water, I would be willing to turn off the water while I wash my hands.	SD D N/NS A SA
I would go from house to house to pass out environmental information.	SD D N/NS A SA
I would be willing to write letters asking people to help reduce pollution.	SD D N/NS A SA
I would be willing to go from house to house asking people to recycle.	SD D N/NS A SA
Actual commitment	
I have not written someone about a pollution problem.	SD D N/NS A SA
I have talked with my parents. People I care about about how to help with environmental probems.*	SD D N/NS A SA
I turn off the water in the sink while I brush my teeth to conserve water.	SD D N/NS A SA
To save energy, I turn off lights at home when they are not in use	SD D N/NS A SA

continued

Revised CHEAKS

I have asked my parents/loved ones not to buy products that harm the environment.*	SD D N/NS A SA
I have asked my family to recycle some of the things we use.	SD D N/NS A SA
I have asked others what I can do to help reduce pollution.	SD D N/NS A SA
I often read stories that are mostly about the environment I find myself seeking out information regarding environmental issues	SD D N/NS A SA
I do not let e water faucet run when it is not necessary.	SD D N/NS A SA
I leave the refrigerator open while I decide what to get out.	SD D N/NS A SA
I have put up a bird house near my home.	SD D N/NS A SA
I do not separate things at home for recycling.	SD D N/NS A SA
Affect	SD D N/NS A SA
I am frightened to think people don't care about the environment	SD D N/NS A SA
I get angry about the damage pollution does to the environment,	SD D N/NS A SA
It makes me happy when people recycle used bottles, cans and paper.	SD D N/NS A SA
I get angry when I think about companies testing products on animals.	SD D N/NS A SA
It makes me happy to see people trying to save energy.	SD D N/NS A SA
I am not worried about running out of water/water scarcity.	SD D N/NS A SA
I do not worry about environmental problems.	SD D N/NS A SA
I am not frightened about the effects of pollution on my family/loved ones.	SD D N/NS A SA
I get upset when I think of the things people throw away that could be recycled.	SD D N/NS A SA
It makes me sad to see houses being built where animals used to live.	SD D N/NS A SA

continued

Revised CHEAKS

It frightens me to think how much energy is wasted	SD D N/NS A SA
It upsets me when I see people use too much water.	SD D N/NS A SA
I would be willing to join an environmental student group.	SD D N/NS A SA
I would be willing to volunteer or work for an environmental organization off campus.	SD D N/NS A SA
I actively participate in an environmental student group.	SD D N/NS A SA
I actively participate in an environmental organization off-campus.	SD D N/NS A SA

Course Influence Scale (CIS1)	
I learned from one or more peers in this course.	SD D N/NS A SA
I trusted to knowledge and expertise of one or more of my peers in this class.	SD D N/NS A SA
I trusted the knowledge and expertise of the instructor in this class.	SD D N/NS A SA
My peers got me thinking critically about content in this course.	SD D N/NS A SA
My peers had an influence on the way I think about issues related to this.	SD D N/NS A SA
Something one of my peers said in this course made me consider changing my own behavior.	SD D N/NS A SA
I found/find myself sharing content from this class with others.	SD D N/NS A SA
I found/find myself talking to others about content discussed in this class.	SD D N/NS A SA
I found/find myself sharing information with others I learned from my peers in this class.	SD D N/NS A SA
I found myself seeking out the Discussion Board posts of one or more peers in this class.	SD D N/NS A SA
I found something I Learned from the content in the class influencing my own behavior.	SD D N/NS A SA
I found something I Learned from the instructor in the class influencing my own behavior.	SD D N/NS A SA
I found something I learned from peers in this class influencing my own behavior.	SD D N/NS A SA

Course Information Scale (CIS2)	
I find myself seeking out information about science.	SD D N/NS A SA
I find myself seeking out information about health.	SD D N/NS A SA
I find myself seeking out information about the environment.	SD D N/NS A SA
I find myself sharing information about science.	SD D N/NS A SA
I find myself sharing information about health.	SD D N/NS A SA
I find myself sharing information about the environment.	SD D N/NS A SA
I find myself sharing information from this class with others.	SD D N/NS A SA
I find myself talking about information form this class with others.	SD D N/NS A SA
I would be willing to talk to others about health issues.	SD D N/NS A SA
I would be willing to talk to other about environmental issues.	SD D N/NS A SA
I would be willing to talk to others about science-related issues.	SD D N/NS A SA

Personal/Demographic Information	
Are you a Communication Major?	
Are you an Environmental Studies Major?	YES NO
What is your major?	YES NO
What is your age?	18-24 25-35 36-47 48-59 60+
Which option best describes where you spent the majority of your time growing up?	Urban, Suburban, Rural, Other
What is your political affiliation?	Democrat, Republican, Libertarian, Independent, Other

APPENDIX D

SUMMARY OF MEAN VALUES FOR

ALL INSTRUMENT CONSTRUCTS

Table D.1 Summary of Mean Values for all Instrument Constructs ($N = 25$)

		Block Variables by Administrations											
		Gender				Class Rank				Major			
		Male		Female		Senior		Other		Environmental Studies		Other	
Instrument	Construct	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post
CoI	Teaching Presence	4.61	4.28	4.56	4.45	4.80	4.74	4.44	4.25	4.67	4.66	4.53	4.32
	Cognitive Presence	4.10	4.03	4.19	4.25	4.49	4.50	3.93	3.93	3.99	4.26	4.23	4.10
	Social Presence	4.50	4.24	4.19	4.07	4.37	4.47	4.29	3.94	3.99	4.15	4.50	4.15
SOVC	---	3.53	3.53	3.47	3.54	3.76	3.86	3.32	3.32	3.48	3.59	3.50	3.51
CHEAKS	Verbal Commitment	3.26	3.17	3.19	3.21	3.46	3.50	3.07	3.00	3.59	3.37	3.03	3.10
	Actual Commitment	3.52	3.58	3.65	3.93	3.74	3.76	3.50	3.79	3.89	4.02	3.44	3.65
	Affect	3.48	3.76	4.11	4.12	4.07	4.36	3.69	3.71	4.13	4.40	3.68	3.73
NEP	Balance	3.68	3.98	4.02	3.96	4.08	4.50	3.73	3.63	4.28	4.47	3.65	3.70
	Human Domination	3.30	3.53	3.87	4.10	3.93	4.22	3.43	3.62	4.29	4.33	3.27	3.60
CIS1	Peer Influence	3.80	3.85	4.10	4.00	4.15	4.39	3.85	3.64	3.81	4.16	4.05	3.82
	Instructor Influence	4.04	3.94	4.34	4.15	4.42	4.42	4.07	3.83	4.28	4.39	4.17	3.89
	Content Influence	3.78	3.78	3.92	3.94	4.08	4.19	3.71	3.66	3.84	4.19	3.87	3.70
CIS2	Seeking Information	3.52	3.36	3.38	3.36	3.59	3.44	3.36	3.31	3.46	3.63	3.44	3.23
	Sharing Information	3.39	3.20	3.23	3.26	3.44	3.21	3.22	3.25	3.50	3.43	3.20	3.14
	Willingness to Communicate	3.79	3.85	3.74	3.54	3.89	3.63	3.69	3.71	3.88	4.04	3.71	3.50

REFERENCES

Aivazidis, C., Lazaridou, M., & Hellden, G. F. (2006). A comparison between a traditional and an online environmental education program. *Reports & Research 37*(4), 45-54.

Alp, E., Tekkaya, C., & Yilmaz, A. (2006). A statistical analysis of children's environmental knowledge and attitudes in Turkey. *International Research in Geographical and Environmental Education, 15*(3), 210-223.

Anagnostopoulos, D., Basmadjian, K. G., & McCrory, R. S. (2005). The decentered teacher and the construction of social space in the virtual classroom. *Teachers College Record, 107*, 1699-1729.

Anderson, R., Dardenne, R., & Killenberg, G. (1994). *The conversation of journalism communication, community, and news.* Westport, CT: Praeger.

Anderson, T., & Garrison, D.R. (1997). New roles for learners at a distance. In C.C. Gibson (Ed.), *Distance learners in higher education: Institutional responses for quality outcomes* (pp. 1-153). Madison, WI: Atwood.

Anderson, T., Rourke, L., Garrison, D. R., & Archer, W. (2001). Assessing teaching presence in a computer conferencing context. *Journal of Asynchronous Learning Networks, 5*(2), 1−17.

Arbaugh, J.B., Cleveland-Innes, M., Diaz, S.R., Garrison, D.R., Ice, P., Richardson, J. & Swan, K. (2008). Developing a community of inquiry instrument: Testing a measure of community of inquiry framework using a multi-institutional sample. *Internet and Higher Education, 11*, 133-136

Bain & Company. (2013). Measuring your net promoter score. Retrieved from http://www.netpromotersystem.com/about/measuring-your-net-promoter-score.aspx. Accessed Sept. 17, 2014.

Ballantyne, R., Fien, J., & Packer, J. (2001). Program effectiveness in facilitating intergenerational influence in environmental education. Lessons from the fields. *The Journal of Environmental Education, 32*(4), 8-15.

Barber, B. (1984). *Strong democracy: Participatory politics for a new age*. Berkeley, CA: University of California Press.

Berge, Z. L. (1995). Facilitating computer conferencing: Recommendations from the field. *Educational Technology, 35*(1), 22-30.

Bhabha, H.K. (1990). The Third Space. In J. Rutherford (Ed.), *Identity, community culture, & difference* (pp. 207-221). London: Lawrence & Wishart.

Blanchard, A.L. (2007). Developing a sense of virtual community measure. *CyberPsychology and Behavior, 10*(6), 827-830.

Blanchard, A.L., & Markus, M.L. (2004). The experienced "sense" of a virtual community: Characteristic and processes. *The DATA BASE for Advances in Information Systems*, *35*, 65-79.

Bourne, J. R., McMaster, E., Rieger, J., & Campbell, J. O. (1997). Paradigms for on-line learning: A case study in the design and implementation of an Asynchronous Learning Networks (ALN) course. *Journal of Asynchronous Learning Networks, 1*(2), 39–56

Bullard, J. (1998). Raising awareness of local Agenda 21: The use of internet resources. *Journal of Geography in Higher Education, 22,* 201-210

Burroughs, S.M., & Eby, L.T. (1998). Psychological sense of community at work: A measurement system and explanatory framework. *Journal of Community Psychology, 26,* 509-532.

Brown, A. L., & Campione, J. C. (1990). Communities of learning and thinking, or a context by any other name. In D. Kuhn (Ed.), *Contribution to human development: Vol. 21. Developmental perspectives on teaching and learning thinking skills* (pp. 108–126). Basel: Karger.

Chawla, L., & Cushing, D. F. (2007). Education for strategic environmental behavior. *Environmental Education Research*, *13*(4), 437–452.

Cissna, K. N., & Anderson, R. (1994). Communication and the ground of dialogue. In R. Anderson, K.N. Cissna, & R.C. Arnett (Eds.), *The reach of dialogue: Confirmation, voice, and community* (pp. 9-30). Cresskill, NJ: Hampton Press.

Conover Johnston, P., Searing, D. D., & Crewe, I. (2002). The deliberative potential of political discussion. *British Journal of Political Science*, *32*(1), 21–62.

Conover, P. J., & Searing, D. D. (2005). Studying "everyday political talk" in the deliberative system. *Acta Politica, 40,* 269–283.

Corbin, J., & Strauss, A. (1990). Grounded theory research: Procedures, canons, and evaluative criteria. *Qualitative Sociology, 13*(1), 3-21.

Cordano, M., Welcomer, S. A., & Scherer, R. F. (2003). An analysis of the predictive validity of the New Ecological Paradigm Scale. *The Journal of Environmental Education, 34*(3), 22-28.

Cothrel, J. P. (2000). Measuring the success of an online community. *Strategy & Leadership, 28*(2), 17-21.

Cox, R. (2006). *Environmental communication in the public sphere.* London: Sage Publications.

Cutler, R. H. (1996). Technologies, relations and selves. In L. Strate, R. Jacobson, & S.B. Gibson (Eds.), *Communication and cyberspace: Social interaction in an electronic environment* (pp. 317-333). Creskill, NJ: Hampton Press.

Davies, J. (2006). Affinities and beyond! Developing ways of seeing in online spaces. *E- Learning, 3*(2), 217-234.

De Laat, M., Lally, V., Lipponen, L., & Simons, R.J. (2006). Online teaching in networked learning communities: A multimethod approach to studying the role of the teacher. *Instructional Science*, *35*, 257–286.

De Leon, L., & Whitacre, M. (2010). Fostering student dialogue through an online student teacher support group: A phenomenological study. *International Journal of Instructional Media*, *37*(4), 355–364.

Dewey, J. (1916) *Democracy and education.* New York: Macmillan.

Donelle, L., & Hoffman-Goetz, L. (2008). An exploratory study of Canadian aboriginal online health care forums. *Health Communication, 23*, 270-281.

Dunlap, R. E., & Van Liere, K.D. (1978). The "new environmental paradigm": A proposed measuring instrument and preliminary results. *Journal of Environmental Communication, 9,* 10-19.

Dunlap, R.E., Van Liere, K.D. Mertig, A.G., & Jones, R.E. (2000). Measuring endorsement of the new ecological paradigm: A new revised NEP scale. *Journal of Social Issues*, *56*(3), 425-442.

Eichhorn, A.C. (2008). Soliciting and providing social support over the internet: An investigation of online eating disorder groups. *Journal of Computer-Mediated Communication, 14*, 67-78.

Ewert, A., & Baker, D. (2001). Standing where you sit: An exploratory analysis of the relationship between academic major and environment beliefs. *Environment and Behavior, 33*(5), 687-707.

Garrison, D.R. (2007). Online community of inquiry review: Social, cognitive, and teaching presence issues. *Journal of Asynchronous Learning Networks, 11*(1), 61-72.

Garrison, D.R. (2009). Communities of inquiry in online learning: Social, teaching and cognitive presence. In Howard et al. (Eds.), *Encyclopedia of distance and online learning*. Hershey, PA: IGI Global.

Garrison, D.R., Anderson, T., & Archer, W. (2000). Critical inquiry in a text-based environment: Computer conferencing in higher education. *The Internet and Higher Education, 2,* 87-105.

Garrison, D.R., Anderson, T., & Archer, W. (2001). Critical thinking, cognitive presence, and computer conferencing in distance education. *American Journal of Distance Education, 15*(1), 7-23.

Garrison, D.R., & Arbaugh, J. B. (2007). Researching the community of inquiry framework: Review, issues and future directions. *The Internet and Higher Education, 10*(3), 157-172.

Gee, J.P. (2004). *Situated language and learning: A critique of traditional schooling.* London: Routledge.

Geertz, C. (1973). Thick description: Toward an interpretive theory of culture. In *The interpretation of cultures: Selected essays* (pp. 3-30). New York: Basic Books.

Goncharova, M. (2012). Planet play: Designing a game for children to promote environmental awareness. *Online Journal of Communication and Media Technologies, 2*(4), 137-154.

Gray, D.B., Borden, R. J., & Weigel, R.H, (1985). *Ecological beliefs and behaviors: Assessment and change.* Westport, CN: Greenwood Press.

Greider, W. (1992). Frontline: The Betrayal of Democracy, PBS, April 15, 1992. Retrieved from http://www.pbs.org/wgbh/pages/frontline/programs/info/1017.html.

Griffin, R. J., Neuwirth, K., Giese, J., & Dunwoody, S. (2002). Linking the heuristic-systematic model of depth processing. *Communication Research, 29*, 705–732.

Gunawardena, C.N., & Zittle, F.J. (1997). Social presence as a predictor of satisfaction within a computer-mediated conferencing environment. *The American Journal of Distance Education, 11*(3), 8-26.

Habermas, J. (1984). *The Theory of Communicative Action: Vol 1. Reason and the rationalization of society* (T. McCarthy, Trans.). Boston, MA: Beacon Press.

Habermas, J. (2005). Concluding comments on empirical approaches to deliberative politics. *Act Politica, 40*, 384-392.

Hafey DeVincenzo, M., & Scammon, D. (2015). Principle based consumption communities: Exploring the meanings derived from socially conscious consumption practices. *Journal of Public Policy & Marketing, 34*(2).

Hare, A.P., & Davies, M.F. (1994). Social interaction. In A.P. Hare, H. H. Blumberg, M.F. Davies, & M.V. Kent (Eds.), *Small group research: A handbook* (pp. 169-193). Norwood, NJ: Ablex.

Hew, K. F., & Cheung, W. S. (2013). Use of web 2.0 technologies in K-12 and higher education: The search for evidence-based practice. *Educational Research Review*, *9*, 47–64.

Hillman, D.C., Willis, D.J., & Gunawardena, C.N. (1994) Learner interface in distance education: An extension of contemporary models and strategies for practitioners. *The American Journal of Distance Education, 8*(2), 30-42.

Hiltz, S. R. (1997). Impacts of college-level courses via asynchronous learning networks: Some preliminary results. *Journal of Asynchronous Learning Networks, 1*(2), 1-19.

Holmberg, B. (1986). *Growth and structure of distance education.* London: Croom- Helm.

Houtsonen, L. (2003). Maximising the use of communication technologies in geographical education. In R. Gerber (Ed.), *International handbook on geographical education* (pp. 47-63). Dodrecht, Netherlands: Kluwer.

Howard, T.W. (2010). *Design to thrive: Creating social networks and online communities that last.* Burlington, MA: Elsevier Company.

Hu, L.-T., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling, 6,* 1-55.

Jackson, J.L., Dezee, K., Douglas, K., & Shimeall, W. 2005. Introduction to structural equation modeling (path analysis) [online]. Precourse PA08. Society of General Internal Medicine (SGIM), Washington, D.C. Retrieved from http://www.sgim.org/userfiles/file/AMHandouts/AM05/handouts/PA08.pdf.

Jang, S. A., Rimal, R. N., & Cho, N. (2012). Normative influences and alcohol consumption: The role of drinking refusal self-efficacy. *Health Communication*, *5*, 1–9.

Jonassen, D., Davidson, M., Collins, M., Campbell, J., & Haag, B. B. (1995). Constructivism and computer mediated communication in distance education. *American Journal of Distance Education, 9*(2), 7–26.

Kasperson, R.E., Renn, O., Slovic, P., Brown, H.S., Emel, J. Goble, R. Kasperson, J., & Ratick, S. (1988). The social amplification of risk: A conceptual framework. *Risk Analysis, 8*(2), 177-187.

Keller, E., & Berry, J. (2003). *The influentials*. New York: Free Press.

Kim, J., & Kim, E. J. (2008). Theorizing dialogic deliberation: Everyday political talk as communicative action and dialogue. *Communication Theory*, *18*, 51–70.

Kim, J., & Wyatt, R., & Katz, E. (1999). News, talk, opinion, participation. The part played by conversation in deliberative democracy. *Political Communication*, *16*, 361–385.

King, F.B. (2002). A virtual student: Not an ordinary joe. *The Internet and Higher Education, 5,* 157-166.

Kleinman, S. (2005). Strategies for encouraging active learning, interaction, and academic integrity in online courses. *Communication Teacher*, *19*(1), 13–18.

Kline, P. (1999). *The handbook of psychological testing*. London: Routledge.

Koh, J., & Kim, Y.G. (2003). Sense of virtual community: A conceptual framework and empirical validation. *International Journal of Electronic Commerce, 8*(2), 75-94.

Kraut, R. E., & Resnick, P. (2011). *Building successful online communities: Evidence- based social design.* Cambridge, MA: Massachusetts Institute of Technology.

LaTrobe, H.L., & Acott, T.G. (2000) A modified NEP/DSP Environmental attitudes scale. *The Journal of Environmental Education, 32*(1), 12-20.

Lave, J., & Wenger, E. (1991). *Situated Learning: Legitimate peripheral participation.*

Cambridge, MA: Cambridge University Press.

Leeming, F. C., Dwyer, W.O., & Bracken, B. A. (1995). Children's environmental attitude and knowledge scale: Construction and validation. *Journal of Environmental*

Education, 26, 22-31.

Liang, B., & Scammon, D.L. (2013). "The Role of Online Talking in Achieving Health Behavior Change" at 2013 *AMA Marketing and Public Policy Conference*, Washington, D.C., June.

Maloney, M.P., Ward, M.P., & Braucht, G.N. (1975). A revised scale for the measurement of ecological attitudes and knowledge. *American Psychologist, 30,* 787-790.

Mayer, F. S., & Frantz, C.M. (2004). The connectedness to nature scale: A measure of individuals' feeling in community with nature. *Journal of Environmental Psychology, 24*, 503-515

McIssac, M.S., Blocher, J.M., Mahes, V., & Vrasidas, C. (1999). Student and teacher perception of interaction in online computer-mediated communication. *Educational Media International, 36*, 121-131.

McLeod, J. M., Scheufele, D. A., & Moy, P. (1999). Community, communication, & participation: The role of mass media and interpersonal discussion in local political participation. *Political Communication*, *16*, 315-336.

McMillan, D.W., & Chavis, D.M. (1986). Sense of community: A definition and theory. *Journal of Community Psychology*, 30*(1)*, 6-23.

Millington, R. (2012). *Buzzing communities*: *How to build bigger, better, and more active online communities*. Lexington, KY: Richard Millington.

Moore, M.G. (1989) Three types of interaction. *American Journal of Distance Education 3*(2), 1-6.

Moore, C., & Huber, R. (2001) Support for EE from the National Science Education standards and the internet. *Journal of Environmental Education, 32* (3), 21-25.

Moorman, C., Zaltman, G., & Deshpande, R. (1993). Factors affecting trust in market relationships. *Journal of Marketing, 57*, 81-101.

Moscovici, S. (1985). *The age of the crowd: A treatise on mass psychology*. Cambridge, UK: Cambridge University Press.

Nomura, K. (2004). Utilisation of IT/ICT for environmental education: World School Network. Retrieved from http://pub.iges.or.jp/contents/APEIS/RISPO/inventory/db/pdf/0122.pdf. Accessed 12 December, 2013.

Pallant, J. (2013). *SPSS survival manual: A step by step guide to data analysis using SPSS* (5th ed.). New York: McGraw-Hill.

Papastergiou, M., Panagiotis, A., & Apostolou, M. (2013). Effects of student participation in an online learning community on environmental education: A Greek case study. *Technology, Pedagogy & Education*, *20*(2), 127–142.

Peugh, J.L., & Enders, C.K. (2004). Missing data in educational research: A review of reporting practices and suggestion s for improvement. *Review of Educational Research*, *74*, 525-556.

Preece, J. (2001). Sociability and usability: Twenty years of chatting online. *Behavior and Information Technology Journal, 20*(5), 347-356.

Rafaeli, S., & Sudweeks, F. (1997). Networked interactivity. *Journal of Computer- mediated Communication, 2*(4), online.

Reichheld, F. (2003). The one number you need to grow. *Harvard Business Review* (Dec.) Retrieved from https://hbr.org/2003/12/the-one-number-you-need-to-grow. Accessed Sept. 17. 2014.

Roberts, L.D., Smith, L.M., & Pollock, C.M. (2002). Mooing till the cows come home: The sense of community in virtual environment: In C.C. Sonn (Ed.). *Psychological sense of community: Research, applications, implications* (pp. 223-245). New York: Kluwer Academic/Plenum.

Rogers, E.M. (1962). *Diffusion of innovations* (1st ed.) New York: Free Press.

Rovai, A.P. (2001) Classroom community at a distance: A comparative analysis of two ALN-based university programs. *Internet and Higher Education, 4*(2), 105-118.

Rovai, A.P. (2002) Building sense of community at a distance. *International Review of Research in Open and Distance Learning, 3*(1), np.

Rovai, A.P. (2006, May). *Building and sustaining community in asynchronous learning networks*. Paper presented at the *Coalition of Christian Teacher Educators Conferences: Equipping for Alignment of Heart, Head and Hands*, Virginia Beach, VA.

Sarason, S.B. (1986). Commentary: The emergence of a conceptual center. *Journal of Community Psychology, 14*, 405-407.

Scheufele, D. A. (2000). Talk or conversation? Dimensions of interpersonal discussion and their implications for participatory democracy. *Journalism and Mass Communication Quarterly*, *77*(4), 727–743.

Schudson, M. (1997). Why conversation is not the soul of democracy. *Critical Studies in Mass Communication, 14*, 297–309.

Schultz, P.W., & Zelenzky, L. (1999). Values of predictors of environmental attitudes: Evidence for consistency across 14 countries. *Journal of Environmental Psychology, 19*, 255-265.

Schumaker, R. E., & Lomax, R. G. (2004). *A beginner's guide to structural equation modeling* (2nd ed.). Mahwah, NJ: Lawrence Erlbaum.

Searing, D. D., Solt, F., Conover Johnston, P., & Crewe, I. (2007). Public discussion in the deliberative system: Does it make better citizens? *British Journal of Political Science*, *37*(4), 587–618.

Shah, D. V., Cho, J., Eveland, W. P., & Kwak, N. (2005). Information and expression in a digital age: Modeling internet effects of participation. *Communication Research, 32*, 531–565.

Shah, D. V., Kwak,N., & Holbert, R. L. (2001). "Connecting" and "disconnecting" with civic life: Patterns of Internet use and the production of social capital. *Political Communication*, *18*, 141-162.

Shea, P.J., Li, C.S., & Pickett, A. (2006). A study of teaching presence and student sense of learning community in fully online and web-enhanced college courses. *The Internet and Higher Education, 9*(2), 175-190.

Sherburn, M., & Devlin, A.S. (2004). Academic major, environmental concern, and arboretum use. *Journal of Environmental Education, 35(2),* 23-36.

Swan, K. (2004). Issues of interface. *European Journal of Open, Distance, and E-learning, 1*, np.

Tabachnick, B.G., & Fidell, L.S. (2007) *Using multivariate statistics*. Boston, MA: Pearson Education, Inc.

Tallent-Runnels, M.K., Thomas, J.A., Lan, W.Y., Cooper. S., Ahern, T.C., Shaw, S.M., & Liu, X. (2006). Teaching courses online: A review of the research. *Research in Distance Education, 76*(1), 93-135

Triola, M. (2010) *Elementary Statistics* (11th ed.). Boston, MA: Pearson Education, Inc.

UC Diversity (2009) http://www.uc.edu/diversity/demographics.html. Accessed 30 January, 2014.

Van Liere, K.D., & Dunlap, R.E. (1981). Environmental concern: Does it make a difference how it's measured? *Environment and Behavior, 13*(6), 651-676.

Vygotsky, Lev. 1962. *Thinking and speaking* (first Published as Thought and Language). Ed. Eugenia Hanfmann and Gertrude Vakar. Lev Vygotsky Archive transcribed by Andy Blunden. Cambridge MA: MIT Press.

Walsh-Daneshmandi, A., & Machlan, M. (2006). Toward the effective evaluation of environmental education: Validity of the children's environmental attitudes and knowledge scale using data from a sample of Irish students. *The Journal of Environmental Education, 37*(2), 13-23.

Wegerif, R. (1998). The social dimension of asynchronous learning networks. *Journal of Asynchronous Learning Networks*, *2*(1), 34–49.

Yang, J., & Stone, G. (2003a). The powerful role of interpersonal communication in agenda setting. *Mass Communication & Society*, *6*(1), 57–74.

Zhu, E. (2006). Interaction and cognitive engagement: An analysis of four asynchronous online discussions. *Instructional Science, 34*, 451-480.