

ABSTRACT

Title of dissertation: “BACKING AWAY FROM THE CLIFF”: A THEORY OF EDUCATION FOR SUSTAINABILITY IN THE POSTSECONDARY CLASSROOM

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Despite growing efforts for Education for Sustainability (EfS), little empirical research documents EfS in the postsecondary classroom and the ways in which sustainability is defined in these classrooms. The purpose of this study was to provide a theory of EfS in the postsecondary classroom in the United States. I sought to understand how postsecondary educators understand sustainability, how they engage in EfS in the classroom, and what contexts influence their work in EfS. Using a constructivist, grounded theory methodology, I selected three institutions – East State University, Liberal Arts College, and Religious University – for this study given both their diversity of mission and their commitment to EfS. I observed 27 different courses, comprising a total of 67 class meetings, and interviewed a total of 42 individuals, 29 of whom were educators, 11 of whom were students, and 2 who were primarily administrators.

Findings revealed that a macro-narrative of sustainability in the classroom concerns (a) the relationship between humanity and the environment, including relationships between communities that are mediated by the environment; (b) the ways in which people come to

understand those relationships; and (c) the responsibilities individuals have because of those relationships. Educators described that the term sustainability is complex but also invites dialogue. Variations of EfS in the classroom existed along two continua, one concerning the role of sustainability (whether fundamental or supplemental) and another concerning the teaching framework (practical or theoretical). When used together, these continua created a typology of courses that helped students conceptualize, operationalize, contextualize, or synthesize sustainability. Although variations of EfS existed, a number of pedagogical characteristics were similar in EfS classrooms, including educators' desire to teach beyond content, multiple sources of knowledge, the use of pedagogical partnerships, invitation to conversation among disciplines, and values orientations. These characteristics together demonstrate a path from knowledge to practice in an EfS classroom.

Findings provide a theory for understanding sustainability within the context of a postsecondary classroom and possible variations for EfS in the classrooms. They reveal implications for educators – both inside the classroom and within the co-curriculum – as they provide an empirically grounded theory for EfS.

“BACKING AWAY FROM THE CLIFF”:
A THEORY OF EDUCATION FOR SUSTAINABILITY IN
THE POSTSECONDARY CLASSROOM

by

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DEDICATION

There is diving beauty in learning . . . To learn means to accept the postulate that life did not begin at my birth. Others have been here before, and I walk in their footsteps. The books I have read were composed by generations of fathers and sons, mothers and daughters, teachers and disciplines. I am the sum total of their experiences, their quests. And so are you.
Elie Wiesel

I dedicate this work to my grandparents.

Agnes
April 25, 1918 – August 23, 2011
&
Clayton Belue
September 9, 1912 – August 11, 1983

Erice
July 22, 1923 - December 4, 2012
&
H. Hepburn Turberville
August 1, 1917 – December 3, 2001

For their belief in me and
for tending the earth and our families.
As they rest in peace, I work in their memory.

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More than once, I attempted to count and name every teacher I have ever had. Usually, I stop once I get to the three digits and realize I will inevitably never name them all in one sitting; and, I have inevitably not mentioned everyone here that has contributed to this work. Then I realize how this process of teaching goes on for generations, with lasting affects throughout the centuries – sometimes in troubling ways when people are systemically left out of ongoing educational relationships and sometimes for the good when a village provides support for each one. In essence, my grandparents’ and great grandparents’ teachers influence me in ways I may never know (thus, Elie Wiesel’s words in the dedication of this work). The number of people who have molded me along the way is astounding, and I am grateful to have the space to thank all of them broadly and some specifically, though I know I have left out names that should be here. Anything useful or insightful in this piece is rooted in the work of perhaps thousands. To borrow a thought from my better half, anything lacking is something I bollixed; next time, I will need to thank the thousands who eventually helped bring clarity to any thinking that went wrong here.

First, I want to thank my advisor, Dr. Stephen John Quaye. He took a chance on me and my seemingly tangential research interests, welcomed me onto his research team, and was a truly outstanding advisor from our first meeting. His willingness to support my ideas, to keep me on track, to open his door, to reach out to me and my family, to read my drafts, to listen to my stresses, to edit even my citations, to provide poignant and focused feedback, to deepen my thinking, to ask questions, to give space, to add extra work to his plate for my progress in the doctoral program seems truly unmatched. All of this while serving as a model researcher, teacher, servant, husband, and dad. Stephen is a model for faculty everywhere in his care for each student, his stance for social justice, his dedication to scholarship, and his willingness to admit that taking time to be a dad is essential. I am honored to call Stephen an advisor and a friend. He is a model of the mentor I hope to be. I am grateful to Sebastian and Brenda for the family time they, too, sacrificed, as Stephen helped me with this project.

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information together in teaching, and his care for students. He inspires many of the students who are already and who will be working around the globe to ensure a sustainable future. He graciously answered my plea for suggestions of readings and has helped bolster my scholarly consideration of sustainability. Despite his many commitments on campus, he agreed to add me to the list without hesitation. Lastly, I am grateful to Dr. Kimberly A. Griffin. She joined Maryland's faculty as I was beginning my dissertation process and was willing to jump on board, despite the many responsibilities being added daily to her plate. Her feedback has helped me step back from narrow ways in which I was conceiving my project, and her example as a scholar has been motivational.

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CHAPTER 1: SETTING THE SCENE

A Path to Teaching

In May 2011, I attended a workshop to learn how to incorporate sustainability into my teaching. In two days, the group discussed definitions of sustainability, shared ideas, and heard from those who had already been “in the trenches” creating and editing courses. I was working to incorporate lessons of sustainability into a collegiate introductory diversity course in an education school. Despite the preparation, however, I launched into my course realizing that the task seemed more difficult than I had imagined. As much as teaching content, I wanted to evoke an ethos or way of thinking. Yet, content was important for providing a baseline understanding for why sustainability is important. One of my participants later gave helpful imagery to my dilemma as she described the metaphorical “cliff” of impending environmental degradation. She was less concerned with teaching about the exact location or make up of the cliff and more concerned about guiding her students with knowledge that would help them “back away from the cliff.” In my own class, I was uncertain about whether to change the whole nature of the course or just spend a day or two focused on topics related to sustainability. And which topics should I pick – fair trade, racial effects of toxic waste dumps, the violence of consumerism? I looked to journals for a guide, and while I found helpful resources, a clear movement at work, and a plethora of case studies, I also noticed a lack of empirical research on the way we, as educators in the United States, are holistically teaching for sustainability in higher education. Thus, my own search for grounding and guidance led me to this study, as did the scope of environmental, social, and economic problems facing the globe today.

My own interest in sustainability began through various moments of growing up. I explored the woods behind my grandparents' house, shucked corn and shelled peas with two generations of family, and learned elements of nature at a local environmental camp. I saw my sister bring her recycling home with her laundry when she started attending college in 1992. When I graduated from college, I lived in an intentional community where we attempted to live simply. With six housemates, I learned to compost, to balance financial cost of food with cost to the environment or to people who labor, and to dialogue about differing opinions. In graduate school at the University of Vermont, I learned about creating a campus culture for sustainability, and there my personal and professional interests merged as I began to see the possibility of working for sustainability within the realm of higher education and student affairs.

Before I consider the problem I sought to address in my study, I must consider briefly the notion of sustainability. I later delve more deeply into common definitions of sustainability, and in my findings, I show the ways in which faculty understood and taught for sustainability. Both common definitions and findings I present in chapter four inform my own understandings of the term. In my synthesis, sustainability is a way of thinking, acting, and being with attention to healthy relationships between humanity and the environment as well as environment-mediated relationships between communities across both time and place. Healthy relationships might be characterized by a number of values, such as social justice, appreciation for the good life, simplicity, or desire to have minimal impact on the environment. These values then move into the realm of environmental ethics and ethics broadly, as each community or individual may have different visions of what each value might become in practice. The idea of sustainability

is rich because it calls communities – and a global community -- together to make sometimes difficult decisions rooted not simply in the value of economic growth, in ever increasing gross domestic products, but in the hope that humanity might slow the conveyor belt of history; see the relationships that abound – both life-giving and literally life-taking -- among people, the environment, and the economy; and, move toward a way of thinking, acting, and being that restores value to these relationships.

Educating a Globe in Crisis

The need for education for sustainability is great when considering the current state of the planet. Environmentally, climate change is drastically affecting the availability of food, cycles of crop productions, predictability of water levels, and presence of biodiversity around the globe (Brainard, Jones, & Purvis, 2009; Intergovernmental Panel on Climate Change [IPCC], 2007; Eldredge, 2001). Economically, consumption and a global market economy are increasingly expanding the divide between the rich and poor while exposing already vulnerable populations to toxic byproducts of production processes (Rees & Westra, 2003). Socially, the most vulnerable are facing growing issues of hunger and homelessness (Brainard, Jones, & Purvis, 2009). In the United States, scholars have also well documented that economic and health consequences of pollution and hazardous waste sites disproportionately affect communities of color (Agyeman, Bullard, & Evans, 2003; Bullard, Mohai, Saha, & Wright, 2007). Therefore, environmental issues are directly connected to issues of social justice.

The IPCC (2007) notes that issues that have led to the need for sustainability, particularly the issue of climate change, have almost certainly been caused by human

behavior. Yet, institutions of education have heretofore largely ignored if not enhanced environmental degradation. Orr (2004) adds that climate change is “not the work of ignorant people. Rather, it is largely the results of work by people with BAs, BSs, LLBs, MBAs, and PhDs” (p. 7). He highlights that some of the most educated people throughout history – those with degrees from institutions of higher education -- have created significant environmental, economic, and societal problems. In part, he argues that educated people use knowledge without attention to its consequences and their values. In a related argument, scholars (Carp, 2013; Cortese, 2003; Orr, 2004) have suggested that disciplines in higher education create silos in which educated people view the world without attention to multiple forms of knowledge and perception. Carp argued that “the ecological crisis is not an ‘accident’ of cultural development; it is a necessary correlate of our knowledge practices” (p. 225). In the academy, such “knowledge practices” tend to be characterized by the preference of rational thought and the separation of disciplines (Carp; Cortese). Orr (2004) noted,

We have fragmented the world into bits and pieces called discipline and subdisciplines, hermetically sealed from other such disciplines. As a result, after 12 or 16 or 20 years of education, most students graduate without any broad, integrated sense of the unity of things. (p. 11)

Cortese added that higher education is designed to reward such fragmentation saying, “Faculty, responding to long-established incentives (e.g., tenure, research) and professional practices, are often discouraged from extending their work into other disciplines or inviting interdisciplinary collaboration” (p. 16). In other words, postsecondary knowledge practices, which exist in distinct disciplines that rarely inform each other, have created current crises. Thus, the need not only for a change in human behavior but for a change in the way of educating is paramount to address some of the

greatest issues facing the globe today. Orr argued, “Now more than ever... we need people who think broadly and who understand systems, connections, patterns, and root causes” (p. 23). The current urgent call for sustainability begs the question of what members of society want from postsecondary institutions.

The Role of Higher Education

Primarily, I argue that institutions of higher education have a stake in sustainability because they do not exist simply to prepare students for society as it exists. They also must engage with notions of what a society should be. I briefly turn, therefore, to a consideration of the role and power of higher education, how it relates to sustainability, and how some campuses are already responding, specifically in the realm of the academic curriculum.

Edgerton (1997), in reviewing the changing nature of higher education, noted that modern postsecondary institutions have come to serve an important place not just in preparing students for society but also in serving as a guiding voice for society itself:

Colleges and universities are uniquely suited to serve a *counterweight* function in American society. If society is caught in tradition, colleges and universities can point to the future. If society is racing to the future, colleges and universities can remind it of its past. If the nation is coming unglued, as ours seems to be today under the onslaught of the mass media and commercialism, colleges and universities can--and should--lean hard into the wind and become a force for social renewal. (p. 50)

In other words, those who work in colleges and universities must critique the very society for which they prepare students. Higher education institutions, therefore, have a role in critiquing a modern society that does not act in a sustainable way and in preparing students to engage in a sustainable society. As issues of sustainability may change over

time, these institutions can help both to identify key issues and help society define sustainability throughout time.

The potential and power of U.S. colleges and universities are apparent when looking at the numbers. The United States alone has 4,409 degree-granting institutions (National Center for Education Statistics [NCES], 2009), enrolling 20.4 million Americans in 2009 (NCES, 2011). This is only a fraction of the population of college and university communities, which encompass faculty, staff, administrators, and visitors. The expenditures of these institutions were expected to amount to over \$432 billion in 2008-2009 (NCES, 2010). This demographic and spending power says little about the political and epistemological power these institutions have as places in which future leaders and global decision-makers learn and grow. Echoing Edgerton's claim that higher education must critique society, the Association of American Colleges and Universities and the Council for Higher Education Accreditation (AAC&U & CHEA, 2008) add that "higher education has an obligation to our democracy as well as our economy" (p. 1). They suggest that "a college degree should ensure that graduates are well prepared to contribute to society as knowledgeable, engaged, and active citizens" (p. 1). These educated citizens must be equipped with the knowledge and skills to successfully steward democracy and economy in a way that restores human-environment relationships. Arguably, given the scope of the problems facing the nation and the globe, colleges and universities must stretch sustainability beyond the programs specifically designed to study sustainability and into the worlds of each student whose knowledge and behaviors have immediate and future significance. Postsecondary institutions have the power to

provide accurate, value-driven, and action-oriented education about and for sustainability to a large population.

Higher Education Responds

Appropriately, therefore, the call for attention to sustainability in higher education has grown in the last decade (Association for the Advancement of Sustainability in Higher Education [AASHE], 2010a; Cortese, 2003; Orr, 2004, 2010; Rowe 2002). One of the myriad topics institutions grapple with while determining priorities (Association of American College & Universities, & Council for Higher Education Accreditation, 2008; Department of Education, 2006) and measuring learning (Keeling, 2004, 2006) is sustainability. Institutions are seeking to prove, in an ever-growing evidentiary-based educational system, that they are environmentally-friendly in their emissions, building practices, and infrastructure development (Association of American Colleges & Universities President's Climate Commitment, 2010; Sustainable Endowments Institute, 2010). The American College & University President's Climate Commitment (ACUPCC, 2009) calls for institutions to begin working toward holistic institutional planning to transform higher education for a sustainable society. Changes in areas as diverse as procurement, waste management, operations, student involvement, and curriculum signal efforts to include sustainability in institutional priorities. Organizations have worked to establish learning outcomes around sustainability (American College Personnel Association [ACPA], 2008) and to provide tracking, rating, and assessment programs for institutional efforts toward sustainability (AASHE, 2012; ACUPCC, 2010).

Curriculum and Education

Colleges and universities must play a role not just in shaping the sustainable reformation of campuses themselves but also of reframing education for students who learn and take lessons from their hallowed halls and cyber classrooms to the public square. One specific area that has received much attention in higher education, therefore, is the need to educate students about sustainability or within a sustainable paradigm. In what has become his rallying cry, Anthony Cortese, founder and president of Second Nature, proclaimed in 2003: “Higher education institutions bear a profound moral responsibility to increase the awareness, knowledge, skills, and values needed to create a just and sustainable future” (p. 17). He is one of many (ACPA, 2008; Bartlett & Chase, 2004, 2013; Blewitt & Cullingford, 2010; Orr, 2010; Rowe, 2002) who are at the forefront of a movement that has grown from a 1977 international document, the Tbilisi Declaration, that called for the “inclusion of environmental education in national educational programs” (Orr, 2010, p. 76) and more recently the 1990 Talloires Declaration, which issued 10 environmental and sustainable goals for higher education and has 400 signers from 50 countries (University Leaders for a Sustainable Future, 2013). Some institutions are responding to the need for education for sustainability by training faculty. Since 1995, Northern Arizona University’s (NAU) Ponderosa Project has brought together faculty from across the disciplines to study sustainability and learn how to infuse sustainability into their courses (Chase & Rowland, 2004). Emory University soon started a similar program, the Piedmont Project, in 2001 (Barlett, 2004). The University of Maryland created the Chesapeake Project in 2009 (Chesapeake Project, 2010). With established goals and measurable progress, institutions of higher education have made positive changes, with significant progress yet to be made.

The Problem

Despite the work for sustainability that I have just described, efforts in higher education are playing catch-up. Most Americans have little accurate knowledge about climate change, which is one concept important to the idea of sustainability. In a recent study, Yale's Project on Climate Change Communication (Leiserowitz, Smith, & Marlon, 2010) surveyed a nationally representative sample to assess knowledge on climate change. Researchers found that 40% of Americans "would receive a C or D, and 52 percent would receive an F" (p. 3). This lack of knowledge is alarming given ongoing documentation (IPCC, 2007) of the role of human behavior in driving the resource depletion, emissions, and waste that ultimately result in climate change. Not only does human behavior relate to the environmental health of the planet itself but also to the health of communities.

In addition, despite the growing awareness of sustainability in parts of higher education, educators have little empirical research on the infusion of sustainability into the classroom. Sterling (2010) writes that "While the progress of environmental and sustainability education over the last three decades has been impressive, it also has been slowed by a degree of incoherence and constrained by a largely uncomprehending and resistant mainstream" (p. 43). A review of the literature shows a number of case studies and best practices from colleges and universities over the course of the last decade (ACUPCC, 2009; Barlett & Chase, 2004, 2013; Blewitt & Cullingford, 2010; Clark & Button, 2011; Johnston, 2013; Savelyeva & McKenna, 2011); yet, little in-depth research on the ways in which sustainability is taught in a variety of courses. Organizations and scholars at the forefront of sustainability in higher education give guidelines for how the

“context of learning,” “content of learning,” and “process of education” must change to promote education for sustainability through the curriculum (ACUPCC, 2009, p. 6; see also Rusinko, 2010). Yet, little research attempts to synthesize how educators across the disciplines teach about or for sustainability (my findings reveal nuances in content *about* sustainability and pedagogy *for* sustainability), what common learning goals these educators have for students, and what commonalities about sustainability exist across the disciplines.

Much of the incoherence and lack of research likely stems from the many related concepts that fall within the term “sustainability.” Sterling notes that as sustainability has matured as a concept, a “paradox” has developed: “The more conceptually far-reaching the movement has become, and the more strategically ambitious, the more difficult it is for education as a whole to respond adequately” (p. 47). In other words, the movement for sustainability has grown to encompass so many different topics, philosophical points of view, and approaches to environmental, social, and or economic health that creating a single academic response to or study of sustainability is conceptually and practically challenging. Sustainability cannot be limited to one class or one discipline, the ways in which postsecondary institutions are structured to “respond” and teach. The concept has grown more complex and more in need of study, yet it is harder to study or teach because of that very complexity. In my findings, I discuss how participants themselves described that they were teaching beyond content, as content about sustainability issues is overwhelming.

At the same time, as institutions have tried to incorporate sustainability into the classroom, collaborative attempts to document such work have been difficult.

Dautremont-Smith (2013) noted that she “analyzed almost 160 definitions of ‘sustainability in the curriculum’.” She noted that because definitions were “ambiguous,” data reported through the Sustainability, Tracking, and Rating System, a program through the Association for the Advancement of Sustainability in Higher Education, “do not allow for meaningful comparisons between institutions.” My study provides a framework that could be used to help institutions compare course offerings.

Purpose Statement and Research Questions

My research addresses a need, therefore, by examining and developing the concept of education for sustainability across the disciplines. I was attuned to disciplines not normally associated with the learning of sustainability because paradigmatic shifts in education will require that institutions incorporate sustainability into courses beyond those in disciplines or programs specifically dedicated to the study of sustainability. The purpose of my study was to understand how educators understand and teach about sustainability in postsecondary courses. I used the terms “educators” or “instructors” simultaneously to encompass not only traditional faculty but also adjunct professors, graduate students, student affairs administrators, and others who taught courses I observed. While many terms exist to describe the infusion of sustainability into the postsecondary classroom (Sterling, 2010), I use most frequently the term education for sustainability (EfS), which carries connotations of “the inner dimensions of valuative psychological and perceptual change” and an education that supports education “for being” (p. 49), meaning an education that supports not simply memorization of facts but instead a way of living informed by both knowledge and values.

My overarching research question was: **How do educators from varied disciplines teach for sustainability?** Supporting research questions included:

1. How do educators understand and define sustainability?
2. What information, values, and action-oriented skills related to sustainability do educators teach?
3. What contexts (e.g., institutions, academic disciplines) influence educators' approaches to or involvement in EfS?

Sustainability: Working toward Definition

I ground my study in the growing literature that seeks to define sustainability. The most

cited definition for the term “sustainability” is the Brundtland Commission (World Commission on Environment and Development, 1987) definition, which states that sustainable development allows for the meeting of “the needs of the present without compromising the ability of future generations to meet their own needs” (Section I, Part 3, Item 27). The American College Personnel Association (ACPA, 2008) highlights the “triple bottom line” of sustainability, which includes social justice or equity, environmental health, and economic health (all areas subject to debate within the realm of ethics). While these widely cited elements of sustainability exist, the concept of sustainability is complex and not easy to define. Norton (2005) provides a philosophically grounded tome on the concept of sustainability and language of environmentalism that consists of hundreds of pages. In the early part of the book he admits:

It turns out that I can offer only a “schematic” definition [of sustainability] – a definition that includes a number of variables that must be turned into specifics by

real communities that choose “important” indicators. If the people of a community choose indicators associated with values they hold dear, and use these indicators to state concrete sustainability goals with respect to their community, they will in effect be defining sustainability – for themselves. Every community might come up with a different definition. (p. 40)

In this excerpt, Norton suggests that at least three important dimensions underlie the concept of sustainability: (a) the ability of individuals to determine what is “important” to their communities and themselves; (b) the existence of an “important” set of shared values or common good; and (c) the use of said values in individual and communal behavior. Because higher education institutions are a counterweight to society, they have a role to play in bringing individuals together to determine these important values, providing a space for teaching and learning these values, and serving as a launching ground for a community’s use of these values. A definition that is “schematic” leaves room for a wide degree of variance; at the same time, I seek to provide a theory that suggests a common framework educators might use in contexts. Using Norton’s definition, I expect each institution, and in fact, each classroom community might have slightly different notions of sustainability based on what each community values as important; therefore, I considered contexts for the courses I observed and people I interviewed.

Methodology and Methods

Given my focus on theory and concept development, I used qualitative methods for my study. I combined observations, interviews, and document review, using grounded theory methodology (Charmaz, 2006; Creswell, 2007) to produce a theory of EfS in the classroom. I used purposeful sampling (Creswell, 2007; Jones, Torres, & Arminio, 2006) to select educators from across diverse disciplines who were teaching about or for

sustainability in their courses. The project was designed to delve deeply into a few “excellent” (Spradley, 1979) cases of teaching sustainability as a means of creating a theory that could inform others. I chose three universities because of their unique contributions to the concept of teaching and sustainability. Each university had demonstrated a commitment to sustainability through offices and staff positions, and each highlighted elements of academic consideration of sustainability on their Web sites. Each, however, provided a different context for learning sustainability. To analyze data, I used NVivo software (a qualitative data analysis program that enables users to perform line-by-line coding) as well as hand coding. Engaging in line-by-line, axial, and selective coding and a constant comparative method (Charmaz, 2006), I was able to identify key themes and work toward a theory of EfS in the postsecondary classroom.

Significance

This study is rooted in the idea that postsecondary classrooms across the disciplines are an important space for infusing learning for sustainability. From American Studies to journalism to education to English to music to policy studies to the hard sciences, the lessons of and for sustainability have a place in classroom learning. These lessons are crucial if the U.S. hopes to work toward a viable planet, society, and economy. As long as sustainability is sequestered in environmental disciplines or areas of study specifically dedicated to sustainability, a cultural shift cannot happen. One contribution of this project, therefore, is to contribute to the literature that seeks to transform education for a sustainable society. Broadly, this study works toward mitigation of current environmental, social, and economic degradation and prevention of

future issues by examining how we teach toward sustainability and providing insight for educators engaged in the process of EfS.

A second contribution of this study is that it extends EfS research by filling a void in a current body of knowledge. So far, the literature on EfS falls within two broad categories. First, organizations and associations have created guidelines and reports that assist educators in teaching sustainability. Second, many researchers have contributed individual examples or case studies of incorporating sustainability into one class or one program. My project is different from these two bodies of knowledge in two specific ways. First, my project includes an examination of EfS in practice, as I interviewed and observed educators “on the ground” implementing the work. Second, while informed by individual case studies, I looked beyond a single case study to provide an examination of a number of EfS examples that contributed to an informed analysis beyond a single case study. I sought to complement and enhance existing knowledge by examining relatively unexplored terrain in EfS. In addition, the study provides a contribution to research and literature broadly in the area of teaching and learning, as I examined a way of teaching that elicits sustainable ways of thinking and learning.

Lastly, my study provides educators with strategies to incorporate education for sustainability in their teaching, no matter the discipline. A goal in writing and synthesizing my findings was to provide tools educators could use to incorporate sustainability into their courses. The findings from my research provide a theory that can help educators and administrators define the concept of sustainability for their teaching and actively incorporate sustainability in diverse classrooms based on their different goals for each class. The theory is a tool that can help educators transform each

classroom, student, and ultimately members of society who have the power either to contribute to or detract from a global paradigm of sustainability. The theory is also a tool that can inform classroom content and teaching frameworks, outside of class work for EfS, creation of academic programs, infusion of EfS into the curriculum, and the training of postsecondary instructors. A theory of education for sustainability is paramount for educating students to think critically about, care for, and resolve social, economic, and environmental issues that face the globe.

Concluding to Proceed

For a true cultural shift that results in pollution reduction, climate change mitigation, new ways of establishing economic health, cultural appreciation, social justice, and enhancement of human health, higher education institutions must teach each student from each discipline – not just those already pursuing sustainability education -- *about* sustainability and climate change, *why* they should care, and *how* the average person can work to make a difference. Students need each of these elements -- accurate information about climate change (Orr, 2010), a value orientation to care for the environment and others (Stern, 2000), along with change-agent skills that will allow them to translate knowledge and values into behaviors (Rowe, 2002). My research provides knowledge for educators about ways to engage in education for sustainability that fosters this kind of learning for students.

I do not intend for my findings to be a final, one-size-fits-all theory that can be applied without nuance to complex and varied courses. Instead, my findings provide a clear documentation of instructors' understandings of sustainability, how those understandings might be translated into different class settings, variations of EfS

educators might employ, and pedagogical characteristics of EfS. I provide examples of what educators expect students will learn and how different contexts shape instructors' involvement in EfS. I highlight ways in which educators can apply these lessons in perhaps untraditional but nevertheless crucial spaces.

With the emergence of knowledge about and cultural momentum toward sustainability, the time is ripe for transforming education for sustainability. To create broad-reaching change, postsecondary institutions must ensure that educators reach not only those already drawn to learning about sustainability but each student whose current and later behaviors have global impact. The implications for this work do not stop at teaching and learning in the classroom. They are crucial for the condition of the planet and our communities in light of the major problems resulting from environmental degradation. Scientists have suggested that human behavior is the most important factor in mitigating climate change; I want to help ensure that current students and future leaders know accurate information about environmental degradation, why it has occurred, and how each person can contribute to its mitigation. The call for sustainability education on college campuses has never been more profound.

CHAPTER 2: LITERATURE REVIEW AND SENSITIZING CONCEPTS

A number of bodies of literature are important for laying the foundation for education for sustainability in higher education. First, I situate the ideas of knowledge and education as they relate to sustainability. Then I briefly review the historical emergence of sustainability in education over the past few decades. I describe a few examples of education for sustainability (EfS) on campuses and provide example guidelines and learning outcomes for EfS. Next, I move from EfS specifically and review some theories of teaching and learning that serve as sensitizing concepts for my study (Charmaz, 2006). Finally, I describe Bronfrenbrenner's (1979) model of the ecology of human development as a sensitizing concept for considering contexts for EfS.

Sustainability in Knowledge

Notions of sustainability come from various culturally-situated sources of knowledge. Many "traditional cultures" protect the environment and honor the earth through farming, hunting, and spiritual practices (Edwards, 2010, p. 7). Edwards describes practices of Tibetan nomads, Balinese farmers, Inuit communities, and Kogi tribes. Elements of sustainability I describe are, therefore, not new ideas but rather stem from elements of traditional knowledge that have frequently been drowned by the rising tide of technology and industrialism. However, the discourse of sustainability – discourse I use in this proposal -- frequently features the newness of the term "sustainability." While the term itself as I use it has a fairly short life, the concepts it seeks to employ have been in the minds of communities perhaps since the beginning of humanity. The discourse of sustainability is not without problem, therefore, given the fact that it frequently purports new ideas, which are, in fact, ancient and well-established. They are

new perhaps only to Western ideas of knowledge. I briefly trace here how those Western ideas developed, as they undergird my own educational trajectory as well as philosophical foundations of the universities I study. Because I recognize the ways in which education has at times silenced traditional knowledge and do not want to imply that education is a monolithic, singular entity, when I refer to education in this document I refer specifically to education in traditional postsecondary institutions in the United States unless otherwise stated. Such education is not the only form of education, but it is one that has significant power in the U.S.

In different historical approaches, Worster (1994) and Abram (1996) highlight the ways philosophy and ways of knowing have contributed to how members of societies view, use, and/or protect the environment. From Galileo to Descartes to Linnaeus, the breaking apart of the measurable, factual worlds from the felt, “subjective” worlds have influenced the way modern day societies conceive of the environment. Abram’s phenomenological account gives a glimpse of how these philosophical divisions have evolved in language, such that the earth has moved from direct communicative consciousness. Linnaeus, the father of botanical taxonomy, argued that “man must vigorously pursue his assigned work of utilizing his fellow species to his own advantage” (Worster, 1994, p. 36). Worster provides a historical glimpse at more modern intellectual developments, and McNeill’s (2000) treatise on environmental history portrays perhaps a more recent history of the consequences of modern philosophy on the degradation of the earth and its atmosphere. Societies in the 20th century have measured, progressed, and moved in ways that have left acres of soils eroded, trails of at times fatal pollution plums, and decreasing biodiversity – all of which have contributed to significant human cost

(Brainard, Purvis, & Jones, 2009). Therefore, with increased technical “progress” and human “knowledge” have come an ecological crisis brought on by this very knowledge expansion (IPCC, 2007). Contemporary ecological crisis is tightly linked to modern intellectual developments.¹

Abram, Worster, and McNeill use different methods for arguing similarly that ways of thinking are fundamental to human-environment relationships. The philosophies that have guided educational institutions and contributed to human progress at least since the enlightenment, therefore, have also perhaps contributed to a continued dismissing of the environment. Yet, some educational institutions seem to have provided models for ways in which higher education can change historical ways of thinking. Education for Sustainability (EfS) is just one example of an attempt to shift education toward a mindfulness of the earth and social-environmental connections. I describe next, therefore, the emergence of EfS and its context in a relatively recent (from the 1970s) history of interest in education for the environment.

History of Education incorporating the Environment

While a broad overview of a history of sustainability would include details about Aldo Leopold’s land ethic, debates between Muir and Pinchot and their respective

¹ While an ecological crisis has been brought on by humanity, humans have suffered, too, as a result of the crisis; and, sustainability as a concept is concerned not simply with ecological health but also with human health. As I have considered in more depth in other studies (Buckley, in press) and as others have noted (Evans, 2012), sustainability has an element of anthropocentrism. In particular the Brundtland Commission definition (WCED, 1997) implies that the earth is largely a resource for human use. Yet, as many educators I interviewed noted, a degree of anthropocentrism differentiates sustainability and simplified notions of environmentalism from the 1960s and 1970s. Sustainability suggests that a society should solve ecological crises both for the sake of the environment and for the sake of humans who live on the environment, particularly vulnerable communities who unjustly face the brunt of ecological crises. The differences are reminiscent of past distinctions of conservation (limit and carefully use environmental resources) and preservation (refrain from disturbing the environment in any way), with an added element of consideration for the state of humanity (Dresner, 2010). Thus, sustainability requires the acceptance that while humanity might be the cause of ecological crisis – as Worster (1996), McNeill (2000), and the IPCC (2007) note -- it is also in need of rescue. Humanity is at once perpetrator and victim, destroyer and repair-person.

followers about preservation and conservation, and Malthusian-inspired debates about the limits of earth's carrying capacity for a growing population (Dresner, 2010), I begin here with specific events that directly relate to education. In examining the history of recent environmental education, I first describe broad international and national movements. Then I describe the ways in which terms have evolved alongside those movements.

Movement for environmental education

The United Nations Conference on the Human Environment in Stockholm in 1972 is widely cited as the kindling for the movement for sustainability (Dresner, 2010; Edwards, 2005; Rowe & Johnston, 2013). The conference was convened to address growing issues of poverty, and despite some debate, the environment came to be seen as connected to issues of international development. The conference “led to the establishment of the United Nations Environment Programme (UNEP)” (Dresner, p. 32). Only a few years later in 1977, the United Nations Educational, Scientific, and Cultural Organization (UNESCO) together with the United Nation Environment Programme organized “the world’s first Intergovernmental Conference on Environmental Education” in Tbilisi, Georgia (UNESCO, 1978, p. 5). The document included that education is of critical importance for mitigation of environmental degradation and its consequences on society. The document stated what was at the time a novel idea:

Environmental education should be integrated into the whole system of formal education at all levels to provide the necessary knowledge, understanding, values and skills needed by the general public and many occupational groups, for their participation in devising solutions to environmental questions. . . The ultimate aim of environmental education is to enable people to understand the complexities of the environment and the need for nations to adapt their activities and pursue their development in ways which are harmonious with the environment. . . Environmental education must also help create an awareness of the economic, political, and ecological interdependence of the modern world so as to enhance a spirit of responsibility and solidarity among nations. (UNESCO, p. 12)

Thus, the representatives at the conference suggested both that all education must incorporate environmental awareness and that such education would focus on the interdependence of the environment and society. The document included 12 principles for the implementation of environmental education. The principles were as follows:

1. consider the environment in its totality—natural and built, technological and social (economic, political, cultural-historical, ethical, esthetic);
2. be a continuous lifelong process, beginning at the preschool level and continuing through all formal and nonformal stages;
3. be interdisciplinary in its approach, drawing on the specific content of each discipline in making possible a holistic and balanced perspective;
4. examine major environmental issues from local, national, regional, and international points of view so that students receive insights into environmental conditions in other geographical areas;
5. focus on current and potential environmental situations while taking into account the historical perspective;
6. promote the value and necessity of local, national, and international cooperation in the prevention and solution of environmental problems;
7. explicitly consider environmental aspects in plans for development and growth;
8. enable learners to have a role in planning their learning experiences and provide an opportunity for making decisions and accepting their consequences;
9. relate environmental sensitivity, knowledge, problem-solving skills, and values clarification to every age, but with special emphasis on environmental sensitivity to the learner's own community in early years;
10. help learners discover the symptoms and real causes of environmental problems;
11. emphasize the complexity of environmental problems and thus the need to develop critical thinking and problem-solving skills;
12. utilize diverse learning environments and a broad array of educational approaches to teaching, learning about and from the environment with due stress on practical activities and first-hand experience.

These principles were designed to guide educators in teaching students about the environment.

While the focus in the 1970's was on environmental education, the discussion began to shift in the 1980's and early 1990's. In chapter one, I discussed that the 1987 report of the Brundtland Commission (the United Nations World Commission on the Environment and Development) produced the definition for sustainability that is

commonly cited. Traditionally, those in international development viewed the environment as an area that developed nations had the luxury of considering, while developing nations needed to focus on poverty and conditions of local communities. The Brundtland commission, therefore, was tasked with bringing together the goals of international development with the goals of environmental protection, which were widely seen as being contradictory. Sustainability, which encapsulates the melding of economy, social equity, and the environment, emerged as the commission's ensuing concept. As a result of the proposals made by the Brundtland Commission, the UN Earth Summit (or Conference on Environment and Development) took place in Rio in 1992. From the Earth Summit came a number of recommendations, including the claim that education must be a primary focus for working toward sustainable development (Blewitt & Cullingford, 2010; Dresner, 2010).

In 1990, senior leaders from 22 universities met in France to eventually draft the Talloires Declaration. The declaration issued ten actions, to which the university leaders agreed, including the goals of increasing “awareness of environmentally sustainable development,” working toward education for “environmentally responsible citizenship,” and fostering “environmental literacy for all” (University Leaders for a Sustainable Future, 1990). The declaration currently has 400 signers from 50 countries (University Leaders for a Sustainable Future, 2013). At about the same time in the U.S., the National Wildlife Federation (2010) launched the Campus Ecology program to “work with college leaders and develop resources” to begin environmental efforts on campus. In 1993, the group Second Nature (2010) was founded to support U.S. colleges and universities in educating students for sustainability. Today the group serves mostly high-level leadership

of postsecondary institutions and hosts many programs that support its efforts around education for sustainability. Second Nature (n.d.) has published a framework for sustainability curriculum, and they have been influential in the creation of the American College and University Presidents' Climate Commitment (ACUPCC), which has also published guidelines for education for sustainability (ACUPCC, 2009). In 2006, the Association for the Advancement for Sustainability in Higher Education (AASHE) officially formed as a result of a regional organization and a national conference that showed demand (AASHE, 2010a). The association hosts college and university members and serves as a resource and educational center for a variety of campus faculty, staff, and administrators. AASHE, among a host of other curricular and educational resources, has issued a guide for sustainability curriculum (2010b).

With each of these movements and publications in the last few years, the approach to education concerning the environment has become more complex while also moving into prominence on an international scale. While I claim to study EfS, I suspect the term itself will (and already has) continued to morph as associations, scholars, and movements continue to fine-tune its meaning. For example, some continued debates wage about whether the idea of ecological resilience or of shared social and communal values ought to guide the developing trajectory of the way in which we care about social-environment connections (Norton, 2005, p. 313). I turn next, therefore, to an examination of the terms, which I italicize, that have emerged to describe the sort of education that is attune to the environment.

Evolution of Terms

The Tbilisi declaration evoked a need for *environmental education (EE)*. At the gathering in the 1970's, the world was primed to think about the environment as a concept that had heretofore been overlooked in education. The terms involving sustainability emerged later. With continued discussion and involvement of the development community, the need for education beyond the environment alone became apparent. *Education for sustainable development (ESD)*, therefore, emerged as a term that encapsulated the need to engage a pedagogy that focused on the intersection of societal development and the environment. Yet, ESD, to some, was viewed as “outer-directed and possibly too instrumentally oriented” (Sterling, 2010, p. 49). Thus, *education for sustainability (EfS)* emerged as “education ‘for being’ rather than (just) education ‘for becoming’” (Sterling, p. 49). The idea of EfS harkens also to the idea of education for doing, as it implies action “for” a sort of ideal state. Sterling argues for the need to move even beyond EfS to the term *sustainable education*. He stated, “Sustainability indicates both the ground and possibility of a change of educational paradigm as a whole” (p. 49). Thus, to Sterling, EE, ESD, and EfS all are add-ons to an educational curriculum, but sustainable education is the restructuring of an educational paradigm itself (albeit not the only important principle guiding educational paradigms).

While sustainable education might be a shared goal, its definition presupposes a fundamentally different paradigm of teaching and learning. Given the slow-changing nature of institutions of higher education (Birnbaum, 1988), I hypothesize that the kind of work I will be examining in the classroom might best be described as EfS. Therefore, I use the term EfS for this study. I believe the fundamental shift in educational paradigm needed for sustainable education, while possible, is largely yet unseen as institutions

slowly chisel their models for EfS. Postsecondary institutions are still in the phase of adding-on or making small adjustments to curricular and co-curricular efforts. I will be examining some of those efforts, and I review next some of the efforts for EfS that are apparent in the literature.

Case of Education for Sustainability

Rusinko (2010) provided a matrix for ways in which institutions can integrate sustainability into higher education ranging from cross-disciplinary approaches to discipline-specific approaches and from existing structures to new structures. Evidence of each of her suggested modes of incorporating sustainability into higher education exists. Broadly, three types of cases of EfS exist in the literature: (a) the work to change the nature of an institution, (b) the (re)creation of sustainability-related programs, and (c) the (re)design of specific courses. I review examples of each.

Institutional Cases

Fieselman and Lindquist (2013) described the ways in which Meredith College worked to incorporate sustainability into the whole curriculum by hiring a sustainability coordinator, assigning liaisons to each academic department, changing general education requirements, and redesigning an Environmental Studies major into an Environmental Sustainability major. As a result, Meredith College has seen more faculty teaching about sustainability in courses that range in topics from art, design materials, to environmental ethics. In another example, Halfacre et al. (2012) described Furman University's adaptive and Middlebury College's emergent models for incorporating sustainability into the curriculum. Middlebury College, with a historic Environmental Studies program (which offers one of the most popular majors), has adapted an existing focus on the environment

to include principles of sustainability into courses and internships. Furman worked to add a requirement to the general education curriculum that would foster learning for sustainability; Furman also developed a sustainability science major. Famously, Arizona State University has worked to launch a School of Sustainability (SOS), transform an existing center into the Global Institute of Sustainability, and bridge natural and social sciences through grants to create learning focused on solving current problems (Redman & Wiek, 2013). ASU president, Michael Crow, stated that the campus must become “The New American University” (Redman & Wiek, p. 215). While the SOS might best be described as an example of a new program, it is indicative of an attempt at the change of education as a whole at ASU. Redman and Weik stated that work with the SOS has made those involved ask “whether sustainability education should be a gradual transition from current interdisciplinary programs adhering to and intensifying many of the approaches already current at research university, or does it require a true transformation in our conduct of research and problem solving” (p. 221)? SOS has eschewed traditional disciplinary boundaries to engage faculty and students in an interdisciplinary education endeavor, and the demand among students has been high.

Program Cases

A number of programs have also emerged to address the need for EfS. A search on the AASHE web site, yields 1323 sustainability-focused academic degree programs (AASHE, 2012), which range in degree attained from certificates to doctorates. Their topics range from areas such as environmental science to sustainable development to sustainability in business. These programs have varied in content inclusion, and Liu (2011) has argued that more of these programs should incorporate courses in geography.

Harvard University has created the area of sustainability science (Kates et al., 2001), which “seeks to understand the fundamental character of interactions between nature and society. Such an understanding must encompass the integration of global processes with the ecological and social characteristics of particular places and sectors” (p. 641). Many institutions have followed suit, with programs similar in concept (Liu, 2011).

Some have sought to institute new curricular foci in sustainability. For example, Keating et al. (2010) described the use of a USDA Higher Education Challenge Grant to create an interdisciplinary curriculum for sustainable agriculture, which among other goals would “support the transition of the state’s small farmers to a post-tobacco economy” (p. 24). The curriculum was designed to address issues of sustainability in regards to real-time agricultural needs of the region and provided for creation of interdisciplinary courses focused on agriculture (e.g., the Dynamics of Rural Social Life) as well as hands-on experience for students in organic community-supported agriculture. Savelyeva and McKenna (2011) described the incorporation of sustainability into Global Seminar, “an on-the-ground and bottom-up initiative, which is facilitated by faculty and ran by students from 40 universities from around the world” (p. 56). Arguing that the Global Seminar provides a curricular model for higher education, the authors described the mutual learning that occurs through the international, innovative, interactive, and interdisciplinary nature of the program. Clark and Button (2011) described efforts at Central Connecticut State University (CCSU) to bring together campus organizations, faculty, local museums, K-12 schools, NGOs, political leaders and artists to bridge the arts, science, and the community within a sustainability transdisciplinary education model. Through a number of local alliances, their initiatives brought together aesthetic

arts exhibits, town hall meetings, and lectures to engage EfS not only inside the university but in conjunction with local community groups. Efforts through the Global Seminar and at CCSU comprise new and innovative methods of collaboration. These examples show educators within postsecondary institutions reaching beyond campus to develop global and community partnerships to work toward understanding and implementing sustainability.

Course Cases

Lastly, some institutions have worked to incorporate EfS specifically at the course level. Zoller (2011) described one such effort in the sciences, making the case for teaching higher-order cognitive skills in science education, namely shifting from “teaching to know” to promoting “learning to think.” In a different case, incorporating topics of sustainability into the conversational and written elements of courses through a service-learning translation project, ter Horst and Pearce (2010) described ways foreign language courses can address issues of sustainability. Students translated website text on sustainability into German, providing both a needed online resource as well as language practice. Such an example demonstrates the ways in which a traditional course can change to address a societal need while also meeting its learning outcomes.

Aurandt and Butler (2011) suggested that reading materials and assignments that can be used to incorporate sustainability into traditional engineering courses are lacking; however, they have woven principles of sustainability into a redesigned organic chemistry course while continuing to meet the stated learning outcomes. They also suggested sustainability can be incorporated into a curriculum through upper-level courses focused on topics related to sustainability. While not discussing one individual

course, Stark (2011) described the ways in which incorporation of sustainability in a university library system's rubric of information literacy can expose most students to ideas of sustainability because libraries are central for students' learning and research on campus.

Different Contexts at Work

What each of these examples show is that the significance of and institutional commitment to sustainability differs at each institution. On one end of a spectrum of infusion of EfS into the academics of an institution, some have fundamentally shifted the structure of their curriculum while others incorporate principles of sustainability into a course or two. Institutions serve as different contexts, therefore, for EfS in the classroom. Given the potential for different contextual settings for EfS, one of my research questions concerns the role of contexts. Though in sampling institutions, as I describe in chapter 3, I have sought to incorporate institutions with more than a course-by-course infusion of EfS to ensure my sample can provide rich data.

What Do Educators Teach?

While I have described examples of EfS at work, I have not yet addressed what exactly EfS might include. And, in fact, a large part of my dissertation includes the exploration of what constitutes EfS. If one learning outcome of EfS is that students learn how to put education into practice through environmentally significant behaviors, a number of factors, such as beliefs and norms, are important for education (Stern, 2000). In other words, as Arbuthnott (2008) described, knowledge acquisition alone is not enough. Norton (2005) would likely argue that each community must define for itself

what EfS would include; thus, examining some of the different conceptions of EfS is important.

Examples of Learning Outcomes

Reviewing stated EfS learning outcomes reveals ways in which some communities have defined EfS already. Rowe and Johnston (2013) review a number of different learning outcomes that have been incorporated into college and university efforts for EfS and highlight that a common element in the learning outcomes is the goal of “transformative learning,” which is “the ability to integrate, connect, confront, and reconcile multiple ways of looking at the world” p. 54). (Though my findings reveal some of the difficulty in carrying out such a goal.) Therefore, within EfS, educational communities engage in holistic examining of different forms of knowledge. I review here four examples of learning outcomes from the United Nations Educational Scientific and Cultural Organization (UNESCO), the University of Gloucestershire, ACUPUCC, and ACPA: College Student Educators International (ACPA). I review each of these examples because of their importance in higher education as well as their accessibility for educators.

UNESCO. UNESCO has named the decade from 2005 to 2014 the Decade of Education for Sustainable Development. The organization states that ESD

aims to help people to develop the attitudes, skills, perspectives and knowledge to make informed decisions and act up on them for the benefit of themselves and others, now and in the future. ESD helps the citizens of the world to learn their way to a more sustainable future. (UNESCO, 2012c)

The UNESCO definition focuses on informed action of communities for themselves and others both today and in the future. The environment is in the backdrop rather than the forefront of ESD as defined by UNESCO. Their web site features four “thrusts” and five

“pillars of learning,” among a number of other resources for educators. The thrusts include: “improving access and retention in quality basic education,” “reorienting existing educational programmes to address sustainability,” “increasing public understanding and awareness of sustainability,” and “providing training” (UNESCO, 2012b). The pillars of learning are based on the principle that while education will vary based on context, for example from “mountainous Asia” to “urbanized Europe,” each education will include: “learning to know, learning to do, learning to live together, learning to be, learning to transform oneself and society” (UNESCO, 2012a).

University of Gloucestershire. Professors (Tilbury & Ryan, 2011) at the University of Gloucestershire in the United Kingdom harkened to the UNESCO Decade for Education for Sustainable Development in a guide to education for sustainability, which has been featured by the Association for the Advancement of Sustainability in Higher Education. Instead of ESD, they used the term EfS and defined EfS as

ambitious in scope, as it is not simply about including new information or issues within the content of what is taught, so that people learn ‘about sustainability’. It focuses instead on how we ‘do’ education: how we respond to sustainability imperatives by rethinking our methods, revising our courses, recasting our priorities and reorienting our communities of practice. (p. 2)

While UNESCO focused primarily on the goal within ESD of informed-decision making, Tilbury and Ryan (2011) highlighted the need to restructure an entire educational paradigm for EfS. Their “five essential pedagogical principles” for a restructured educational paradigm are futures thinking, critical and creative thinking, participation and participatory learning, systematic thinking, and partnerships (p. 5). In concluding their guide, the authors provided five summary points which indicated areas of importance for EfS. They stated that a change to EfS requires:

- Not interpreting sustainability literally – seeing it *as a process and learning experience* to improve quality of life and contribute to more positive futures for all
- Maintaining a *critical learning discourse* about sustainability thinking and action
- Developing *diverse tactics and an inclusive approach* to support colleagues in embedding EfS in their courses and subject areas
- Using pedagogies that *develop student capabilities* to respond to sustainability agendas
- Drawing out links with *employability and internationalisation* as well as other strategic priorities that influence educational practice. (p. 7)

For these authors, EfS requires that educators help foster students' ability to critique ongoing processes, use information, and collaborate with others. EfS involves more than simply transferring knowledge about or a definition of sustainability.

American College and University Presidents' Climate Commitment. One of the goals for signatories of the ACUPCC is that they incorporate EfS within curricula and courses. The ACUPCC (2009), therefore, has published a 50-page document that serves as a guide for institutions who have signed the Presidents' Climate Commitment and are working to implement their commitments on campus. The ACUPCC guide includes information about “the context of learning,” describing opportunities that may range from orientation for new students to the creation of new courses; the “content of learning,” which requires interdisciplinarity and requires some form of assessing students' knowledge; and, “the process of education,” which incorporates experiential learning and the development of new pedagogical strategies. In each of these three areas, ACUPCC lists examples of the work for EfS at different institutions. The document provides suggestions on what both “sustainability literacy” and “climate literacy” might entail. For example, for the former, an understanding of “how the natural world works” and “the interdependence of humans and the environment” (p. 22) or for the latter, an

understanding of “the *scientific basis of climate change* (both the workings of the climate system, and the anthropogenic disturbances to the system)” (p. 23)

ACPA. The last example I review of what EfS might include is a monograph published by ACPA (2008). In the field of student affairs, ACPA highlighted the importance of self education for student affairs professionals and listed seven specific learning outcomes for students related to sustainability:

Each student will:

1. Be able to **define** sustainability.
2. Be able to **explain** how sustainability relates to their lives and their values, and how their actions impact issues of sustainability.
3. Be able to **utilize** their knowledge of sustainability to change their daily actions and consumer mentality.
4. Be able to explain how environmental, social and economic systems are **interrelated**.
5. Learn **change agent skills**. . .
6. Learn how to **apply** concepts of sustainability to their campus and community.
7. Demonstrate a **commitment** to sustainability by actively applying their knowledge of sustainability to their lives, professions, and societies. (p. 12)

As with other examples of learning goals and outcomes, ACPA highlighted the need both for knowledge and appropriate use of knowledge in the world.

Thinking, Knowing, and Doing

Each of the four prior examples from UNESCO, the University of Gloucestershire, ACUPCC, and ACPA show what EfS might entail. Common elements appear among the examples. EfS requires a certain way of thinking (e.g., within multiple disciplines, holistically, with attention to interrelations), a focus on particular content (e.g., connections between societies and the environment), and attention to action (e.g., working with content knowledge in mind). Among the notions within these examples are the need to transform education and society, to move beyond siloed disciplines and

single-minded definitions of what constitutes knowledge, and the need to engage communities in discussions of what sustainability means. A new conceptualization of education would entail blended in- and out-of-class learning, educator collaboration across disciplines, awareness of the environment in relationship to the topic at hand, and attention to not only the “what and why” of education but also the “should.” Many of the suggested pedagogical practices and tools harken to theories of teaching and learning that have developed outside of the discourse for sustainability. I turn now to some of these theories of teaching and learning that relate to the kinds of pedagogical tools organizations and faculty evoke for the implementation of EfS, as I situate EfS within a broader literature of teaching and learning.

Theories in the Classroom

Because my study is ultimately about examining a way of teaching, theories of teaching and learning serve as sensitizing concepts (Bowen, 2006; Charmaz, 2006; Dey, 2007), a term I describe in detail below, to my study and they also inform much of the work for EfS, which invokes the need for new and nontraditional ways of educating. I review here briefly the work of Dewey (1997), Friere (2003), and Baxter Magolda (2004a,b) for a few reasons. Each of these scholars is well-known for contributions in the field of education and each has been influential in my own understanding of teaching and learning. At the same time, the work of each of these three scholars relates directly to the kind of teaching and learning that EfS evokes. I describe Bronfrenbrenner’s (1979) Ecology Model as a sensitizing concept for considering contexts for EfS.

The Role of Theory

Each of the theories I highlight here – Dewey’s experiential learning, Freire’s problem posing, Baxter Magolda’s Learning Partnership Model (LPM), and Bronfenbrenner’s Ecology Model – informed the ways in which I interpreted teaching and learning because they were theories to which I had been exposed. These theories also serve as models for the kind of teaching necessitated for EfS. Describing them here is important because they inform the lenses I brought to data analysis. While I did not explicitly draw on these theories in an inductive process of coding -- whereby I examined all data broadly looking for emerging themes rather than entering data analysis with preconceived findings -- they inherently informed my interpretations. Charmaz (2006) described theories, such as the teaching and learning theories I address here, as sensitizing concepts and disciplinary perspectives. She stated that “grounded theorists use sensitizing concepts as tentative tools for developing their ideas about processes that they define in their data” (p. 17). While I will “not force preconceived ideas and theories directly upon [my] data” (p. 17), the theories I address here are “disciplinary perspectives [that] alert [me] to look for certain possibilities and processes” (p. 16) while I conduct data analysis. Together with a historical understanding of sustainability and terminology surrounding EfS, teaching and learning theories provide a backdrop for my study.

Teaching and Learning Theories

I rely on three theorists, Dewey, Freire, and Baxter Magolda, whose work specifically informs ways of teaching and learning. I draw on these theorists because the kinds of educational experiences their theories tout relate directly to the kinds of pedagogical principles I have outlined as important for education broadly. What these three theorists say is good for teaching and learning broadly seems closely linked to what

scholars have noted is essential for EfS. After describing each of these theorists' ideas, I briefly draw connections between their theories and EfS. These theorists helped inform the ways in which I see interactions in the classroom, interpret relationships, and understand teaching and learning. They opened my eyes to ways of understanding what happens in the classroom, and a reader knowledgeable of these theorists could easily draw connections between their own work and what I saw at play in the classrooms I observed. In chapter 5, I make those connections explicit as I draw connections between my findings and these theorists.

Dewey's Experiential Learning. Dewey (1997), arguing for a new form of education, stated that traditional education is made of experiences that are "defective" (p. 27). He argued that traditional education imposes information "from above and from outside" (p. 18) such that "the very situation forbids much active participation by pupils in the development of what is taught" (p. 19). A vision of the traditional education he evokes might entail a classroom where students all face the educator, memorize material, and repeat memorizations through tests. Dewey was a proponent, therefore, of a new kind of education, which could bring "expression and cultivation of individuality," "free activity," and "learning through experience" (p. 30). He thought learning should cultivate action in one's present (rather than a far off future) and engage students in thinking and working in a dynamic universe. In his treatise on experience in education, Dewey primarily argued for education that was relevant for students and that required their participation in the use of rather simply the memorization of information.

Elements of EfS resemble Dewey's revolutionary ideas. Just as Dewey argued for a kind of education that would engage students in hands-on learning and real-world

problem-solving, proponents of EfS argue for engaged learning that allows students to learn to grapple with and solve complex problems. Consider Tilbury and Ryan's (2011) "engaged and participatory pedagogies" (p. 4). They argued that EfS would involve students in:

- (i) setting challenges and reframing questions on sustainability; (ii) making connections and understanding complexity; (iii) clarifying the positions and rationale behind people's actions; (iv) creating, considering and enacting alternative pathways for the future; (v) understanding professional responsibilities for sustainability. (Tilbury & Ryan, p. 4)

In Dewey's experiential education and in models of EfS, participatory learning that involves students is central. In both, education moves beyond acquisition of knowledge and transaction of already-known information to informed critique, evaluation, and use of information.

Freire's Problem-Posing Education. Elements of Dewey's experiential learning argument take hold in the work of Freire (2003), who argued for a pedagogy of liberation. Teaching literacy among adults in Brazil, Freire worked to free educational practice from the oppressive processes to which Dewey alluded. Freire painted a portrait of traditional education, "A careful analysis of the teacher-student relationship at any level, inside or outside the school, reveals its fundamentally *narrative* character. This relationship involves a narrating subject (the teacher) and patient, listening objects (the students)" (p. 71). He said such a narrative form of education deposited information into students, thus, he named it a "banking" model of learning (p. 72). Given his context in a developing country, the oppression inherent in banking education was markedly visible as colonizers sought to co-opt learning. Freire, therefore, enacted and argued for "problem-posing education" (p. 79), which at its core assumes the consciousness of each

person and learner. In problem-posing education, “people develop their power to perceive critically *the way they exist* in the world *with which* and *in which* they find themselves; they come to see the world not as a static reality, but as a reality in process, in transformation” (p. 83). Problem-posing therefore requires active thinking, contextual learning and understanding, and participation in a dynamic reality.

Parallels between EfS and Freire’s (2003) problem-posing education again abound. As Freire called for dialogue and recognition of the consciousness of each individual, Norton (2005) argued that communities must engage in dialogue to come to communal understanding about shared values of sustainability. While Freire called for learning that assumed a dynamic reality, Wals and Blewitt (2010) stated that EfS must engage “transformative learning that also allows for transdisciplinary, transgeographical, transtemporal, trans-species and transcultural learning” (p. 66). Problem-posing education and EfS assume the need for communal dialogue as well as recognition of the multiple points of view that are inherent in a diverse world.

Baxter Magolda’s Learning Partnerships Model. Dewey (1997) and Freire (2003) both argued for a learning process in which students have power to participate in the learning process. Baxter Magolda’s (2004a,b) Learning Partnerships Model (LPM), based on longitudinal study of adult development, incorporates a similar idea. The LPM includes three assumptions and three principles. Assumptions include that knowledge is “complex and socially constructed” (p. 41), “self is central to knowledge construction,” and “authority and expertise [are] shared in the mutual construction of knowledge among peers” (p. 42). The principles include “validating learners’ capacity to know,” “situating learning in learners’ experience,” and “mutually constructing meaning” (p. 43). These

assumptions and principles, much like the elements of Dewey and Freire's educational theories, speak to the kind of pedagogy needed for EfS. Students must realize the complex and multiple dimensions of global problems, understand the ways in which their contexts influences their view of knowledge, and work in community to bring multiple perspectives to the table. Educators teaching within EfS must also recognize students' contributions, foster contextual thinking, and teach with the understanding that students contribute to knowledge for sustainability as they bring multiple perspectives.

Bronfenbrenner's Ecology Model

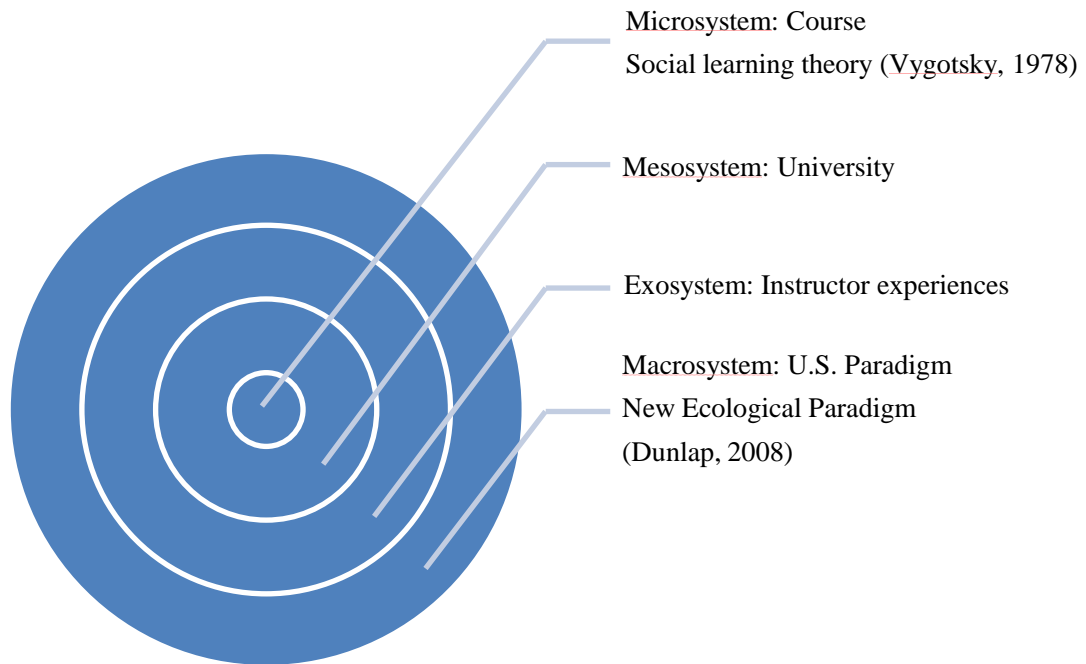
At the same time, learning at each institution likely takes on unique forms as institutions provide different contexts for learning. For example, a large state institution requires lecture courses of over one hundred students while a liberal arts institution necessitates mostly small courses. A religious institution may incorporate theology into requirements where a state institution would necessarily refrain from required theological coursework. Thus, learning that occurs in courses is contextually-situated in institutions. Bronfenbrenner's (1979) Ecology Model, therefore, is a theory that serves as a sensitizing concept for my consideration of the contexts in which EfS occurs.

Both the definition of sustainability and methodology I describe require attention to the context in which teaching takes place, in which students learn, and in which sustainability is defined. Therefore, Bronfenbrenner's (1979) Ecology Model provides a framework for envisioning the interaction of an individual with her or his context. His Model appears graphically as a series of up to five concentric circles, each representing different layers of the environment in which an individual is in contact: the microsystem, mesosystem, exosystem, macrosystem, and chronosystem. Microsystem is one's

immediate surrounding environment, which I define here as one's course. The mesosystem is one's surrounding community, which I define in my study as the college or university. The exosystem includes peripheral communities or institutions that impact an individual, though the individual may not be in immediate contact with these institutions, such as parents or the backgrounds of individual instructors. The macrosystem is one's overarching context. For the purpose of this study, I consider the context of the U.S. and the growing paradigm shift from one of production and unlimited use of earth's resources to one of ecological stewardship and caution of resource use. The chronosystem is one's place in time, and my understanding of the changing ecological paradigm within the U.S. highlights that a macrosystem can, in fact, have temporal shifts.

The four most important contextual elements I consider in this study are educators, courses, universities, and the national context. Therefore, the microsystems comprise courses under study, mesosystems comprise the universities, and the ecological paradigm within the U.S. forms the macrosystem; after conducting my study, I realized that educators' personal experiences are exosystems for EfS in the classroom. I use a few different theories as lenses to examine each of these levels of an individual's surrounding environment. *Figure 1: Human Ecology Model* displays the connection between each of these theories.

Figure 1: Human Ecology Model



Macrosystem: New Ecological Paradigm. The macrosystem at play in my analysis is a general “environmental” paradigm within the United States. Dunlap and Van Liere (1978) created what is now called the New Ecological Paradigm (NEP) (Dunlap, 2008) as a way to measure a shifting culture in the United States. They created the concept, with many edits over the years, with the idea that with the dawn of Earth Day and the accompanying environmental momentum, a dominant paradigm within the United States was shifting toward environmental awareness and away from “beliefs in progress, material abundance, and the goodness of growth,” which had been the dominant social paradigm before the 1960s (Dunlap, 2008, p. 5). While Dunlap described that the paradigm shift he expected to see in the United States has happened much more slowly

than expected, largely due to shifting political priorities and beliefs in the last three decades, the shifts have been happening most particularly in research and academia. The emergence of the concept of the NEP undergirds an assumption in my study, as it suggests a looming cultural paradigm shift within the United States that has been in motion – if perhaps slowly -- since the 1960's. As I evaluate the individual courses and educators, I do so with the understanding that they exist within a larger macrosystem of a shifting U.S. paradigm.

Mesosystem: Institution. The postsecondary institutions I study exist within the broader U.S. societal paradigm and serve as contexts for courses. While I do not use a particular theory as a lens for viewing institutions, I understand the university as the mesosystem that influences educators, courses, teaching, and learning. Therefore, I look at the institution as a mesosystem within my study to ensure I examine the ways colleges and universities serve as contexts for how educators understand and educate for sustainability.

Exosystem: Educator contexts. Originally, I did not expect to encounter significant exosystems across cases that would inform EfS. However, findings revealed that the background of each instructor was important to their involvement in EfS. Each educator's individual experiences – ranging from family value systems, to educational opportunities, to work – helped shaped their role as instructors. These instructor-specific contexts make up the exosystem at play.

Microsystem: Social Learning Theory. Lastly, the microsystems at play in my study are courses, alongside the educators and students who interact in the context of a course. These microsystems are the true foci of my study, although I consider

mesosystems, exosystems, and macrosystems because of the importance of understanding microsystems in context. Social Learning Theory provides a lens through which I evaluate education for sustainability as I observe courses and interview educators and students. Vygotsky (1978), one of the most cited social learning theorists in the realm of educational psychology, proposed that learning is always contextual and makes way for development that can only happen in one's social and environmental context. His research centered on the ways in which social learning preceded development – learning through interaction allowed children to develop new capacities and ways of thinking. Social Learning Theory is a theory that informs this study given that the concept of sustainability is rooted in the interplay of human interaction with the environment. The very concept of sustainability necessitates and is based on interaction; and what it represents might be different across different temporal and spatial scales. What a community might view as sustainable today will be different from what it views as sustainable in 10 years; what a community views as sustainable in America, for instance, is different from what a community views as sustainable in India. We create the term as we enact it, learn, and change as a society.

Holzman (2004) notes that

In order to be ecologically and historically valid, an understanding of [human] development must take into account not only the human capacity to adapt to society (whatever that society is), but also the capacity to reorganize and change it and, thereby, to create history. (p. 2)

The ideas of social learning coupled with Holzman's ideas of simultaneously adapting to and changing history mirror the kinds of principles undergirding adaptive ecosystem management and resilience, concepts related to sustainability. Norton (2005) writes that adaptive management has to do with the ways in which generations adapt to and with a

place over time and resilience concerns ability to renew after disaster; both concern long-term survival and thriving. He says, “long-term survival, for adaptive managers and pragmatists, is thus simply a specialized form of social learning to adapt practices and actions to the opportunities and constraints stored in local ecological systems” (p. 124). Yet he emphasizes “not mere physical survival, but survival of individuals as *members of an ongoing culture*” (p. 124, emphasis in text). He harkens to Holzman’s thoughts:

If the culture is to survive over many generations, it must be intertwined with the development, use, and protection of the land that represents the habitat of the culture. This point can be taken one step further: interactions between individuals, a culture, and the land they inhabit are not only essential for simple survival; they also give meaning to the experiences that are shared by members of the culture. The institutions that sustain the culture must include practices and institutions that embody the stored wisdom of that culture. (p. 124-25)

In Norton’s mind, therefore, sustainability of the land is intertwined with sustainability of societies as the land contributes to social communities. Social learning is tied to ecological learning in sustainable societies as communities seek to attune themselves to the land that serves as context and participant in a culture.

Thus, as I study EfS, I do so through the framework of social learning that necessitates the examination of context (i.e., a university or college and classroom setting in the U.S.) and interaction (i.e., learning that happens inside a classroom community). My study is rooted in the idea that we learn through social interaction and in context. Vygotsky’s theory and social learning theory broadly informs my understanding of classrooms as social spaces and contributed to my awareness of social learning in the classroom that occurred among educators of different disciplines and among students and educators.

Holzman (2004) says that in Vygotskyian theory, “The person, the mind, development, learning, psychological processes such as thinking, speaking, remembering, problem solving, and so on, are created or produced through participation in and internalization of social-cultural-historical forms of activity” (p. 3). In such social learning theories, “people do not ‘come to know the world,’ nor do they ‘act upon it’ or ‘construct’ it, for such statements subtextually embody a separation of human beings and the world” (p. 4). Instead, learning is inseparable from the world and context in which each learns. Just as learning is tied to context and social interaction, so, too, is sustainability tied to contextual and social understanding. Lest I fall prey to what Cullingford (2010) calls the “myth of ontological security” (p. 17), I engage Social Learning Theory as a framework that reminds me of the contextual basis of EfS and that EfS varies pending the context in which it occurs. Cullingford (2010) says of sustainability, “The dilemmas and the choices are real. They demand not just scientific study but detailed intellectual debate” (p. 20). Thus, scientific fact is not the only important piece of sustainability but also the social processes of determining how to engage with scientific facts sustainably and of deciding what might be sustainable in different contexts.

From my research, I created a theory that was attentive to the contextual and social nature of learning in EfS. Yet, I was also attentive to Guba and Lincoln’s (2001) reminder that “theories and facts are quite *interdependent* – that is, that facts are facts only within some theoretical framework” (p. 59). Thus, just as the facts taught within the classrooms are situated, so, too, are the theories I propose through empirical research.

Thus, the methodology that I use is congruent with the notion that research findings are specific to certain contexts and the inherent biases of the researcher.

Summary

In this chapter, I have provided inroads into a number of bodies of literature that inform my study and provide lenses for analysis. First, I established the ways in which sustainability has existed for years within traditional knowledge and made the case that I focus my study on contemporary postsecondary education in the United States. I then described a brief history of the term sustainability, focusing particularly on the movement and changes in terminology related to education for sustainability. I gave examples for EfS, focusing specifically on institutional, programmatic, and then class-based cases, followed by an overview of four specific examples of learning outcomes, goals, and guidelines for EfS. I then highlighted teaching and learning theories that are congruent with EfS, which served as sensitizing concepts for my study. Lastly, I presented Bronfenbrenner's (1979) Ecology Model in conjunction with the New Environmental Paradigm and Social Learning Theory, which facilitate my description of the ways I see postsecondary institutions as contexts for courses.

CHAPTER 3: METHODOLOGY AND METHODS

Given my focus on theory and concept development, I employed qualitative methods for my study. I combined observations, interviews, and document analysis, using a grounded theory methodology to produce a theory of EfS in the postsecondary classroom. The project was designed to delve deeply into a few excellent cases of teaching sustainability – East State University (ESU), Liberal Arts College (LAC), and Religious University (RU) -- as a means of creating a theory that could inform others. Demerath (2006) suggests that the “developing of new theories worthy of additional testing” (p. 102) is one of the goals of social science, and the strength of qualitative research is that it can allow researchers to accomplish this goal. I have worked so that the findings may help educators and student affairs professionals not only articulate but also carry out education for sustainability in diverse settings in higher education by providing theoretical grounding for their teaching. In the following section, I clearly delineate the epistemological foundations, methodology, and methods I used for this study. These theoretical and practical underpinnings both stemmed from the research goals and guided the research project.

Grounding Research Paradigms

In this section, I describe the methodology that provides the philosophical framework and logistical process for studying the teaching of sustainability across the disciplines. I begin with the description of my ontological and epistemological beliefs, which ground the constructivist paradigm (Hildenbrand, 2011) that was the overarching set of assumptions of my study. Next, I describe the methodology of grounded theory (Bryant & Charmaz, 2011; Charmaz, 2003, 2006; Creswell, 2007; Glaser & Strauss, 1967)

and its methods, including sampling, coding, and analysis. Finally, I explore the criteria of quality qualitative research (Glesne, 2011; Guba & Lincoln, 2001; Jones, Torres, & Arminio, 2006; Morrow, 2005) as well as some theoretical caveats and limitations that result from the methodological underpinnings of the study.

The purpose of this study was to explore education for sustainability in diverse disciplines. Specific questions I explored were: (a) How do educators understand and define sustainability? (b) What information, values, and action-oriented skills related to sustainability do educators teach? (c) What contexts (e.g., institutions, academic disciplines) influence educators' approaches to or involvement in EfS? The findings from the study help guide educators from a variety of disciplines and in a variety of roles within higher education as they incorporate sustainability into postsecondary curricular and co-curricular endeavors.

Ontology and Epistemology

As important to the research project as the data are the beliefs, frameworks, and methods that guide the collection and interpretation of the data. The beliefs, frameworks, and methods must align with the goals and questions of the research. Guba and Lincoln (2001) suggest that "Questions of method are secondary to questions of paradigm, which we define as the basic belief system or worldview that guides the investigator, not only in choices of method but in ontologically and epistemologically fundamental ways" (p. 57). I begin the discussion of research methodology, therefore, with an introduction to the ontology and epistemology that grounded my study.

In an opening chapter of his introduction to qualitative research, Creswell (2007) delineates ontology as one's "stance toward the nature of reality" and epistemology as the

way in which a researcher “knows what she or he knows” (p. 16). In my project on the nature of teaching, I believe that the interpretation of reality is co-constructed among a number of important forces. Educators, students, and broader institutional cultures help create and interpret the reality of what students learn in a college course. Even as educators teach a similar course repeatedly, the nature of what is learned differs when new students bring new information, attitudes, or experiences to the table, in addition to the fact that many lessons themselves are seen differently from different perspectives. In fact, the reality of “sustainability” itself as a concept is an impermanent, mutable idea. Philosopher Brian Norton (2005) in his “philosophical exploration of the language of environmentalism” (p. xi) writes that “it is often said that the terms *sustainability* and *sustainable development* mean all things to all people” (p. xi). In one course I observed, the professor described the shifting temporal and spatial scales of sustainability, meaning what might be judged sustainable at one time and place could be judged very differently in another time and place. If sustainability itself is a complex, co-constructed term, then teaching it must also be a complex, co-constructed process.

Therefore, epistemologically, part of my goal as a researcher was to understand how, why, and with what ends in mind educators carry out EfS in their courses. Because I believe interaction is paramount to understanding the process of teaching sustainability, I also sought to understand, at least partially, the beliefs and contextual background of those within my study. Rather than separate myself from my research to study from a distance, I entered into the research space to see the reality of those within the study so that I could more effectively and fully evaluate their responses. Polkinghorne (2005) alludes to the ontological realization of the complex, changing nature of reality and its

role in guiding the relationship of the researcher to the research itself. He says “Data used in qualitative research are not simply lying about on the surface already to be gathered; rather, the researcher is required to dig below the surface to bring up experiential accounts” (p. 141). Part of the process of “digging below the surface” in a qualitative project is developing a relationship with research participants.

Constructivism

The aforementioned ontology and epistemology undergirded the constructivist paradigm that guided my research methodology. Crotty (1998) says that constructivism (or constructionism) is “the view that all knowledge and therefore all meaningful reality as such, is contingent upon human practices, being constructed in and out of interaction between human beings and their world, and developed and transmitted within an essentially social context” (p. 42). Jones, Torres, and Arminio (2006) similarly define constructivism as a framework that scholars use to “understand individual social action through interpretation or translation” (p. 18). A constructivist worldview encompasses beliefs that reality is mediated by a person’s perspective and interaction with the world. At the same time, it does not reach a postmodern relativism; constructivism posits that a glimpse of reality is possible, but one must take into account the stance and context of the studier and the studied. Charmaz (2003) alludes to the space between scientific objectivism and postmodern relativism that constructivism occupies saying, “The constructivist approach . . . remains realist because it addresses human realities and assumes the existence of real worlds. However, neither human realities nor real worlds are unidimensional” (p. 523). A constructivist worldview requires the understanding of

context of information -- both the context of the researcher as well as the context of the researched -- and the meaning that arises from human interaction and activity.

Guided by a constructivist framework, my study entailed understanding the interaction and activity of EfS. Guba and Lincoln (2001) write that “the aim of [constructivist] inquiry is *understanding and reconstruction* of the constructions that people (including the inquirer) initially hold, aiming toward consensus but still open to new interpretations as information and sophistication improve” (pp. 61-62). Thus, I worked to interpret a variety of approaches to EfS as well as a variety of definitions of sustainability before creating a theory of EfS. My role was to work toward an ever-reforming consensus from a diversity of beliefs and experience.

Because constructivist methodologies acknowledge the importance of understanding the co-construction of knowledge through interaction, they also require attention to the fact that the research process itself is interactive (which grounds the iterative research process I describe here). In the very process of a constructivist research project, I contributed to the co-creation of the understanding of EfS by asking participants about their beliefs, experiences, and practices. Broido and Manning (2002) reminded scholars that the “research-respondent relationship is subjective” and “values. . . cannot help but undergird all aspects of the research” (p. 436). I brought certain understandings and values to the topic, as did the participants. Thus, I was attentive to and aware of my own understandings, and, to the extent possible, described my own context that helped others see the ways in which I interpreted and presented data (which I describe in more detail below). Charmaz (2003) suggests that “what we know shapes, but does not necessarily determine, what we ‘find’” in research (p. 510); “in short, we share in

constructing what we define as data” (p. 509). Similarly, Guba and Lincoln (2001), while comparing and contrasting paradigmatic frameworks, say that in constructivism, “values have a pride of place” (p. 68). Values are at the center of the work, rather than, for example, generalizability or measurement.

Therefore, I recognized that part of a constructivist research project was not only rooted in a values orientation but admittedly and perhaps unapologetically so. Creswell (2007) noted that the role of values in a study is the axiology of a study, and most qualitative researchers report the values that undergird and/or intersect with the study. In this project rooted in sustainability, values that guided the project included the desire and appreciation for the thriving of a healthy environment, economy, and society (ACPA, 2008; Dresner, 2010). My assumption in conducting the research was that EfS is worthwhile, learning how it is done is instructive, and providing research about it will contribute to the continued work for sustainability. To embark on my research, I used a grounded theory methodology.

Methodology

Grounded theory, much like the title suggests, is a methodology that allows a researcher to develop a theory that is grounded in qualitative data. It entails a researcher’s close attention to participants’ words, constant comparison of data and data analysis, and a series of coding processes that allows a researcher to narrow emerging themes. It comes from the work of Glaser and Strauss (1967), though the work of Charmaz (2003, 2006) most closely informed my own research. Over time, methods of grounded theory have changed in their assumptions and uses (Bryant & Charmaz, 2011). While Glaser’s

training was rooted in objectivist, quantitative scholarship that is positivist in nature, Strauss brought training rooted in symbolic interactionism and pragmatism. Both were interested in examining social interaction and the structure of social processes, but over time diverged in their employment of the method. While in initial publications of the methods of grounded theory Glaser and Strauss were providing an alternative to traditional positivist methods, today their codified methods of grounded theory are often seen as positivist (Charmaz, 2006). Charmaz (2003), therefore, makes the case for a constructivist grounded theory; one that “adopts grounded theory guidelines as tools but does not subscribe to the objectivist, positivist assumptions in its earlier formulations” (p. 509).

Methods

While the methods Charmaz (2006) describes need not be employed in a linear fashion, the rigorous consideration of each guides the researcher in creating a theory that is grounded in the data. Sampling, gathering rich data, data analysis, and reconstructing theory are all methods that Charmaz discusses, and I describe below my own employment of these methods in my dissertation.

Sampling. Morse (2011) notes that “The key to developing any comprehensive and dynamic theory is the use of astute and efficient methods of sampling” (p. 229). My sampling procedures were “purposeful and sought out” in order to ensure data “are sufficiently rich to bring refinement and clarity to understanding” the experience of teaching sustainability across the disciplines (Polkinghorne, 2005, p. 140). Sampling was meant to provide an up-close examination of EfS. I employed criterion sampling (Polkinghorne), or purposeful sampling, (Morse) to select the sample; these methods

entailed the selection of a sample that met criteria necessary for exploring the research questions. Spradley (1979) claimed that such a sample (i.e., one that meets the criteria or has experienced the phenomenon under study) can provide “excellent” information (p. 25). I employed criterion sampling both at the site level to select colleges and universities for consideration and at the participant level to select educators and students to interview. I describe below the criteria I used to define the “excellent” sample I selected.

The institutions I included in the study were East State University, Religious University, and Liberal Arts College. I chose these three specific sites because they met a few specific criteria. First, the institutions as a whole had considered sustainability on an institutional level, whether through the formation of a sustainability office, the creation of a sustainability plan, or the adoption of a curricular emphasis on sustainability. Including institutions already dedicated to sustainability as research sites ensured some communal sense of sustainability, such that faculty were exposed to concepts of sustainability in the context of postsecondary education. As Jones et al. (2006) suggest is key in sampling, choosing institutions already thinking of sustainability helped yield “information-rich” cases (p. 66). Second, the institutions were diverse in their geographic region. Jones et al. state that “coverage” of data (p. 66) is also important, meaning the sampling strategy must yield enough appropriate data for analysis. Because sustainability changes both in time and place, sampling in different geographical regions could yield nuances in meanings of sustainability and help with data coverage. Because teaching is viewed differently at different institutions (Birnbaum, 1988; Boyer, 1990), I interviewed educators from different types of institutions according to the Carnegie classification who could illuminate nuances in the role of teaching sustainability. Although institution type

proved less important to educators I interviewed, I initially chose to include different types of institutions to examine ways in which a faith-based institution, a liberal arts college, and a land-grant institution allowed for unique perspectives on EfS because of the differences in institution mission.

In selecting educators for the sample, I had similar criteria. For information-rich cases, I selected educators who included information about or for sustainability (broadly defined) in a course, such as connections between the environment and society or consequences of human action on climate change. Second, because I was interested in a theory of EfS that was transdisciplinary in its reach, I sought educators from a variety of disciplines, ranging from the humanities to the sciences. I have purposefully opted for breadth, studying courses in a variety of disciplines, rather than depth, studying courses in a single discipline, given the need for EfS across the curriculum. Cullingford (2010) writes that “In an ostensibly postmodern world . . . the lack of cross-disciplinary studies verges on the absurd. Universities should focus on studying not just subjects for their own sake, but the central issues of the time” (p. 22). I worked, therefore, to include observations of courses and interviews with educators from many disciplines and find EfS principles and tools that might be carried across the disciplines. While I did not specifically set out to examine transdisciplinary, interdisciplinary, multidisciplinary, or cross disciplinary classrooms, many courses branched into multiple disciplines and issues of disciplinarity and the need for multiple disciplines arise in my findings.

I chose to study multiple disciplines in efforts that my findings be transdisciplinary, though my own methods were primarily rooted in the social sciences. Transdisciplinary researchers attempt to

grasp the complexity of [life-world] problems, to take into account the diversity of scientific and societal view of the problems, to link abstract and case specific knowledge, and to constitute knowledge with a focus on problem-solving for what is perceived to be the common good. (Hirsch Hadorn, G. Biber-Glemm, S., Grossenbacher-Mansuy, 2008, p. 19)

My study engaged a “life world problem” (meaning a problem that exists in the world rather than in a controlled environment) of EfS, developed a theory from specific examples of EfS, and was rooted in the idea that EfS can help to bring about a common good. My dissertation brought richness from humanities, biological sciences, social sciences, and other disciplines, which informed a theory that incorporates a diversity of perspectives.

To begin the process of selecting educators to interview, I contacted initial gatekeepers with whom I developed a relationship. These gatekeepers suggested people or courses that fit the criteria for the study. At East State University, I reached out to individuals in the sustainability office and faculty who had partnered with the sustainability office; these individuals suggested other educators and courses to consider. At Religious University, I also reached out to the sustainability office, speaking with a manager who worked with faculty. Educators I contacted then continued to recommend other instructors to interview, until many educators were recommending the same individuals. At Liberal Arts College, I worked with the director of an academic program related to sustainability, who works with a variety of faculty on campus. He recommended initial individuals to contact and also forwarded my request for interviews to colleagues. At all institutions, I initially contacted both educators who gatekeepers recommended as well as those that I learned of through online research, such as reviewing course offerings and departmental Websites. When on site, I continued

sampling through a snowball method whereby instructors recommended others to interview (Jones et al., 2006; Polkinghorne, 2005). In Appendix A, I include a template of the letter I sent to educators requesting an interview. In total, I observed 27 different courses, comprising a total of 67 class meetings. I interviewed 29 instructors and 2 administrators.

After I selected educators, I e-mailed students from the educators' courses and at times made announcements in class to obtain a sample of students with whom I could conduct a focus group. Appendix B includes the template of my e-mail to students. My one criterion for selecting students was that they be taking a class from an educator in the study. I chose to interview students primarily for two reasons. First, I saw students' comments as a form of data triangulation; I wanted some information from individuals holding a different perspective in the classroom than educators. Second, I expected students' voices would most help me answer my second question concerning what is taught in EfS courses. Instructors were able to tell me how they planned courses, what they incorporated, and how they taught. Students were also able to interpret teaching and lessons from EfS courses and then compare their experiences in EfS courses to other courses in which they were or had been enrolled. As I expected, I interviewed students who had studied sustainability in depth as well as those who knew little about the topic. A goal of my research was to create a theory of teaching sustainability that would apply not just to those students who already knew a significant amount about sustainability but also those who did not study and were not specifically interested in studying sustainability. I valued perspectives, therefore, from both the well-informed and the less-aware students. In fact, Broido and Manning (2002) remind scholars that within a

constructivist paradigm “knowledge, generated by less experienced students or more experienced teachers, is equally valid and jointly constructed. The simple Cartesian dualism of either-or, black-white, and right-wrong, gives way to complex constructions of human living” (p. 436). At ESU, no students attended the scheduled focus group, but I have included data from 7 students I interviewed from ESU for an ethnographic project examining a course for an entire semester. At LAC, one student attended. At RU, two students attended the focus group and one student volunteered to stay to talk with me after I observed her course. Appendix C includes the template of the demographic information form I asked students to complete so that I would have some background information related to this study for each student.

After interviewing an initial group of interested faculty, I planned to engage in theoretical sampling (Charmaz, 2003, 2006; Creswell, 2007; Jones, Torres, & Arminio, 2006; Morse, 2011). The process of “seeking and collecting pertinent data to elaborate and refine categories in [the] emerging theory” (Charmaz, 2006, p. 96), theoretical sampling allows researchers to continue sampling after initial data analysis to ensure they filled gaps in the data collected. For example, after my initial pilot study for this project (I discuss the pilot study in more detail in the data analysis section of this chapter given the way in which I used the data for this study), I realized I needed the perspective of someone in engineering. Because I had interviewed an engineering student and had encountered debates about how to infuse sustainability in engineering education, I engaged in theoretical sampling in attempts to interview six engineering faculty at different institutions. Ultimately, I was able to interview two engineering faculty, observe an engineering course, and interview an additional engineering student. Although I

engaged in theoretical sampling after my pilot study, I ultimately decided not to engage in theoretical sampling again after data collection for this study given both the “saturation” (Morse, p. 231) of the themes I generated and the wealth of data I had to review. I determined that I had reached saturation because I began to observe and hear many of the same approaches, challenges, and opportunities from participants.

Gathering rich data. As I selected participants, I began to gather data. Charmaz (2006) dedicated a chapter to gathering rich data – data that allows the researcher to analyze and provide what Geertz (1973) calls “thick description.” Charmaz (2006) writes that researchers must “choose methods that help [them] answer [their] research questions with ingenuity and incisiveness” (p. 15). To be able to provide thick description around each of my research questions, I engaged in data collection procedures that included interviewing, document analysis, and observation. To answer the question how do educators understand and define sustainability, I interviewed educators about their understanding of sustainability, where it began, how it had developed, and how they continued to learn about sustainability, especially related to their disciplines. To answer the question what information, values, and action-oriented skills (or combination thereof) related to sustainability do educators introduce in a course, I used not only interviews but also course observation and student focus groups and interviews on-site. While my time on site was limited at LAC and RU, my goal was to observe at least five different courses once at each institution and have one student focus group at each institution. I observed 11 courses at ESU, 8 at LAC, and 8 at RU. Courses needed to include elements of sustainability in order to meet criteria for observation. I compiled a list of potential courses to observe by speaking with gatekeepers and reviewing course information

online. When selecting the courses to observe, I sought to diversify disciplinary focus, especially when a number of courses were offered at the same times during the week. To answer the question what contexts (e.g., institutions, academic disciplines) influence educators' approaches to or involvement in EfS, I added to interviews and observations document analysis, scanning institutional information online and onsite during site visits. I discuss below the three methods of data collection in detail to elicit how they provided rich data for my study.

Interviews. As part of data collection, I interviewed both educators and students about their courses that include lessons of sustainability. Fontana and Frey (2000) discuss the differences between structured and unstructured interviews, saying that researchers use structured interviews to capture “precise data of a codable nature in order to explain behavior within preestablished categories” and unstructured interviews “to understand the complex behavior of members of society without imposing any a priori categorization that may limit the field of inquiry” (p. 653). While I had some categories of interest, which were a result of my research questions, my research questions opened themselves to a breadth of responses. Therefore, I engaged in semi-structured interviews informed by an ethnographic context in which I approached each interview with foundational questions that could guide the conversation, but I also responded and asked follow-up questions based on the answers of the participants. Because rapport is important in gathering data, as Spradley and Fontana and Frey suggest, an in-person interview helped me establish a face-to-face relationship with participants and learn from their body language in addition to their spoken language. I shared details of the project with each

participant and asked for their signed consent before the interview began. Appendices D and E include templates of consent forms for educators and students, respectively.

I engaged in what Spradley (1979) described as an ethnographic interview. He noted that the ethnographic interview might be thought of as “a series of friendly conversations into which the researcher slowly introduces new elements to assist informants to respond as informants” (p. 58). Three key elements to the ethnographic interview that differentiate it from other speech events are an “explicit purpose,” “ethnographic explanations,” and “ethnographic questions” (p. 59). When sampling and when beginning an interview, I succinctly described the purpose of my study. During the course of the interview, I provided ethnographic explanations, such as the type of questions I hoped to ask, the type of information that might be helpful, and the procedures I planned to follow. I also asked ethnographic questions that elicited information to answer my specific research questions. Appendices F and G include the interview protocol I used with educators and students, respectively. Because two pairs of educators I interviewed collaborated and suggested I meet with them together, I conducted two interviews with these educators that were more like focus groups.

While Fontana and Frey (2000) and Spradley (1979) describe some of the theoretical considerations for interviewing, Creswell (2007) discusses the logistics of an interview. He first suggests researchers must determine the type of interview. I conducted in-person, on-site interviews with educators in their offices or in other locations of their choosing (e.g., campus coffee shops or public spaces) conducive to interviewing. Similarly, I conducted focus groups with students in appropriate locations on or near campus, which gatekeepers recommended and helped me secure when necessary.

Creswell recommended focus groups could be ideal “when the interaction among interviewees will likely yield the best information, when interviewees are similar and cooperate with each other, when time to collect information is limited, and when individuals interviewed on-on-one may be hesitant to provide information” (p. 133).

While I ultimately only conducted one focus group with two students (and one with a pair of faculty who co-taught) and instead interviewed individual students, I initially chose to conduct focus groups given two of Creswell’s suggestions. First, time with students was limited. The focus group was convenient given the need to schedule many courses and interviews during a short period of time. During my visits, I typically attended courses and interviewed faculty throughout the days, typed memos during the evening, and returned to campus one evening during a time recommended by gatekeepers for the focus group. Second, I believed conversation among a group of students could be helpful. Students are not often asked to talk about a course in the way I was prompting, and I expected that a group setting would facilitate their comfort and would allow them to feed into each other’s comments. In the one focus group I conducted, having two students together was helpful as they spurred each other’s memory of different aspects of courses and as they spoke about differences in similar courses they were taking.

Creswell (2007) also discusses the importance of determining and recording interview and consent procedures. At the beginning of each interview, as a part of the Institutional Review Board process, I asked for participants’ consent in being a part of my study. As a part of their consent process, they indicated their willingness to be digitally audio recorded. I explained to participants that I would store recordings on a password-protected computer and that I would only use them for my own analysis. All

participants were willing, so I recorded each interview. I conducted a pilot test of the interview protocol and continued tweaking questions throughout the data collection phase based on responses and feedback from participants. I transcribed most interviews myself, and a professional transcription service transcribed some of the student interviews from one of the in-depth ethnographic examinations of a course (I describe the ethnographic studies in detail in the data analysis section).

Observation. In addition to interviews, I conducted various levels of observation. Polkinghorne (2005) noted that observations are often “used to supplement and clarify data derived from participant interviews” (p. 143). While one form of my observational data includes the nonverbal cues, like body language, which I addressed earlier, another form includes purposeful observation of events and activities. Purposeful observations can “contribute to a clarified and satiated description” (Polkinghorne, p. 144). Thus, in addition to interviews, I also observed classes to add to my understanding of the ways in which educators teach about sustainability.

Glesne (2011) describes the potential role of the researcher as existing across a “continuum from mostly observation to mostly participation” (p. 64). She cautions that both have positive and negative consequences. Participating more, a researcher may begin to learn from the perspective of the people or environment being investigated. Observing more, a researcher may be better able to maintain the perspective of the “uninvolved outsider” (p. 65). Along the continuum, I was mostly an observer though occasionally participated when it seemed appropriate, such as in a small class setting when students broke into groups for conversation. While I expected to learn from the courses, I found from pilot studies that my frequent interest in the content could interrupt

my role as an observer. Thus, while I was consciously attentive to content, I also sought to limit participation so that I could observe the class as a whole. From observations, my goal was to understand the teaching of and for sustainability in the classroom context -- to see the interactions among students, educators, and the environment in addition to the way in which educators carried out the values and understandings of sustainability, which we discussed in interviews.

While observing, I drafted field notes, which served as part of the data for my project. Emerson, Fretz, and Shaw (2001) write about field notes as part of data collection, though some might consider field notes mostly a manner of data analysis (these authors admit “even seemingly straight-forward, descriptive writing is fundamentally a process of representation and construction” p. 358). They describe field notes as a “form of *representation*, that is, a way of reducing just-observed events, persons, and places to written accounts.” (p. 353). Therefore, field notes were a form of data I used when conducting data analysis offsite. I could review moments from class as I read observation field notes. These notes were “selective,” “descriptive,” and part of “a larger *corpus*” (p. 353). Thus, I selected what to record based on my research questions and sought mostly to describe rather than analyze while taking field notes *in situ*.

Emerson, Fretz, and Shaw describe the types of data included in descriptive field notes, ranging from “newsworthy facts” and “daily events” to “personal reactions, what people in the setting treat as especially important, and any unusual happenings” (p. 358).

Spradley (1980) gives specific details in what he calls a “descriptive question matrix” about the kinds of questions researchers can ask in observations; he notes categories of space, object, act, activity, event, time, actor, goal, and feeling (pp. 82-83). His categories

guided my observations as I sought to be attentive to multiple aspects of courses I observed. Emerson (2001) writes that contemporary ethnographers believe that “multiple descriptions of the same scene, activity of culture” could be “legitimate” (p. 22). Thus, I also asked students’ their understandings of the class and compared my reactions and notes with their reflections.

For this purpose of conducting observations, I visited Religious University and Liberal Arts College each for one week in the spring of 2012. I was frequently on campus at East State University and conducted my pilot study and two ethnographic studies there (I describe these studies in depth in the data analysis section). I decided which courses to observe at each institution by speaking with educators, reviewing syllabi, and considering schedule availability. Although often short in duration, my visits were informed by ethnographic methods. Observations from these visits enhanced my ability to understand the perspectives of educators and students about EfS. I was able not only to understand how educators described their beliefs about and incorporation of sustainability in their courses, I was also able to witness their manner of teaching and students’ response to teaching.

While an ideal study of EfS might require in-depth and long-term ethnographic fieldwork of classrooms, such methods would have been prohibitive for the scope of this project. On the one hand, my observations provided only a snapshot of each class. At the same time, conducting interviews without observations would limit the holistic view I would have of each course and educator. Alongside educators’ interpretations of their beliefs and teaching, I could compare and contrast my own and students’ interpretations.

Guided by a constructivist paradigm, I engaged in observations because they enhanced interviews by allowing me to see EfS at work in the classroom.

Document analysis. Love (2003) writes that when researching “in a collegiate environment with the goal of understanding something about student, faculty, academic, or administrative life, failure to include document analysis may indeed be leaving a gap in the ability to fully understand the issue or question at hand” (p. 84). Creswell (2007) names a few types of documents researchers might include as part of their data. He lists researcher and/or participant journals, participant letters, public documents, biographies, videos, images, charts, and medical records. I engaged purposefully in reviewing public documents, online biographies of educators, and institution Websites.

First, I viewed public documents, mostly through the Internet, that showed institutional commitment to sustainability. I looked for institutional sustainability goals or commitments, any academic requirements or rewards for sustainability, and any repetitive information from online research about sustainability at the institution. Love (2003) reminds researchers that review of documents might illuminate faculty or administrative points of view while overlooking student voices. Thus, I sought a variety of documents that might show both points of view, such as student organization pages and flyers posted on campus in addition to official university sites or text. Second, I viewed documents that could help me to understand the local context of the educator in his/her department or area of the university. I examined departmental websites and reviewed information available about the educator. I also requested copies of syllabi from participants to understand the way in which they framed and introduced their courses and student assignments.

Data analysis. With interviews, observations, and documents, I had a large amount of data from which I gleaned informed, data-driven responses to my research questions. I began data analysis as soon as I collected data and continued analyzing throughout the project. Polkinghorne (2005) writes “the research process is an iterative one, moving from collection of data to analysis and back until the description is comprehensive” (p. 140). Analysis informs continued data collection just as data collection informs analysis.

Constant comparison. In grounded theory, the simultaneous analysis and collection of data is one part of the constant comparison method, which also entails the constant comparison of codes with other codes. Jones et al. (2006) describe constant comparison as the simultaneous nature of sampling, collecting data, and analyzing data. Thus, I began analysis of my data while continuing to collect data. At the same time, Kelle (2011) highlights that constant comparison also describes the constant comparison of “already coded incidents . . . with each other and with incidents not yet coded (p. 194).” Glaser and Strauss (1967) provide the instructions that when researchers code, they should “compare [data] with the previous incidents in the same and different groups coded in the same category” (p. 106). Using these guidelines for constant comparison, I was frequently comparing pieces of data with codes, comparing codes, and reorganizing developing theories based on those comparisons. Code generation was essential both for the constant comparison method as well as for my overall analysis.

Coding. Kelle (2011) noted that codes “are used to qualify certain bits of data . . . Each code represents a value of a certain variable.” (p. 193). Kelle continues noting that “With the help of such a coding scheme, every unit of analysis can be investigated in

order to find out whether a certain value of a variable applies to it” (p. 193). Codes, therefore, helped me to qualify pieces of data to generate themes that ultimately were the foundation for my theory of EfS. Grounded theorists suggest beginning with line-by-line coding (Charmaz, 2006; Glaser, 1978), or open coding (Holton, 2011; Jones et al., 2006), to develop initial codes. Covan (2011) remembers her own courses with Glaser and Strauss and suggests that while Glaser insisted students engage in line-by-line coding, Strauss did not emphasize this manner of initial coding. In my own initial coding of data from the pilot study, I found line-by-line coding contradictory to some of the data. As I broke data apart into segments (on the computer screen by highlighting pieces of text), the data themselves often pointed to the connectivity, wholeness, and closed-loop nature inherent in the principles of sustainability. Therefore, while I engaged in line-by-line coding, my primary goal was to, in the words of Holton (2011), “verify and saturate categories,” attempt not to miss “an important category,” and “[ensure] relevance by generating codes with emergent fit to the substantive area under study” (p. 275). Themes emerged even before coding, and the line-by-line coding process was a tool for grounding themes and carefully reviewing data I could have overlooked. After close review of the data through open coding, I engaged in axial coding, which is the process of reweaving data, generating categories, and relating categories to each other (Glaser, 1978). The final coding process, or selective coding, entails finding a core category and building the final theory based on the relationship of codes and categories to the final core category (Strauss & Corbin, 1990).

For initial open coding, I coded by hand, writing on each transcript. I then transferred some codes to note cards to begin clustering, a method described by Charmaz

(2006) that I used for initial axial and selective coding. While clustering may differ for each researcher, Charmaz provides some direction: “Write your central idea, category, or press; then circle it and draw spokes from it to smaller circles to show its defining properties, and their relationships and relative significance” (p. 86). For finalizing axial and selective coding, I employed the use of NVivo software. I recoded all of the interview data in NVivo software, focusing on broad categories which related to the main themes of my theory. Before this project, I was part of a research team trained to use the software, and I had used NVivo as a data analysis tool for both team and individual projects. I found NVivo useful for organization of codes in electronic storage of data but not nimble enough for the kind of constant comparison, fluid movement between texts, and reorganization that hand-coding allowed. At the final coding stages, however, when I knew the broad structure of my theory and its overarching codes, NVivo was helpful as I gathered related data in one place so that I could easily begin writing and perform the final stages of analysis. The combination of hand-coding methods, such as clustering, in addition to computer coding helped me minimize the potential disadvantage Creswell (2007) admits can result from computer-based analysis of putting “distance between the research and his or her data” (p. 165). I used both the tracking and storing ability of the software for axial and selective coding with the closeness and flexibility of in-person coding for line-by-line review.

Memo-writing. One additional method of data analysis I used while collecting data and while coding was memo writing. Lempert (2011) describes memo writing as “*the* fundamental process of research/data engagement that results in a ‘grounded’ theory” (p. 245). While I described field notes of observations earlier as a descriptive tool

for recording observations, memos are a different sort of written document (Emerson, Fretz, & Shaw, 2001). Rather than a means of description, memos are a means of analysis through which researchers can interpret, question, and construct meaning based on data collection. Charmaz (2006) dedicates an entire chapter to the purpose and method of memo writing. She recommends that memo writing be “the next logical step after [defining] categories,” but she also recommends that researchers “write memos from the beginning” of their research (p. 82). Therefore, I often wrote memos after interviewing, observing, or examining documents as a way of reflecting on the data and comparing or contrasting it to emerging codes or other data. I also wrote memos during the coding process to help decipher patterns I was seeing. Memos were primarily informal notes I made for myself. Lempert suggests “a memo need only be the account of a researcher talking to him/herself. Clarity and integration come with the expanding analysis” (p. 249). The clarity and integration to which Lempert alludes is the formal written analysis of the research, in this case, the final dissertation.

Reconstructing through writing. The “final” written analysis is the cohesive rendering of analysis from constant comparison, coding, and memo writing. This “final” portion is the formal interpretation of the data. Demerath (2006) writes that an area he believes will develop in qualitative research is “making more transparent the chains of reasoning through which we move from data through coding to our inferences – and ultimately our interpretation” (p. 105). Through the writing process, therefore, I sought to make my reasoning transparent. The role of writing for the grounded theorist is to lay out a cohesive theory grounded in data others can follow and see the researcher’s reasoning.

Charmaz (2006) suggests that interpretive grounded theory “emphasizes *understanding* rather than explanation” (p. 126). Thus, a part of my goal in writing the dissertation was to clearly establish how I had come to understand the process of EfS in the postsecondary classroom. Through the process of showing my understanding of the ongoing work of EfS, I sought to provide theoretical grounding that could help educators in framing, preparing for, and enacting EfS in the classroom. I drew connections to sustainability from a variety of angles and showed patterns in the ways in which educators worked for EfS, following Charmaz’s indication that written interpretations “allow for indeterminacy rather than seek causality and give priority to showing patterns and connections” (Charmaz, 2006, p. 126).

Pilot study and ethnographic studies. In addition to data that I collected in methods described here, data for this study includes a pilot project that I had already collected before proposing the dissertation study, a classroom ethnographic study I conducted also prior to proposing, and an additional classroom ethnographic study I was conducting simultaneously with this project. In the 2011-2012 calendar year, I conducted a pilot study for my dissertation. I interviewed eight educators at East State University and observed four EfS courses. I attended and observed each of these four courses once, and they lasted between 50 and 75 minutes. In the spring 2012 semester, I conducted an ethnographic study of a course titled “Introduction to Sustainability” observing almost every class session, interviewing seven students, and interviewing the faculty member. In the spring 2013 semester, I conducted a similar ethnographic study with a team of researchers as a part of a research praxis group, where another doctoral student and I lead a team of three undergraduate students in learning qualitative research methods while

conducting an ethnography of a course focused on sustainability. I drew on each of these sources of data as I analyzed my dissertation research.

For example, from initial findings of my pilot study for the dissertation, I developed a two-part theoretical framework for understanding EfS. One dimension was the degree to which educators taught with an explicit value orientation, meaning whether they focused on the ethical and moral implications of topics, such as climate change and pollution. The second dimension encapsulated educators' pedagogical beliefs and techniques. This framework provided an entry point for the process of constant comparison as I evaluated new data, determining whether to retain, enhance, or change my understanding of EfS. My initial theory changed as I gathered more data for consideration and noticed, for example, that almost every course incorporated some value-orientation.

The two ethnographic studies in Spring 2012 and Spring 2013 helped to round out my view of classrooms. In the data collection for the dissertation, time and resource restrictions limited the observations I conducted on each campus. However, being able to draw from two semesters of ethnographic examination of two courses on sustainability at East State University helped provide a lens into the entire arch of courses. They helped remind me that the single courses I witnessed were not necessarily representative of every day of class. Thus, as I wrote my final interpretation of EfS, I drew from a number of data sources.

Writing the formal analysis of the data is a form of interpretation, just as data collection and analysis are. Just as sustainability has temporal and spatial scales, so, too, do research and my interpretation of the data. Charmaz (2006) reminds readers, "Any

analysis is contextually situated in time, place, culture, and situation” (p. 131). Similarly, Creswell (2007) writes that “all writing is ‘positioned’ and within a stance” (p. 179). Thus, while I have written a “final” paper to explicate my own theories from this research, I recognize and welcome the ongoing iterative process of questioning, collecting more data, and reinterpreting that is a part of constructivist theory development. Because I understand my interpretation to be linked to my own time, place, and understandings, I sought to be attentive to the role of researcher reflexivity. Reflexivity is just one of many important considerations concerning the quality of qualitative research (Jones et al., 2006). Thus, I turn next to the criteria I considered and sought to meet in conducting this research project.

Quality and Goodness

Jones et al. (2006) suggest that the concept of “goodness” in qualitative research has grown to replace the concept of validity from quantitative research (p. 119). In qualitative research, traditional, positivist concerns such as generalizability, replicability, and internal and external validity are inappropriate for assessing the quality of one’s research. Guba and Lincoln (2001) suggest two “sets of criteria” for constructivist qualitative research (p. 68): (a) trustworthiness, which includes credibility (compared to internal validity), transferability (compared to external validity), dependability (compared to reliability), and confirmability (compared to objectivity); and (b) authenticity, which includes fairness, ontological authenticity, educative authenticity (research helps in the understanding of others), catalytic authenticity (research promotes work), and tactical authenticity (research spurs others’ work) (p. 68). Guba and Lincoln admit that the trustworthiness criteria they describe are often questioned in constructivist research,

given their parallel to positivist frameworks. Morrow (2005), however, broadens the idea of trustworthiness, suggesting trustworthiness might be reached through the carrying out of a “systematic” (p. 253) process and the consideration of multiple perspectives.

Morrow (2005), therefore, expands criteria that Guba and Lincoln propose. She describes roughly two criteria sets as well: (a) authenticity, which resembles Guba and Lincoln’s similar criterion, and (b) quality and credibility, which include dependability (researcher follows the systematic process), triangulation (researcher considers multiple perspectives), reflexivity, praxis, verstehen (researcher brings deeper understanding), particularity (research is attentive to each case), and dialogue (research is in conversation with multiple perspectives). These criteria are guidelines that ensure the researcher clearly addresses her or his context, is attentive to relationships with participants and others’ perspectives, engages in transparency in the entire research process, and seeks to look at and represent each case carefully so that others can understand and then act as a result. Part of the writing of this methodology section, therefore, was my attempt to show my systematic process of research, address these issues of goodness, and transparently describe the ways in which I sought to produce credible, authentic, and trustworthy research. I journaled about the research process and talked with a peer debriefer (Glesne, 2011) in addition to my dissertation advisor and committee to examine and remain attentive to the quality and goodness of the research process.

I worked to meet established standards of goodness. I followed the systematic process I have described here and maintained copies of handwritten codes as well as the NVivo coding structure, which point toward my process of theorizing. I sought to ensure my methodology and methods aligned with my ontology and epistemology to ensure data

I was appropriately seeking answers to my research questions. I also included a number of data sources to triangulate perspectives of EfS. I worked to develop positive rapport with participants in the study and wrote thank-you notes when I had a physical address or an e-mail thank-you note when I did not. When participants offered perspectives that might not initially have been seen as “fitting into” a theory of EfS (e.g., such as some faculty’s comments that they rarely used the word “sustainability,” despite having been recommended for interview or their course having been selected to fulfill sustainability requirements), I worked to give sufficient voice to such perspectives in my findings. I also sought to bring rich understanding to EfS through my interpretations, promote action through them, and highlight the voices of participants. I include a number of long quotations in my findings chapter so that readers can experience the voices of those I interviewed. I also engaged in member checking (Charmaz, 2006), the process of seeking feedback from participants, by sending transcripts of conversations and my interpretations of findings. Those who replied noted that I had represented their thoughts appropriately.

Reflexivity and Research Positionality

While grounded theory methods provide a rigorous approach to data collection and interpretation, the methods are not strict, linear processes. As I have addressed already, the research process involves a researcher rooted in certain contexts, examining contextual data. Thus, while the findings are “grounded” in data, they also exist as one construction and interpretation of the data. A key component of ensuring quality research is the reflexivity of the researcher. Jones et al. (2006) provide guidelines for a “systematic approach” to addressing reflexivity, which are rooted in reflection – reflection about

oneself, with one's participants, and on the related research. Because of the importance of reflexivity in a grounded theory methodology, in sections of this project I address my own interest, knowledge, and values related to sustainability as well as my biases. While I shared these perspectives briefly with participants, I also refrained from knowingly providing perspectives that might alienate their perspectives or diminish rapport.

My own interest in sustainability is rooted in personal experiences. All of my grandparents lived in "the country," in rural Alabama. I spent childhood years roaming the woods, shucking corn, and chasing lightning bugs. As a young adult, I was exposed to environmental education through regular Girl Scout trips to Bear Creek Environmental Education Center, where I learned (later to forget) names of trees, insects, and snakes. The environmental ethic of my childhood grew into awareness of my own relationship with the environment as a young adult. I lived in an urban volunteer community where I learned to compost and discussed impacts of community decisions on the environment. I also began to see the ways in which issues of social justice were tied to environmental concerns. Each of these experiences has primed my assumption that sustainable thinking and action is necessary for a thriving planet.

As I pursued continued graduate education in the field of higher education and student affairs, I began to see the opportunities and challenges of sustainability within higher education. As a scholar in the field of education, I argue that education is key for embedding a sustainable mindset into society. At the same time, I recognize that the educational enterprise has often failed at working toward sustainability; and, in so doing has exacerbated the issues facing the planet. Thus, my biases include my belief in the need for a transformed process of teaching and learning that embodies and incorporates

principles of sustainability. I believe sustainability is wrapped in paradox as it often begets our relinquishing of systems that currently sustain us (modern agricultural production or energy use); but, it offers a framework for finding new ways of living that restore relationships with each other and the environment. Having encountered situations in which sides become rooted in a sense of rightness about what action/behavior/belief is sustainable, I also believe that while sustainability requires that individuals understand the reasons behind their behaviors or decisions, they also remain open to continue reinterpretation of such decisions. Cultural aspects of sustainability are paramount and can lead individuals and communities to make different decisions. Such beliefs influence the way I would carry out or consider EfS in the classroom, and they may have influenced the way I interpreted data. These beliefs, my professional training in education as well as my upbringing inform the analyses I have drawn and the assumptions I have brought this study.

Demerath (2006) suggests that “qualitative researchers . . . have to actively give up control if they are truly going to the local or *emic* point of view” (p. 102). Thus, I sought to develop reflexive research relationships where I relinquished control of my biases, which could lead to narrow findings. By reflecting on and describing my own biases, I worked to be better able to put them in communication with others’ biases. Phenomenologists call the recognition of one’s beliefs in order to suspend them and see others’ positions “bracketing” (Van Manen, 1990). While I did not necessarily seek to suspend my beliefs in this case, I did seek to recognize their role in my research. I used member checking (Jones, 2002) as a way of ensuring representation of participants’ views was congruent with their views. While member checking does not ensure my

interpretation of participants' views is "right" or "closer to the truth" (Magolda & Ebben Gross, 2011), it does "lessen the power gap between respondents" and myself as a researcher (p. 35). I provided interview transcripts to participants and invited their feedback on portions of the written analysis. I also discussed my interpretations with a peer debriefer as I began final analysis.

Limitations

While I have made research design decisions for the purposeful reasons I have addressed in this chapter, as with any research process, my design choices have limitations. I address them here as a way of providing continued dialogue about ways to improve empirical examinations of studying EfS. First, I address some potential limitations with constructivism as a paradigm for my study. Then, I describe limitations concerning the language I use, the contextual nature of my data given my sampling strategies, and the breadth of my research design.

Constructivism and Anthropocentrism

One of the limitations is rooted in the very philosophical assumptions of constructivism. Constructivism touts that multiple realities exist because of the agency people have through interaction with each other and their world. The very nature of constructivism is that people create and recreate knowledge through interaction (Broido & Manning, 2002; Jones et al., 2006). In this dissertation I, too, claim that I can understand and then relay meaningful, purposeful, useful, and good information about teaching for sustainability through interaction with others and consideration of others' ideas and practices.

Yet, concerns abound in the discourse of sustainability about the anthropocentrism of societies in the modern world and people's claims to knowledge, albeit knowledge coming from multiple perspectives (Norton, 2005; Orr, 2004). A constructivist perspective largely omits the role of the environment and the potential "agency" of the environment in responding to and then changing human meaning and action. Constructivism says little about what causes certain human interactions but places primacy on the humans and their interactions themselves. I retain a constructivist paradigm given its ability to open itself to multiple causes of human action and interaction. It also undergirds my understanding that human action and interaction has caused environmental degradation, the realization of which has necessitated the ensuing concept of sustainability and the need for sustainable practices that might right past and ongoing degradation (IPCC, 2007). Yet, in the background of my research is a question -- is human knowledge and perspective not intertwined with, and perhaps at times, subordinate to the very nature of the earth that sustains us?

While such a limitation is ironic to address in the midst of *social* science research, it is worthy of consideration when the research itself seeks to restore human-environment relationships. Norton (2005) addresses a similar limitation in his tome on adaptive management, which he argues is a "science-based management that assumes we usually do *not* know enough to choose what is absolutely best to do" (p. xiii). Following Norton's philosophy, I attempted to examine EfS with the knowledge I had at the time with the understanding that my own knowledge—and thus conclusions—are limited but improvable with attention to others' *and* environmental responses.

Language and Scope

While I only address briefly my attention to language, I must include that the language I use to describe the phenomenon I am studying is limited and ever-evolving (Sterling, 2010). I use the term “education for sustainability” to describe the kinds of courses I am examining, and this terminology automatically sets these kinds of courses apart from other courses. Ideally, however, all courses would work within an EfS paradigm. Sterling argues that instead of a selection of courses that evoke EfS, we actually need a paradigm shift in education so that all education is “sustainable education” (p. 44). Such a paradigm shift does not imply that all courses must reach unreasonably beyond their scope to include the teaching of the term sustainability, but it does imply that courses would need to consider and teach within a certain set of values that sustainability evokes. Thus, one limitation of this study is that by studying EfS, I continue the separation of courses that educate for sustainability and those that do not. I believe the understanding of EfS currently, however, is important for the wider implementation of sustainable education. Thus, I hope this current project might contribute to continued consideration of paradigm shifts in education.

Another limitation with language concerns my terminology. Throughout this study, I often use the word “sustainable” as an adjective as if it might be a clear concept, despite the fact that findings show the term is complex. What I label as sustainable is rooted in participants’ beliefs, cultural norms, and in literature I have cited. However, as instructors shared in the findings section, what one labels as sustainable another may label as detrimental. Thus, I both admit the limitation of my terminology and invite dialogue – which my findings suggest is a natural outgrowth of the concept of sustainability -- about my terminology.

Contextual Knowing and Case Selection

As is necessary and purposeful in qualitative research, in which I have selected only a few key, excellent cases, this theory of teaching sustainability across the disciplines is “context specific” (Broido & Manning, 2002, p. 436). With different institutions, educators, and/or students, I might create a different theory. One glaring limitation is that all of these cases are centered in the United States, yet much work is being done in education for sustainability in other countries. Therefore, this research could be expanded by considering more cases, particularly international cases.

Given a desire to produce useful findings in a timely fashion, I purposefully created methodological parameters that would provide enough rich data without deterring timely analysis. At the same time, continued review of EfS at different institutions and at different times would enrich this study. In particular, I was purposefully working in this study to highlight institutions that were working diligently to incorporate EfS but were doing so in a way that would not dramatically alter their existing institutions (e.g., adding a school of sustainability, like Arizona State University) or become part of a unique, driving mission of the institution (e.g., College of the Atlantic’s inclusion of one human ecology major). My reason being that most institutions will at least begin their EfS endeavors in a way similar to the cases I selected. The institutions I selected provide excellent examples within the subset of institutions I am considering. Another study might also examine institutions that are offering rare “boutique” programs or foci on sustainability or might incorporate community and technical colleges. In addition, I selected excellent institutions that could help inform a grounded theory, rather than institutions that would provide comparisons of schools not engaging in EfS.

Breadth

An additional limitation is the breadth of topical areas I explore in this project. While I address above an important reason for considering EfS in a number of disciplines, the fact remains that EfS might have different elements in different kinds of courses. I have chosen not to study one discipline or topical area in depth for the sake of gaining a broad picture of EfS across the disciplines, expecting that seeing both the similarities and differences in EfS knowledge and practice across the curriculum will provide fruitful information. A number of other studies, as well, highlight in more depth EfS in disciplinary areas (Blewitt & Cullingford, 2010). Thus, the breadth of topics considered in this study will combine with in-depth studies of topical areas for a clearer picture of EfS both across the breadth of the curriculum and in the depth of each individual topical area.

Ways of Thinking

A final limitation I address is that most scholarly endeavors -- this study included -- rely heavily on rational thought. However, Cartesian thinking has often been cited as one of the most fundamental sources of environmental degradation (see Evernden 1993: Orr, 2004). The typology I prescribe is heavily aligned with the operationalizing category I describe. A typology foregrounds the measurement and definition of teaching – an act which is dynamic, intuitive, and social rather than static, prescribed, and controlled. Therefore, while I have created a theory that I hope is a useful tool for institutions, I realize it does not adequately reference the radical, immeasurable, unquantifiable concept of sustainability or the act of EfS. I realize that EfS calls us to do more than name our educational approaches, but to instead, operate in fundamentally different ways, both

rationally and perceptually. While I see the theory I propose as a tool for important work toward EfS, ensuring that we work toward different ways of learning, I welcome creative and critical methodologies that break from rational, cognitive approaches to thinking about EfS.

Summary

In this chapter, I addressed the methodology and methods I used and methodological issues I considered in conducting my research project. I described the epistemological beliefs that are the foundation for the methodology of grounded theory, which I employ. I described my sampling strategies, the manner in which I sought rich data through interviews, observations, and document analysis. I also reviewed the ways in which I analyzed and presented the data, using a constant comparison method as I collected and coded data, engaged in open, axial and focused coding, wrote memos, and ultimately wrote the final dissertation. I reviewed the criteria of goodness and quality I sought to uphold, namely issues of trustworthiness, authenticity, quality, credibility, and reflexivity. Lastly, I provided both philosophical and logistical limitations of the study.

CHAPTER 4: FINDINGS

In this study, I investigated education for sustainability (EfS) in the postsecondary classroom. I sought to understand how educators understand and define sustainability, the lessons instructors teach in EfS classrooms, and the contexts that influenced educators' involvement in EfS. In this chapter, I provide findings from the study, focusing on the three main questions. I observed 27 different courses for a total of 67 class meetings. For most courses, I observed only one class session, but for two of these courses, I observed several class sessions, using ethnographic methods; I observed 20 meetings of Sustainability Introduction and 22 meetings of Sustainability on Campus. I also interviewed 42 individuals at three institutions, 29 of whom were educators, 11 of whom were students, and 2 who were primarily administrators. *Table 1: Participants and Courses* displays each individual as well as his/her role, institution, discipline, and course (if applicable). I also indicate whether I observed the course.

Based on the data analysis procedures described in the previous chapter, I identified several themes related to how participants made sense of sustainability in the teaching process. The themes that emerged from the data concern largely the way in which educators define sustainability, the variations of EfS, and the pedagogical characteristics of EfS in the postsecondary classroom. While the focus of my study was teaching and most questions concerned educators' understandings and actions, I also interviewed students as a way of triangulating data, particularly concerning the question about what educators teach in EfS classrooms. Before describing the themes, I first briefly describe the institutions and participants. Then, I discuss the meaning of sustainability, focusing on macro-narratives that emerged. Next, I describe the variations

of EfS in the classroom, including the role of sustainability in the course and the teaching frameworks educators used. I also describe pedagogical characteristics of EfS that were similar in each course, the sources of knowledge for educators, the teaching beyond content, the role of pedagogical partnerships, the use of disciplines in conversation, and the values-oriented material in the classroom. To close the chapter, I delineate the way in which each of the aforementioned components contributes to the grounded theory of EfS in the classroom, featuring both the path from knowledge to practice and a typology of EfS in the classroom.

Table 1. Participants and Courses Included in the Study.

Name	School	Interview	Observe	Course Pseudonym	Discipline or Role
Anthony	ESU	Y	N	Intro to Built Environment	Architecture
Sam	ESU	Y	Y	Consumer Culture	Cultural Studies
Graham	ESU	Y	Y	Environmental Science	Science
	ESU	Y	Y	Sustainability Introduction	Science
Marie	ESU	Y	N	Microbiology & Genetics	Science
Adrianna	ESU	Y	N	Professional Writing	Writing
Joelle	ESU	Y	Y	Science Literature	Humanities
Katie	ESU	Y	N	Science & Special Education	Education
Mariella	ESU	Y	Y	Professional Writing	Writing
Camille	ESU	Y	N	Culture and Sustainability	Social Science
Aiden	ESU	Y	Y	The Chesapeake Bay Anthropology and Climate Change	Social science
Zoe	ESU	Y	Y		Social Science
Amalia	ESU	N	Y	Environmental Engineering	Engineering
Aileen	ESU	Y	Y	Intro to Energy & Design	Engineering
Roger	ESU	Y	Y	Intro to Energy & Design	Engineering
Tom	ESU	Y	Y	Campus Sustainability	Architecture
Patrick	ESU	Y	NA		Student
Laura	ESU	Y	NA		Student
Martin	ESU	Y	NA		Student
Jack	ESU	Y	NA		Student
Alex	ESU	Y	NA		Student
Angie	ESU	Y	NA		Student

Chris	ESU	Y	NA		Student
Nina	LAC	Y	NA		Administration
Adam	LAC	N	Y	Seminar	Science
Jeremy	LAC	Y	Y	Environmental Economics	Social Science
Myra	LAC	Y	Y	Environmental Science	Science
Nikki	LAC	Y	Y	Views of the Environment	Religion
Maddie	LAC	Y	Y	Sustainability in Education	Education
Thomas	LAC	Y	NA		Student
Leah	LAC	Y	Y	Environmental History of America	Humanities
Jorge	LAC	N	Y	Environmental Policy	Social Science
Julian	LAC	Y	Y	Readings on Justice	Humanities
Hank	RU	Y	Y	Environmental Problems	Social Science
Carla	RU	Y	Y	Seminar	Science
Jennifer	RU	Y	N	Sustainability Introduction	Science
Carl	RU	Y	Y	Sustainability Introduction	Science
Ezra	RU	Y	Y	Sustainability Introduction	Humanities
Neil	RU	Y	Y	History of Sustainability	Social Science
Estelle	RU	Y	NA		Student
Aldo	RU	Y	Y	Environmental History of America	Humanities
Cecilia	RU	Y	Y	Environmental Ethic	Theology
Lynn	RU	N	Y	Studio	Architecture
Miles	RU	Y	N	Business	Business
Sarah	RU	Y	NA		Administration
Russell	RU	Y	NA		Student
Quinton	RU	Y	NA		Student

Site Descriptions

I chose three institutions as sites for study: East State University (ESU), Religious University (RU), and Liberal Arts College (LAC). I selected each institution because of its attempt to foster sustainability in classroom learning. Two of the colleges (ESU and RU) offer a minor in sustainability and two (ESU and LAC) offer workshops dedicated to assisting faculty from across the disciplines in infusing sustainability into their teaching. Observations at each institution show that each desires to portray an image of sustainability. At RU, a sign on classroom walls provide a checklist of ways to ensure classroom use is sustainable (e.g., use of lighting occupancy sensors, recyclable goods, classroom temperature policies). At ESU, signs in various campus buildings highlight sustainable features. At LAC, the campus map notes sustainability efforts. While the campuses fall on a spectrum of commitment to sustainability – with both ESU and LAC highlighting it as a main priority and RU highlighting it as one of my priorities – each attempts in various ways to show its commitment to sustainability.

The educators and students I interviewed for the study represent a diversity of disciplines, interests, and perspectives on sustainability. I describe in detail in the following section some different understandings of sustainability. While brief in its description of each person, *Table 1: Participants and Courses included in the Study*, provides details about each person I interviewed to provide context for each person whose interview comments and/or teaching provide grounding for this study.

Introduction to the Grounded Theory of EfS

Recent work to incorporate sustainability into postsecondary education has proven both prolific and complicated. On the one hand, many programs and courses have

emerged given the importance of the issues. Jennifer noted that if she and her colleagues “were doing [their] job as academics, not only should [they] be doing research on these issues [e.g., climate change] but [they] should be empowering students to really understand what these issues are about and to get them going towards solving them.” Yet, while the work is important, educating for sustainability has been characterized by “incoherence” (Sterling, 2010, p. 43) and definitions of sustainability at work seem “ambiguous” (Dautremont-Smith, 2013). The theory I propose is one interpretation of EfS that brings coherence and clarity to the work for EfS in postsecondary institutions.

The first part of the theory concerns the way in which educators define sustainability and the ways such definitions inform the teaching and learning process. Educators described their uncertainty about, appreciation for, and understanding of the word sustainability. The concept is at once “complicated” (Zoe) and “vague” (Myra) while “intellectually interesting” (Jennifer). I delineate the complexity of the term and then describe a macro-narrative of sustainability that emerged across all the data and can serve as a framework for teaching, while micro-narratives wove through individual courses or institutions. The data reveal an overarching understanding of sustainability as concerning relationships between humans and the environment – a concept different from environmentalism, which while also “equally vague” (Leah), highlights environmental stewardship that “kind of takes humans out of the picture” (Myra).

Important to the concept of sustainability is the realization that human understanding of sustainability is ever changing. Feedback from human action or inaction continually informs an understanding of sustainability. One student in Nikki’s class noted that “The consequences of climate change are bad but important for our understanding of

land.” He was noting that as humanity sees the consequences of its relationship to earth, we can better understand “the land” and then modify the human-environment relationship. The cycle of learning and relearning is an important element of sustainability that is not inherent in every subject. Tom, specifically, chose not to use a textbook because he shared it would be out of date as soon as students purchased it. Many educators shared that knowledge of concepts related to sustainability (e.g., climate change) is constantly changing; thus, they must frequently relearn in order to feel they are effectively teaching.

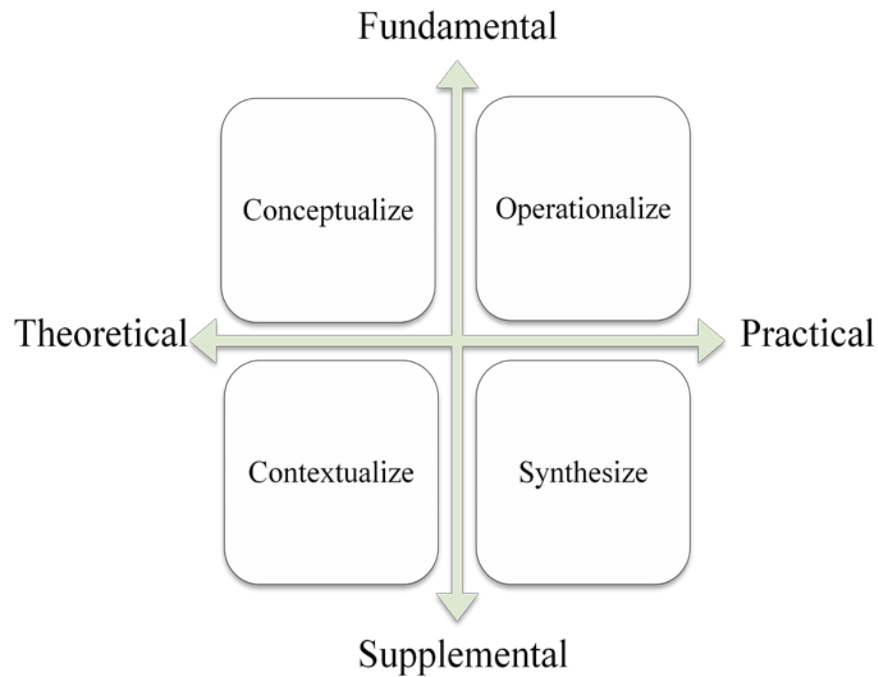
Moving from the definition of sustainability and the way that it informs educators’ perspective of knowing, the second part of the theory specifically addresses EfS in the classroom. First, I describe the role sustainability may play in each course, from a fundamental to a supplemental role. Second, I provide the teaching frameworks of each class. Some classes were theoretically framed, focused primarily on students’ learning of concepts or understandings of reality; some were practically framed, focused on building students’ concrete skills for tangible actions. Both the role of sustainability and the teaching frameworks in a course translate into two continua along which courses fell. After describing these variations of EfS courses, I share the pedagogical characteristics of EfS, including teaching beyond content, sources of knowledge in EfS classrooms, pedagogical partnerships, disciplines in conversation, and a values orientation. Lastly, I describe contexts that were important for EfS.

In the final section of this chapter, I integrate the components outlined above. I show the ways in which components of EfS weave into a feedback loop of knowing and teaching. I also provide a typology of four courses for EfS – those that conceptualize,

operationalize, contextualize, and synthesize sustainability -- suggesting ways in which the role of sustainability and the course frames vary in EfS courses (see *Figure 2: Typology of EfS Courses*).

Typology of EfS Courses).

Figure 2: Typology of EfS Courses



Defining Sustainability

Observing courses, I encountered a variety of topics that fell within the ideas of sustainability. I learned about the transition to farming in the Neolithic period (in Neil's course). I learned about global weather patterns and ways in which different currents converge around the earth (Tom). I learned about a land ethic rooted in Thoreau and Leopold (Graham, Nikki). I learned about Carson's exposé of DDT and the struggles Carson faced in a masculine-driven profession (Zoe). I learned about fishing and ways in which economists attempt to advise fisheries' policies based on both profit and sustainable ecosystems (Aiden). I learned about the racial correlation to sites of toxic

waste dumps (Nikki). I learned about peak oil and past failed attempts to shift a carbon-dependent energy need (Hank). I learned about radiative forcing and what it has to do with climate change (Tom and Myra). While a number of concepts or themes repeatedly appeared in various classes, almost every instructor I interviewed iterated again and again that the “facts” were pointing toward a lesson beyond content, as I will describe in detail later. What they worked to do in the classroom was build a narrative, piece by piece, that students could put together using the facts – be they texts, scientific principles, historic examples, cultural artifacts – to demonstrate principles about (a) the relationship between humanity and the environment; (b) the way humans come to understand the relationship between themselves and the environment; (c) the responsibility of humans to the environment and humanity itself. These three elements comprise an overarching macro-narrative of sustainability that was similar in most courses.

While most educators referenced popular definitions for sustainability, such as the Brundtland Commission’s (WCED, 1987) definition that highlights sustainable development as current of use of resources such that future generations still have access to resources, they also discussed the term at length beyond traditional definitions. In the following section, I describe the macro-narrative of sustainability that most educators shared; this macro-narrative is a framework around which educators built micro-narratives, composed of the kinds of lessons I describe at the beginning of this section. I then turn to discuss characteristics of the concept of sustainability that educators highlighted, including the complexity of the term and its use for inviting dialogue.

Macro-narrative of Sustainability

Woven throughout educators’ definitions of sustainability were many threads, but

a central theme remained important in each account of sustainability: the relationship between people and the environment (broadly defined to incorporate both the Earth, the atmosphere, and space beyond). If one considered my language critically, she or he might argue that humanity is, in fact, part of the environment. I acknowledge the tension at play when linguistically separating humanity and the environment, when in fact the two are not easily separated. I also recognize the terms “people,” “humanity,” and “environment” are umbrella terms that represent considerably diverse entities. Conceptually, however, most educators discussed humanity and environment as different, if related, and uneasily separated, entities. In addition, as I will describe, the human-environment relationship concerns not just a relationship between people and the environment but also the relationship among different social communities that are mediated by the environment.

The core of an understanding of sustainability for educators in this study concerned (a) the relationships between humanity and the environment, (b) the ways people understand human-environment relationships, and (c) the ensuing responsibility people have to the environment and each other, which I describe interchangeably as humanity’s responsibility to the environment or societal enactment of the relationship between humanity and the environment. In addition, the element of time played an important part in educators’ understanding of sustainability given the historical effects and future impact of human-environment relationships. While many narratives of sustainability changed in different classroom spaces or in conversation with different educators, these central tenets of sustainability remained central to each instructor’s understanding of sustainability.

Relationship between humanity and the environment. Most educators with whom I spoke held an underlying if not stated belief that sustainability primarily concerns the relationship between humanity and the environment. Classes introduced that relationship in different ways. Amalia was teaching about the chemistry of water purification and mentioned at one point:

We're shifting gears. Let's talk about how to evaluate water's equilibrium or steady state conditions. What conditions are we at when we have no more chemical reactions occurring after pollution? These equations can't tell us how fast a reaction will go but will tell us to what extent.

One practice question she proposed concerned whether a solid would completely decompose at a given temperature. After a series of steps, she showed that much solid would remain. She was teaching steps for students to understand chemical relationships between humanity's pollution (often from manufacturing) and the environment. The nature of the relationship she described existed in equations and scientific principles or terms – Gibb's Free Energy equation, biological oxygen demand, or LeChatelier's Principle.

The nature of the relationship between humanity and the environment looked different in other courses. In Leah's course, students studied the Columbia River Basin where controversy exists over damming and the ensuing results on the environment, for example, the livelihood of fish. In relation to salmon ladders, designed in attempt to help salmon migrate despite damming, one student noted "it's an ecosystem that can't function without interaction." Another noted that salmon are "seen as the good life" or the way life once was and thus have a cultural power. Leah then noted, "salmon are not as needed for survival now as they used to be." In the discussion, students saw the

relationship between humanity and the environment not as equations and principles, as they did in Amalia's class, but instead as an exchange of cultural meaning.

In yet another class, Aldo wove together science and culture to show how they interact. He described the ways in which gender is associated with understandings of the environment. He described that when birth control exploded in popularity in the 1970s, "scientists began to discover sexually confused species of fish" because fish near sewage treatment plants were exposed to high levels of hormones. He described the properties of endocrine disrupters, of which birth control is one type, and how the culture of gender can "influence biological history of sex." In this example, culture influenced biologically "the way bodies behave." Thus, in Aldo's course, students saw the relationship between the environment and humanity as governed both by cultural meanings and scientific reactions in "feedback loops."

All of the examples I include highlight arguably negative effects of humanity on the environment, but I have chosen them for their clear and poignant images of different human-environment relationships. Yet, the relationship between humanity and the environment was not always portrayed as negative or value-laden. Photosynthesis and the ways in which plants use carbon dioxide was one lesson concerning the relationship between the environment and humanity (Graham). Another was the theological concept of Sabbath and the Biblical creation story which ends on a day of rest, highlighting the importance of being "in relationship with each other and creation" (Leah). What existed in each class, however, was an indication – whether implied or subtle – that a relationship exists between humanity and the environment.

Many educators shared the connections between the terms "environment" and

“sustainability.” Myra described what many educators echoed:

Think about it [sustainability] as environmental science or science for the environment, it can be taken as that’s your goal -- is just to maintain the environment. And it kind of takes humans out of the picture. Like humans are just screwing it up and humans shouldn’t be there. I think it’s harder to get the human element if it’s so focused on the environment . . . Sustainability I think ropes [everyone in], everybody has a stake in sustaining the environment, sustaining livelihoods.

Myra suggested that sustainability invites humanity into relationship with the environment when some prior concepts, like environmentalism, in her perspective created a dichotomy in which the environment was pristine and worthy of protection while humanity was invasive and destructive of the environment. Sustainability as a concept, instead, invites humanity to examine its relationship with the environment. It attempts to break the dichotomy of humanity and environment.

Resembling Myra’s description, Graham’s comments depict his living through a historical shift toward the term sustainability. He suggested that environmental concerns in the 1970s included human health but also noted that perhaps faulty perceptions existed about who “pollutes” and who instead cares for the environment:

I finished [college in] ’73. At that time, there was of course all kind of environmental things happening. The EPA was established, the endangered species act, the Clean Water Act, the Clean Air Act, the National Environmental and Policy Act. And President Nixon . . . was signing this legislation because it was in the public mind. There was fear of pollution and effects on human health. Rachel Carson, you know, it was ten years or so after Rachel Carson published a *Silent Spring*. What we say then was sort of a human health perception, that was the concern . . . I, as an undergraduate, a 22 year old, thought you know, we were the ones with the white hats and everybody else – industry was black hats, they were bad people polluting the atmosphere making life miserable. And what I think has happened is that we have gone from that focus to more one of focusing on communities and focusing on future perspectives . . . So I think that what we’re doing now [with the term sustainability], we’re integrating at this point some of Thoreau and Muir and Darwin and Pinchot and these others, Leopold, and they are all kind of coming together in this kind of a community dynamic. Looking at things more broadly, more nuanced, with more tolerance for different

points of view. And not just like there's one correct answer, and we know it. Graham highlighted that sustainability involves a "community dynamic," in which "different points of view" exist. In other words, sustainability entails what Norton (2005) described – a community in conversation about its values.

The notion of community is important in a macro-narrative about sustainability because it reveals that the term itself is not simply about a connection between people and the environment. It also entails a feedback loop, wherein people are in relationship with each other "through" the environment. The effects of one community's relationship with the environment impact other communities. When discussing sustainability, Camille shared that in her course, she "incorporate[s] the traditional bottom line, but we have to look broader than that definition. If we do not, we run the risk of leaving out people, as if people are in a void, without connection to cultural contexts." She continued by providing one example of the importance of including culture in notions of sustainability:

We offer perspectives on sustainability without seeing that people cannot afford to live this way – and by 'afford' I do not mean just money. How do we expand our definition to incorporate broader swaths of people? Both nationally and internationally? Products we push here affect people around the world. We push fair trade, and that is good for fair trade farmers, but that affects an Ethiopian coffee farmer who is not on the [fair trade] market. I want students to see sustainability is way more complicated than we usually see.

Camille iterated that humanity's cultural ways impact the environment, and, therefore, others whose livelihoods similarly rely on the environment. Zoe said she reflected on the way her individual interactions affect others in the way that Camille suggested; Zoe commented:

The earth is constantly changing so I guess as a human being, I don't want to contribute to the extinction or the death of another living being. I know I do that through just living, I mean I've got to eat food somehow. There's things that I do that I have no concept of what effect that will have 6000 miles away. And

sometimes it's a little overwhelming to think of it like that. But at the same time, it's really empowering to think about it like that. Because the fact that I'm connected with someone or something I've never seen or may never meet or know is actually pretty powerful.

Zoe's interaction with the environment in her location within her culture contributes to implications in the environment on the communities around the globe. Zoe and Camille helped show the importance of the cyclical understanding of the relationship between people and the environment referenced by the concept sustainability; they include notions of environmental justice. The relationship is neither linear nor finite but ramifies throughout a global existence.

Thomas, a student in Leah's course, discussed some of the main lessons he took from his course; and, his comments reveal the cyclical relationship between environment and humanity as he alludes to ways in which people are tied to the environment.

The biggest thing [I will take away from class] is that there will always be another side to a development project. And that that side of the coin isn't sort of a hindrance but something you should really pay attention to. Like environmental history is more or less empathy than anything else. Because once you study history you learn there's Native American dispossession involved or native people involved or business interests versus local interests and stuff like that. So the biggest take away from this class would be, because I'm working for an urban development project next year, like you need to understand that when you're doing something, there's always consequences. And you need to have a very, very good understanding of what those consequences are going to be.

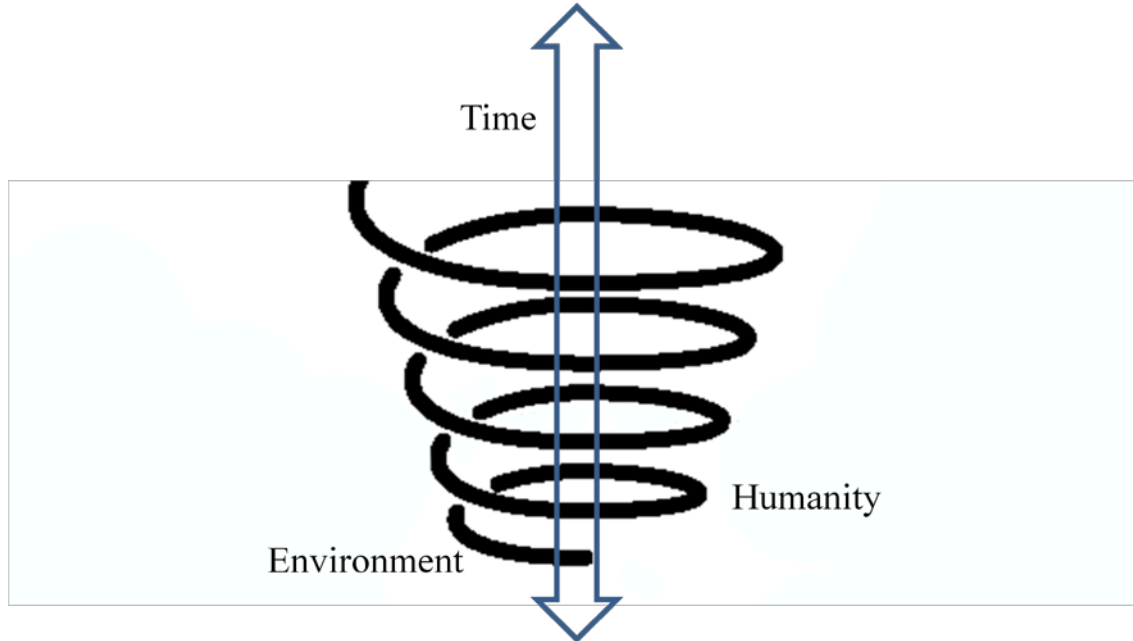
Implied in his comments about Native American dispossession and competing interests is that

environmental issues are indelibly tied to societal issues, and human involvement in the environment will impact communities as well. The course reminded him of the need to be aware of consequences of his actions both on the environment and on individuals.

The cyclical relationship also occurs across time. Educators frequently noted the

importance of considering both historical and future relationships between humanity and the environment. Zoe noted her work in research to encourage communities to think “25 to 30 years head.” Jeremy asked students to grapple with different trade-offs across time: “If there’s less consumption now in the name of the future . . . then there’s less available now for people, some of whom really need it.” Myra noted she wanted students to know the “interaction between what we know scientifically and what the role of science is to understand what’s going on, to give us different scenarios for the future.” Hank noted the need to “imagine a future that can go on and on and on.” Neil noted the need for expanding the temporal range, encouraging educators to think in not just centuries but also millennia; he examined humanity’s impact on nature archeologically and highlighted, “Everything we do is going to limit choices in the future. We want to do things not that limit choices the least in the future.” Part of understanding the relationship between humanity and the environment, therefore, requires awareness of the temporal relationships, as historical interactions affect current and future components of the relationship. *Figure 3: Cyclical Relationship of Humanity and Environment* depicts the linked relationship between humanity and environment, shown both as different pieces of the same whole, whose relationship ramifies through iterations over time.

Figure 3: Cyclical Relationship of Humanity and Environment



In all of the aforementioned descriptions of sustainability, humanity features significantly as a species that uses, lives on, and tends parts of the environment. This view can be seen as anthropocentric. Yet, consideration of the role and place of humanity is central to sustainability. The term exists because societies are grappling to understand what positive relationships with the environment might entail, and such relationships involve the acknowledgement of the presence and role of humanity in the environment and vice versa. Consider Myra's comments:

Humans belong somewhere in this planet, and we just have to understand these relationships. And maybe they've been too lopsided in one way or the other, but I think sometimes the environment is seen, or the environmental movement is seen as kind of not focusing enough on human wellbeing. So I think sustainability . . . allows humans into the picture in a not-always-negative way.

Myra noted that sustainability entails considering humanity's role within (perhaps rather than on top or in control of) the environment. Sustainability's very definition requires the incorporation of humanity. Therefore, a significant part of the macro-narrative of

sustainability is humanity's attempt to understand the human-environmental relationship.

Understanding the relationship. While educators taught different relationships between humanity and the environment – be they cultural, scientific, theological, or otherwise -- they also showed students how we have come to understand those relationships. In Amalia's case, students learned equations and the way in which positivist, scientific procedures can help students understand relationships. In Leah's course, students saw the ways in which cultural beliefs shape human-environment relationships, which are therefore seen as constructed, malleable, and interactive. The second part of the macro-narrative of sustainability, which I highlight in this section, concerns therefore not just the fact that relationships exist but that educators come to understand those relationships in vastly different ways – whether through measurement, social construction, or other tools.

In many cases, educators agreed that the relationship of humanity and the environment is not easy to understand, and one of the goals of EfS is to work toward understanding that relationship. In the first week of a course, Graham highlighted that many hold different beliefs about human-environment relationships. Graham asked questions about the nature of the relationships between humanity and the environment in a course – “are humans apart from nature or a part of nature?” Students in the class had different responses and saw that the relationship might be hard to characterize and that different viewpoints might be correct, depending on one's lens.

Leah, using the term “nature” rather than “environment,” shared one historical tension (specifically in America) of societies seeking to understand their relationship with the environment:

Americans have struggled . . . certainly since the end of the 19th century to define and create nature as a category separate from the human. And the history reveals that no such separateness exists. That any attempt to draw a line between what is human and what is non-human will ultimately fail because most of history involves an endless blurring of that distinction and that much of the natural world is shaped and profoundly constructed by humans themselves. So that any system that's labeled natural turns out to be shaped by humans in many ways.

In her course, Leah worked to show students that while humanity commonly envisions itself as separate from nature, such separation is hard to delineate. She included narratives and cases that showed the ways in which history revealed how human-environment relationships are defined by connections that are hard to delineate between humanity and the environment.

Anthony discussed that the attempt to understand human-environment relationships holistically is largely connected to modern epistemological turns. He said:

It wasn't long ago that we understood that the world was actually a very complex system, right? Before that we were actually working the other way, where we were trying to separate everything and analyze everything separately. Today we're trying to understand the world as a whole.

Anthony shared that sustainability entails an attempt to consider holistically the impacts of the relationship between humanity and the environment, but such an attempt requires a new way of thinking. Similarly, Myra suggested that science as it has traditionally been practiced – “within the confines of the beaker” – yields a limited understanding of the environment and human-environment relationships. She said that while we need to understand scientific principles governing parts of the world:

We can't anymore understand natural systems just by studying natural systems, natural quote unquote. Because humans are interacting all through natural systems on a global scale. And so you have to study humans and human interactions to understand nature . . . We're not actually standing outside a system looking in.

She said that she works to teach her students that understanding must come not only from

controlled experiments but also from examining human-environment interactions in reality.

Neil described in detail one new way of thinking, complexity science, he employed to help students work toward understanding the nature of human-environment connections. While it entails experimentation and modeling, it also assumes non-linear, unpredictable relationships between various factors in the human-environment relationship. He said of complexity science:

It [allows] experiments, so that you can say, “Well what if you change [a component of the human-environment relationship] and run the model ten times? Does it always end up one way? Does it go crazy after awhile? Is it very unpredictable? Is it highly predictable?” We want to do things that are more predictable, that have a smaller range of complex unpredictable results, you know what I’m saying? Over long periods of time. And we really want to look at long periods of times because that’s the time scale [during which] . . . unforeseen potential consequences will unfold, and they’ll diverge over time. So potentially it looks tight over 50 years, 100 years. But then something happens and it becomes really unpredictable. And you can only figure that out if you do long term forecasting, long term modeling. So those are the kind of tools that are totally lacking in the sustainability world.

Neil introduced students to the idea of complexity science as tool for considering implications for human-environment relationship over the period of centuries or millennia. His point for students about complexity science was that human-environment relationships are neither completely predictable nor completely chaotic; they rest somewhere in between, and thus we can model various predictions of the relationship or the impact of current human-environment relationships to see potential future outcomes.

While not all educators referenced a modern philosophical trajectory or the use and limitations of traditional scientific research, most agreed that sustainability entailed a careful consideration of the nature of the human-environmental relationship.

Sustainability, therefore, requires that students not only acknowledge a human-

environment relationship but also think about how they understand such a relationship. A natural last component of the macro-narrative of sustainability, therefore, is the way in which humanity carries out its relationship with (or perhaps as a part of) the environment.

Enacting the relationship. Most educators shared the belief that because a relationship exists between humanity and the environment, humanity has a responsibility to enact the relationship, or more simply a responsibility to the environment. Sustainability as a concept requires that humanity seek to engage in a positive way with the environment and refrain from significant harm to the environment or certain communities. Actions may range from minimizing harmful effects of daily decisions that might be seen as indirectly affecting the environment and neighboring communities (e.g., eating, bathing, seeking shelter) to engaging in behaviors that might be seen as directly stewarding the environment and nearby communities (e.g., contributing to preservation efforts, planting native plants, lobbying for discontinued pollution from manufacturing in a body of water). Considering one's responsibility to enacting a positive relationship with the environment seemed an important element of sustainability.

While she spoke at length, Zoe simplified her thoughts saying that “at the very sort of basic level . . . sustainability is to live on this planet in a way such that all living beings, not just people, have the opportunity to have some sort of quality of life.” The spirit of Zoe's comments also invited into question non-living entities that are part of the environment (e.g., air or rock). She stated what many educators shared – EfS invites students to consider the ways in which their lives and their communities can best ensure global quality of life.

Cecilia, a theologian, shared a faith-based perspective on sustainability, using religious imagery to share the connection between humanity and the environment. She reflected that sustainability entails:

Living a life of husbandry really, of kind of intimate concern for the planet around us . . .
Actions and decisions that we make need to be such that it supports [the] community. And then the goal of all this being ultimately as a person of faith is the worship of God and being with one another.

Cecilia's beliefs are rooted in a faith tradition, which she portrays in her theology class. She built into her teaching the lesson that students have responsibility to care for the planet and others because of the nature of the relationship between humanity and the environment. In her class, the understanding was rooted in scripture. Anthony echoed Cecilia's reflection of the need to care for earth, using more economic imagery:

I think sustainability has to do with how we manage our resources on earth. I mean once we realize that the earth is finite, and we realized that we want to sustain the planet as a species, sustainability has to do with how we are going to administer our resources in order for future generations to be able to live here.

As is common language in discussion of sustainability, Anthony referenced the role of the environment as a source of resources for current and future generations, and thus, intertwined with humanity. One might note differences in Cecilia's and Anthony's vision of the environment – one a place to care for and tend for its own sake and one perhaps a place that supports humanity. While these differences are important and represent different micro-narratives of sustainability, they share the notion that humanity and the environment are in relationship that humanity has a responsibility to steward.

Isaac noted that one's current actions always have some kind of impact on others and the environment; thus, in his course the idea of engaging with the environment entailed not doing away with negative impact but with living "smartly:"

We have to live and we have to support the people that are already here. We have a responsibility to do that in a way that has the most benign impact on future generations as well. It's not to say it won't have any impact because I don't think that's a reality. I think it's not only naïve, I think it's actually dangerous to think that we can actually make a way of life that is so sustainable that there's going to be no impact, you know. I think that's you just can't do that. We are part of the world, and as part of the world, part of the universe, we interact with parts of it, and there will be consequences of that. We have the ability to think about that. We have the ability to understand that if we really think hard and well about it, so I think we have the duty to try and be smart about it.

He shared that while an individual might not ever live in a perfect relationship with the environment, he taught in such a way that students in his class worked to recognize the need to consider more harmful or more benign ways of living.

Aiden's course incorporated a similar theme of considering the ways in which humanity engages in relationship with the earth. Yet, his course centered on helping students understand how science and economic data help inform local governments in making policy decisions about pollution in waterways. Aiden shared a moment in class mid-way through the semester when he tried to return students to the main point of his economics class. He reflected:

Right after the break, I said to them, "What's the big question here? What are we trying to answer? . . . It's not just can we restore the bay? Yeah, it can cost trillions and trillions of dollars. It is *how much* should we, what's the amount we should restore it to? How far should we go? Is it the existing law, is that right? Did they just happen to guess and come up with the right amount? Or, can we refine that a little bit more?" . . . As you clean up more and more, the benefits on the margin are getting smaller and smaller.

He was teaching students over the course of the semester the kinds of data they might use in knowing how and if they were engaging in a positive way with the environment. While a central theme of his course was that knowing exactly the way to reduce pollution or to restore waterways might be impossible, tools exist to help communities make important decisions about caring for both communities and the environment.

Jorge's students called into question in class who holds responsibility for care of the environment – individuals or organizations. The students had been examining environmental policies, such as the Clean Water Act. After reading an article describing the ways in which fracking contaminates water, the following conversation ensued:

Student: Why are [fracking companies] not required to disclose to regulators or enforcers?

Student: Or why not equip water treatment plants to treat [fracking byproducts]?

Jorge: What does everyone think?

Student: It's not fair to make people pay. Shouldn't fracking firms be responsible?

Jorge: Shouldn't people who drive be responsible for car pollution? The legacy is that polluters don't pay. I agree with you but the issue is that we do not have a standard.

In his class, Jorge was showing ways in which policies do not eliminate all types of pollution. The natural follow up questions from students concerned the responsibility humanity has to eliminate pollution (and refrain from polluting in general). Such elimination is not easy, as the class quickly saw. They discussed that determining who holds responsibility for cleanup is difficult, and the energy demand is only growing. Jorge's class showed that despite suggesting humanity globally has a responsibility to the environment and other communities, EfS courses do not always have easy answers for how to carry out that responsibility in both individual and collective ways.

In one last example of the ways in which sustainability in courses related to students' learning about engaging positively with the environment, Joelle discussed the way in which the responsibility to the environment entered her literature class. While she encouraged students to think of caring for components of the earth – the ground, the air, water – she also encouraged students to consider cultural and human ties to the environment. She said:

[I] want them to think about the environment more broadly than environment. It isn't just about nature or green places, it's about where we are, wherever we are is an environment. It can be a built environment, it can be an outdoor environment, it's going to have some elements of the natural and the human put together . . . We don't pass over our environments, we are immersed in them.

She asked students to reflect on humanity's symbiotic or dependent relationship with the environment because she wanted students to see their responsibility to the environment as both for the sake of the environment and for the sake of humanity. Joelle shared that whether manmade or natural, "all environments are subject to our destruction or to our care." She reminded students that care for humanity and the environment are indelibly linked.

Characteristics of the Concept of Sustainability

While I outline a macro-narrative of sustainability, many educators spoke at length about the difficulty in defining sustainability, and some educators chose not to use the term because of varying interpretations of the concept or preferences for other terms. Therefore, I highlight characteristics of the concept of sustainability, which show educators' different interpretations of the term. Many educators – both those who used the term freely (e.g., Graham) and those who were cautious with its use (e.g., Leah) -- shared that the word is complex, at once simplified and all-encompassing. They also noted that because of its complexity, the term invites dialogue. In this section, I share these two characteristics of the concept of sustainability.

A complex term. The term sustainability is complex in many ways. On one hand, the term seems simple and inviting, yet looking closely, encompasses a number of disciplines and ideologies. It suggests humanity might perpetuate a lifestyle that may be unsustainable and points toward an ideal way of living that may not be possible.

Educators I interviewed grappled with the term and the way it entered into their classrooms and students' lives. One instructor, Graham, shared that one issue with the term sustainability is that it is broad and on the surface appears simple. He noted: "It's almost like diversity or freedom. It's like, "Well, sure, I want more of that. But I don't know what it is" . . . It's almost an article of faith . . . We know it's good . . . [But] we need to analyze it." At first glance, the term seems like a "good" concept, yet it is too complex to accept without careful analysis.

Describing the close examination of the word, educators shared that it reaches into a number of different disciplines and has a number of different components. A biology professor, Jennifer, shared that basic terminology associated with sustainability is itself complicated: "Words like 'nature' or 'environment' . . . are not easy concepts . . . they come with a lot of complex issues." Ezra, an English professor, discussed the difference between his prior experiences with interdisciplinary subjects and sustainability:

I've done a fair amount of team teaching throughout my career, did a couple courses with a psychologist . . . So I've read a lot of cognitive psychology . . . And that was fairly finite, I mean it was a challenge, but it was finite. Sustainability I feel like I could be reading anything, there's the ethics; I'd really like to be an economist some days. I'd like to know a whole lot more about ecology. There's half a dozen disciplines, right?

As Jennifer and Ezra described, the concept is complex in large part due to the fact that it encompasses so many ideas and disciplines that are themselves rich and nuanced.

While sustainability as a classroom subject entails many disciplines, it also entails ideals or principles that could be hard to reconcile. In one example, Julian shared that sustainability is "a term fraught with problems . . . Sustainability is about sustaining what we already have, and what we have is killing us." In other words, while sustainability

promotes the continuation of a way of living, issues like climate change and pollution point to the potential that lifestyles as we currently know them are unsustainable. The term holds irony.

Similarly, some educators shared that sustainability is also a stand-in for a utopian ideal that is impossible to expect in reality. Leah described the ways she interprets her students' use of the term:

The students generally seem to recite the idea of a combination of what I would say is the definition of conservation, which is the use of resources in ways that do not irreparably deplete through generation of the resource, which is a late 19th century definition basically of conservation of resources. With an added layer of social equality; and, for the econ folk, economic profitability. Historically, I would say these three things rarely coincide and that there is . . . not a particularly clear historical record of such a definition existing, i.e. a society or culture or situation in which any human group has conserved natural resources, created economic capitalist profit, and social equality or democracy. So I guess as a historian, the fact that these are impossible goals – that they have never existed in the past – would indicate that they're unlikely to exist ever. And, therefore, the definition of this as some sort of elusive goal for a social movement is interesting but history would indicate that such a goal is impossible.

In this quotation, Leah described both the ways her students used the term “sustainability” and the ways in which the common triple bottom line of sustainability is problematic. Leah found students associating the term with a way of living that is ideal and in “harmony with nature.” In another part of our conversation, she suggested that students pointed toward past societies and communities, such as some Native American communities, as having achieved sustainability. But with careful study, students came to see that no community has achieved a contemporary vision of sustainability, even if some have lived more in “harmony” with nature. Leah goes on to say because no past societies have achieved sustainability, particularly the union of equity, capitalistic economic health, and environmental health, the term represents an impossibility. In just one

example, equity often suffers in the name of popularly defined visions of economic health as wealth disparities go hand-in-hand with capitalist economic prosperity. While sustainability may call us to think of new, creative solutions that simultaneously heal the environment, support the economy, and foster equity, Leah suggested that history reveals such solutions may not be found. For Julian, the term holds irony (sustaining what cannot be sustained) and for Leah, it holds impossibility (a concept that incorporates goals that are inherently in tension).

Overall, most professors agreed that the concept was, on the one hand, not “doing enough” because it invites superficial agreement, and on the other hand, “doing too much” because it encompasses so many disciplines. At the same time, as I will address, this very tension in the word – its surface simplicity and underlying complexity – invite many to discussion. Aldo suggested that the vagueness and complexity of the term yields benefits: “If it came with a much more rigid instruction manual, I don’t think it would be appealing . . . You need a word that deals with fracture, that deals with a certain level of urgency . . . but not panic.” The complex, vague, all-encompassing nature of the concept is perhaps what makes it compelling and worthy of study.

Inviting dialogue. The concept of sustainability invites dialogue because it prompts analysis as people seek to understand the context of its use, and it has inroads into a variety of areas. Aldo described the way in which the concept of sustainability afforded an openness to discussion in a way a term, like, environmentalism does not:

Sustainability is an odd concept in that for me it’s really a way to start a conversation . . . It’s an inert enough word that enough people can come together and start talking to one another. It doesn’t scare away the business folks. Ok. In fact, they’re very keen to be involved in sustainability . . . I’m fine with starting that way. Now, as an academic, as a historian, as a cultural and environmental historian, I mean my first instincts are to start deconstructing those ideas and say,

“Well what do you mean by sustainability?” . . . We are so polarized as Americans politically now that it’s hard to step into a room and say, “Well, I’m an environmentalist, and I believe this,” and to get any kind of productive response . . . You know it’s very easy to get a group of people that believe exactly what you do around and have a group session of anger, but it’s really hard to get other groups together. And I think sustainability right now, in our, the situation that we’re in now, it’s one of the ways . . . that you can do it. So I think it has value.

Aldo discussed that sustainability is a term that must encapsulate many ideas that concern the condition of humanity and the environment alike, issues that require consideration and broad discussion. He noted that while many concepts or ideas either result from or engender political polarization in America, sustainability instead invites dialogue among individuals with different points of view. The concept in his community brought together academics in ways that concepts like environmentalism would not. Nina echoed that sustainability had been an inviting concept on campus. She noted that some faculty who traditionally refrained from dialogue sought opportunities to learn with other faculty about incorporating sustainability into the classroom.

Both Aldo and Joelle described the connotations environmental language can often carry. Conjuring stereotypical images, Aldo shared that the term sustainability is

a way that you can talk about these issues, but you don’t have to commit to wearing Birkenstocks (laughs) or growing your hair out, or I don’t know, all the silly things [that] are associated with folks, the stereotypes . . . I think sustainability is a way to talk about things and try to solve problems as opposed to expressing a coherent viewpoint.

Joelle agreed with Aldo’s perception that terms carry connotations. She said,

“Sometimes, the environment has these political connotations. [Students say,] ‘I’m not that, I’m not environmentalistic,’ but sustainability seems to transcend that.” With faculty and students alike, sustainability is seemingly a “safe” term people can use to start a conversation without implying a stereotypical identity. This safety and vagueness may on

the one hand be dangerous as it allows an easy, unanalyzed use of a complex topic, but on the other hand, as Joelle and Aldo experienced, it starts an intellectual conversation that they believe is needed on campus.

Adding to Aldo and Joelle's comments, Myra suggested that the term, by allowing individuals to enter the conversation without implying a certain personal identity type also shifts responsibility to all individuals, not just those Birkenstock-wearers who are stereotypically concerned with the environment.

I think sustainability because it's [broad], . . . it's harder for people to just kind of push it away as kind of, "That's somebody else's deal. Ok, you care about the environment, but I'm going to live life." Sustainability, I think, ropes, everybody has a stake in sustaining the environment, sustaining livelihoods.

The broadness of the term suggests that humanity broadly is responsible for its implementation. The issues at stake are not elitist preservation aims but the sustaining of each person's life. Thus, each person has a seat at the table.

Definitions in Sum

While the concept is complex, at once broadly and contextually-situated, sustainability has identifiable narratives in EfS. The main attributes of its macro-narrative concern the relationship between people and the environment. The concept is not monolithic and is not always used in exactly the same way in each course, but the macro-narrative ran throughout courses I observed. Educators shared that the broad nature of the concept, its separation from polarizing stereotypes, and its connection to many disciplines and topics opened the conversation to dialogue across campus. It invited shared perspectives and exploration. EfS is likely in its current state of widespread consideration and implementation because sustainability is a concept that both concerns real, urgent needs around the world and also invites diverse opinions and disciplines to the table. It is

a topic in need of intellectual consideration and one diverse intellectuals can approach contextually and broadly without immediately branding themselves in a particular identity or within a particular political camp. Therefore, I next turn to the ways in which educators carried out EfS on campus.

Variations of Education for Sustainability in the Classroom

When analyzing the data, variations of EfS became apparent. In particular, I observed two continua along which EfS courses fell. First, the role of sustainability varied among classes. When fundamental, sustainability in and of itself was the main focus of the class. When supplemental, educators either wove sustainability into the material or material was related to sustainability although it was not the topic of primary study. Second, the teaching framework of classes varied. Educators centered information and pedagogy on frameworks ranging from the theoretical to the practical. Based on the role of sustainability in the class as well as the learning frame used, I combined the two continua to develop a typology of four sustainability courses, which I describe at the end of this chapter and illustrate in *Figure 2: Typology of EfS Course*.

Role of Sustainability

I chose courses to observe based on the inclusion of principles of sustainability in the course material. I describe detailed selection of courses in chapter 3. At all institutions, educators offered suggestions or reviewed courses I observed and lists of educators for interview. At ESU and RU, most courses I observed fulfilled a requirement within a sustainability academic program. At LAC, courses often fulfilled requirements for an environmental academic program. Yet, the roles of sustainability (i.e., the ways in which educators incorporated sustainability into the course) differed. In some cases,

sustainability was fundamental for the course and in other cases, it was supplemental. In the next two sections, I describe these variations and provide examples.

Fundamental. In some courses, sustainability was a named, primary focus of study. In these courses, educators spent a significant portion of the course defining sustainability, exploring its facets, and engaging students in activities like examining case studies that would elicit sustainability at work. These courses were centered on studying *about* sustainability as a concept. Because sustainability was the primary subject matter in these courses, I describe the role of sustainability in these courses as fundamental. Educators noted on one syllabus, “This course will introduce students to the ideas behind, the debates within, and the work that goes into sustainability studies.” On another syllabus the titles of class meetings highlighted the focus on sustainability: “What is Sustainability?”; “The *Science* Behind Sustainability”; “Sustainability: Virtuous or Vulgar?”; “Species and Biodiversity.” Each of these courses were primers on sustainability itself. Chris, a student in one of these courses, said that the educators

Present students with an understanding of the topic and the definitions for some of these terms thrown around. You hear global warming on the news, how’s that different from climate change? Which green house gases are more different than others? Making people more aware of what’s at stake.

He described what he believed educators most wanted students to learn in a course in which sustainability played a fundamental role, to understand definitions of concepts like sustainability and become aware of related issues.

Another course focused on using the local campus and region as a way of seeing sustainability in practice through institutions. The syllabus noted

Sustainability is probably the most ubiquitous and important issue facing you and the rest of the world’s citizens today, and it promises to be long lasting and increasingly important. While sustainability is difficult to define, its concerns are

based on substantial science and they cause many to fear the consequences of inaction or the continuation of present actions. Many individuals, organizations, jurisdictions and nations are acting on their perception of the right ways to act sustainably, and many rating systems exist or are being developed to certify those ways. We will use [ESU's] campus . . . to better understand what the issues of sustainability are.

In this course, students learned about sustainability from a variety of lenses – both academic and administrative – to develop an understanding of how a campus enacts and understands the term sustainability.

In another example, Jennifer team-taught an introductory course on sustainability and discussed ways in which introductory courses in sustainability can differ. She shared about the creation of her course:

In our course, we decided to teach it in a sort of case study method, so if you look at it. . . there are sort of like two ways of doing [intro sustainability courses]. One is that you can, many sustainability courses just go through all the issues, right so it's like climate change, water, agriculture . . . and the semester goes through all that stuff . . . We just felt like there's too much, and if you just gave [students] this laundry list of issues, they would miss the point. So we picked 3 things . . . We gave them an introduction, and what we told them in the introduction is that sustainability is about all the disciplines put together in deciding what kind of world you want to live in. And then trying to achieve that. Recognizing that the opportunities and the costs, the pros and the cons, and that it didn't sit in any domain . . . We really hit them over the head with values and ethics from the beginning. We had a whole section on that. That's when we read Leopold. We felt it was critical they have some sort of ethical framework . . . We really thought that sustainability is about decision making, about what is the right thing to do, not just for the here and now but for what is right and what is long term and what's fair and all those kinds of things. and then we wanted to give them some examples, so we did [in-depth case studies].

In Jennifer's course, sustainability was fundamental to the course, though she and her co-educators chose to limit the amount of topical content areas to focus on three cases in depth. Her comments highlighted that courses in which sustainability plays a fundamental role may differ depending on the ways in which educators choose to incorporate content.

As Jennifer described, the topics educators covered and the ways in which they

taught these topics varied slightly at each institution, and frequently, in each offering at the same institution. For example, Jennifer's course with a fundamental focus on sustainability included little individual coverage of the science of sustainability (though it was woven into case studies) but in another semester, three course sessions were directly dedicated to understanding scientific principles. Craig noted that he taught the same course twice, and in his second time teaching the course, it was "in some ways radically different" from the first time teaching the course. He explained that because "the movement toward sustainability is a process, it's not an endpoint" educators must be responsive to the fact that "rules are always changing. . . . In two years from now, we will think differently about the deal than we do now. So I don't think you can say . . . 'We're done.'" Therefore, although sustainability was similarly fundamental to a series of courses at the institutions I observed, the content included in the courses varied slightly at each. A macro-narrative and even many micro-narratives were similar, however, educators decided differently about time spent on topics and ways of addressing topics related to sustainability. Most importantly in these courses, however, sustainability was the primary concept of study.

In all of the aforementioned courses, sustainability was situated primarily within an introductory course where a breadth of topics were covered. Yet, some courses in which sustainability played a fundamental role were either advanced or topically rooted. In one example of a fundamental course that was not an introductory course, Camille explored cultural aspects of sustainability and the ways that it might induce or be interpreted differently in light of both natural disasters and social identities. In another, Neil guided students through "looking at big issues informed by archeology." Introducing archeology

as a discipline uniquely able to provide a long-term lens into analysis of sustainability, Neil wanted his students “to be able to critically evaluate these big important questions that mainly center around sustainability.” In both Camille and Neil’s courses, students explored one topic or idea and its relationship to principles of sustainability.

Few versions of courses in which sustainability played a fundamental role existed at any institution I visited. Many of these courses were often (though not always, as I noted with Camille and Neil’s courses) associated with an academic program in sustainability and served as a common, often introductory course designed to provide shared language for students who would then pursue sustainability through other disparate courses at the institution. Some common topics within these courses included an examination of common definitions of sustainability, such as the Brundtland Commission definition (i.e., using resources in such a way as to allow future generations to use resources); an exploration of a land ethic through writers like Aldo Leopold; a study of issues of identity and social justice connected to environmental degradation; basic components of literacy in earth science, such as laws of thermodynamics or concepts related to ecosystems; discussion of population growth and the progress of energy and fossil fuel use; and case studies, such as the damming of the Columbia River, an in-depth review of agriculture, or an exploration of energy, designed to bring many topics together to explore human-environment relationships and consequences of decision-making.

Supplemental. For other courses, sustainability was not the primary concept under consideration. In a wide range of courses, sustainability played a supplemental role in courses. Courses in disciplines ranging in areas from education to anthropology to

environmental engineering to American Studies were centered on topics other than sustainability; however, educators wove the macro-narrative of sustainability into primary course material. While primary topics included concepts such as human response to climate change (Zoe), the chemistry for water purification (Amalia), or the culture of consumption in the U.S. (Sam), sustainability and its principles were related and if not overtly stated in the class. In one syllabus, the professor noted that lessons from the class would help students see how anthropological evidence could be used to “improve the sustainability of communities” in a perhaps undetermined future.

The ways in which sustainability played a supplemental role varied along a continuum ranging from overt, frequent inclusion in the class to subtle, perhaps unnamed relationship to course topics. I describe three distinct ways in which sustainability supplemented course material. First, in some courses, the primary material from class was a *foundation* for understanding or enacting sustainability. The triple bottom line of sustainability incorporates economics, environment, and equity; therefore, theoretically, courses touching on any or all of these three areas and the way they inform human-environment relationships might have foundational material for the understanding of sustainability. In some of the cases where sustainability was supplemental but the course played a foundational role in understanding sustainability, educators overtly mentioned sustainability and described how the course could help students understand sustainability. For example, an instructor of Environmental Science included a section on his syllabus highlighting ideas related to sustainability, such as human use of ecosystem services, and suggested to students that the course would provide “opportunity to incorporate new thinking and learning related to sustainability into [their] intellectual growth.”

Environmental science in this course became a knowledge base that could serve as a tool for understanding sustainability. In other cases where courses provided foundational material for sustainability, the principles of sustainability were related to the primary topic of the course but sustainability was not overtly mentioned or studied in class. For example, I observed two courses concerning the environmental history of America, one at RU and one at LAC. While both educators discussed the socially constructed relationship among humanity and the environment throughout the course of time, they did not include material on sustainability in the course. In fact, both educators shared that they rarely used the term sustainability. Similarly, Nikki rarely used the term “sustainability,” but taught a course considering how societies have come to understand the environment. A description of her course online described the overview of the course:

Today’s ideas about “nature” have emerged from a complex history of diverse experiences, perceptions, and understandings of the bio-physical world, and of contests over that world. In this course we will investigate how American meanings of nature have changed from European-Native contact to the present. These questions will be addressed from multi-disciplinary perspectives in the humanities and will include attention to race, class, gender, and environmental justice. Topics and readings may include: Native American authors, Emerson, Thoreau, Marsh, Muir, Leopold, and Carson, as well as rural, urban, pastoral, and marine ecological contexts.

She did not directly address sustainability but her course provided grounding for students’ ability to understand how societies have come to understand “nature” and ways in which social identities have influenced or been affected by conceptions of the environment. In another example, students in a science literature course explored science from a literary perspective, reading selections, such as Rachel Carlson’s *Silent Spring*, and exploring the way in which writers discussed the environment. Yet again, while the macro-narrative of sustainability was related to subject matter, they were not directly

addressed. However, both the science literature class at ESU and the environmental history class at RU could fulfill requirements for students within the sustainability program. While sustainability was not a fundamental topic of study in any of the courses I described, the courses provide a foundation for deep understanding of aspects of the macro-narrative of sustainability.

In a second example of the way in which it could be supplemental to a course, sustainability was at times incorporated as a *unit* or a focus of one or a few course sessions. Educators incorporated sustainability in a distinct way during certain class sessions, frequently then moving to other important concepts for the class. Marie described weaving sustainability into genetics and biology courses in small units that she could relate to the broad topics she was covering. In a molecular genetics course, she featured Craig Venter's ("a well known geneticist") work in showing that microorganisms were being carried around the world on the hulls of ships. She showed a video relating the work back to genetics; the video described "how that project was . . . possible because of where genomics has come and how we can sequence large quantities of DNA." Then she was able to lead "a discussion about the implications of that kind of research to the environment and to sustainability." Marie described another example of incorporating a unit on sustainability in a lab course. In the course, they were studying *vibrio cholerae*. She noted that the bacteria is usually found "in the warmer environments, [but] they are seeing it further and further north" because of global warming. She chose a case of an "Alaskan cruise ship [with] an outbreak of cholera; and it took them a long time to even figure out what it was because it shouldn't be that far north." She chose the case "because . . . [she] was thinking sustainability, how can I bring it into the class?"

After studying the bacteria itself, she and the students then “ talked about the implications of . . . global warming to outbreaks and to pathogenic outbreaks and infectious diseases.” While both of Marie classes were centered on other topical areas (genetics and a pathogenic laboratory), she connected sustainability to the topics under study through one or two course sessions.

Next, sustainability was a *medium* through which students could explore the primary objective of the class. Two courses used sustainability as a medium. The first was a writing course. Students at ESU can choose from a variety of writing courses to fulfill a requirement. Two educators I interviewed choose sustainability as a topic for their class. While they each dedicated class time to discussing sustainability and they expected students’ writing to focus on sustainability, the concept was primarily a theme through which students could practice writing. Mariella noted that she led students in discussion of readings on sustainability at the beginning of the course, but most of class time focused on aspects of writing:

As a whole class [after the few courses on sustainability], we don’t talk about the concept of sustainability any more. We will hash out specifics and they may include sustainability as it pertains to various assignments. So we will talk about audience and we will talk about what does your audience know about sustainability? How can you educate your audience based upon their current level of knowledge, so it will get revisited. It will just get revisited in pretty focused iterations.

In a similar fashion, students in a business course learning about project management could choose a variety of projects the instructor provided. Two groups chose sustainability-related projects, and thus, the concept of sustainability became a medium for practicing lessons from the course. Miles’s course was featured on the campus’s sustainability Website because of the work of his students. When talking about

sustainability within the course, he shared students' exposure was rooted in their projects:

It's really been primarily these projects. I've had sustainability projects in the past, so obviously when we have those, the class takes more of that type of feel, if you will, because they're presenting and promoting awareness that other people may not have known previously . . . You saw my syllabus, it's not like we have anything just on sustainability.

Each of these courses might fall on different areas of the continua representing the role of sustainability in the course. In Mariella's course, students all encountered sustainability and wrote about it in detail. In Miles's course, however, only a few students encountered sustainability and their exposure was centered more in a project for a community partner than in delving into the concept itself. Yet, in each, sustainability was supplemental, not fundamental to the course. *Figure 4: Role of Sustainability* provides a visual display of the continuum of the role of sustainability in a course; though the space along which medium, unit, or foundation courses falls depends on the particular course, I placed them here roughly based on where groups of courses fell in this study.

Figure 4: Role of Sustainability

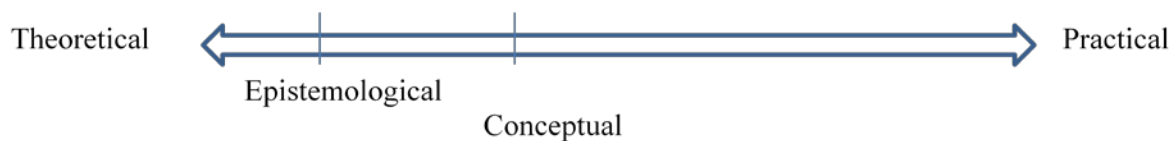


Teaching Frameworks

In describing the role of sustainability in courses, I considered primarily the content of the courses. I addressed education *about* sustainability. At the same time, I have framed this study around education *for* sustainability. Thus, I was also attentive to the teaching frameworks educators used. That is, what were educators teaching *for* or what did educators see as a broad goal of their teaching? In the courses I observed, just as

the role of sustainability varied, so did the teaching framework of the class. Sustainability might be viewed as a concept or way of thinking or as a set of actions, and I saw each of these frameworks at play in courses. The term I use, “teaching framework,” refers specifically to the broad goal of educators’ teaching – whether educators asked students to conceptualize a topic or undertake a way of thinking (using a theoretical framework) or to perform a specific task (a practical framework). Much like the role of sustainability in a course, teaching frameworks existed along a continuum ranging from theoretical to practical frameworks (see *Figure 5: Efs Teaching Frameworks*). While most courses incorporated elements of both frames, some more heavily relied on one than another. I describe each frame and provide examples from my study. Because teaching frameworks align closely with students’ learning, interviews with students proved particularly helpful in elucidating the theme of teaching frameworks.

Figure 5: Efs Teaching Frameworks



Theoretical. Educators using a theoretical frame were primarily concerned with ensuring students thoroughly understood often complex concepts or considered new ways of viewing the world. Educators had two broad categories of theoretical frameworks. In the first category, they facilitated students’ conceptual learning of specific content, helping them understand often complex, multi-faceted topics. Conceptual learning included tasks such as learning equations, examining multiple points of view of on issue, or learning terminology. In the second type of theoretical framework, educators

facilitated students' epistemological learning, making them aware of knowledge itself and the ways it can be created. I provide examples of both conceptual and epistemological thinking within a theoretical class frame.

Conceptual learning facilitates students' examination of human-environment relationships and the ways in which humanity, the environment, or both work. Concepts under study in different courses I visited included the nitrogen cycle, radiative forcing, Aldo Leopold's land ethic, the chemistry of acids and bases, and racial implications of historical environmental writing among others. Chris was a first-year student in a course rooted in a conceptual framework and shared about the course:

It starts from the basics – for example the structure of society and how society is set up unsustainably. It also teaches us to think critically about the future. We are supposed to apply concepts from class to our analysis of issues.

He noted that the class helped build his conceptual understanding so that he could engage the course topics further thorough analysis. In the same course, Angie noted that the professor (Graham) “made [her] think about . . . more options than [she] would normally be thinking of – like renewable energy or all the factors that go into it.” She continued, “At first you might think something is a good idea and then you think, ‘Oh wait, this requires oil, which is coming short.’” The course encouraged her to look beyond the surface of an issue to see multiple viewpoints.

Two economics courses on two campuses help further illustrate the use of a conceptual frame. Jeremy, an economics professor at LAC, shared the desire that students in class thoroughly understand sustainability and the way the concept is used in economics. He said he wanted students:

To understand what sustainability is from the perspective of our discipline. I want them to understand the intergenerational part of it and seize the idea, how difficult

it is to get it right. That's one of the things I was trying to get to [in class]. So challenge them with, "OK, there's this ideal of sustainability? How do I actually act on it?" That's something I definitely want them to be doing. And I want them to be comparing and contrasting sustainability and the inter-generational question therein with the intra-generational challenges we face around poverty alleviation and pollution. So, having them wrestle with different trade-offs. If there's less consumption now in the name of the future and then there's less available now for people, some of whom really need it.

In the class I observed, Jeremy drew a number of economics curves on the board he could use for illustration and then he asked students to discuss in small groups. He led students through an examination of economic perspectives on sustainability versus environmental perspectives. He asked students to "take apart and compare the two approaches" because part of the role of a liberal arts education is to learn to "make a case from different perspectives." His teaching drew students into the concept of sustainability, asking them to examine it from multiple perspectives to understand it complexly.

Another economics professor, Aiden at ESU, described his desire for students to understand the concepts related to the ways that economics and science inform policy decisions related to pollution in water ways:

So this is the idea, the basic theme of the class. That science contributes to decisions, and there is usually a solid foundation and an agreement on the science up to a point and that process of getting to decisions and the policy -- it's both complex and also sometimes distorts the science . . . from all sides because people will ignore things that might be, might make it messier . . . They [students] as consumers of, as decision makers in society need to understand that these different roles are played by the science and the economics and the politics. So that they can say, "Ok, this is what the science tells us, and here's all the shortcomings of science. And then that's influenced by the economics. And then politicians take that and turn it into policy."

In class, Aiden provided basic content about each of the areas in question – science, economics, and policy – and then wove together a narrative about how they inform each other, using lecture, class activities, and assignments designed to help students grasp the

complexity of the concepts related to policy making. In one activity, which he described to me, he led students in a fishing exercise, complete with scoops and buckets, where he had assigned costs for materials (to simulate costs for commercial fishers) that changed as resources were depleted. Students saw first-hand both the relationship of cost to supply and the effect of overfishing on fish populations. He worked to ensure students grasped that decision-making related to restoring waterways is informed by, but not solely reliant on, economics or science. He wanted students to be able to be effective consumers of information, seeing what science or economic data might be informing policy and when such data might be misrepresented.

Both Jeremy and Aiden provided rich content, from a variety of perspectives, to help students see sides to complex concepts. Scaffolding new material on introductory concepts and tying information together, these educators worked to strengthen students' conceptual understandings broadly of the way economics informs environmental issues. Both of these educators used primarily a conceptual frame for their courses.

Although the use of a conceptual frame is characterized by both inclusion of a large amount of content or data, educators often worked to elicit students' informed questions. They were not seeking to relay content without providing guidance in processing the information. One student, Alex, noted the way in which his sustainability introductory course differed from an introductory architecture course, while he saw both as theoretical courses:

[The course is] theoretical, though I have enjoyed the readings. I expected and would like to learn more technical knowledge. Like how to calculate water use and what is sustainable . . . The theory in this class is different than the theoretical [material] in the architecture class I had. There, the professor would ask something like "what is design?" And would expect an answer "the right answer is *this* is design," whereas here I'm using the word "theory" to mean something

like "what does it mean to be sustainable in water use?" It's less about a right answer.

Alex described that when looking at sustainability theoretically in class, the instructor invited multiple points of view rather than a right answer that might represent memorization or mastery of a concept. In addition, from his perspective, the course was theoretical because it invited multiple points of view, focusing on theory rather than "technical" or "how-to" knowledge.

One instructor of genetics and microbiology, Marie, shared her own struggle within a conceptual frame to provide both content she wanted to cover as well as time for critical thinking about content:

It's hard for [me] to get away from content. Even though we have to, because it's ludicrous that we can think that we can teach all the content that we think we need to teach all the students in sciences, cause it's growing at exponential rates. [When] I'm good, I get away from having to teach so much content, but it's so easy to fall back into it. And so I get in [the classroom] and I forget, and I don't make . . . [the] connection. I won't take the time, because I've got to get through this, this, this, and this. I don't have time to talk about this. So, I think there is the time issue. And that's for every discipline right now . . . It's [difficult] finding the time and making the connections with the content that I thought that I would have to cover . . . Other people may not have that struggle – breaking away from this whole idea that we have to get away from the content and that is the depth that matters.

She was particularly reflective of the difficulty of incorporating sustainability into a class already full of specific content that educators usually cover. But, she iterated that she wanted not only to cover content but also to help students draw concepts together.

Anthony shared a similar goal about his courses. He noted that he wanted students to grasp concepts of sustainability in architecture in deep ways, and he tries not to simply give facts or a checklist for designing sustainably (though such checklists do exist, such as the Leadership in Energy and Environmental Design [LEED] green building

standards). He wanted students to take concepts in class and be able to put them in context, weigh them against all options, and make informed design decisions while considering a variety of information:

Most importantly, I think is that throughout the course, we try to make [students] understand that design and architecture in this case is something that has to be thought of critically, so systems thinking is something that we address all the time. So, to make them think that every decision that they make as designers has an implication in, you know, sustainability and technology, and that they are not taking isolated decisions when they are designing . . . So, I'm not only interested in telling them, "Ok, you have to put solar panels in your house." That to me is just a technicality right, you can count the kilowatts that you need and say, "I'm going to take your TV and you won't be able to watch TV so that we lower the kilobytes, so that's less solar cells." But that's a technicality. That to me doesn't carry though because I think social sustainability is as important.

Many educators shared Anthony's understanding that the "technicalities" of sustainability were only a piece of conceptual understanding. Students must be able to connect information in new ways and "think critically" to make complex decisions based on concepts (such as public policy or design) educators worked to explicate.

Thus, while conceptual class frames drew heavily from presenting, comparing, and understanding a variety of content, they relied not simply on rote memorization but on connecting many pieces of information in perhaps new ways. One student, Alex, related to the idea that he was learning how to connect ideas rather than pieces of information to memorize. I asked about his learning in an introductory course on sustainability, and he said:

I think learning may be the wrong term. I think of learning as concrete, like learning a method. But there are new concepts I'm learning, for example, owning books. My family owns many books and our neighbors own a lot of books. I think of all the same people in a small area owning the same copies of the same thing as unsustainable -- the concept of private ownership.

While book ownership was not addressed in class, Alex was applying concepts of private

versus communal ownership and resource use learned in class to consider the world around him. He saw the class as informing his consideration of “new concepts” rather than mastery of “concrete” pieces of information. Another student, Martin, shared Alex’s understanding of what his learning was like in the same class:

It's pretty different because in all of my other classes, since I'm an Engineering major, it's all science-based and physics I guess, chemistry... [and] this class is more about ideas. It's all about . . . ideas, about innovation, and a lot of the ideas aren't implemented because they're not practical. For example, when [Graham] said that one idea for the future is to give all of our oil to developing nations, which completely would never work, but it's an awesome idea. So that's what I mean I guess, just gets you thinking.

Martin referenced a course during which the instructor invited students to consider the temporal component of equity and resource use. Some nations have an inequitable share of energy resources, and at the same time, current use of resources seems likely to diminish equitable distribution of resources across time (i.e., use of fossil fuels now could ensure future generations will have less). The consideration of such issues was unique for Martin who spent much of his coursework learning equations and memorizing information. The course he highlighted here asked him to understand a concept from multiple points of view and to think creatively.

Angie in describing her development as a vegan over time gave one example of why a theoretical framework, which invites consideration of multiple points of view, is useful. She noted that when she became a vegan, she was “extreme” but she has grown to appreciate multiple points of view on food consumption:

I’m not as extreme now. I function in society. But when I was 15/14, I was very intense. You did not want to get in a fight with me about animal rights. My friends knew not to bring it up in front of me. I was a little brat of a teenager, so I thought I was right about everything. I shoved my ideas down people’s throat a little more. Not I’m must more respectful of people’s ideas. And do it in an adult like manner.

While in the next chapter I consider Angie’s change in viewpoint in light of general trends in students’ cognitive and moral development, she provides one example of the ways in which different viewpoints about sustainable behaviors exist and should be considered. Theoretical courses help students to critically examine these different viewpoints. Graham highlighted that part of his role in encouraging students to think creatively and critically is to show them nuances in potential solutions, like Angie learned, for global problems:

[I want students] looking at things more broadly, more nuanced, with more tolerance for different points of view. And not just like there’s one correct answer and we know it. So I try to depart that idea to my students . . . Don’t go out of here thinking you are going to beat up on people. So we don’t just try to inculcate them with our ideas about, you know, advocacy – “go out there and tell people what’s wrong.” It’s more how do you study a problem, how do you bring the puzzles together. That’s where I see environmental sciences now and sustainability..

The importance of seeing many points of view, like Graham emphasized, becomes important when students are developmentally growing to recognize that solutions are not simply black and white. In the sustainability arena, claiming one solution is correct and certain can be easy. Angie noted that for her, veganism was once her adamant cause. Sam highlighted she occasionally teaches “eco Nazis,” who might criticize others’ behaviors, such as bringing a water bottle to class. Theoretical frameworks can guide students in their consideration of the problems that may be associated with causes they support and the potential benefits of behaviors they condemn.

Aldo addressed his attempt as an instructor to create assignments that encouraged creative, connective thinking (much like what Alex described) since students have mastered memorization:

I'm really interested in how they think, in how they would ask questions and draw some lessons from a few things. Because [students are] really good at studying for exams. They're really good at doing what you tell them to do. So, I spend a lot of my time in almost all of my classes like asking them to conceptualize things, to come up with their own questions, to come up with their own ideas to get them to show me how their mind works. Because if you give them a test, they'll do really well on it. But that's too easy for this group. And it's very much tailored for them.

Thus, while a conceptual framework might, at times, require memorization (e.g., ecosystem cycles, chemical equations, appropriate names and vocabulary), in the classes I observed, this frame also required critical thinking in the form of connecting complex ideas related to the concept under study.

While a theoretical frame often involved learning a concept in detail, at times it involved students learning about knowledge itself and then entertaining or examining new or different conceptualizations of reality – what I call epistemological learning. Classes invoking theoretical, epistemological frameworks worked to address and question humanity's ways of knowing and often invoked ideas like the social construction of the environment to show new ways of understanding the reality of humanity, the environment, and the relationships between them.

Both environmental history courses I observed included significant use of epistemological learning. In describing the macro-narrative of sustainability above, I included Leah's description of the ways in which Americans have tried to separate humanity from nature. She noted "that any attempt to draw a line between what is human and what is non- human will ultimately fail because . . . much of the natural world is shaped and profoundly constructed by humans themselves." Part of her work entailed showing the ways in which a commonly held perspective of the separation between humanity and the environment is unfounded. The Columbia River basin was a case study

she used to demonstrate her arguments as it is an area where human influence has vastly affected the environment. Another environmental historian, Aldo, echoed Leah's sentiments:

My job is to introduce these terms and these ideas and then complicate them almost to a point where I'm sure students are just like, "Oh man, what . . . does nature mean? I don't know what this means any more . . . Or conservation or preservation. Or, what does a species mean?" It's just a way to, it's almost teaching people how to think, how to approach and not take ideas or words that they think that they are certain that they know, or present themselves as certain. Nature – we use the word nature to imply that we know what we're doing or that there's a bedrock. And that quickly goes out the window.

Aldo highlighted his role is not simply to teach content about which students must think (though that is part of his role) but also to encourage students to question what they believe is real. He showed students ways in which their given understandings of words and concepts they regularly use are, in fact, much more complicated than they might initially realize.

Camille described that she worked to incorporate ideas of cultural sustainability; she noted such components of sustainability are often overlooked. Teaching for epistemological learning, she guided students to question sustainability and to consider how knowledge of or about sustainability is linked to one's cultural view point. She shared:

What I want students to get out of class – We discuss what do we mean when we talk about trauma? . . . When we think of people of color, we think of people always already traumatic, who are born out of different kinds of trauma, like slavery. We consider how is trauma manifested? What happens to the triple bottom line in moments of trauma – natural and manmade disasters? What happens when people try to live sustainably in the face of Hurricane Sandy, for example, when people want to eat locally? On an everyday, localized level, how do food and trauma intersect when people are forced to move to New Orleans as migrants or to New Jersey? How do you sustain your culture and food ways in light of such trauma?

One often-touted principle of sustainability is to purchase and consume local food, and Camille's students learned to see ways in which such a principle might be or become traumatic, especially for people whose geographic region does not support their cultural food ways or who find their local landscape in trauma. She complicated the concept of sustainability itself, drawing on issues of identity, trauma, and culture, asking students to suspend their old, perhaps limited, beliefs in what sustainability calls one to do.

Teaching for epistemological learning, educators like Camille asked students to think beyond their current conceptions of reality. Julian noted "When we turn a light switch on, we don't think about the wire behind the light switch and what's behind that wire. We need to begin thinking beyond the switch." Similarly, Jennifer shared that sustainability invites "profound social questions:"

Like, what is the purpose of the suburbs, why are the schools better in the suburbs? Kids would say, "Well, we don't live in [the city] because it's it too expensive." Well, too expensive for what, right? Too expensive to have your suburban house for sure, but you know like what it is that, what makes a good life, what are we striving for?

As much as understanding the concepts of electricity use or suburbs, educators were asking students to entertain new perceptions of these concepts to see alternative ways of interpreting them, to recognize that knowledge is situated in one's experience and might change in different contexts. Thus, a theoretical class frame drew, at times, on conceptual learning, requiring complex thinking about material, and at other times, epistemological learning, requiring students to consider that their commonly-held beliefs about reality – from nature to suburbs – might be limited or not fully informed.

A number of students commented on their roles in courses rooted in theoretical frameworks. Chris, an engineering major, noted that the course he took on sustainability

was more theoretical than his engineering courses, making it more difficult to put its lessons into practice:

In engineering, it's more applied, easier to see how to take action and make a difference

. . . [In this sustainability course], he raises questions for us and we have to critically think about them. It's not about him telling us, "Here's what you need to do to do this." And I honestly think that's better than him telling us because in the real world, that's not how things are done. You don't just tell someone, "You should reuse this reusable water bottle just for the sake of it," you say, you give them the knowledge of this is how much plastic it takes, and this is how much oil it takes, all the trash and how people don't recycle it. And they can come to their own conclusion and when they come their own conclusions, usually they're more likely to make a difference or to change their ways. So I think that's actually a good thing for this class, even though it's not so much "here's this so do this," it poses questions that will really help.

In his description of the course, Chris highlighted that he appreciated that he did not know exactly "what you need to do" to be sustainable from the course. Instead of an exact how-to, the course grounded his "critical thinking" and ability to ask questions.

From a different perspective, Patrick was an anthropology major. While most of Chris's engineering courses were highly "concrete," Patrick's were highly theoretical, yet he echoed some of Chris's comments:

I think most professors trot a fine line between being too subjective. [Graham is] almost on the precipice, but does it in a really good way. He gives you things that are indisputable, for example laws of thermodynamics, or geo-spatial stuff, or things about the earth, that is empirical. Then he gives you economic concepts, which for the most part are not subjective either, and then he gives you more subjective things like the concept of sustainability or environmentally-friendly. And he allows you to do with them what you will, and that's how he succeeds. Like in philosophy, sometimes things are too subjective. It's postmodern and it loses any scrap of applicability. There's a point where you can question things too much.

While Chris found the course more theoretical than most of his engineering courses, Patrick found it more practical than some of his postmodern-leaning anthropology

courses. Both described that walking away from the course, they were primed with the ability to think critically and understand the concept of sustainability in greater depth.

Some students noted that resting in a theoretical framework alone is potentially detrimental. In particular, Laura highlighted the difference between her unique secondary education experience, rooted in outdoor, experiential learning, and her postsecondary major related to environmental issues:

[High school] was always [an] outside experience, and I think that's a huge part of learning that is completely absent from college courses . . . the things that I learned in the classroom never impacted me until I lived them outside. . . [when] you're in a concrete building you don't connect it to what they're really talking about.

She continued saying that her coursework related to issues of sustainability is “depressing.” She remarked, “Every single class is just about how much we've messed up and how when we try to fix things we mess it up more.” For Laura, the combination of the gravity of issues related to sustainability and a theoretical framework, mostly centered in critical thought and in-classroom learning was at times stifling. She yearned for more concrete, hands-on, “outside” experiences. At the same time, Patrick was motivated by the theoretical content about global crisis: “I kind of like the doomsday stories. . . The global water crisis, desertification. . . Some of it is just kind of like apocalyptic and ‘Oh God I have to do something about it now.’”

Graham (one of Laura's educators), noted, however, that unlike Patrick, many students can be halted by depressing stories of the “big problems” related to sustainability. Directing a major that examines the environment, he shared:

Sometimes students by the time they get through taking this major, this used to happen not as much now. They say, “I'm so depressed I can't do anything. I'm frozen with fear.” And they'd say, “Every course tells me what horrible animals humans are and how we can't fix anything. We're all going to just be swallowed

up in our waste, so what am I supposed to do? I don't feel like working now, I don't feel like going to grad school, I feel just like crying." They truly are depressed. This was true especially in the early 2000s, Soon after this program started. And we started to make some changes, and sort of how we present things. Encouraging internships – get them out there doing something, working for an agency or whatever. And say, "Okay, I can do something. I can make a difference." So activism about, you know, being constructively critical or being an activist.

In these comments, Graham noted that he particularly worked over time to ensure students had more exposure to and experience in working to solve issues related to sustainability. In other words, he worked to incorporate not only theoretical learning but also hands-on, concrete decision-making, using principles of sustainability. While Graham commented the use of internships, some educators themselves used a practical framework in class, encouraging the hands-on work of sustainability.

Practical. Courses concerned about the logistics behind enacting sustainability or other concrete lessons from the course incorporated a practical frame. In these courses, educators may also draw heavily on a conceptual learning as they ask students not to question reality but to apply principles related to sustainability or lessons from class in an often tangible way. In using the term "practical," I call upon the meaning of the word that suggests a practice or action-orientation, rather than the meaning of the word that implies a worthwhile, sensible orientation. I admit that skills within any teaching framework are in many ways practice-oriented; educators employing all frames want students to use the applied, though abstract, skill of thinking critically – perhaps it was one of the most important skills educators in this study addressed in relationship both to learning generally and learning for sustainability. Yet, educators using theoretical frames often sought to establish continued theoretical questioning of sustainability while educators using practical frames sought to delineate clear parameters of sustainability such that it

could be enacted, defined, or measured.

Again, I suggest that teaching frameworks fall along a spectrum rather than a dichotomy. Therefore, before I review courses that were more heavily centered in practical frameworks, I draw attention to courses rooted in theoretical frameworks that incorporated components of practice. Teaching an introductory sustainability course, rooted primarily in a conceptual frame, Craig suggested that he also wanted students to learn practical skills:

There is a great danger in a class like this because you can cover so much and you can do it in such a superficial way that students walk away with really no new tools to understand this problem. So, the only thing for me is what tools do I give [students] that they can use over and over again.

In the course I observed, Craig showed data from a book students had read and walked them through a careful consideration of the graph. In class, he modeled his reading of the graph:

We see now discussion in the book of how plots are generated. We see a systems diagram with stocks, flows, feedback loops treated quantitatively, so there are assumptions made about what you think is true in this system. So, why are there no errors in this system as shown on the graph? I wouldn't imagine you can't assess [the error terms]. It's not good for the sustainability community to [refrain from showing error in measurement].

He then showed an earlier graph and described the way error was displayed in the graph and what it represented. Craig's close reading of graphs modeled for students ways of interpreting data, such that they could apply a similar close reading in their own consumption of information outside class.

In a course on consumption, also rooted mostly in a conceptual frame, Sam noted that although she wanted to complicate students' thinking, she would also "like [students] to be conscious consumers, to think more carefully about what they're doing, whether it's

thinking more carefully about the 100 pairs of shoes they bought or thinking more carefully about judging somebody's else's consumption." In the course I observed, she assigned Websites and articles, which students discussed in small groups in class. Students shared with each other how they learned about the materials, travel distance, and labor involved in particular brands of clothes, the journey clothes take when donated, and the differences in organic, non genetically-modified, clothing versus conventional clothing. She provided tools for their use in conscious, careful consumption outside class. In a science literature course, Joelle shared she drew information from the news and "different organizations that might be associated with the movement or the conflict we're studying." She noted that much of her class entailed "learning to process versus to know where to find authoritative sources to learn how to read them to believe, to decide whether to believe, to use, to credit, to discredit that course." In the class I observed, students viewed organizational materials – such as those from Susan G. Komen foundation -- to analyze language on Websites and brochures. Each of these courses most heavily drew on conceptual frames but included both lessons and opportunities for students to practice tangible skills associated with the concepts under study.

Next, I turn to examine courses primarily rooted in a practical framework. Architecture, for example, incorporates a time-intensive studio course in which students practice practical tools of design. When I observed Lynn's studio course at RU, students were learning how to draw light and shadow based on where a building was located in relationship to the sun and other structures. At ESU, an architecture professor, Anthony, described the incorporation of sustainability into a studio course:

Every Monday and every Wednesday and every Friday, the studio instructor meets with each [student] for say half an hour and we talk about the project, we

sketch with them, we analyze the decisions that they've made and through that we address for example the building's orientation, passive ways of whatever bio-thematic ways of designing the structures. We analyze the lifecycle of some of the materials that they are proposing. We analyze construction methods that they are proposing. We analyze the functionality in terms of sustainability, for example, how do we dispose of waste? And everything that has to deal with the built environment is reviewed from daily basis in studio . . . So, in my mind, what educators should do, and that's what I'm trying to do, is to give the students direct knowledge to try to make them think critically and systematically about these things so that if one solution didn't work, it can't address the next solution . . . It's not just about telling them how many solar panels they need to put, right, it's about trying to make them understand how the solar panel is built so that they can analyze where that materials panel come, so that they can be creative about making the next type of solar material. But also the other way, "How do we dispose of solar materials, what are the implications of using solar materials and how, or even question, you know, solar energy? Is that the best, is that the future?" So I don't think it's a given, our researchers, our scientists, are telling us that that's possibly and through thousands of years it has been our main source of energy, but it might be that in a certain region with certain different characteristics, with a different climate, it might be the wind energy would be best. So, again, we need to give them the tools to think systematically and creatively.

Anthony described the apprenticeship-type relationship in studio where the instructor helps guide the students' physical creation of a structure. Students learned tangible skills of drawing, design, material composition, energy use, solar patterns, and they also learned how to contextualize those skills through their time spent in conversation with an instructor. The instructor asked questions about various aspects of the project, including issues related to sustainability, such that the student could then make changes to or enhance the design. Students put into practice the lessons and questions from interaction with the instructor. The course resulted in a student's creation.

Similarly, Aileen and Roger taught a course focused on teaching design principles, rooted in engineering curricula, to students from many disciplines. Roger said of the class that he wanted students "not only to leave class not only understanding and being aware of issues but to see issues empowered to design and act." Aileen noted, "We

use a balanced strategy. People can look at environmental and social issues and find the right materials to ensure future generations can use resources.” At the end of the course, students worked to create a design that could address a sustainability issues. From a design for a powerless gym to solar disinfection of contaminated water, projects from the class represented students’ attempt to craft a design that would solve a problem.

Design courses, such as architecture and the engineering-based course I describe above, were not the only practically-oriented courses. I observed one writing course and spoke with two writing educators who taught primarily the practical skills of writing. In this case, the theme of sustainability was woven into the writing courses. Mariella described:

I really want them to think practically from start to finish. So, global warming is a large problem if they have a practical solution for that, and I’m talking about all realms of the scope. Everyone needs to stop driving – that’s not practical. I wish, but it’s just not. So, if they can take something in and take it to a practical level, that’s fantastic for me . . . If they’re willing to start thinking about large issues in practical ways, they’ll start thinking about how sustainability works practically in their own life, and in their families’ lives, and in their job situation. So, they can take something big and start thinking about it more realistically, more action “oriented-ly” I guess, that’s what I want . . . They can create a technical manual, which is pretty standard for the discipline or they can write a recommendation report, which is what most of my students end up doing, where they essentially propose a solution to a specific audience for some sort of technical sustainability related problem that they see. So, this group is using too much paper, we’re wasting energy in this way, I see a need to have this thing happen on campus, here’s how you can do it sustainably, for example.

In this course, Mariella asked students to learn or improve their practical writing skills and then related those skills to sustainability, requiring that they propose concrete, practical solutions to broad issues of sustainability. She worked with students on technical skills of writing and asked that they seek a disciplinary “expert” who could help advise them on technical issues related to the sustainable topic they selected.

Using a practical framework in a different way through an education class, Maddie taught students ways to carry out education for sustainability in local schools or organizations. She taught students what an EfS curriculum contains in a K-12 setting and sent them into the community to find needs that they could address – such as lessons on growing food or issues with trash. Students learned concrete skills of developing projects in a group and problem solving in a community. At the same time, Maddie shared this action-oriented learning style is not simply about “how-to’s:”

Sustainability education is like education about how to compost or how to recycle or how geothermal energy works. It’s education about sustainable practices. But education *for* sustainability – that *for* is your goal. It’s different. So, it’s not just about the physical campus practices. It’s about justice, and equity, and intergenerational thinking, and about civic engagement as a goal.

Although Maddie’s class focused on concrete employment of principles, she reminded students that the concept of EfS should direct their efforts toward goals, such as social justice. She described her course not simply as a “how-to” manual of “sustainable practices” but as a lesson in working “for” sustainability. In her course, she shared that sustainability was more than the sum of individual practices but a way of bringing community needs, issues, and awareness into one’s education.

Both the writing courses and the education course were concerned with practice-oriented lessons. Some faculty addressed their desire for disciplines not always known for practice-orientation to consider the ways in which research might more practically address issues outside of the “beaker.” Myra spoke of her training in chemistry and the ways in which her love of chemistry and time researching soil contaminants drove her appreciation for what “chemistry could do.” Yet at first, her mentors knew a good deal about contaminants but little “about soil” or “the environment.” She sought graduate

programs where she could find interdisciplinary approaches to using chemistry not only within controlled, laboratory environments. Her own learning affected the ways in which she drew on practical frames (i.e., ways of conducting research) in a heavily conceptual course, like environmental science:

It's a lot harder to think about what's going on in the natural environment [than in a laboratory] because a lot of our tools can't handle what's going on out there – all the complexity. The number of variables that you can't control. And so chemists are still struggling to really acknowledge that environmental chemistry is rigorous. Because it seems like too much hand waving – there's all these variables that change in this part of the lake and that part of the lake . . . As I've continued teaching, I think I've found, I am finding the ongoing process of how to integrate that chemical perspective and show how it has this power. So, even as I'm going the other direction, too, I think about unifying themes . . . So, instead of treating it I think as a chemist normally does, which is "each topic, let's learn the science; next topic, let's learn the science; next topic." It's like over time, I'm continually better able to give them a broader framework of themes that transcend the topic and then choosing when to dive in deep and teach them a little bit more about this specific example.

Myra's practical research orientation toward exploring chemical properties of the environment in situ rather than only in laboratory environment spills into her classroom as she tries to give students a practical orientation to environmental science. Myra noted that she seeks to refrain from simply moving from one topic to the next by instead bridging topics, providing real-life examples, or incorporating themes that run throughout the course. She continued:

. . . We can just point to things like gravity and the second law of thermodynamics. Those are important and crucial to understand but that's not going to help us understand what we need to do going forward or what the effects are that we're going to have. So, that's sort of a non-scientific aspect that I'm pushing them on – is having them realize how much our choices are determining what goes on in the natural world and that we have choices and whether it's how we use technology or what we policies we want to promote.

Myra sought to show students not simply that scientific laws exist but the implications of those laws in practice. In this example, Myra described different ways of teaching (to

which Marie alluded earlier when discussing the balance of content within a course) a science-oriented course that not only provides deep learning of specific topics (e.g., radiative forcing) but also opportunities to consider ways in which students' choices interface with the science topics (e.g., use of technology and its role in carbon production). She borrowed a practical frame to help illustrate ways in which science can help students make tangible decisions that influence the condition of their communities and the environment.

Given that conceptual understanding could arguably be seen as a concrete skill, some might question my discussion of conceptual and practical frames separately, particularly when considering lessons implemented within practical frames largely rely on knowledge gained within conceptual frames. Nikki spoke about her role within the liberal arts tradition:

I think most of us have inherited as what the liberal arts is all about. I think we've inherited the idea, we, meaning the faculty, of there's so many things that students want to learn about that they should learn about, that it's not about content so much as it's about critical thinking. Reading, writing, speaking, and -- really important is and this I think I do a lot in my religion class -- is inhabiting the shoes of other people and other historical periods and other literatures. And understanding the world in a more nuanced and compassionate way through the courses that you're taking. And there I'm speaking more like a humanist, and I'm sure someone teaching organic chemistry would not say what I just said.

She noted what I alluded to in the introduction of this theme, that especially within a liberal arts tradition, the role of critical thinking is highly practical. So perhaps more important than grasping of any specific content, or concept, are the practical skills of reading, writing, speaking -- which many courses (especially within the liberal arts) address alongside the concepts under study. Even as I delineate a continuum of teaching frameworks, therefore, I do so cautiously and with the awareness that they frequently are

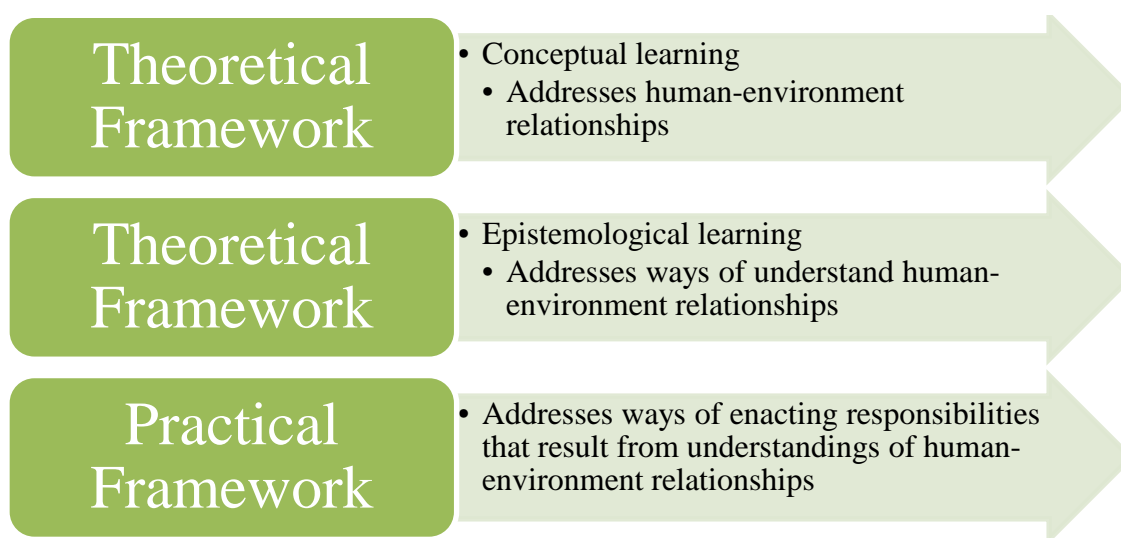
held in tandem. A course centered on sustainability likely draws from all frames, as educators seek to incorporate the macro-narrative of sustainability in all its aspects. However, many courses do rely more heavily on one frame than another in the primary learning activities students pursue.

Relating Teaching Frameworks to the Macro-narrative

In the next chapter, I discuss how the use of each framework is important for helping students learn in different ways, particularly in light of ideas and research from educational theorists. Yet, I address briefly here how the teaching frameworks theoretically align with the macro-narrative of sustainability I outlined earlier. Educators and students must engage conceptual learning to address the first component of the macro-narrative of sustainability, concerning the relationship between humanity and the environment. A theoretical framework rooted in conceptual learning can help students and educators alike to understand in detail the kinds of human-environment relationships important for an individual course. At the same time, a theoretical framework rooted in epistemological learning works in tandem with the second component of the macro-narrative of sustainability – how people come to understand or know the relationship between humanity and the environment. In many ways, sustainability is an acknowledgement that ways of life that have heretofore been acceptable are endangering the environment and communities; thus, what humanity has believed it has known as “real” or “known” about societies or the environment have not always been fully informed. Epistemological learning, therefore, helps students to see how knowledge itself can be flawed and to see different ways of understanding human-environment relationships. Finally, a practical class framework is related to the last component of the

macro-narrative of sustainability – enacting the relationship between humanity and the environment. Within a practical framework, students implement theoretical understanding of sustainability to carry out their responsibilities to human-environment relationships in practice. As I show in *Figure 6: Relationship Between Teaching Frameworks and Macro-narrative of Sustainability*, the frameworks work in tandem with the macro-narrative of sustainability.

Figure 6: Relationship Between Teaching Frameworks and Macro-narrative of Sustainability



Pedagogical Characteristics of EfS

Before bringing information together to describe a cohesive theory of EfS in the classroom, I will share a few pedagogical characteristics of EfS that were apparent from interviews and observations. First, educators described courses whose purpose transcended or moved beyond content. Therefore, educators relied on a variety of sources of knowledge, the second pedagogical characteristic I describe. In courses I visited, I also witnessed a number of pedagogical partnerships, the third pedagogical characteristic in

this section. These pedagogical partnerships existed between and among educators and students and, at times, others such as university staff, government employees, or “practitioners,” such as farmers. Most educators also invited conversation among or between disciplines in order to see sustainability from different perspectives. Finally, courses often held an implied or obvious values orientation, and educators shared that components of EfS were in constant change.

Beyond Content

A number of educators shared their realization that potential course content related to sustainability was vast. Jennifer mentioned in putting together an introductory course with colleagues, “We just felt like there’s too much, and if you gave [students] a laundry list of issues, they would miss the point.” While a guiding micro-narrative and specific disciplines served as anchor points for organizing an EfS course, content within such a narrative or topic could vary. While certainly broad areas of content were important for each course as students learned vastly different topics (from genetics to literature), faculty discussed their role in teaching beyond content toward a way of thinking. Maddie, teaching an education course shared,

I’m actually not all that interested in specific content anyway. I think it’s kind of irrelevant because there’s so much content in the world, it doesn’t matter what content you pick. It’s the context you put it in, and the way you look at it, and what you take from it that’s important.

For Maddie, the context of content was as important as the specific facts covered in class.

Hank, teaching about climate change, commented similarly:

I don’t much care what goes in and what gets left out, so when I plan a course, I plan the first half of a course. And then when we go through it, and if kids are interested in one topic, we spend more time on that and something else drops off of the end. So the course is constantly in the making.

Engaging in co-construction with students, Hank laid a foundation in the beginning of his course and then provided opportunities for students to help determine the specific content they would study.

Adrianna reflected both on her own teaching as well as the training of educators, saying that “facts” are not the root of learning in the classroom:

I’ve heard recently that if you’re spending class time just teaching facts and teaching content, you’re wasting people’s time because they can learn those facts on the internet, you know read the PDF, read a book. Don’t use class time to convey facts . . . And the facts, people are going to forget the facts.

She continued noting that when training teachers, focusing on “pedagogy” is most important. Katie, an instructor in special education who taught future elementary school teachers, commented that she wove issues of sustainability into both science and social studies curricula; however, her primary interest was in helping students “think” rather than teaching them “facts:”

I think that the way I’ve presented it to the students [who are training to be teachers] is that it is a universal thing, so while we’re exploring [sustainability] in the science portion of the class, I’m also planning on looking at it through the social studies lens and basically this idea of migration and why people move and change and how resources, whether they be natural, physical, or economic resources, are a contributing factor to how human beings make decisions and communities function. So what I’m trying to show them over all and throughout the course is that the goal of instruction and learning isn’t for the children to walk away with very specific nuggets of knowledge and facts but rather an understanding of how major themes in life and ideas in life that help them to connect with one another and help them to think and understand the world around them.

In Katie’s course, she emphasized a sustainable way of seeing “life” and connections with “one another” and the “world.” Content would help her demonstrate such a way of living, though students might not retain the “specific facts.” Marie, a geneticist, echoed the need to “get away from content” because content grows “at exponential rates,”

particularly in genetics research. She shared her difficulty in attempting to lay a foundation of limited content from which students could then easily learn on their own or pursue additional courses.

Myra described that attempting to attain minute specificity in facts could, in fact, be problematic. She noted the uncertainty that exists in the realm of sustainability:

We also discussed in class though that if we focus too much just on “Is this sustainable?” in some absolute sense, and we think about what is sustainable ground water use? Well, when your extraction rates are equal to your recharge rates . . . Then you have to know exactly your recharge rates, and you have to know exactly. And we don’t. There’s all this scientific uncertainty. Or variability, natural variability in precipitation patterns and ground water recharge. So how do you operate in that? And that’s when we’ve had some readings that really talk about, we don’t need to know exactly how much we can do and still not cross a threshold. We know we are so far beyond a threshold. Let’s just start tiptoeing away from that cliff. Like instead of arguing is the cliff in 1 millimeter or 10 millimeters, let’s just back away from the cliff. Don’t let it distract us from the fact that we know what we need to do. We know we’re so far on the other side of sustainability and so I think when it comes to science, there can be a tendency to focus on exactly what’s the limit. What’s that number? How many people can the earth hold? How much ground water can we pump? And I think, I like to focus on where are we now, and in which direction is . . . sustainability. That way? Ok let’s go that way. So I like to think of it more as a direction than an end goal.

Myra made an analogy between determining exact sustainability scientifically and measuring the distance to a cliff. Rather than attain exact measurements, she argued that members of society and scientists need to concentrate on “backing away from the cliff.” Much as Katie suggested that educators teach ways of living, not just facts, Myra commented that scholars work and teach for sustainability rather than for knowledge of exact limits of the earth.

While many spoke about teaching beyond facts, they also spoke about the need for accurate understanding. Estelle, a rare science student in a humanities course noted that “having a science background makes me more confident to be able to disagree with

things, so I feel like I have more facts. I have the technical knowledge of how things work.” Her knowledge helped her to speak intelligently in a course when others had different understandings than she. Craig noted statements students may hear but not understand. In one example, he shared:

A student I feel needs to have some grounding on why [methane burning is far better for the environment than coal]. And that pulls into play a lot of fundamental chemistry, the other thing that’s important is the notion of how climate really works.

He shared that he seeks out not only “technical” knowledge, like how the climate “works,” but also inaccurate information, so he can know to what students are exposed. He argued that students need some content familiarity, such as “fundamental chemistry” to decipher arguments and make sound, sustainable decisions. He continued, however, that despite such need, “data are changing all the time” in relationship to sustainability, unlike many scientific equations, such as the “Gibb’s free energy equation, which has been in existence for 200 years.” His overarching point, much like many of the other educators I highlight in this section, is that students need basic intellectual tools, but beyond some point, content becomes secondary to pedagogy as educators in EfS seek to teach a way of thinking or being that students can apply with any content rather than memorization of certain facts or what Katie called “nuggets of knowledge.”

Sources of Knowledge

Because content is vast, educators shared that they drew from different sources of knowledge. While such a concept might seem like common sense, I have chosen to address sources of knowledge in EfS for a few specific reasons. First, educators working to teach about sustainability repeatedly described their work first to show students the nature of evidence in their specific disciplines and how such evidence can be seen as

“valid” knowledge in relationship to issues of sustainability. Second, educators incorporating sustainability into their courses – particularly those working to revamp “old” courses that did not always include consideration of sustainability – used the media as an important source of information about topics related to sustainability. Third, educators shared that knowledge is often changing in relation to sustainability, particularly in relation to societies’ use of knowledge; therefore, the use of knowledge informed knowledge itself. In other words, praxis, or use of practice or implementation of knowledge to refine knowledge, is crucial for EfS.

Research and disciplinary evidence. Educators shared that part of their role included showing students the ways in which disciplinary evidence is grounds for knowledge in areas related to sustainability. Neil, an archeologist at RU, described the process in his course examining sustainability from Neolithic and Paleolithic ages:

It’s been a little bit of a struggle having such a diverse student base. I spent a lot more than that I thought of the course teaching them about archeology, about how archeologists know about the past, because I don’t think it’s fair to them to just start throwing patterns at them and say, “You don’t get it?” Because I didn’t teach them about what pollen means, you know, in a pollen sample from 10,000 years ago. The frequency of one plant versus another . . . I like to show them . . . how people showed up in Australia, and then all the large marsupials mammals died. And they showed up in New Zealand and New Guinea, and they all died, a plant species, the biodiversity change, the ratios changed the ecology changed. They showed up in North America, weird stuff happens, so I like to talk about this. I approached it this time as a blame game – who is to blame? Is it climate change? Is it something else? What kinds of effects? The point is you need to know how do we actually know about long-term anything? How do archeologists know about it but why is that important to know about long-term thinking?

In his course, Neil described spending a significant portion of the time explaining the kinds of evidence used for knowledge in archeology – pollen samples. Then, after detailing how such evidence is collected and validated, he moved into case studies examining changes in flora and fauna over thousands of years using archeological

evidence from which he asks students to make hypotheses and informed opinions about issues related to sustainability.

Similarly, Aiden discussed that he showed students the ways economists attempt to measure economic values of aspects of the environment that do not come with a price tag:

This is what we do as economists. We have a challenge in saying you want to improve the environment and a lot of things that you value about the environment are not like buying fish in a market place. It's like going recreational fishing, it's going out with your friends to a park. It's having a waterfront home property . . . The last thing we'll do is non-use value. Where you simply use surveys to try -- but you have to do that on a very controlled manner -- where you ask the questions [that address something's value outside of its price].

Aiden showed students ways that economists attempt to capture dollar values of items that are not easily measured, such as the value of recreational time spent on the water. He showed how such evidence, which can be gathered through surveys or other tools, can then inform policy and regulation related to waterways that help the viability of a community. Like Neil, Aiden demonstrated methods economists use to gain knowledge and then showed how such knowledge can be put to use in work for sustainability.

In a slightly different example, I observed a course team taught by a biochemist and literature professor. I then interviewed them together, and they jointly reflected on the ways in which evidence within their disciplines is quite different, yet they work to bring them together in the class.

Ezra: One of the things maybe humanists have to contribute is it's a field where imagination is really important. It's very hard – it's hard to imagine a lot of things talked about – if CO₂ were purple instead of invisible, we'd be in a better fix. But that's a primitive way to try to make all these intangibles or unassimilatable statistics and huge numbers and billions of this and millions of that to try to make those things vivid is a real challenge. And that's where novels to some extent, poetry, occasionally and visual art can be useful. I think in terms of close reading

of texts, that's what I've been doing for 40 years. And so everything starts with a book or, you know, some kind of reading and goes out . . .

Craig: I think what [Ezra] is alluding to here is a fact that again one of the challenges is teaching this class with faculty from different walks of life is getting them to accept the different ways in which they treat the subject, really . . . I'm inclined when I look at a problem to look at more the technical side, and I think that's part of the role I play, and I tend to be hesitant most of the time in conveying my own personal philosophy about something . . . When I teach biochemistry, I don't interject, I don't tell the students whether I believe that, you know, the Gibbs Free Energy equation is correct. It's not part of the discussion. It's, there it is, it's been shown to work, and there you have it. Right? So I'm not, this has been a real different experience for me because the subject matter is not written in stone. There's a lot of uncertainty.

Ezra noted that part of his role as a humanist is both to closely examine texts, looking for symbolism, hidden meanings, nuances, and then to encourage imaginative thinking that could help with problem solving around sustainability. Craig, on the other hand, discussed that evidence within the sciences is first based on principles that are set in stone about which there is little discussion or imagination. From those principles, scientists can conduct controlled experiments. One perspective – from the humanities -- is rooted in creativity and interpretation of multi-faceted concepts, another – from the sciences -- is rooted in exactness and measurement of quantifiable entities or processes. Both educators share their disciplinary practices in the course and show students what such lens have to bring to EfS. Evidence from texts can provide analogy and provide visuals of numbers that might be hard to imagine, while evidence from equations and scientific principles can show ways in which the world typically operates.

Some faculty described that in their own work they seek to move from a limited, single discipline view of their research interest. Jennifer described her career in showing how climate change affects biodiversity loss. But she realized she was repeatedly showing species by species, similar outcomes and sensitivities to climate change. “It was

a lot of documenting, not just how species were reacting, I mean revealing mechanisms that underlie those responses, doing basic biology. But it seems like you need to do something a little bit more productive.” Incorporating economics, ethics, and policymaking, she described working to combine her disciplinary knowledge with other disciplines for positive contribution to the environment.

In most cases, courses related to sustainability were grounded in a discipline that had a specific technique or perspective on what might count as knowledge and in what ways such knowledge could be gained. Faculty, therefore, spent first a portion of class describing such evidence followed by a portion of class in which faculty then showed how such evidence could be used in relationship to issues related to sustainability. Disciplinary evidence was a primary source of knowledge for faculty and educators teaching for sustainability.

Media. At the same time, a number of educators discussed that they relied on various forms of media – popular books, news, the internet, social media -- as sources of knowledge for information about issues related to sustainability. Media fueled their own learning and also provided examples or cases they could provide for students. Marie shared that her approach to learning in sustainability was different from her approach to learning in her discipline of molecular biology. “In my field,” she admitted, “I go much deeper, I read the primary research, but in sustainability, I probably listen more to the media. [Yet,] I always tell my students, ‘Don’t listen to the media.’” Marie encouraged her students not to rely on the media, given potential inaccuracies in the information reported; she reminded them always to look to primary literature. However, she relied on media, such as “TED talks,” because of the quick, up-to-date information she could

garner on issues not in her own area of research. Marie's comments highlight that knowing primary research in every field might not be reasonable, but media provides information readily-available for a wide audience and can also translate primary research into language that is accessible to all, not only topical experts.

Zoe described that she learned from and used videos in class. That way, she can often provide short clips of concepts or situations that would not have the same impact for students were they to read about them, like an interview with someone in another country, or a "NASA video explaining how solar flares affect temperature." Students also send her materials she uses in class. Similarly, Myra described reading *The New York Times* and reviewing National Public Radio (NPR) podcasts. The day I observed class, she referred to a podcast on Fairbanks, Alaska, which is "prone to temperature inversion in the atmosphere," which contributes to poor air quality. She said such examples from the media provide a "tangible story" so that when she is talking about "abstract ideas of atmosphere mixing, [students] can listen to something that's happening right now in a town that makes it more relevant." In another example, Maddie described reading popular books like *The Omnivore's Dilemma* or *Farm City* because the narratives in these books provide access to thinking about sustainability through food. She shared food is a key issue and that many contemporary books help tie agriculture into one's informed decisions about consumption. She said, "It's not just about knowing where your tomato comes from. It's about how knowing where your tomato comes from impacts the decisions you make about everything you might consume."

A number of educators discussed scanning the Internet regularly to stay up to date on information. Craig described that he tried to understand in particular the layman's, not

just the academic's, perspective of sustainability. He shared:

I try to access information a lot of different levels – like, for example, at least every other day, I search the Internet for some key terms just to see what's out there, what people are saying. It's not a scientific sample; it's a way to kind of ground me on what the everyday sort of literature is saying. This is not hard core, not the hard core side. This would be the laymen's side of the problem, the stuff that people are reading in the outside world, it may not be technically oriented. I also find especially intriguing the feedback from those articles – what people say is the consequences. That really does interest me, especially when you get into the arguments people make on the denial side. So, I find that level, but I also equally find intriguing the heavier, technical side, for example, why is it that people claim that methane burning is far better for the environment than coal? You know, we all hear that but a student I feel needs to have some grounding on why that's true. And that pulls into play a lot of fundamental chemistry, the other thing that's important is the notion of how climate really works.

The Internet provided Craig other people's perspectives about the denial of climate change and a view into information available. Yet, it also provided him opportunities to connect disciplinary technicalities to information that did not include the "hard core" side of information. In a similar fashion, Graham described that he attempts to read articles in magazines and books that are written for different populations, for example, the intelligent lay public or governmental staff. Just like Craig found technical inroads to various articles, Graham realized he had to "translate the way words are used." He shared that he works carefully to consider "how much opinion comes through versus not. How much people are just promoting some agenda that they have or trying to stop somebody else's agenda." In his reading, Graham gained the ability to see broadly different agendas related to sustainability he might not have seen solely in research journals. In a similar fashion, he guided students through careful consideration of words. In one of his first class sessions, he showed students signs in grocery stores and other public places with words like "environmentally friendly," and asked students to examine them closely, consider what they might mean, and consider why they were being used.

Faculty also described the use of social media as a source of or connection to knowledge for sustainability. Jeremy mentioned that in his own learning, he constantly searches for information. He uses

a lot of social networking – Facebook and stuff like that – to find articles that are interesting. So, if somebody will see there’s a piece in *Science* or there’s some new piece on climate change. That’s something I’ve actually come to depend on a lot.”

Social media connected him at times to disciplinary evidence. He shared he did not “overly rely on academic articles” although he “keeps up” with relevant research.

Jennifer also mentioned that she read environmental news and had become “quite enamored with Twitter as a source of information. I follow knowledgeable people. I also try to follow some very not knowledgeable people, too, so I know what they are saying.”

Thus, connecting to live contemporary issues and connecting to other people is important for EfS. Educators rely on traditional disciplinary evidence but also on popular books, news, and other people. Few sources are completely off limits.

In discussing her own learning, Sam discussed the potential paradox created by such a vast array of information that can serve as knowledge about sustainability. On the one hand, information abounds, but on the other hand, not all information is accurate. She shared:

The problem right now with finding information that’s useful information, let’s say for consumers . . . is a lot of it has an agenda. So, you always have to be reading it through that filter of what are they trying to sell or who they represent. There are people out there who have very strong-felt opinions . . . who don’t have really good technical information . . . I used to have a Google alert for green fashion, sustainable fashion, and a lot of other phrases. And after awhile . . . there is so much green wash in this area that having a Google alert on it is not at all useful. I have been able to find some scholarly articles on people who do voluntary simplicity, people who are anti-consumption, alternative consumer movements. . . A lot of times what I’ll do is try to find what’s going on, I’ll do a Google scholar on that book and see who’s citing it.

Many educators shared Sam's sentiment. They could spend days searching for, reading, and finding information, some of it useful and some inaccurate. Although, as Graham and Craig described, some liked to read inaccurate information to know arguments to which students are exposed. Yet, despite the vast disparity in quality of information, educators learned through media in ways they could not through disciplinary evidence, as they learned about current events or examples of the ways in which lessons of sustainability happen in real-world cases.

Praxis. Media were important for EfS in part because of the role they played in a feedback loop of knowledge and practice, or praxis. Praxis, in bell hooks' (1994) definition is "action and reflection upon the word in order to change it" (p. 14). Media provide live feedback of human-environment relationships as journalists and other individuals share information freely and quickly about the condition of societies and the environment. Zoe shared one example of a feedback loop made visible through media:

[Take] the example of [the insecticide dichlorodiphenyltrichloroethane or DDT] . . . When it came out, DDT was this awesome thing. It was supposed to be harmless, it killed off mosquitoes, which carried malaria. Then, you've got Rachel Carson's *Silent Spring*, and the recognition that it wasn't such a nice chemical. Quote unquote. And that it could cause significant harm both to our environment and other living beings but also to humans -- we bioaccumulate and we can get cancers and all kinds of stuff like that. So, now we know that it's a bad thing. And so, this idea of learning more helps us understand, "Ok, so we did things in the past that weren't so great. We can't really blame people because they were trying. But know that we now it was have to do it differently. So, how do we do it differently?"

In the case she mentioned, a popular book by a scientific journalist provided catalyst for change. The book became a part of a praxis loop as it provided a narrative suggesting that the negative consequences of DDT outweighed the good, and a once highly regarded

practice became illegal in most of the globe. Media can contribute to praxis, and many educators shared that praxis itself is a source of knowledge within sustainability.

Cecilia described the praxis of simple observation of the world around her, one of the few who commented on the ways in which a perceptual rather than rational attention to the environment itself might yield knowledge. She shared that she learned not only through media but also by looking around her and seeing “how early the spring flowers [bloom], those kinds of things that signals of climate change.” Her living in and observing the world informed her knowledge. Sam discussed the role of using the past as a player in praxis, and she shared an old image with me from *Life Magazine* of the celebration of a “throw away” culture. She commented:

We need to be aware of what kind of consequences [practices] have had in the past so that we cannot perpetuate bad consequences that we did. I mean, look at that throw away culture picture. You know, looking back then and saying, “But, at the time, it seemed like a really good idea.” But at least now if somebody comes up with some kind of disposable product that would be a really, really bad use of materials, you would hope people would say, “I don’t know about that.”

In American Studies, she noted that part of her role is in critiquing components of everyday life and culture so that we may come to learn simply from ways of living. In this example, she highlighted how a culture of disposable items, such as ballpoint pens, utensils, cups, and plates, was celebrated, largely because of the convenience such items brought to a society. Now, however, she noted we have hindsight to show the negative consequences (such as trash and manufacturing pollution) of disposables. The practice of simply living within a cultural context (in this case, one that valued convenience and low cost) and then becoming aware of the consequences of such a way of living can become a tool for critiquing and changing one’s knowledge.

Anthony discussed the praxis of seeing the negative effects of efforts initially thought to be sustainable. He described having read a story of biodegradable bottles, and the manufacturers quickly learned a chemical byproduct of the biodegradation was harmful to the environment. In attempting to solve one problem, they instead created another. Anthony continued that this example is helpful because it showed what education should provide. He noted, “What I’m trying to do is to give the students direct knowledge to try to make them think critically and systematically about these things so that if one solution didn’t work, it can’t address the next solution.” He wanted students to be able to take lessons from their practice and change their ways of working if once accepted practices are learned to be harmful to the environment or others.

Craig shared that sustainability begets praxis naturally; understandings of sustainability must always change because data are always changing:

The movement toward sustainability is a process, it’s not an endpoint . . . Sustainability is like that because our rules are always changing, they are never going to be the same, that’s part of the deal here, right? In two years from now, we will think differently about the deal than we do now. So, I don’t think you can say, “Ah, yeah, we’re done” . . . Like, for example, last year we talked about BP’s energy map in 2011. They came out this year in 2012 with another one which is different, well now all that stuff I told them last year needs to be updated. So, the complexion of the class and the data are changing all the time, it’s not like me talking about the Gibb’s free energy equation, which has been in existence for 200 years. So, it’s challenging from the point of you’re teaching, and you’re not going to be able to rely on the data that you used the year before.

In EfS, educators must be constantly updating information learned through praxis and must be continually learning from their own practice. So, unlike Craig’s discipline of biochemistry, in which basic equations are constant and well-known, sustainability is about an ever-evolving relationship, and knowledge about it comes about through the enactment of the human-environment relationship.

Pedagogical Partnerships

EfS was characterized by a number of partnerships in pedagogy. Educators were not the only individuals contributing to teaching. Frequently, educators called upon students to contribute to classroom learning. In one example, Graham described a number of different theories about economic systems and then invited students to share what they had seen and what might be ideal:

Student: We see both cooperation and competition [in economic systems]. But both goods theories and Maslow's theories suggest we need more cooperation.

Graham: Are you describing what exists today?

Student: No, we have mostly all competition.

Graham: What an outrageous idea! More cooperation.

Student: We also need to consider externalities and rethink private goods.

Graham: Elinor Ostrom talks a bit about that. She works on common pool resources as a sociologist.

Student: We could also think of consumption only in terms of *needs* rather than *wants*.

Graham: Great. I'm working on this, too. I learn from you, you from me, and we get these ideas. Think about this. Write notes.

Graham did not present one theory as final, official, or factual; instead, he invited students to share in the discussion, asking their opinions – which were rooted in data from class. Students were in pedagogical partnership with the instructor. Angie, a student in Graham's class, commented that she “likes the way he stops and asks for questions and asks our opinions about things.” Martin, another student in the course, similarly noted,

He always wants to call to the audience because he says there's no right answer to this and he wants to hear everyone's point of view on it because there's people from all different majors. In math, the answer is always right in front of you. . . this class is more open to interpretation.

Despite the fact that Graham “knows more than students,” as Martin reiterated, Graham invited students into conversation and into consideration of potential answers for questions under consideration. Angie appreciated the invitation and Martin recognized

that such an invitation was rare in other courses, like math.

In other cases, outside guests became partners. In one course, students heard about a local farmer using both sustainable and conventional practices in agriculture. In the course I observed after the farmer visited, students discussed the farmer's attempt to support both agricultural production and conservation on his land. They discussed that while his was more sustainable than most local large-scale farms, the farm had potential for more sustainable practice. Students agreed that they would be interested in joining the co-educators of the course in writing to the farmer to continue dialogue about his work and their learning in class. Here, both the farmer and students were pedagogical partners.

In one last example, community members and organizations became partners. Maddie asked her class to work “in small groups with classmates and community partners to plan and carry out a project that [would make] a positive impact on the quality of life in [their] community.” One group worked to conserve water in bathrooms on campus and another worked on a composting program at a local elementary school. The partners were influential in informing much of the learning students pursued as they worked to embody EfS in their projects. In an online blog about their projects, students referenced the ways in which local governmental employees, campus facilities workers, staff at their partner sites, and local experts helped them in carrying out their projects. Maddie noted that when working in the “world” students saw the ways in which various policies, cultural values, or relationships can influence their work. She said:

[The students] are all out doing different community projects . . . They've all been doing blog updates of their projects and they've all taken 15 different turns because they're working in community. This is the nature of it. They're experiencing, this is why it's the way it is in the world. Because they're trying to figure out how to change it, and now [they're] seeing what limitations . . . are.

She noted that inviting partners and real world projects into the classroom creates potential “turns” that students might not encounter if projects were confined to in-class boundaries or to groups involving only fellow students. Inviting community partners into the class projects ensured both that students were meeting real needs of those partners and that students experienced the ways in which working in the community might require different skills, such as patience, cooperation, and listening.

Pedagogical partnerships were important to sustainability in a large part because of the complexity of the issues related to sustainability. Many educators shared that they were not experts in all areas of sustainability; rather, only in small niches of sustainability. One administrator commented that “going into areas [of sustainability]” can “be a risk professionally” for an instructor when it is not one’s expertise. Her campus provided incentives, therefore, for faculty who made the effort to incorporate sustainability into their teaching in new ways. Neil shared he was not “formally trained in sustainability,” and Jennifer said she “wouldn’t claim to be an expert on sustainability generally,” though “there are certain dimensions of sustainability” in which she is knowledgeable. Tom reminded students in class that they were, in fact, the experts on many topics because they were conducting in-depth research into areas he had not studied. Thus, EfS courses were often characterized by partnerships in pedagogy where many people had voices, as multiple sources of knowledge were important for a well-rounded perspective on a complex, vast topic.

Disciplines in Conversation

Most EfS classes encouraged conversation between and among various disciplines. While not all classes were specifically interdisciplinary, many were and most

involved the incorporation of more than one discipline. In a history course, an instructor wove together narratives of science, history, “the culture of gender, and the biology of sex” when discussing the intersections of gender and the environment, particularly the consequences of the rise of birth control on fish living near sewage treatment plants.

Students in an economics class considered both economic and environmental perspectives on climate change. Another economics class covered scientific data and the process of policy making when discussing economic value-setting. In a humanities-centered seminar, Estelle reflected on the instructor’s attempts to incorporate science so that students had basic information about arguments they were studying in class:

I think in terms of students, I know I’m the only science student because this type of class . . . is only for [humanities] students. But the professor definitely brings a lot of science and engineering. And I remember the first day we talked about what is fire and how do we burn fuels. So for me it was all, I’ve heard it before, the chemical equations and everything. But for them it was something new. But I think the professor tries to bring it in in this class.

Estelle noted that she was a science student who encountered scientific background about topics like energy frequently, while she felt other students did not; she noted that the professor worked to bring science into a humanities classroom so that students would have foundational knowledge about energy and use of fuels as they studied texts and arguments related to climate change.

I suggest that EfS includes *conversations* among disciplines because while it does frequently incorporate many disciplinary perspectives, it, at times, retains disciplinary perspectives as silos even while they are in conversation. Both Craig, a biochemist, and Ezra, a literature professor, discussed some of the challenges in team-teaching a course on sustainability. Craig noted that one challenge in teaching such a course “is getting faculty from different walks of life to accept the different ways in which they treat the

subject.” He noted that the two talked a great deal about how to “coordinate efforts” better. Ezra agreed, saying that he wanted students to gain the perspectives of both disciplines but felt he and his co-instructor were still working on the best way to integrate teaching:

One of the things we hope in the background here is that students do get an appreciation of different disciplinary perspectives. I don’t think we’re at the full integration point, I mean our examples are still – there’s Craig’s part, there’s my part . . . But I’ve learned far more science in 6 weeks.

These faculty modeled disciplines in conversation, but they noted that teaching in such a way that fully integrated the disciplines was a challenge. While each professor wanted students to “read everything more critically” (Ezra) or “be analytical” (Craig) – be students reading text or charts – they each brought their own expertise and different sources of knowledge, which were at times difficult to portray except in conversation. In this example, I highlight a scientist and a humanist, those who represent disciplines traditionally seen on opposite ends of a spectrum. Arguably, some disciplines might be easier to integrate in a single classroom (e.g., history and literature or physics and math); yet, these educators described the difficulty in trying to integrate disciplines that are at the same time critical for sustainability and concerned with considerably different ways of knowing. The work of disciplinary integration seemed a goal for these professors as they worked through the challenges of bringing together their disciplines in conversation.

Students were able to see the disciplines in conversation and also the ways in which each instructor frequently remained rooted in a discipline, often representing a particular point of view in a conversation. Estelle commented on her experience of another course co-taught by educators from many disciplines. In this course, faculty worked to integrate disciplines by showing multiple sides to a particular case:

[The faculty] divided the class into case studies. The first case study was just an intro on sustainability and the history. And so what happened is they would kind of split up lecture days so one professor would teach something one day, another professor would teach something another day. Some case studies were more science-based, so we spent one case study talking about corn and its affect on the environment. So, we had a few lectures from the biology professor. She talked to us about how corn is grown, how grown is breed, and the impact the fertilizers and all that has on the ecosystem, the environment. And we also had lectures from the business professor who talked about the economics of corn, with all the subsidies from the government and the recent drought that causes the corn shortage. You know, “We’ll see huge price increase in the market not just in terms of actual corn, but everything corn’s affected because it’s used for plastics and all that.” So, they definitely divided the class up into their perspective disciplines. Also with corn we talked about, the theology professor [talked about]. . . stewardship and being more sustainable is an obligation that you should be doing, and just trying to promote more local grown products. It wasn’t like one class all of it together. It was more like different sections divided up in targeting the different fields. And then, [at] the end we would bring it all together and have a discussion or exam; we just brought it all together.

In her class, Estelle described the ways in which each faculty member provided unique expertise on corn. Faculty shared their perspectives and knowledge one by one, putting their ideas in conversation with one another about a similar case. Then, a closing discussion or exam would help students bring the information “all together.” Quinton provided a similar description of a different case from the same class:

[Educators] were stakeholders in any given situation. So, one of our case studies was the Columbia River basin, and one of the stakeholders were [religious leaders] writing documents, some were scientists, some were business people, and the historian looked back at the past. They all portrayed those different roles, each presenting documents from their point of few.

Quinton highlighted the ways in which faculty could represent different “stakeholders” in a situation, given their expertise. They could represent pros and cons to a situation that might hold tension with other points of view. In this way, faculty modeled conversations across disciplines and the ways in which different pieces of accurate information might suggest to students a different course of action or needed outcome. As Ezra and Craig

noted, though, “reaching a full integration” point is difficult as faculty remain rooted in each discipline that grounds their expertise.

The role of disciplines in conversation varied in courses I visited. In some cases, courses were *deeply* rooted in one discipline, with branches extending into other disciplines. Consider an Introduction to Environmental Science course. The course was heavily rooted in the discipline of environmental science with topics ranging from the study of the atmosphere, lithosphere, and hydrosphere. Yet, Graham taught in such a way as to encourage “transdisciplinary ways of knowing,” inviting the use of both “mathematical approaches” and “individual creative writing.” I visited another environmental science course on LAC and asked the faculty member about how the course I observed related to the arch of class as a whole. She noted:

You [visited] a pure science course We’ll kind of cover science and then we usually broaden out. And I’m like, “Ok, how does this intersect?” We’ll look at some of the potential solutions, and we’ll think about which are cheaper or more accessible to most of the world. We could build these gazillion dollars waste water treatment plants. That’s one possibility. And is that going to be feasible in sub-Saharan Africa? So, we bring in the equity aspects of sustainability. If we can’t afford to sustain it, it’s not really sustainable. So, the best science or the best technology in the world, if it’s not accessible and economically feasible, that’s not really scientists contributing in the best way possible.

In this case, Myra grounded her environmental science course in the scientific information necessary and then invited students to consider economics and equity when thinking about the ways in which science might inform approaches to sustainability. She asked students to bring multiple disciplinary perspectives into conversation about decision-making and problem-solving for sustainability.

In a similar fashion, Joelle brought scientific information to bear in a literature course. She shared with me a discussion students in her course held about a book and the

ways she worked to relate the material to the work of engineering students in the course:

We were reading a book called *Mountains beyond Mountains*, which is about a doctor working in Haiti, and one of the things that you see happening throughout the book is that is that one of the reasons that Haiti is so poor is because its environment has been destroyed. So, that opened up a conversation for us on who the decision-makers are and who the decision-makers are in that political situation and how their decisions are impacting. It's so far beyond what they think they're impacting. So, the best example that came out of the book was this dam that the Americans decided to build when they were occupying Haiti. And they build this dam and it, the thought was that the dam would all energy, water to flow down river to Port Au Prince, and provide power to that city and provide industry to that benefit at least the wealthier classes. And what the dam does is basically flood all the farm land in this one area so that then the peasants are moved up land where they can't really successfully farm, and they try to farm there and everything erodes. So, you're left with these brown hills and now food and an incredibly poor population. So, we talked a lot about the dam and who decided to build it and why and how far down the road you have to think to be an effective decision-maker? And for my students who are engineers, that kind of thinking is really important for them to imagine. We talked about the difference between charity, development, and justice a lot with that book. And they really struggled in order to develop in a just way. How can those two work together because I think that's core conflict for engineers and it's also really a sustainability issue.

While Joelle discussed helping students through understanding traditional literary devices and style, she also encouraged her students to consider how the book might inform their roles as engineers. While not necessarily bringing in technical aspects of engineering, she incorporated the process of design and construction in conversation about the book, asking students to consider societal impacts of their work as engineers. In engineering, students learn *how* to build or implement a process, but in Joelle's course, they were asked to consider potential ramifications of design and whether they *should* build. She asked them to bridge their engineering knowledge with a literary narrative that added elements of justice, fairness, and long-term, communal thinking. The narrative she chose also represented that students could encounter competing factors; in this case, students saw the tension between the need for renewable energy from hydroelectric power and the

need for reliable farming land for food, as well as tension among different communities' rights. Joelle used literature to provide complexity to scientific knowledge.

In both the environmental science and literature courses I describe, material was rooted in a particular discipline while consideration of other disciplines helped bring critical thought and broader understanding to the course material. Yet, at other times, courses were *broadly* rooted across many disciplines. Most courses with sustainability as a fundamental role openly incorporated multiple disciplines – ranging from science to philosophy and ethics to literature and history to business – with, sometimes, more than one instructor leading the course. At RU, four educators from many disciplines taught a fundamental sustainability course and each provided different disciplinary perspectives on various cases under study.

Aldo, for instance, noted when teaching a fundamental course on sustainability, he and fellow educators asked together:

How do you blend different kinds of knowing and questions? What's the role of science? What's the role of ethics? What's the role of politics in these controversies? The minor [on sustainability] is based on this idea that you need to know something from a lot of these disciplines in order to wrap you mind around and offer up solutions to some of these problems. So, a lot of what we did [in class] was just demonstrating how the disciplines work.

He and his fellow educators spent time demonstrating how the role of each discipline provided new information or new perspectives for consideration of sustainability.

Most educators iterated that while some disciplines were clearly needed to understand issues related to sustainability – environmental science, ethics, and economics, to name a few – many believed that almost any discipline could relate to aspects of sustainability and bring important information or understanding. Ezra described how learning in the field about issues related to sustainability was difficult

because of that very fact – one could learn across many disciplines and spend hours reading. He compared his experience in EfS to other experiences of team-teaching:

I've done a fair amount of team-teaching throughout my career, did a couple courses with a psychologist at Emory, a cognitive psychologist. So I've read a lot of cognitive psychology, there's a subfield of a field, and I wasn't trying to master it. But things on memory and a few of the topics that were a part of our courses, including his work. And that was fairly finite, I mean it was a challenge, but it was finite. Sustainability, I feel like I could be reading anything -- there's the ethics; I'd really like to be an economist some days. I'd like to know a whole lot more about ecology. There's half a dozen disciplines . . . I've spent long days basically going from one long article to another . . . I mean interdisciplinary work is always hard, but typically, in my field somebody says I've got an interdisciplinary project they've decided maybe they have to master psychoanalysis, or they really have to do, become really well-versed in the period they're writing about, in a way that you don't if you're just reading the literature. But, again, usually putting two disciplines together, we're trying to somehow put together at least 6 or 8.

Ezra noted that sustainability in and of itself is not a discipline, but it can incorporate many disciplines about which one could learn continually. Sustainability is a topic that inherently requires multiple areas of expertise.

Commenting on the historical evolution of disciplines, Graham commented that sustainability has the potential to become its own discipline. But, he believed that it would instead remain an area of transdisciplinary study, and an area that would require academics from diverse traditions to work together. He commented:

I think that what [sustainability] going to be is a trans-discipline. But, I think this is the way that a lot of areas start. They are fuzzy and then they become more solidified in the public mind. Like physics or chemistry. Chemistry started out historically in the middle ages through alchemy, alchemists trying to make gold out of lead and trying to cure syphilis by trying to give people arsenic. So, what emerged was knowledge about elements and how they behave. And of course chemistry is a discipline now and alchemy is considered fuzzy stuff. So, it may be that sustainability will take a similar path. Ancient Greeks couldn't stand the biology and the geology, they thought were unfit to be science because they were too observational. They were into mathematics and astronomy and physics . . . Well, of course now, geology and biology are disciplines.

In his consideration of current disciplines, Graham noted many were once out of favor; thus, a slow evolution of interest in and foundation for the study of sustainability could yield a discipline. Another faculty member noted, however, that issues would arise were sustainability to become a separate discipline. For example, typically, departments promote and provide tenure to faculty based on thorough review from disciplinary experts. A department of sustainability experts could feasibly host a historian, a business person, and a biologist, all who would not easily be able to evaluate the research of their colleagues. Currently, sustainability seems to exist in the academy as a topic in need of many disciplinary experts while not a discipline in and of itself.

Although all the faculty I interviewed believed interdisciplinary work of EfS to be challenging, they were grateful for the opportunity to participate in this kind of teaching. Julian noted: “We need to come together and allow voices to take shape – the economists, the poet, the policymaker. We need various disciplines to address issues from different viewpoints. It’s maybe slower, but the questions are better.” He believed interdisciplinary work grounded better questions, which could in turn inform better action. Nina discussed that a campus workshop helping students incorporate sustainability into their courses had encouraged people to talk and collaborate “who hadn’t and wouldn’t have” had they not had the opportunity to do so. Sustainability as an interdisciplinary focus from her perspective had brought “broader institutional integration,” which she believed was healthy, so as not to encourage one department or program to compartmentalize the topic all the time. From a research perspective, Jennifer, a biologist, noted with humor about her research, “I don’t want to spend my life trying to grind up animals trying to save them because that doesn’t do it for me.” She enjoyed branching into other disciplines to

consider how her research in the lab could inform policies that may contribute to protection of biodiversity. Across the board, faculty who were pursuing disciplinary conversations wanted to be doing so and often sought out the work not only because of their own interest but also because they thought sustainability required interdisciplinary thinking.

A few faculty also noted that entering into conversation across disciplines was a practice necessary given the concept of sustainability. Because multiple disciplines inform sustainability, individuals must be able to understand research from many different fields. Therefore, scholars must learn to translate their research into language that those not experts in their fields could understand. Julian noted:

We need to stop writing in these idiosyncratic journals that no one reads. Look at leading figures. Over and over they can speak to people about their areas of interest. Those are the people that lead. That doesn't mean we just give up – we still need to train people in disciplines. But we need to train people who can speak across disciplines.

Julian suggested that learning to communicate to others in different disciplines would be necessary for scholars to lead around issues of sustainability. Similarly, Carla noted that scientists cannot act alone and must be able to talk with others:

If you are a scientist and you are working on pollution, or invasive species, or any of this sustainability issue, you need to be able to talk to everybody else. If you just talk to scientists, nothing is going to happen.

Julian and Carla highlight the importance of educators continuing to engage in and model conversations across the disciplines. Educators must themselves be able to understand each other and their disciplinary perspectives, and students must learn how individuals from different disciplinary perspectives engage in conversation to work toward sustainability.

Values Orientation

EfS was characterized not only by interdisciplinary thinking but also by a values orientation, or an understanding that certain principles undergird appropriate and just use of knowledge gained in class. Educators were teaching issues that required the use of values in making certain decisions, such as to what extent to address pollution, whether to limit current resource use now for the sake of future generations or to use resources with little limitation now for the sake of developing nations, or whether to tout local eating knowing its potential omission of cultural considerations. Thus, some values inherent in EfS included responsibility to care for the environment and responsibility to consider equitable decisions and their consequences. Carla noted:

The main thing again I want them to care. You know, they need to care about [these] problems [of sustainability]. Because a new generation that doesn't know anything about this, doesn't care and they won't solve some of these problems. And we need people who care.

She wants students not simply to learn information, but to care about the information and how they can use it to solve the “problems.” Craig noted the place of values in sustainability when he described he felt that he must address his own opinion in EfS, while he purposefully refrained from doing so in science courses:

I tend to be hesitant most of the time in conveying my own personal philosophy about something, I tend to draw the line there. But in a class like this, I think you do have to from time to time reveal your own personal views, what you think the world should like or what the world should do now given the circumstances. But, in science we tend not to, when I teach biochemistry, I don't interject . . . It's, there, it is, it's been shown to work, and there you have it. . . .

In class, while Craig did not suggest students needed to share his beliefs, he did feel compelled to share, at times, what “the world should look like” as he engaged in conversation in class. Because sustainability contains uncertainty, he sometimes shared

perspectives on what values might guide decision-making in light of uncertainty. In one example in discussing beliefs about population growth and its potential plateau, Craig disagreed with the statement but said to the students, “Whether you do or don’t [agree], it’s important to understand the multiplicity of perspectives.”

In another example of values at play in the classroom, Zoe taught an anthropology course in which students learned about the impact of climate change on communities around the globe. She shared that part of her role is to encourage students to consider their role in climate change, the ways climate change affects other communities, and the hope that rests in their ability to live differently. She reflected that she helps students to ask:

What is my responsibility to the people that live next door that don’t look like me or don’t have as much money as me or maybe have more money than me or maybe we don’t share the same language? What is my responsibility as an American toward the rest of the world given that we’ve created a huge part of this problem? Do we, if we walk around with all this guilt, all it does is paralyze us from action. So, I want them to understand that yes, we are contributing but that shouldn’t stop us from trying to work together to find some sort of solution.

Because sustainability entails a responsibility toward the environment and communities that are a part of the environment, Zoe suggested that in teaching for sustainability, she urged students to consider where their responsibilities might lie. She wanted students to consider values of care and respect for others in making decisions about living sustainably. With a similar sentiment to Zoe’s, Martin said simply that he felt an EfS course urged the values of “thinking about other people and being a humanitarian.”

In one final example, Jennifer described the way in which she and co-educators began a fundamental sustainability course. She said they were overt about “values and ethics from the beginning,” and noted:

We felt it was critical they have some sort of ethical framework . . . So, we really wanted to give them a framework for making sort of social decisions. I guess we really thought that sustainability is about decision-making, about what is the right thing to do, not just for the here and now but for what is right and what is long term and what's fair and all those kinds of things . . . Sustainability is about all the disciplines put together in deciding what kind of world you want to live in, and then trying to achieve that. Recognizing that the opportunities and the costs, the pros and the cons, and that it didn't sit in any domain. You need to bring to bear your values and swap that out for your data, and you need to do this all the time . . .

Jennifer noted that while answers for sustainability might not be certain, she wanted students to have a framework and a set of principles that would help ground sustainable answers within a set of values. She wanted students to make decisions not simply out of ease or of capitalist, consumptive norms but to consider new, value-driven ways of living and acting sustainably. She wanted students to move beyond questions of “paper or plastic” and help them to “navigate” the “kind of profound social questions that sustainability truly invites . . . including questions of value.” Thus, while EfS incorporates information, many sources of knowledge, and much data, it also incorporates a values-oriented way of being or living that fosters awareness of and respect for the environment and its communities.

A values orientation did not necessarily mean students were required to make certain decisions or implement values in the same way. Jack said of his professor, Graham, “he presents the issue and doesn't really bias it one way or another and leaves it up for the thinker to decide what they believe.” Graham himself noted in class, “There's a lot of variables and that's what I want to emphasize. We may have preexisting values and overlook others.” That is, he wanted his students to be open-minded and thoughtful about their decisions, knowing some values may be overlooked. Jennifer similarly noted that her role was to help students “navigate” issues rather than to give them a specific path. In

each case, a values orientation was meant to serve as a guide for decision making rather than a strict set of rules students must follow. In fact, one reason a values-orientation is critical for EfS is because information is constantly changing. Like the case of DDT, what people might consider environmentally-friendly or at least benign at first may later turn out to be harmful. Thus, data are continually updated, feedback continually generated, and information continually growing – in each of the many disciplines related to sustainability. A values orientation helps a society have a basis from which to make decisions in the face of uncertainty and constant change.

Context for EfS

In the previous sections, I described the ways in which faculty understand sustainability, the variations of EfS in the classroom, and the pedagogical characteristics of EfS. In this section, I shift slightly to address contexts for EfS. Beginning the study, I selected different institutions in different regions assuming that institution type and region could influence EfS on campus. I also included educators from across the disciplines to consider different disciplinary roles. My findings reveal that while institutions and regions play a role in EfS, disciplines help provide greater context and specificity to the complex concept of sustainability. In addition, many instructor-related contexts fueled individuals' involvement in EfS – from personal experiences to educational experiences.

Campus-Related Contexts

Perhaps the most obvious contexts for EfS in the classroom are the regions, institutions, and disciplines within which the courses occur. I consider the role of each of these as contexts for EfS at the institutions in my study.

Institutional and regional contexts. On a university level, institutional mission had somewhat of a role in informing the content of EfS. Ultimately, each institution I selected for study had some form of commitment to sustainability, and educators were often supported symbolically, though rarely formally (e.g., in promotion and tenure procedures), in their EfS work. Thus, institutions I observed were primed to serve as supportive contexts for EfS. Educators (e.g., Jennifer, Craig) noted that theology played an important role in contextualizing courses at RU, while at other institutions, a faith perspective, while occasionally incorporated (e.g., in Nikki's and Graham's course), played a minor role. At LAC, educators (e.g., Jeremy, Nikki) were proud that students were exposed not only to scientific aspects of the environment but also a rigorous humanities curriculum, which incorporated study of human-environment relationships. At ESU, the land grant nature of the institution meant EfS courses were available in areas that did not exist at many institutions, for example, in agriculture. At both RU and LAC, faculty gathered often outside of class to discuss issues related to sustainability – in a reading group or in colloquia – and those relationships seemed to continue inside the classroom where educators on occasion co-taught courses.

On a regional level, the surrounding geographic and cultural region at times came into the classroom. A nearby farmer talked about farming practices at play in the region near RU, and Cecilia highlighted growing interest in both the health of a local water way and the farming of local food. At the same time, Cecilia noted that the institution as a whole was not particularly active. She joked as she noted, “It tends not to be the most active place in the world – there's a reason why political candidates aren't too interested in [this state]. It's a very predictable sort of place.” Region did not provide a strong

context or motivation for EfS at RU. In contrast, ESU named university programs after local waterways and discussed publicly the university's impact on those waterways. The region often became a topic of study in courses. At LAC, educators (e.g., Leah, Jeremy) described students often focusing on regional issues for projects, and in one course I observed (with Julian), a student talked with impressive exactness and authority on costs associated with pipelines in the region.

From simple observations around campus, I saw that different symbols on campus showed perhaps varying levels of commitment to "sustainability in practice." At RU, small recycling bowls existed on top of larger trash cans while at ESU, one trash collection area might have one bin for trash and three equally sized bins for various recycling containers. Yet at RU, a note in a classroom informed educators how to ensure most sustainable use of rooms (with attention to use of electronics and lights). LAC boasts on its campus map its efforts for sustainability and features local food in various locations on campus.

Thus, the institution and region provide contexts for EfS. University mission influenced content highlighted in EfS, and region influenced projects students considered for study. Institutional or regional context helped provide case studies, tangible connections to lessons in class, and micro-narratives, but they did not ultimately reshape the way in which educators defined sustainability or the ways in which they taught. Sustainability and EfS in the classroom seemed to transcend institution and region. Macro-narratives of sustainability remained similar at each institution, and almost every institution found some way to connect similar versions of EfS to part of their mission. If I included more variety in institutions for comparison (e.g., community colleges, Tribal

colleges, or other institutions), or perhaps institutions in other countries, I would likely see differences in contextual rootedness of EfS.

Disciplines and contextually-situated meanings. Disciplines provided an important contextual approach to EfS. On a disciplinary level, the nature of knowledge, research and/or teaching task of the instructor, and learning task of the student affected EfS. In economics courses, students learned how to measure values, costs, and declining yields. They learned economic theories that guide or could guide principles individuals, industries, and governments use in practice. In humanities courses, students were exposed to foundational texts. At times, students were exposed to cultural criticism and theories designed to challenge their perceptions of reality. In disciplines like engineering and architecture, students started with basic content that they then implemented in practice through design; these departments were more likely to offer synthesizing courses. In other words, the discipline within which EfS occurred helped shape the learning frame of EfS. Disciplines rooted in theoretical learning typically incorporated theoretical EfS class frames, and disciplines rooted in practical learning typically incorporated practical class frames. In addition, the discipline often played an important role for the micro-narrative for sustainability in the class. For example, sustainability was mostly discussed in relation to waste, consumption, and use of natural resources for common household goods in an American Studies course on the culture of consumption. However, in environmental science courses, sustainability was mostly discussed in relationship to systems, processes, and patterns at play in the environment and the way in which humanity is integrated or detached from each of those.

Consider Aiden's course. From an outsider perspective, it seemed as if sustainability was a key element in the course. The course qualifies within the university's sustainability minor, and the main theme of the class concerned ways in which science and economics inform policy decisions about restoring waterways. Yet, Aiden carefully pointed out that his class covered the term "sustainability" only once or twice (by coincidence I observed one of these classes) and in those times, the term held specific meaning:

I discuss sustainability in a very specific context and being trained as an . . . economist, sustainability and the concepts I was talking about have been around 30-40 years. Concepts of maximum sustainable yield or sustainable fishing and so on. And so you can walk out with the impression that, for example with the lecture from the class, "Oh this guy's talking about sustainability all the time." [But] I was talking about a specific definition that wasn't in the political context. And again . . . the only way [sustainability] really comes in is providing the context for why we're doing all this. I don't view this as a course about, the sort of high level discussion about sustainability.

Aiden continued with his description, explaining that the "high-level discussion" he referenced is theoretical and entails broad definitions of sustainability. In his course, sustainability is a measurable term concerning the self-sustaining reproduction of – in the specific example from class – fish. This measurable concept then helps economists inform policies about fishing limitations. Thus, while the entire class might be related to macro concepts of sustainability as I have described in this study, Aiden understood sustainability in a very specific, disciplinarily-based way. The term is situated in his course in the context of the discipline of economics.

On the other hand, Leah described the role of her disciplinary lens in history. Leah described the way in which the use of the term sustainability varies by one's

generational connections to the term. She described the reasons she tended to use “environmentalism” more than “sustainability:”

I was educated, you know, in the 80s and 90s before the term [sustainability] emerged as a sort of central tenet. So I don’t tend to use it. I find students use it and have substituted it for their label for an ideal state, which used to be called living in harmony with nature. . . . it’s so clearly historical, it so clearly emerges into the discourse after ’87 as a new way to portray environmentalism in a way that is de-politicized from a context of ’70s environmentalism and is very clearly post Cold War. And linked to the end of the Cold War. And had very clear meanings . . . This meaning changes very clearly after the fall of the Berlin Wall . . . I would also say the term “environmental” is profoundly historical. It doesn’t exist in popular discourse until ’69. . .

Leah suggested that one’s cultural and temporal relationship with the concept of sustainability may change one’s use of or understanding of the word, and her historical viewpoint required that she put the term in its historical place and consider it in light of other, similar terms. Much like Aiden described, sustainability is not a term that frequently emerges in Leah’s vernacular, but her course may be seen as relating to sustainability as she teaches environmental history and calls students’ attention to the ways in which humanity has shaped, defined, destructed, and attempted to care for the environment. But for her, the term is known specifically through its historical socio-political development

Zoe suggested yet another contextual use of the term sustainability, which relates to Norton’s (2005) definition of the term. In the field of anthropology, she studies and works in “communities.” She shared that “sustainability is to live on this planet in a way such that all living beings, not just people, have the opportunity to have some sort of quality of life, whatever that might be, however they might define it.” While Aiden placed the term in economic terms and Leah highlighted its placement in a history of global events, Zoe suggested that sustainability related to a local, community context.

Sustainability for her entailed a quality of life; yet, she suggested that definitions of “quality of life” might differ. Communities can determine for themselves what quality of life requires. Such a view relates to Zoe’s disciplinary research where she lives and works alongside communities around the globe. She sees “People coming together in small groups to do things that they couldn’t necessarily do on their own.” Particularly in anthropology then, educators are in tune with the fact that sustainability may have local, place-based contexts or meanings depending on the communal definitions of the values sustainability upholds.

Aiden, Leah, and Zoe all showed in different ways that sustainability exists both as a broad, expansive concept, one that includes the macro-narratives I describe, but also as a term that has contextually-situated meanings rooted in disciplinary understandings. The term can take different forms when placed in a particular disciplinary context. These contexts help educators to hone their use of the concept in the classroom.

The physical classroom. One last campus-based context I highlight is the physical classroom itself. While I talked with few people about the classroom as a space, I could not ignore notes from the first page of my field notes from almost every class I visited. A rudimentary diagram marked traditional people and objects in the classroom – a board, an instructor, students, tables or desks, clocks, religious symbolism, an honor code statement, or technology. Classrooms typically had four walls and one to four doors. At times, a classroom had no windows, at times windows lined two full walls. Most classrooms followed two models of orientation between instructor and students. In one, the instructor was alongside students in a circle or around a table, though usually at the symbolic front of the room. In another, the instructor was at the front of the room with

students facing her as she lectured; although students might move chairs of themselves for small-group discussion, the basic orientation of the class was toward the instructor. Many slight variations existed, but most came back to those two models.

One exception was the architecture studio. While a studio space is unlike a traditional lecture hall or seminar room, it is common in the discipline of architecture. Students each had their own, individual desks marked by their own aesthetic appeal and personality, which filled a large room. Educators walked throughout the room as students worked on their projects. I did not observe a laboratory class, but I would expect such classrooms to be unique in design as well.

While questions about physical spaces were not part of my study, I briefly consider these physical designs of class spaces both because of their consistent presence in my field notes and because of the way they can serve as contexts for learning. In each of these classrooms, space was used in traditional ways. At times, educators, such as Nikki and Maddie, asked students to go into the community or the environment to moving learning outside of classroom spaces. Yet, the classroom space existed primarily to facilitate an exchange of ideas shared among a group of individuals. The space did not directly facilitate the inclusion of the environment. Laura noted that a classroom centered on human interaction rather than human-environment interaction was likely typical, although it was different from her unique high school experience:

I was so spoiled in high school having such ... like my teachers were . . . so in touch with nature, and there, [learning] was so much more, I don't want to say spiritual, but the way that they taught it was never really from a textbook, it was always outside experience, and I think that's a huge part of learning that is completely absent from college courses, because that's really where I ... the things that I learned in the classroom never impacted me until I lived them outside. Like we used to have to go on solitary night walks, they would call them. We were in [the valley] in three feet of snow, and we were there for four days.

We were hiking every day. And at night . . . [the teachers] would find a trail and . . . they would send us off one at a time with like 10 minutes in between each other, and we had to just walk it, and just listen, and pay attention. And that simple of an experience made all of the difference.

Laura noted when “you’re in a concrete building, you don’t connect it to what they’re really talking about.” In some ways, therefore, while EfS continually directs students to see relationships between humanity and the environment, the physical classroom space traditionally shifts the environment to the background.

Instructor-Related Contexts

Campus-related contexts were not the only contexts for EfS. Most educators’ involvement in EfS was rooted in a context outside of the institution in which they were teaching. Some contexts were personal in nature, some work-related, and some rooted in prior educational experience.

Personal experiences. A number of educators described the ways in which their values from family or from home influenced their desire to carry out EfS. Zoe described growing up on an organic farm, tended by her working parents. Katie, a doctoral student teaching in a special education program where she incorporated sustainability into teacher training courses, noted her ethnic identity that informed her values:

I’m half Japanese. And I’ve lived in Japan pretty much every summer since growing up . . . Their way of living is very different in terms of conserving resources, using resources. They don’t consume as much on an individual basis. Like they don’t eat as much food. Watching how resources were used was kind of always something that I would transfer over here [to the United States]. You actually knew exactly what happened to your garbage because you had to sort your garbage and bring it to a neighborhood drop off point as opposed to having it just picked up and throwing it in a really huge bin and then not sorting it. We were required to sort it partially because it was sorted between burnable and not burnable because they don’t have space for it. But this idea that you have a finite amount of space and you have to use it in a certain way and be very efficient about how you use it definitely sparked my interest as well as the Japanese have a very unique connection to nature. They revere nature and gardens and esthetic,

natural esthetic is very valued. And I think that contributed to my interest.

Time spent in Japan and a culture of care for nature provided a context for Katie's work in EfS. Her ethnic identity and its accompanying cultural values provided a sense of connection with concepts of sustainability.

Marie described that her interest in issues in sustainability has "always been" in place. She mentioned taking recycling to a center before curbside pickup began. But she also talked about working in the summers at a wildlife refuge with Young Conservation Corps. She said, "part of what we did is we had to go to boat landings and pick up trash. So maybe that's where it started. Just picking up trash and seeing [the condition of the environment]." She already had an interest in the sciences and her experiences growing up and in her first few jobs provided a link to her desire to incorporate EfS into science courses.

Some educators shared that their work and interests before or outside of their roles of educators influenced their interest in EfS. Maddie described working at a non-profit farm, helping develop curricula for local teachers based on principles used at the farm. She then joined a local non-profit designed to help with sustainable solutions so she "could do the work [she] was doing at the farm in [her] community." These experiences carried into her teaching as she guided students in projects for nearby schools. Adrianna, similarly had experiences before teaching that influenced her desire to work toward EfS. She shared:

In the 90s, I worked for a small organization that did environmental justice tours of [the area]. Educational tours mostly for . . . public high-school students, so I have a background in environmental education and in environmental issues from my work with high-school students and also I trained teachers in how to take environmental justice concepts and adapt them to their curriculum through service learning. So I brought that experience with me when I started [teaching at ESU].

Her interest in EfS began with earlier work experience related to teaching high-school students about connections of social justice and the environment.

Some individuals discussed other personal experiences outside of experiences growing up or time at work. Cecilia discussed buying local produce and getting to know local farms in the region:

Over the years here, we've lived here long now, I've made friends who are local farmers, and I get a lot of food from local farmers. And you know, I've kind of by observing them, I could kind of you know I really see what Wendell Berry is talking about, you know, it's not just theoretical any more. You really understand how hard it is to get products to market and what they do with all this.

Her personal experiences meld with her classroom experiences as she practices the kind of relationship building the lessons of Sabbath and care of creation she teaches. Joelle, a doctoral student in literature, discussed a number of reasons she worked toward EfS in her literature course; yet, one of the reasons related to her desire to understand links between environmental degradation and cancer:

I also had a friend, I think you were in class that I maybe mentioned this. I had a friend who passed away when she was [young] of cancer, and that experience, that personal experience just really hit me hard. And thinking about why that happened, and what potential influences that could have been in[her] environment, and that launched a project that I did when I got here about the breast cancer movement and the debates about the environmental causes of breast cancer.

While Joelle's interest in the environment started before her friend's passing, the loss of a friend only fueled more her interest in understanding connections between the environment and health and leading students in doing the same.

Pre-doctoral education. Joelle shared that the loss of her friend was only one connection to her EfS work. When searching for college papers to share with a friend, she was surprised when she "realized [she] was writing about these same ideas [of the

environment] when [she] was in college.” She had not before pinpointed her interest in human-environment connections because she did not identify as a stereotypical

“environmentalist.” She noted:

I would not have considered, I still wouldn't necessarily consider myself an environmentalist in any way. I'm not the protesting type, but I do love to be outside, I don't go camping though. So I'm on the typical profile, and yet I find myself thinking about place a lot and the connection to region and home and even in my study of education because I originally studied to be an elementary school teacher, I was very much interested in the classroom as a location and cultivating a classroom environment, so there's all these concerns I realized were building this other thing I've been drawn to and have been over time, even though they're not explicitly necessarily environmental.

Her interests in college were clear in her writing, she realized later, and they only continued in unique ways into her graduate projects.

Joelle continued that she had a clear moment when she realized her interest in issues related to the environment.

The moment I can pinpoint as a moment of recognition, active recognition, was when I was studying for my master's degree . . . And I took a course called eco criticism which was about a school of literary thought that's interested in the way places are represented in literature, so usually in novels and poetry. And that course, for that course I wrote a final paper on John McFee's essay, The Atchafalaya, which is about the Mississippi River Delta, which is a piece of literary non-fiction, and I just thought he was brilliant, and I loved this essay . . . And I went to the Mississippi River Delta and did work down there after Hurricane Katrina. And I studied the Hurricane discourse, and I looked at the history of how we talk about the Mississippi River Delta as a troubled place. So that project was fun and it was interesting, and it was when my first real immersion in the field of eco criticism and looking at environmental language, and I realized when I got here I wasn't sure which way to go but I realized of course this is what I wanted to study.

While her interests were already in place, Joelle did not recognize them until a Master's level class drew them out for her. Her educational experiences helped guide her interest in issues related to sustainability, which informed then her own involvement in EfS as an instructor.

Other educators shared educational experiences that provided contexts for their work for EfS as well. Leah, a historian, noted her path was “pretty standard.” She took courses in college that solidified her interests, pursued a Master’s program, and then completed her doctorate in history with one of her subfields being environmental history. Graham, a scientist, highlighted attending a liberal arts college and studying both chemistry and environmental studies. He shared that his desire to study both science and the environment broadly was apparent in college: “That was in the early 1970s, and you know I had courses in landscape design and environmental economics, law, ecology. Things like that. I had this dual interest.”

Jo shared her memories of course in college in apparel design and the ways in which she approached the courses differently than fellow students:

I was an undergraduate major in apparel design, and this was in the late 60s and very, very early 70s. There was a time when in a lot of my friends in apparel designs were still wanting to be the next Betsey Johnson or they were wanting to go to 7th Avenue and make a big splash there. I’d be sitting there how to figure out on an index card what is the smallest wardrobe you can have and still be able to express yourself and have fun clothes and all this sort of thing. So I’ve always been fascinated with the idea of minimalist living, and I am really interested in making things myself, doing things myself, and the whole do-it-yourself culture in America, even though it’s never been my primary research area.

She noted that her approach to her college major was one early example of her interest in sustainability. She also reflected how that interest had carried into her teaching, incorporating ideas of sustainability into her classes. She noted that her courses attracted the same diversity of student interest that she experienced among peers in college, and she described her attempt to understand both “fashionistas” and “eco hard liners” and help each come to understand through the class that “sustainable consumption is what the

unintended consequences of your consumption are that specifically relate to either the environment or social equality.”

Doctoral training. A few educators specifically addressed their doctoral programs. Zoe shared that she had an interest in ecological anthropology and “there were only 3 or 4 in the country.” Her options were limited because few were studying the environmental relationships she hoped to examine. Myra’s experience was similar as a chemist interested in studying the environment. She discussed her how an undergraduate research experience influenced the kind of doctoral program she wanted:

I found out that all the chemists and the engineers, none of them knew anything about the subsurface. So I was like, “Well contaminants, we’re sending them up [above the soil to study them] but aren’t there still some in the soil? So we can get relative amounts like if there’s more, we’ll get more. But there’s still a lot down there, we’re not getting it all right?” . . . So that’s I think really what I was seeking in graduate school. Was some place where, rather than the instruments being the focus, or the chemistry being the focus, and we happen to do it somewhere near dirt. I wanted someone who understood the environment and could use the chemistry perspective, the chemistry techniques to understand.

Echoing Zoe’s comment, Myra shared there were only two graduate programs “even remotely actually environmental and actually chemistry. There were plenty that were environmental, but they were more biology end or more geology end or sort of environmental studies but not science.” Eventually, Myra found a program she described as “interdisciplinary,” and one that helped her to consider science in the full context of the environment.

Jennifer commented that her doctoral program also helped her think toward sustainability, in so far as her advisors encouraged her to consider not just her research but what her research might mean for society:

[My advisors] taught that your purpose as an academic is to be generally informative, that you need to have your area of specialization but if that’s your

only contribution to society then you have failed. But, I also was taught that the way you become broadly relevant is by building a foundation in something . . . I got tenure a couple of years ago, two or three years ago, so before I had tenure, I tended to kind of keep my head down and work in my own subject area. I was always interested in talking to the media or whatever, but you know, really emphasizing my own theory and my own space, but now that I have built that foundation to stand on, I'm more interested in broadening back out again or making that relevant in a broader context . . . My advisor always did that . . . in fact many of the people that I spent time with in graduate school that I looked up to were those kinds of people.

She noted that in the path toward tenure, maintaining a clear focus on disciplinary research was important. But after she demonstrated her skills in those areas, she felt compelled because of the lesson of her graduate advisors, to then shift into a focus of making her work “relevant” for society. Her graduate program helped inform her desire to relate her research to a broader sustainability narrative and to incorporate EfS into her teaching.

Non-traditional paths. Jennifer’s comments above related not only to the role of her graduate program but also the way in which her work shifted from traditional science research after tenure. She was one of many who described herself as working in non-traditional ways in her discipline. Jennifer shared more about her scientific-turned-interdisciplinary research interests, “I’ve sort of made my career on how do climate changes, climate change and other kinds of global change [affect] habitat loss, invasive species, affect biodiversity?” Yet, such research “was a lot of documenting not just how species were reacting, I mean revealing mechanisms that underlie those responses, doing basic biology.” Simple documentation was not satisfying for her, she continued, “It seems like you need to do something a little bit more productive.” She started to consider in her research “what things can we do to make that situation better?”

Julian shared the experience of a non-traditional path. He noted,

In some ways I'm a traditional English professor with a PhD . . . [But] it became clear early on that the space occupied by English professors is dwindling. We will die. I better learn more. This was in the late 1980s, so I started to put my nose in technology. I had some colleagues who said this not going to affect us, but I thought differently. So, I built a reputation for technology. . . I worked in the area of humanities and technology.

While his work in EfS is not necessarily a direct outgrowth of his specialization in humanities and technology, it informs his own identity as a faculty member as someone who thinks creatively and with attention to interdisciplinarity. He shared, “we need to train people who can speak across disciplines,” and his work in EfS is grounded in this non-traditional approach to disciplinary work.

While Julian believed he needed to reach outside of his discipline for career reasons, Hank was not satisfied with the research philosophy of his discipline. He believed the discipline was headed in “the wrong direction” without the “wherewithal to change course,” primarily with the kinds of research methodology scholars were using. He began working toward a specialty within psychology:

I was educated, you know, in the 80s and 90s before the term [sustainability] emerged as a sort of central tenet. So I don't tend to use it. I find students use it and have substituted it for their label for an ideal state, which used to be called living in harmony with nature. . . it's so clearly historical, it so clearly emerges into the discourse after '87 as a new way to portray environmentalism in a way that is de-politicized from a context of '70s environmentalism and is very clearly post Cold War. And linked to the end of the Cold War. And had very clear meanings . . . This meaning changes very clearly after the fall of the Berlin Wall . . . I would also say the term “environmental” is profoundly historical. It doesn't exist in popular discourse until '69. .

Hank pursued a non-traditional path in psychology both thinking of his children's future and because of his unease with traditional psychological research. He started learning and teaching more about the environment, and his courses naturally developed an EfS component.

In a final example, Neil described his role as a scholar who attempted to consider

long-term implications of his research in archaeology. He said most scholars make “connections here and there” with their research and “implications . . . in a long-term sense for the future of the globe” but that most do not do so using the “long-term perspective” he believes archaeology has to offer. He noted, “I’ve learned to walk a fine line” between his nontraditional interest in long-term implications and “traditional disciplinary issues.” His non-traditional research interests help inform examples and lessons he uses in EfS, as he guides students in considering how data from thousands of years ago might inform the ways in which they think about human-environment relationships today and in the future.

A scientist, a humanist, and two social scientists provided examples of faculty from across the disciplines who described their nontraditional paths in the disciplines. In each case, much of their nontraditional work was the very impetus for their work in EfS in the classroom. Connecting research with potential implications for society, reaching across the disciplines or into new topics to see new connections, and choosing to research differently were all elements of their nontraditional work. Each of these faculty did so carefully, with attention to tradition in their discipline.

Contexts Considered

I considered the institution and the region in which the institution is located as particular contexts, and both played minor roles in the way in which EfS was carried out in individual classrooms.² Disciplines, however, helped provide contextual meanings for sustainability and accounted for particular micro-narratives at use in each class. Personal

² It is important to note that my study did not particularly consider the creation, administration, and structure of sustainability programs, rather the nature of EfS in each classroom. If my unit of study was an entire program rather than individual classrooms and educators, data might point toward different roles of institutional and regional contexts.

experiences of educators also provided contexts for EfS in the classrooms – educators’ encounters with the environment or human environment-connections when growing up, in prior jobs, or in educational programs influenced their interest in EfS. Doctoral programs with qualities of EfS, while at times difficult to find, led some faculty to EfS, and some faculty described their EfS-related interests as nontraditional approaches to their disciplines. All of these experiences served as contexts for educators’ involvement with EfS in the classroom.

A Grounded Theory of EfS

Thus far, I have described macro-narratives of sustainability, variations of EfS in the classroom, and pedagogical characteristics of EfS. In the final section of this chapter, I bring together many of the components I have described to put forward a grounded theory of EfS. The theory has two major components: first, a path from knowledge or thought to practice in EfS; and second, a typology of EfS courses.

From Knowledge to Practice

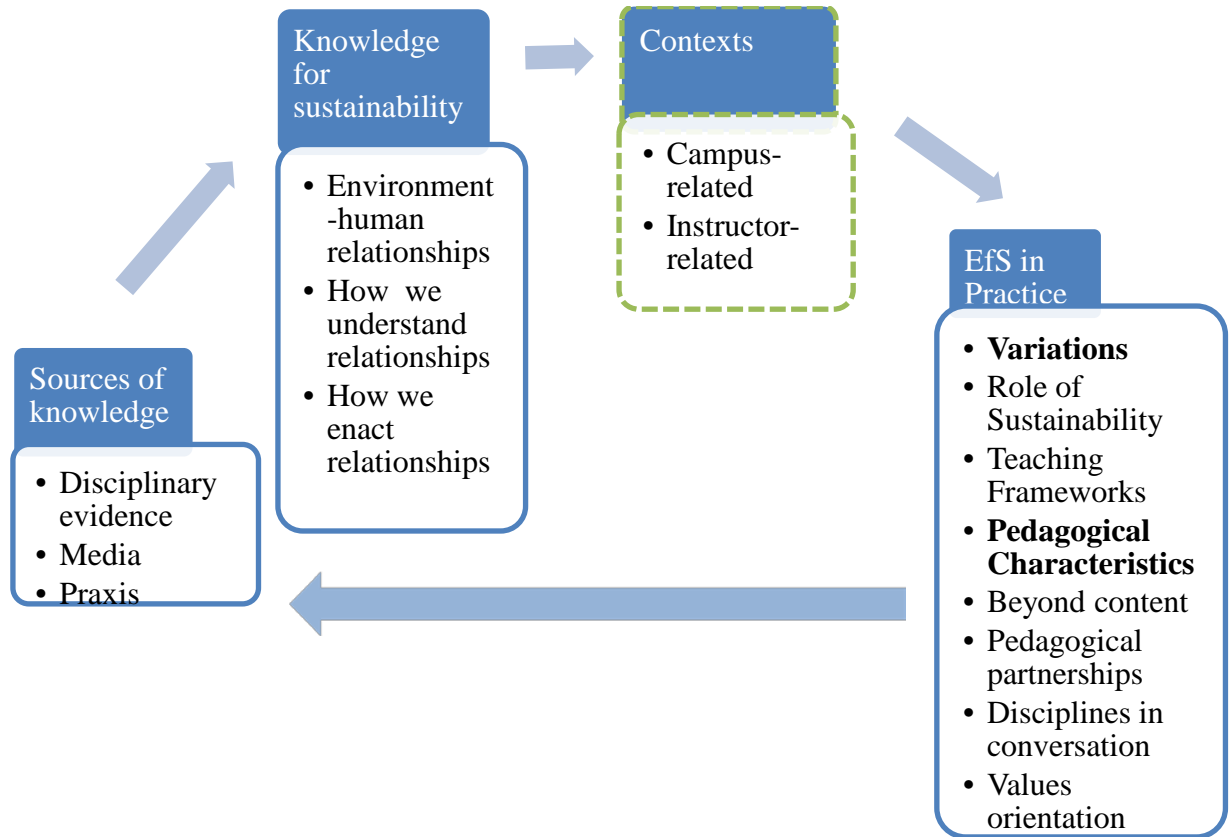
EfS courses have similarities in the pedagogical characteristics of EfS in the classroom. Central to EfS is knowledge for sustainability. In this case, knowledge for sustainability is comprised of the three overarching elements (knowledge about relationships between humanity and the environment, an understanding of how we claim to know about those relationships, and the responsibility required to enact those relationships) within the macro-narrative of sustainability as well as many specific details that make up micro-narratives of sustainability relevant to specific courses.

The three specific sources of knowledge – disciplinary evidence, media, and praxis – then serve as a foundation for knowledge for and of sustainability. Continued

learning from research, news, books, or social media, and from the practice of enacting sustainability informs continued and changing knowledge for and of sustainability.

Contexts then serve as a sort of filter (shown in *Figure 7: The Path from Knowledge to Practice in EfS Classrooms* through the permeable border) that influences EfS in practice in the classroom, which is itself a sort of praxis that re-informs knowledge. As educators teach from their knowledge base of and for sustainability, they implement similar pedagogical characteristics of EfS. First, they describe their courses as teaching principles and skills that are beyond the specific content covered in a course. In the act of teaching, they rely on pedagogical partnerships, recognizing that because the subject is complex and contextual, many people have a role in sharing and producing knowledge. Similarly, they draw upon myriad disciplines in teaching and attempt to represent in their teaching that sustainability requires the consideration of multiple points of view. Finally, they teach with a values orientation, insinuating that knowledge for sustainability requires a basic care and concern for the environment, including humanity. As teaching itself is a form of praxis, the cycle of knowledge to the practice of teaching to the return of knowledge continues as educators work toward EfS in the classroom.

Figure 7. *The Path from Knowledge to Practice in EfS Classrooms.*



Typology of Courses

The variations that exist within EfS classrooms comprise the second part of my theory, which is a typology of EfS courses. On the one hand, the work of EfS is antithetical to a typology. It begets complexity, crossing of boundaries, and uncertainty. On the other hand, institutions of higher education are continually calling for accountability and ways of clearly describing their work. Part of the impetus for this study was the lack of clarity around labeling the kinds of EfS implemented in the classroom. Therefore, I propose a typology based on the role of sustainability in the course and course frames that, on the one hand, provides room for flexibility and, on the

other hand, can help institutions delineate ways in which their courses work toward EfS. The typology is flexible, showing the role of sustainability and teaching frameworks as existing on a continuum. Courses fall along the continuum, although, generally, within the four categories delineated by the axis. *Figure 2: A Typology of EfS* provides a visual depiction of the typology, and I describe each type briefly below.

Conceptualize. One type of course involves the conceptualizing of sustainability itself. In these courses, sustainability plays a fundamental role to the course and is often the main concept under study. At the same time, the frame of the course is theoretical. While students may be learning applicable skills, the course is primarily centered on students' theoretical understanding of sustainability and topics related to sustainability. In one example, a course on the Introduction of Sustainability introduces the main themes of sustainability and cases through which students can see potential sustainability at work. Students spend a significant portion of their work for class reading to understand and writing to make sense of the topic. Students often consider different points of view and debate or discuss equally valid responses to issues related to sustainability.

Operationalize. A second type of course concerns primarily the operationalizing of sustainability. In this type of course, educators foremost teach students parameters that can help one measure sustainability. The frame of the course is practical, as educators facilitate students' ability to implement measurement techniques associated with operationalizing sustainability. While I did not observe many of these courses, one instructor incorporated a concept that related to operationalizing sustainability in his course. Another instructor described a course that he regularly teaches (that I was unable to observe) that would be considered an operationalizing course. In the former, an

economics professor showed a maximum sustainable yield curve and what such a curve would mean in relationship to fish populations in a waterway. A course devoted to learning, measuring, understanding, and implementing such a concept would be an operationalizing course. In the latter example, an architecture professor taught a course on the U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED) principles. Such principles clearly delineate ways of designing and building in a sustainable fashion and help designers and builders carry out these principles in their work. Such a course is rooted in a practical class frame with sustainability as a fundamental role to the course.

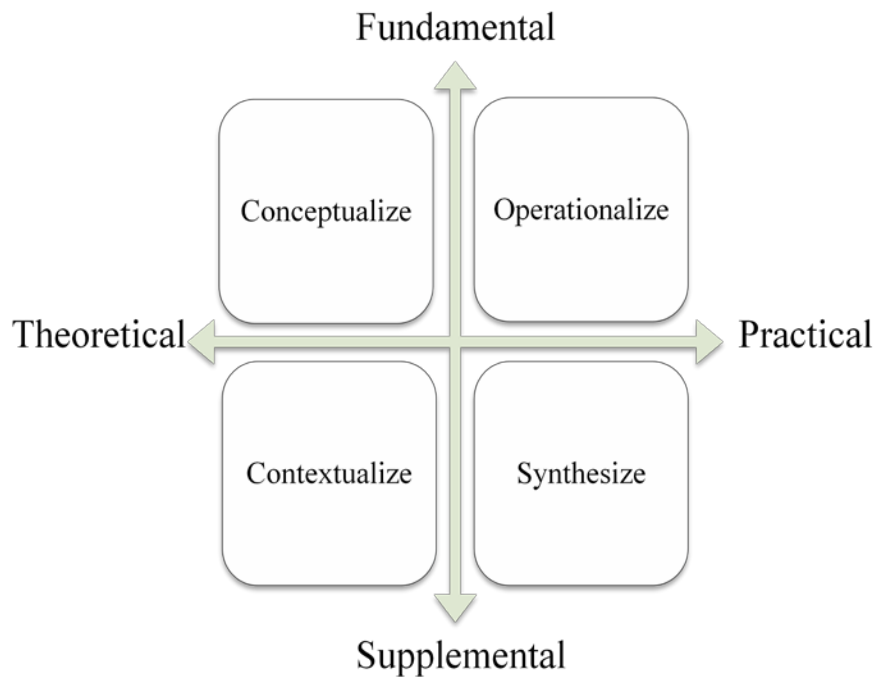
Contextualize. An additional course type requires that students contextualize sustainability in relationship to other material. In such a course, sustainability plays a supplemental role as other topics are the main focus of the course. Again, the class frame is theoretical as educators focus primarily on conceptual or epistemological learning. One example of a contextualizing course is environmental science. In this case, students learn primarily about the inner-workings of the environment, such as the hydrosphere, the atmosphere, or the lithosphere. They could encounter all of those topics without considering the relationship among humanity and the environment. Yet, in the EfS-focused environmental science courses I visited, educators incorporated ideas of sustainability to lead students in considering the ways in which humanity may alter, respect, or denigrate the environment. Sustainability was contextualized in relationship to environmental science.

Synthesize. In the last type of EfS course I describe, educators ask students to synthesize components of sustainability within their practice. In such a course,

sustainability is again supplemental as another topic is the primary topic for learning. The class frame in this case is practical, and educators teach practice-oriented skills into which they incorporate elements of sustainability. I witnessed a number of synthesizing courses. One example could be an architecture studio course. Educators have a number of design-oriented skills to teach students, of which sustainability is one, as students learn how to design in such a way as to limit waste or use natural components of the environment to enhance a building. Another example is a professional writing course whose topic centered on sustainability. While educators were primarily trained in writing and taught components of writing, they incorporated sustainability as a topic and guided students in creating technical manuals or other projects that contributed to sustainable principles.

Each type of course helped contribute to thought and practice about sustainability. Some helped students from disciplines not related to sustainability see connections among humanity and the environment. Some helped students delve deeply into thought about sustainability to either consider new ways of thinking about sustainability (e.g., Camille's reminder that cultural sustainability is often overlooked) or concrete ways to enact sustainability in their work (e.g., designing according to established principles). Both thought and practice were necessary in order to carry out EfS as students must enact their learning but also must be open to feedback and re-learning if they discover once-accepted practices are newly revealed as detrimental to societies or the environment.

Figure 2. A Typology of EfS



Summary of Findings

I described in this findings section first the macro-narratives that run across EfS courses. Sustainability across these courses represents an acceptance of the relationship between humanity and the environment, the desire to understand that relationship, and the acknowledgement that such relationship begets responsibility. The concept of sustainability in this study was seen as complex, at times contextually situated, and often a catalyst for dialogue.

In the practice of EfS, the role of sustainability varied. In some instances, sustainability was a fundamental component of the course and served as the primary topic of consideration. At other times, sustainability was a supplemental component of the course; whether incorporating a unit about sustainability or a medium through which to learn or enact sustainability, courses in which sustainability played a supplemental role had other material of primary concern.

The frame of class also varied. In some cases, courses were focused primary on theoretical understanding of sustainability. In theoretical courses, students engaged in both conceptual and epistemological learning in relationship to sustainability, through which educators invited students to consider new ways of envisioning reality or the relationship between humanity and the environment. In other cases, the course frame was practical, and educators guided students in the implemental of practice-oriented skills, such as building design or professional writing.

The role of sustainability and the course frames, then, each represent a continuum on which an EfS course may fall. Courses with fundamental role of sustainability and a theoretical frame help students conceptualize sustainability. Courses with a fundamental role of sustainability and a practical frame help students operationalize sustainability. Courses with a supplemental role of sustainability and a theoretical frame help students contextualize sustainability. Courses with a supplemental role of sustainability and a practical frame help students synthesize sustainability into their practice-oriented skills. I provide a diagram (see *Figure 2*), which visually displays the typology of four courses.

I suggest that a number of characteristics are similar across courses for EfS. Educators describe various sources of knowledge, ranging from disciplinary evidence (e.g., research) to media to praxis. The courses are also characterized by important learning of lessons beyond content, pedagogical partnerships, disciplines in conversation, and a values orientation. *Figure 7* represents each of these characteristics and shows the ways in which sources of knowledge lead to continually more informed knowledge, which, in turn, lead to characteristics of EfS in practice. In the next chapter, I consider

potential implications of these findings for institutions of higher education and provide suggestions both for implementation of EfS and for continued research.

CHAPTER 5: DISCUSSION AND IMPLICATIONS

In this study, I used a grounded theory methodology to create a theory of EfS in higher education classrooms. Data consisted of visits to 27 courses within three different institutions, and interviews with 29 instructors, 11 students, and two administrators. In large part, my findings help bring empirical definition to a practice, which is fairly new and uncharted in higher education. In chapter four, I described the ways in which instructors defined sustainability in the classroom, focusing on the macro-narrative of sustainability, which entailed consideration of the relationship among humanity and the environment, the ways in which educators come to understand such a relationship, and the responsibilities that ensue for caring for that relationship. I described the complex, often contextually situated meaning of the concept of sustainability that invites dialogue.

I then described the varying role of sustainability in courses – from fundamental to supplemental – and the ways in which instructors incorporated sustainability in their teaching. I also described the varying class frames; theoretical frames included conceptual and epistemological learning while practical frames included the learning of concrete, practice-oriented skills. In chapter four, I provided a visual representation (see *Figure #2*) of the ways in which these varying components of EfS form a typology of four courses, which: (a) conceptualize; (b) operationalize; (c) contextualize; and (d) synthesize sustainability.

I also discussed common characteristics of EfS courses. They typically incorporated teaching beyond content, included a variety of knowledge sources, engaged pedagogical partnerships, brought disciplines together in conversation, and exhibited a

values orientation. I highlighted the ways in which these characteristics came together in a path that moved from knowledge to teaching and back to knowledge (see *Figure #8*).

In this chapter, I provide discussion about the findings with attention to my research questions. I invite my theory into conversation with other existing theories and literature about EfS and teaching broadly, suggesting implications for this study for teaching and learning in higher education. Then, I spend a majority of this chapter addressing implications of my findings for educators in higher education – from instructors to student affairs educators. Alongside these implications, I provide suggestions for future research. Because this study purports a theory that touts the importance of both theory and practice, in appendices I include worksheets based on my theory that institutions could use in their practice of EfS.

Theory of EfS and Existing Theories

In chapter two, I drew on specific EfS learning outcomes and general theories of teaching, which served as sensitizing concepts for the study. In this section I consider my findings in relationship to those theories, and I add discussion about sustainability learning outcomes and taxonomies that relate to my study.

Theories of Teaching

EfS instructors enacted many of the teaching theories I addressed in chapter two. Consider the findings suggesting that EfS instructors typically invited pedagogical partnerships, drew from many disciplines, and incorporated a values orientation. In her Learning Partnerships Model, Baxter Magolda (2004b) described assumptions and principles that guide teaching when instructors are teaching such that students work toward self-authorship. Two of her assumptions – “knowledge is complex and socially

constructed” and “knowledge is mutually constructed via the sharing of expertise and authority” (p. xix) -- feature prominently in EfS teaching. As I described, faculty saw the concept of sustainability itself as complex and socially constructed. Even when they found traditional topics they taught, for example the Gibbs Free Energy equation or the nitrogen cycle, as static or unchanging, they saw knowledge of and for sustainability as dynamic and complicated. Different disciplines constructed different micro-narratives of sustainability, and in-depth examination of concepts like “nature” revealed multiple ways of seeing relationships between humanity and the environment. In addition, instructors mutually constructed knowledge in many ways. They shared expertise with students, other instructors, community partners and farmers, among others and often engaged in praxis as continued research, media, and observation of the environment informed and re-informed their beliefs about the environment and humanity. Because sustainability as an idea intuitively suggests a person’s ethical action, rooted in a set of both personal and communal values, it conceptually relates to the idea of self-authorship. EfS seems to be a teaching philosophy that aligns well with LPM and could be one way in which instructors could incorporate the LPM into their teaching. Continued research could delve into connections between the LPM and EfS.

In addition, just as Dewey (1997) called teachers to move from behind the podium into the world, EfS instructors worked to move the concepts of their class out of “the beaker” and into the environment (in Molly’s words). Environmental scientists showed how a scientific process, like the nitrogen cycle, works in conjunction with human-environment relationships and use of fertilizers. English instructors showed how narratives of global development serve as cautionary tales to engineers seeking to design

technology that will “solve” global problems. They asked students not simply to memorize facts but to put facts to use within a values orientation. At times, EfS instructors encouraged what Dewey called “free activity” and “learning through experience” (p. 30). Camille asked students to attempt to eat locally for a week and Nikki asked students to find a place in nature where they could reflect each week following different prompts. Most courses I observed – even lecture courses – incorporated some in-class dialogue. While EfS courses often resembled a traditional classroom with a professor in the front of the room lecturing, they attempted to move beyond traditional teaching notions by inviting shared expertise and placing knowledge in relationship with the media and current events. Dewey provides a voice that suggests EfS might continue to push further the boundaries of teaching. Given the complex nature of sustainability, the need for multiple sources of knowledge, and both the theoretical and practical aspects of the concept, EfS is primed for new, creative ways of teaching.

Freire (2003) called for a problem-posing education in which educators invite students to consider problems alongside each other. He also invited educators into considering liberation as “praxis: the action and reflection of men and women upon their world in order to transform it” (p. 79). While EfS occurred in a different context from which Freire was writing, his call echoes within educators’ efforts for EfS. As I described in chapter one, sustainability as a concept comes out of the realization that the world is facing serious, urgent problems – those that are difficult to understand and in which humanity is at once culpable and at risk. As instructors invited students into discussion on those issues, they invited pedagogical partnerships and showed complexities at play in the concept. Students frequently entered into classroom

conversations as participants exploring the problem alongside instructors. Faculty also engaged in what I called praxis; while it is perhaps not exactly Freire's conception of liberation as praxis, it carries similar features. As students and instructors learned in the classroom together, they sought to teach, learn, and re-learn ways to liberate humanity and the environment from destructive relationships, systemically rooted in place. In its ideal form, then, EfS carries out an extension of problem-posing education even if happening in traditional classroom spaces.

In general, I found that instructors were working to break some boundaries – boundaries Baxter Magolda (2004a,b), Dewey (1997), and Freire (2003) urged educators to cross -- within traditional disciplinary and classroom boundaries because EfS required it. In my introduction, I explained my use of the term EfS, suggesting that I would likely not yet see sustainable education. As I reviewed observational notes and considered the ways in which faculty moved with caution into nontraditional practices, I wondered what new ways of teaching sustainable education would require. What boundaries would be crossed? What would a classroom space entail such that it encouraged such boundary crossing? Educators can answer these questions with theoretical attention to sustainability as a concept, teaching theories, such as those I addressed, and practical attention to the design of classrooms as contextual spaces for EfS.

Orr's (2004) Suggestions for Rethinking Education

I also frequently called upon writings of David Orr in introducing this study. Known for his commentary on the need to consider the environment throughout higher education, Orr (2004) addressed in a famous essay myths of education and suggested six principles as guides for higher education. I consider my findings in light of Orr's principles. In one

principle, Orr noted that “knowledge carries with it the responsibility to see that it is well used in the world” (p. 13). His principle is rooted in my finding that instructors believed a part of the macro-narrative of sustainability was the responsibility that ensued when one believed there was a cyclical relationship between the environment and humanity. Orr’s principles took the idea of responsibility and combined with it a sense of praxis, which faculty noted as important. One must not only use knowledge but also see that it is well used; that is, one must be attentive to feedback and relearn if knowledge results in unexpected negative outcomes. He added in a related principle, “we cannot say we know something until we understand the effects of this knowledge on real people and their communities” (p. 13). Knowledge is not truly knowledge, therefore, until we understand its practical social implications.

Because content knowledge is not the only way of learning, Orr argued that we need “(a) faculty and administrators who provide role models of integrity, care, and thoughtfulness and (b) institutions capable of embodying ideals wholly and completely in all of their operations” (p. 14). Although my study did not particularly feature the ways teachers modeled behavior even in a traditional classroom, this particular study suggested that a number of faculty are working to model the kinds of values Orr suggests but that doing so is often difficult. Institutional barriers exist to EfS because of the way in which faculty are rewarded (e.g., involvement in EfS does not usually contribute to one’s tenure dossier). I did not explicitly examine in this study the ways in which institutions “wholly and completely” pursue sustainability; continued research could examine the ways in which institutional efforts influence EfS or vice versa.

The last principle I address is that “the way in which learning occurs is as important as the content of particular courses” (p. 14). In particular, Orr noted that the built environment (i.e., buildings and other human-made environments or infrastructures) influences learning, and in general, he reminded readers that students learn “beyond the overt content of courses” (p. 14). Orr’s comment relates to my brief reflection on the design of each classroom and begs the question of what kinds of environments and spaces best foster or hinder EfS? This principle also serves as a reminder that education occurs not only in the classroom. Therefore, later in this section, I will address potential implications of my findings for student affairs professionals, educators who work largely outside of the classroom. Before I turn directly to implications, however, I return to the concept of learning outcomes for sustainability to consider them in light of my findings.

Learning Outcomes

A number of learning outcomes have been published for sustainability. My findings do not directly address learning outcomes, but my study relates to learning outcomes as it addresses the kinds of teaching frameworks that relate to what students learn. Rowe and Johnston (2013) reviewed many different learning outcomes for sustainability, and I addressed these in chapter two. In seeing the ways in which findings revealed a typology of EfS, I noted that more so than focusing on specific content learning, faculty focused on the ways in which students would use knowledge in sustainable ways and use critical thinking to solve problems to solutions that are not easy. As I noted, faculty frequently suggested that potential content for the course was so vast that they had to narrow the topics in order to ensure the kinds of learning in which they

were most interested. As I noted in chapter 5, Anthony commented that he did not tell his architectural students simply to use solar energy because students needed to be able to assess a building's location and context, the lifecycle of products used in solar energy, and other factors. He hoped to give them the tools to then move beyond the issues addressed in class. Many instructors shared similar comments.

The kinds of learning outcomes the instructors, like Anthony, addressed can be found in examples in Rowe and Johnston's article. Two outcomes they highlight from ACPA (2008) include

- Each student will learn how to apply concepts of sustainability to their campus and community by engaging in the challenges and solutions of sustainability on their campus.
- Each student will learn how to apply concepts of sustainability globally by engaging in the challenges and the solutions of sustainability in a world context. (p. 12)

The notion of applying concepts to communities and problems outside the classroom was important for most instructors I interviewed. The learning incorporated in these outcomes relates to the kind of learning educators addressed when describing their desire to teach beyond content. They wanted students not simply to remember facts or information but to realize how to use information in complicated, real-world scenarios. They engaged in teaching, in part, so that students would learn to think and act with local communities and the globe in mind.

Learning Taxonomies

While instructors shared some of their learning outcomes, during interviews we rarely directly discussed learning taxonomies at play in the classroom. Yet, the typology I propose, particularly the different teaching frameworks, seems related to ideas that Bloom (1984) and others (e.g., Anderson & Krathwohl, 2001) have addressed. I did not

address learning taxonomies in my literature review because I did not initially consider my study as related to learning taxonomies; however, my findings revealed connections to this body of literature, which I explore in this section. Bloom's taxonomy of "educational goals" helps give structure to what faculty addressed wanting to do in EfS classrooms. He highlighted that knowledge might fall in three main areas – cognitive, affective, and psychomotor. Anderson and Krathwohl published an updated taxonomy to incorporate new knowledge. They delineated that cognitive knowledge includes factual knowledge (knowledge of facts and terms), conceptual knowledge (ability to connect ideas and theories), procedural knowledge (how-to knowledge), and metacognitive knowledge (knowledge of one's own cognition). In the theoretical teaching framework from my study, I grouped together each of these kinds of knowledge to describe a teaching framework mostly focused on cognition. In education in the United States, such a framework is not surprising. I delineated within a theoretical frame that students could encounter both conceptual learning, related to conceptual knowledge, and epistemological learning, related to metacognitive learning. At the same time, some EfS students learn particular hands-on skills and processes that rely on both procedural and cognitive knowledge and what Bloom called psychomotor domains of knowledge, a domain he noted was rarely called upon in educational settings. Knowledge rooted in such hands-on aspects of building and designing I described as grounded in a practical framework. Such a practical framework also informs activities I did not witness in my study though they occur in some EfS settings, such as working navigational, laboratory, and other equipment or assessing various health factors of a setting's flora or fauna. I witnessed fewer practically oriented courses in this study than theoretically oriented,

which could be a sampling problem or it could be representative of the kinds of EfS courses being offered. Continued study could reveal the broad spectrum of classes within postsecondary institutions. At the same time, very few courses or instructors (Cecilia and Nikki would be exceptions) discussed a kind of perceptual knowledge, rooted less in rational thought and more in sensory-based attention to one's environment; arguably this kind of knowledge could enhance rational consideration of human-environmental relationships. Bloom's taxonomy also provides little space for considering perceptual knowledge.

Anderson and Krathwohl (2001) suggested that Bloom's (1984) original three-part educational objectives – cognitive, affective, and psychomotor -- were criticized because of potential overlap. Particularly, educators noted that “nearly every cognitive objective has an affective component” (p. 258). Bloom originally wrote that the affective component concerned “changes in interest, attitudes, and values, and the development of appreciations . . .” (p. 7). Similarly, I found that attention to values was not separated into particular kinds of classes or divided into particular lessons. Instead, most classes were rooted in a values orientation that was often implied because of the macro-narrative of sustainability embedded into courses; that is, because the macro-narrative included a component about humanity's responsibility to the environment and humanity alike, most courses included lessons – whether overt or subtle – about what those responsibilities might be.

While Bloom (1984) and Anderson and Krathwohl (2001) considered taxonomies in education in general, Frisk and Larson (2011) suggested that there are four types of knowledge domains particularly in EfS: (a) “ecological or declarative knowledge

typically addresses how environmental systems operate in technical, mechanical, or biophysical terms” (p. 4); (b) “procedural knowledge... refers to basic how-to information such as how to sort garbage into recyclables and non-recyclables for proper disposal” (p. 4); (c) “effectiveness ... knowledge addresses the outcomes of different behaviors” (p. 4); and (d) “social knowledge encompasses information regarding the motives and intentions of other people” (pp. 4-5). These types of knowledge do not directly map onto the macro-narrative of sustainability and teaching frames I have identified, although there are relationships. Declarative knowledge relates to understanding the basic relationship between humanity and the environment, and likely occurs in all teaching frameworks. Procedural knowledge relates to the need to carry out one’s relationship to human-environment relationships and occurs most frequently in practical teaching frameworks. Effectiveness knowledge relates to the role of praxis and the manner in which individuals choose to engage in praxis. Social knowledge concerns social norms and can relate to the first two components of macro-narratives (knowledge of human-environment relationships and how we come to understand those relationships) as students learn both human-environment relationships and how societies have come to understand such relationships as true. My findings, like those of Frisk and Larson, suggest that multiple kinds of knowledge co-exist. What Frisk and Larson reinforce is that different types of knowledge are necessary and result in different levels of behavior change. Simple content learning will not necessarily result in changed behavior.

What Theories Suggest for Higher Education

In this section, I have considered my own theory in light of other related theories on teaching, learning, knowledge, and EfS. I have chosen to do so not only to consider

my theory in light of existing research but also to highlight some areas in which this study speaks to teaching, learning, and knowledge in general. In a broad sense, this study is about teaching and learning, specifically about those who are seeking new, creative, boundary-breaking ways to facilitate students' ability and interest in thinking about and addressing global problems. The disparate theories I call upon have suggested that education requires more than factual learning, that the environment might be better integrated into educational practice, and that many ways of knowing exist. My theory pulls from each of these seemingly distinct areas of educational theory and shows the ways they might work together for an enhanced approach to teaching and learning. It suggests that in EfS classrooms, educators recognize the importance of classroom interaction and shared learning, of considering environmental and societal relationship, of honoring the idea that current knowledge might be limited if not incorrect, that many ways of knowing must feed into a holistic knowledge best equipped to address issues of sustainability, and that values are bound to knowledge. These lessons from EfS classrooms speak to the whole of higher education. They show that for deep learning and consideration of global problems, education may require teachers who engage in pedagogical relationships (and humility alongside), an openness to sharing the values that accompany knowledge, self awareness about their stances toward truth, and an ongoing search for multiple forms of knowledge that can continually inform and re-inform learning. In many cases, such an education works against the traditional tide of postsecondary teaching and learning, particularly in an age when educational success is assessed by graduation and employment rates. While both are important facets of an education, they grasp only at the utilitarian role of an education, making it a means to an

end rather than a means to a purpose. The theories I pull together in this section help demonstrate that an education rooted in purpose and in preparing students for addressing global issues invites postsecondary institutions into new practices focused on the quality of teaching and the recognition of a diversity of knowledge and knowers.

Implications In and Outside the Classroom

In simplified answers to my research questions (i.e., how instructors define sustainability, what they teach, and what contexts influence EfS), I have found that educators view sustainability as a complex term; they teach in ways such that sustainability varies from a fundamental to a supplemental role and within a teaching framework that varies from theoretical to practical; and both disciplines and instructors' personal experiences provide key contexts for EfS in the classroom. These broad findings have a number of implications for institutions of higher education. First, I address the issue of defining sustainability on campus. Then, I suggest ways in which campuses might use the typology from my study. I also consider new approaches to disciplinary thinking. I conclude with some implications for student affairs educators, as those who teach but do so typically outside of traditional classrooms.

Defining Sustainability on Campus: Using the Macro-narrative

In defining the term sustainability, I highlighted that the Brundtland Commission (1987) definition is often used. The term focuses on temporal aspects of sustainability and resource use, as it is rooted largely in consideration for sustainable international development. It implies that people are largely users of resources that the environment produces, and current use could limit future use of resources. The triple bottom line of sustainability incorporates different entities – environment, economy, and equity -- whose

common health results in sustainability. Norton's (2005) definition, on the other hand, provides a schematic definition onto which different communities can map their values. None of these definitions (admittedly simplified), however, directly provides a framework for considering the interplay of humanity and the environment in relationship.

Using the ideas of participants from this study, I put forth a macro-narrative of sustainability that runs across most of the courses I studied. It concerned the idea that (a) a cyclical relationship exists between humanity and the environment (such that humans have a relationship not only directly to each other but also through the environment); (b) humanity comes to understand that relationship in various ways (e.g., through scientific study or social construction); and, (c) humanity has some responsibility to care for humanity and the environment because of that relationship. Faculty can use this definition in EfS to show students their own relationship to these three concepts. In one example, an environmental scientist might highlight the natural connections between humanity and the environment such that (a) respiration in the current condition of earth requires reciprocal relationship between plants and humanity; (b) we can come to measure that through scientific methods; and (c) we need to be cautious of the balance of gases in the atmosphere. On the other hand, a historian might highlight (a) no real separation exists between humanity and nature; (b) social construction of the environment has separated nature from humanity; and, (c) we must reframe our way of living to tend nature carefully as nature and humanity are extensions of each other. The three-part macro-narrative is a framework, therefore, on which instructors might scaffold other definitions of sustainability, concepts such as long-term thinking; systems-thinking; the interplay of economy, environment, and equity; and micro-narratives of the course,

such as the narratives I highlighted for potential environmental science and history courses.

Considering the kinds of knowledge each part of the macro-narrative lends itself to, the narrative becomes a framework that can help faculty teach in order to elicit different kinds of knowledge in a micro-narrative for each class. Reframing the components of the macro-narrative as questions provides a potential tool for EfS classrooms as they build micro-narratives: (a) What do we hold as true about the relationship of the environment and humanity? (b) How have we come to understand the relationship? (c) What does our understanding, then, call us to do or what responsibilities do we then have to the environment and humanity alike? The first two questions relate to theoretical awareness – both conceptual and epistemological awareness. The last question relates to practical awareness. While some courses focused more on one of these questions than another, most courses alluded to all of these questions and potential ways to answer them. All of these questions are informed by the ways in which EfS is enacted on campus – through lessons beyond content and pedagogical partnerships, with disciplines in conversation, with multiple sources of knowledge, and with grounding in a set of values. Almost any course, program, or institution can seek to answer those questions within a given context and begin working to incorporate EfS into their work. In the classroom, instructors might consider making those questions clear and relate parts of the syllabus and topics in class directly to the question under consideration. As a tool, I have included a worksheet as Appendix I incorporating these questions such that instructors or administrators could use them in planning for EfS. The worksheet can help

those new to EfS conceptualize their broad goals and can help those already engaged in EfS think in a structured way about their work.

Using the Typology

While the macro-narrative of sustainability can become a tool for instructors, the typology can also become a tool. Dautremont-Smith (2013) conducted a study of 160 definitions of sustainability in the curriculum for AASHE and found that even institutions using “similar definitions often seemed to interpret them differently when it came time to classify courses.” She suggested that the result then does not provide “meaningful comparisons between institutions” for those using the Sustainability Tracking, Assessment and Rating System (STARS). During data analysis of this project, AASHE (2013a) released STARS 2.0, and the new system conceptually aligns with the typology I have identified. The STARS Technical Manual (AASHE, 2013a) now incorporates an infrastructure for campuses to include “sustainability courses” (aligns with fundamental courses) or “courses that include sustainability” (aligns with supplemental courses) (p. 26). STARS could easily incorporate the typology to further identify the teaching frame of the courses, offering institutions the opportunity to document the theoretical and practical frameworks. In addition, data from the current iteration of STARS will easily align with the typology.

Each of the types of EfS is rooted in different teaching frameworks, but the other side of a teaching framework is a learning framework. And the kinds of teaching implicit in each of types of EfS I described result in different types of learning. Each of those types seems important in a holistic education. Baxter Magolda (2004b) argued that college learning outcomes should incorporate cognitive maturity, integrated identity, and

mature relationships. Phillips and Soltis (2009) and Stage, Watson, and Terrell (1999) both reviewed different learning theories, highlighting among others, behaviorist theories rooted in learned behavior change, constructivist theories rooted in social construction of learning, and multiple intelligence theories rooted in ideas that many types of intelligence exists (e.g., not simply rational knowing). In the introduction to this study, I emphasized scholars have suggested that EfS must incorporate thinking, knowing, caring, and doing. In each case, an important theme is that teaching and learning are multi-faceted. Different ways of knowing are naturally occurring and are important for holistic learning.

I highlight these learning theories because a natural question when considering a typology is “which type is best?” I argue from a theoretical standpoint rooted in the scholars and theories highlighted above that each type is important for EfS. If one was to clearly delineate what “best” might mean (e.g., clear knowledge of climate change or the participation in certain behaviors), continued research could help explicate if one type might best carry out EfS. However, given that EfS is rooted in a macro-narrative that corresponds to conceptual knowledge of an existing relationship between humanity and the environment, epistemological (my terminology) or metacognitive (Bloom’s [1984] terminology) knowledge of how that relationship is understood, and practical (my terminology) or procedural (Bloom’s terminology) knowledge about how to enact that relationship, different types of teaching and learning are needed to ground each of those elements of the macro-narrative of sustainability. Briefly, I highlight what each continuum (i.e., continua concerning the role of sustainability and the teaching framework) and each type of EfS can contribute in a holistic education.

I described in chapter four that the role of sustainability in a course can range from fundamental to supplemental. When fundamental, sustainability is a key feature of the course. When supplemental, sustainability is interwoven with other primary course topics. Both provide needed foci. Fundamental courses provide in-depth examination of a concept that we have seen needs careful consideration. At the same time, without weaving the concept of sustainability into other courses and topics, sustainability will not be incorporated and implemented in the world in ways that the very concept requires. Cortese (2003) has argued that postsecondary institutions need to incorporate sustainability more broadly in the curriculum, and in my study, Sam suggested that a current call for sustainability in the classroom might be similar to the call for attention to diversity 30 years ago. Scholars (hooks, 1994; Hurtado, Milem, Clayton-Pedersen, & Allen, 1998) have argued that universities need fundamental foci on issues of diversity because a history of injustice that has resulted in inequality. Ideally, society would reach a point when a multicultural mindset permeates every aspect of education. Similarly, sustainability would also permeate education. As I noted in chapter two, the term “sustainable education” aligns with the kind of education in which sustainability permeates every aspect; therefore, separate classes on sustainability may not be required in such an education. At this point, however, such education is an aspiration rather than reality. Thus, courses in which sustainability is fundamental provided the needed in-depth attention to sustainability while supplemental courses allow for sustainability integration.

The next continuum I highlight is the teaching framework of class, whether theoretical or practical. Again, both frameworks are important in a holistic education. Theoretical teaching frames help ground students in critical thinking, guide thorough

consideration of concepts potentially from multiple points of view, and provide tools for continued reflection on practice. Practical teaching frames ensure that students are able to tangibly carry out the last element of the macro-narratives – carrying out one’s responsibility to human-environment relationships. It can also ensure that students do not become nihilistic thinking they “can’t do anything” (Zoe) to contribute to sustainability or that they do not remain “relativistic” saying “everyone can have an opinion” (Sam). It allows for informed actions.

In turn, then, each of the types of EfS has contributions to EfS. A conceptualizing course provides deep understanding of sustainability. An operationalizing course provides a practical orientation to sustainability such that students can learn to implement lessons from conceptualizing courses. Conceptually, sustainability is connected to all we do; thus, contextualizing and synthesizing courses help to bring sustainability into other topical and disciplinary areas. Contextualizing courses interweave sustainability into conceptual grounding in diverse disciplines and topics, and synthesizing courses integrate sustainability into existing practically-oriented courses.

These types of classes can help inform categorizing of courses in EfS. The institutions I studied organized courses in some similar ways. ESU organized roughly around the triple bottom line: environment, economy, and equity. LAU organized roughly around disciplines, such as sciences, social sciences, and humanities. One might engage in the same kind of teaching and learning frameworks in each of these topic areas (e.g., all conceptual). Institutions could find it useful to think not only of the topic of the course but the role of sustainability in each course and their course frames to ensure students have a grounding in each type of learning of EfS. Institutions can use the typology in

simply indicating the teaching frames of classes or to organize courses within a curriculum. Instructors could also use the language of the typology to show other kinds of learning students can pursue and to place their courses within the typological context. In Appendix H, I provide another worksheet, which includes a blank typology institutions could use in mapping or graphing the kinds of courses offered.

The typology also can inform future research related to what students are learning in each of these types of classes. Do students learn differently in the ways that the theory implies they might? Are there other dimensions that should be included in the typology given the kinds of learning students report? This research could inform what learning may be missing. In addition, continued longitudinal research could track the ways in which different types of EfS influence students' long-term behaviors for sustainability. Does EfS ultimately inform each individual's sustainable behaviors? If so, how? If it does, how does EfS inform societal behaviors?

Another potential area of research concerns a finding that was largely missing from the data. Stage and Muller (1999) suggested that the idea of "self efficacy" is important to teaching and learning as it concerns "individuals' beliefs about their capabilities to exercise control over their own levels of function and to exert influence over events that affect their lives" (pp. 29-30). Similarly, Stern (2000) described that a component of a theory of "environmentally significant behavior" (p. 407) included one's perceived ability to act, for example, to reduce an environmental threat. While instructors often hoped students would believe in their ability to act accordingly, the outcome of self-efficacy was often seen as an indirect outgrowth of classroom learning rather than a skill learned directly in class.

Consider Zoe's comment about what she knew versus what she hoped students would learn:

One of the things I know [students] will take out [of class] is that we have a big problem sitting in front of us. One of the things I hope they take out is that they are capable of finding solutions that work . . . I want them to come out not so fearful.

Zoe knew students would have a cognitive recognition of the problems associated with sustainability. She hoped, however, that they would have the capability to address them, to refrain from fear, and to think about issues of justice. Many of her hopes were grounded in her desire for students' self- and – to consider concepts she addressed – communal efficacy. Yet, she saw such efficacy as a potential, but not certain, outcome of her teaching. Therefore, continued research might consider strategies that instructors use to ensure self- and communal efficacy about students as they leave the classroom. What kinds of teaching lead directly to self- or communal efficacy about issues of sustainability and what leads indirectly to such skills?

Approaches to Conversations between Disciplines

In my findings, I suggested that one characteristic of EfS is its involvement of many disciplines. Such a finding is not surprising given the literature (Barrlett & Chase, 2004; Blewitt & Cullingford, 2010; Rowe & Johnston, 2013) focused on the need for interdisciplinary approaches. Yet, instructors, particularly Ezra and Craig, highlighted that such interdisciplinary teaching was difficult.

One reason interdisciplinary thinking is so difficult is that expertise is allusive. Nina shared that reaching outside one's area of expertise is, at times, a risk for faculty, who are judged narrowly on their continued mastery on one topic, which their fellow experts can assess in depth. Moving outside of such a model is not rewarded in traditional

faculty settings. I must credit a student co-researcher on a related project who pointed out that rarely do students expect to hear faculty claim lack of expertise on a subject; academia is designed exactly to develop experts. Yet, faculty claimed they were not experts on sustainability over and over again in my study. In one perspective, therefore, EfS is antithetical to traditional disciplinary training as its bounds are so wide no one person could manage expertise. Another perspective, however, is that EfS provides a new opportunity – in fact a new need – for experts from across the university to work together in researching, teaching, and learning for an urgent, global problem.

While this dissertation focused primarily on in-classroom work, a number of institutional boundaries exist to the collaboration of experts, mostly concerning the ways in which faculty receive rewards toward tenure. Working collaboratively may mean less individually-authored papers, teaching collaboratively may mean less courses taught within a department, and learning a new subject may mean less articles published in the short-term as faculty develop mastery in new concepts and vocabulary. My findings show faculty moving with caution as they seek the non-traditional paths of working collaboratively or learning new subjects. Yet, they did so because they found the issues related to sustainability to be both intellectually inviting and paramount for fostering healthy human-environment relationships. The potential crisis is so big, instructors echoed, how could experts in various field not address it? Doing so, however, required both/and approaches. EfS required both scholars and teachers; both scientists studying “in the beaker” and those in the environmental context. EfS also required humanists who are “citizen scientists” (Craig) and scientists who can share scientific findings with the

general public. It required both experts and those willing to seek collaboration because of lack of expertise.

My study suggests that institutions should consider reward structures that will foster continued interdisciplinary teaching so that more faculty will pursue it and so that faculty might move with less trepidation. Attention to Boyer's (1990) now classic but still revolutionary *Scholarship Reconsidered* attends to the need for a restructuring of the ways in which higher education sees and rewards scholarship. His scholarship of discovery, integration, and application would support interdisciplinary research. In addition, his scholarship of teaching addressed directly the need for attention to teaching that supports "*transforming and extending*" knowledge (emphasis from source) (p. 24); involving multiple disciplines in the classroom is one way of acting on Boyer's scholarship of teaching. My findings provide the suggestion that faculty begin simply with conversations between or among disciplines and modeling the ways in which those with different points of view or expertise might dialogue about a text, a topic, or a principle. Cross- and inter- disciplinary conversations are an important start. Ezra and Craig modeled conversations in their classroom by providing their individual perspectives on similar texts and topics. Students could see in real time the ways in which a humanist and a scientist might read, interpret, and act upon a text or data.

That kind of conversational modeling was reminiscent of what Vygotsky (1978) promoted when studying early childhood development. His zone of proximal development defined "those functions that have not yet matured but are in the process of maturation" (p. 86) and was rooted in the principles of social learning. In this space, students with help of teachers or peers were able, in some ways, to perform beyond their

individual level of development or knowledge. When modeling conversations across the disciplines, instructors helped develop students' recognition of such skills and fostered their ability to join into such conversations. Even a single instructor can model such conversations by presenting multiple points of view of a subject, engaging with the ideas in teaching, and encouraging students to do the same in assignments.

Considering Contexts

In the literature review, I highlighted that EfS might happen on an institutional level, a programmatic level, or a classroom level. In each case, different contexts may be at play. While findings suggest cross- and interdisciplinary work is important, my findings also suggest that disciplines are an important context for EfS as are instructors' individual experiences. Because disciplines play a role in EfS and help structure different micro-narratives of EfS, institutions could benefit from being attentive to what disciplines are present or absent when considering EfS at institutional, programmatic, and classroom levels. Absence of a discipline might suggest that an institution could work toward fostering EfS in missing areas to ensure students can encounter multiple points of view requisite for engaging the concept of EfS.

In addition, instructors' personal experiences often grounded EfS. Those experiences range from summer jobs to a college class to a doctoral program. Such a finding suggests that institutions wanting to encourage EfS in the classroom might focus not simply on the curriculum or topics of teaching but also on current and future instructors. Institutions might consider both fostering personal experiences for instructors that encourage human-environment relationships, providing exposure to EfS in doctoral programs, and including attention to EfS in the hiring process.

EfS in Student Affairs

While my study was focused on learning in the classroom, teaching and learning also occurs outside the classroom in postsecondary institutions, as Orr (2004) reminded us. Student affairs educators often facilitate this outside of class teaching and learning. Therefore, I would be remiss to overlook the implications that my findings might have for those in student affairs.

Conceptual relationships to sustainability. Conceptually, sustainability is related to the issues of student development to which student affairs educators are attuned. Many educators in this study noted that complex thinking and ways of knowing are required to understand sustainability. Theorists, such as Perry (1968, 1981) and Kohlberg (1958, 1976), suggest that such complex ways of thinking usually occur later in a progression of cognitive and moral development. In other words, attention to cognitive and moral development may help foster the ways of thinking required in EfS. Studying moral development, Kohlberg identified that students' moral development existed along a type of continuum where in early development, individuals are driven to avoid punishment, and in late development, individuals are driven by global principles, such as justice. Studying cognitive development, Perry identified a development continuum where individuals move from dualistic thinking, in which problems are black and white, to relativistic thinking, in which individuals understand nuance and multiple points of view. I briefly highlight moral and cognitive development literature because these two areas are conceptually related to one's understanding of sustainability.

In my findings, I highlighted one student (Angie) who shared becoming burned out. She also noted in her interview that she became vegan in high school and was

“extreme” in her veganism. Sam also described “eco Nazis” in her class who “judged, they criticized other people based on what they brought something into class, like they brought a water bottle into class.” In each of these cases, students were demonstrating a sort of dualistic approach to sustainable behaviors – they believed in very specific right and wrong ways to behave. Yet, Angie highlighted a move in her development. She noted, “I’m not as extreme now. I function in society.” In other words, she began to realize that her dualistic thinking was keeping her from engaging with society – potentially both reaching out to those who may not be living sustainably and to seeing that those living sustainably may approach their food choices differently than she. Because sustainability is a complex term rooted in decision-making, behaving in certain ways, and values or principles, it begs that individuals develop both cognitively and morally. Individuals must wrestle with potentially competing values or principles and understand multiple points of view. Student affairs educators might consider focusing on students’ moral and cognitive development in their practice, as such developmental skills are arguably not only important for each student but also for the work of EfS. Conceptually, EfS, is rooted in ways theories of development that can inform the work of student affairs educators; and, such work can contribute to learning that occurs in the classroom.

One additional conceptual relationship between sustainability and the work of student affairs is the focus on social justice and equity. Recently, the National Association of Student Personnel Administrators (2010) listed social justice as one of the top ten areas needing further research. One question the authors asked is “how can student affairs effect institutional change regarding social justice?” (p. 6). At the same

time, the concept of sustainability brings together equity with the environment and the economy to encourage individuals to see the links among the three. In the macro-narrative of sustainability from findings in this study, the first component involves the cyclical relationship of humanity and the environment. Such a cyclical relationship in many micro-narratives reveals that environmental degradation also relates to inequity around the world (Agyeman, Bullard, & Evans, 2003; Brainard, Jones, & Purvis, 2009). Thus, in their work for social justice on campus, student affairs educators have natural inroads to EfS.

EfS typology, academic advising, and career counseling. While the professional values of student affairs broadly aligns with ideals of sustainability, academic advisors and career counselors might most directly be able to use the EfS typology from this study's findings. In academic advising, advisors (often student affairs professionals or faculty) give "insight or direction to a college student about an academic, social or personal matter" (Kuhn, 2008, p. 3), and Appleby (2008) noted that "advising is teaching" (p. 85) but that advisors often work within a "learning paradigm" in which they do not simply provide answers but help students as they work toward finding their own answers (p. 89). Often, advisors helps students select courses from a set of choices and put together a curriculum based on options within a series of requirements. The typology can be a tool in such advising settings. The typology can help an advisor foster a conversation about the kinds of courses the student has already encountered, and then the advisor could suggest different types of courses for the student to consider, putting together a holistic set of courses. On the other hand, an advisor could use the typology to

ascertain the kinds of courses the student has most enjoyed or from which a student has grown the most in order to encourage similar courses for a student to consider.

In a different form of advising, career counseling focuses on connecting a student's academic interests with a potential career. In this different setting, professionals could also use the typology to help students discuss the kinds of courses that have been most appealing. Such courses might then indicate what aspects of courses within EfS would relate well to particular jobs. For example, courses within a practical framework might direct someone to careers that lend themselves toward following concrete rules or principles to work toward a specific outcome, such as careers working with green building standards; whereas, someone most interested in courses with a theoretical frame might value careers that rely on skills of considering multiple points of view or studying topics in depth, such as determining the best ways for incorporating sustainable principles into an educational, political, or religious institution.

Sustainability in practice and in dialogue. Thinking directly about the values orientation of sustainability, student affairs educators have the opportunity to bring sustainability into practice in higher education. As much as EfS might incorporate issues like radiative forcing or the process of policy-making, it also entails a fundamentally moral education incorporating decision-making about shared resources and values. Instructors wanted students to “realize how much our choices are determining what goes on in the natural world and that we have choices” (Myra). However, Marie reminded us that it is at times hard for instructors in the classroom to “get away from content, even though we have to.” Student affairs educators have a role to play, therefore, in ensuring that co-curricular activities help students encounter opportunities to process content-

oriented information in class. Dedicated to development of students' whole selves, including "moral and ethical values" (American Council on Education, 1949, p. 3), student affairs educators are uniquely placed to foster ethical and moral learning connected with issues of sustainability.

A few examples of such practice in action are as follows. Student affairs professionals at times facilitate students' use of organizational funds. Simple questions related to sustainability could be added to paperwork students use to request funds (e.g., have you searched for local providers of this item? How will this item/event impact the environment or other communities? What are the labor practices of the companies with which you are contracting?). Students may see such questions as bothersome, but they would provide needed time for reflection on the consequences of actions and could spur students to begin asking those questions of others. Those working in arenas of social justice can highlight the ways in which sustainable thinking contributes to an overall equitable world and diverse world – encouraging, for example, campus entities to consider fair trade products or to generally refrain from purchasing items with companies known to exploit communities. Events, such as tunnel of oppression, designed to teach students about systemic injustice could incorporate components centered on issues of sustainability. For example, information displayed or described to students might show the correlation of locations of toxic waste sites with communities of color, the effects of climate change on impoverished communities, or the ways in which lower class individuals are exposed to higher rates of pollution often through their jobs (e.g., in factories or on pesticide-laden farms). Student affairs educators at any stage – from entry level to senior officer – sit on and oversee institutional committees. These are places in

which student affairs educators can identify potential for EfS outside the classroom, ask difficult questions about the institution's modeling of EfS, and incorporate the lessons of EfS in areas as diverse as hiring to program assessment. Service-learning is another specific example of work within student affairs that could lend itself to EfS as it is rooted in service "designed to meet identified community needs" while "enhancing "students' skills and understanding of course content" (Stage, Waston, Terrell, 1999, p. 104). Often entailing study before or during service and ongoing reflection upon one's action, service-learning blends both theoretical and practical frameworks in a praxis model.

Student affairs educators can also draw from participants' remarks that the concept of sustainability, in part because of its complexity, begs communities to dialogue. As Leah noted when describing the racist and classist foundations of the 1960s-based environmental movement, "when they define sustainability as equal consideration to economic profit, social equality and environmental conservation, they need to take into account that those three are usually in direct contradiction with each other." Another faculty member noted that the term sustainability, while inherently problematic, begins a "discussion" and brings people "to the table" who might not otherwise participate in dialogue. Student affairs educators, having a commitment to holistic learning and bordering both academic and administrative realms, can provide, foster, and enter into spaces for dialogue needed on campus. Student affairs educators can continue to seek out instructors whether for student or student affairs partnerships, working to break down in and out of class boundaries to help foster dialogue and praxis related to EfS. To foster dialogue among students, student affairs educators can include related questions or topics in roommate contracts and frameworks for community-developed rules. In roommate

contracts or in residential communities, students could be prompted to consider how they will use energy and electricity, limit waste, or commute to class. They can model EfS-inspired dialogue in places like an orientation skit in which students mimic a dialogue about sustainability that happens on campus (e.g., issues of veganism, consumption, or waste). Such settings can role model the values at stake and the breadth of perspectives that might be represented on campus, for example someone who grew up on a livestock farm living alongside a student who lived in the city. Because EfS has such a strong conceptual relationship with the work of student affairs, encouraging such dialogue seems a natural extension of student affairs work.

Lastly, student affairs educators are poised to model EfS in their individual and collective roles on campus. Individuals on campus who oversee many building operations, hold positional power, and interact with many students, student affairs educators each have abilities to carry out lessons of EfS in their work. On a person-by-person basis, these educators – from entry level to presidential -- might engage in a number of modeling behaviors. A hall director can foster a culture of less energy use and ensure his own practice of turning off or limiting use of lights, computers, and hot water. A student activities coordinator might seek to limit purchasing of disposable items and model the use of her reusable utensils and mug. A vice president can reward divisional work for sustainability and engage in waste reduction or consideration of all campus employees. While individual actions are important, collective efforts have the ability for a far-reaching impact. Policies, procedures, values, and standards that are discussed and shared within student affairs divisions reach across campus and have the ability to institutionalize (and operationalize) sustainability into the fabric of an institution,

modeling and teaching students through vast areas. The compost and waste options available in a dining hall, the attention to not only financial but social and environmental costs in procurement, the training of administrators to understand and act in light of the ecosystem of the institution, geographic region, and local communities, are but a few areas in which a collective divisional or departmental consideration of sustainability can help enhance EfS outside of the classroom on the large scale. Collective movements on behalf of student affairs departments or divisions might, in fact, have the most unifying effort for EfS on campus as such work would reach students across majors and disciplines, showing ways to put potential classroom learning to work in the living community that is a postsecondary institution.

Conclusion

Broadly, my study defines empirically the work of EfS and helps outline characteristics as well as variations of a practice that span the disciplines. Connections of this study to existing theories, implications of this study, and potential future research questions based on this study are many. EfS seems to share elements of ideas rooted in Baxter Magolda (2004a,b), Dewey (1997), and Freire's (2003) theories, while it does not necessarily map directly onto any of these theories as it can take different forms in different classrooms. My study also included findings that coincided with published learning outcomes for EfS and resulted in a typology reminiscent of Bloom's (1984) and Anderson and Krathwahl's (2001) taxonomy of educational objectives. Bringing many bodies of literature together in considering my own theory, I suggest that an education, like EfS, rooted in solving global problems requires attention to the quality of teaching and learning in the classroom. Findings suggest that postsecondary institutions concerned

with the quality of their teaching and their role in addressing issues like sustainability need to be attentive to educators' ability to teach within and acknowledge diverse ways of knowing; institutions must also consider the values that accompany knowledge learned in the classroom.

I also address implications of specific components of my theory. The macro-narrative of EfS, which my findings revealed, provides a framework of sustainability that instructors and institutions can use in developing micro-narratives and showing students the content arch of a class or program. The typology can help institutions identify the kinds of courses offered and what might be missing. In addition, my findings reveal that while disciplines provide specific contexts for EfS so, too, do instructors' previous personal experiences, ranging from experiences growing up to foci of doctoral preparation programs. Therefore, those building or administrating academic programs in sustainability might work to ensure a diversity of disciplines represented in EfS programs. They also might consider fostering educators' continued interest in EfS through training and/or hiring.

I also included implications of my findings for those within student affairs. Conceptually the discipline of student affairs and the idea of sustainability have many areas of connection, particularly the importance of moral and cognitive development and the emphasis on equity and social justice. I provided suggestions for student affairs educators in implementing sustainability in practice and fostering EfS-oriented dialogue on campus.

Overall, this study is one attempt to document the work for EfS on campus and help institutions clarify the work they are doing as campuses seek to remain accountable

to each other and standards of sustainability (AASHE, 2013b). Given the urgency of sustainability and contemporary environmental, economic, and societal issues, such consideration of and implementation of EfS seems paramount. EfS also seems crucial in postsecondary institutions given the historical role of higher education in addressing society's gravest problems and educating students to think and act critically, globally, and carefully. At the same time, the words of instructors from the study urge those reading to consider the study and then take the next step. I provided suggestions for how the documentation and theoretical underpinnings from this study can influence practice.

After this study, a number of questions remain unanswered. Future research could explore new, creative approaches to teaching that might foster EfS in yet unexplored ways. Such research might work to establish new pedagogical techniques or new ways of engaging established pedagogical techniques (e.g. service learning) that enhance EfS. Researchers might also investigate how postsecondary educators can shift the work of EfS into sustainable education. Research on sustainable education might first consider institutions that have a unique school-wide or campus-wide focus on sustainability and how such a focus was developed. This study suggests that continued questioning, teaching, boundary-breaking, learning, and relearning will help educators continue the praxis of EfS to help answer these questions.

The theory of EfS proposed by this study establishes a macro-narrative of sustainability that includes the cyclical relationship of humanity and the environment, the ways in which we understand that relationship, and the ways in which societies enact those relationships. It also establishes typologies of EfS, comprised of course types that arise from the combination of two continua. The first continuum concerns the role of

sustainability in the course, whether supplemental or fundamental; the second concerns the teaching framework of the class, whether practical or theoretical. Lastly, the theory describes pedagogical characteristics of EfS courses – the multiple sources of knowledge, educators’ desire to teach beyond content, pedagogical partnerships, disciplines in conversation, and a values orientation. As Marie reminded us when sharing her desire to “back away from the cliff,” the quest toward sustainability is less about precise knowledge and exact measurement of how to work, learn, and educate -- items that can be hard to attain -- and more about continued, informed efforts in the right direction. We must begin backing away from the looming cliff by educating for holistic relationships between humanity and the environment, and among society, the environment, and the economy for the long term.

In closing, I return to the path from knowledge to teaching in EfS (*Figure #7*), and call attention to the visual pattern of the model that resembles many ecosystem cycles. While many pieces of the theory from this study have implications for higher education broadly or EfS specifically, the work for EfS I researched ultimately resembled a thriving ecosystem in which educators were working to maintain nimbleness, renewal, and purpose in light of an educational system that is often rigid, repetitive, and focused on easily-standardized measures of success. Educators were willing to draw upon non-traditional sources of knowledge while maintaining rigorous standards; they brought their own experiences and passions into their work while considering institutional contexts; their courses were characterized by pedagogical practices that honored different points of view, accepted the potential of being wrong, and welcomed new knowledge that could re-inform their teaching. The courses were unique because of the kind of ecosystem in

which they were engaged, attentive to individual and collective contexts, the need for multiple and continually re-informed ways of knowing, and the interplay of both content and pedagogy. The ecosystem at play was driven by educators' desires to consider the ways in which their expertise might address global problems and engage in quality teaching and learning. This study, suggests, therefore, the importance to society of educators who are attentive to the interplay of diverse sources of knowledge, collaborative and values-oriented pedagogy, and multiple contexts. The educators in this study model not just EfS but a way of teaching that can inform postsecondary education as a whole.

APPENDIX A: Letter to Educators

E-mail sent to recruit faculty

RE: Invitation to participate in dissertation research on education for sustainability

Dear [Faculty member/educator],

I am a Doctoral student in College Student Personnel at the University of Maryland. For my dissertation, I am exploring the ways in which colleges and universities educate for sustainability in the classroom. I am contacting you because of your commitment to teaching about sustainability, and I am e-mailing to ask if you would be willing for me to interview you and observe a class you teach. I expect to be conducting this research throughout the course of the 2012-2013 academic year and expect to be visiting your institution on [dates here].

Participation in the study would entail a one-hour interview on campus and potential follow up by e-mail. If schedules allow, I would also ask if I could observe a class you teach. If you are willing, I would also send an e-mail to students enrolled in the class or make an announcement in class, asking that students consider participating in a focus group on campus. Participation is voluntary and you can stop participating at any time during the course of the study. If you are interested in participating, I can provide a consent form closer to time and will bring a hard copy when we meet.

I would be happy to answer any questions you have.

Thank you for considering. I can be reached at jbuckley@umd.edu or at 256-320-3243. I would be grateful for a reply about your interest or disinterest in participating.

Sincerely,

Jessica Belue Buckley
University of Maryland

APPENDIX B: Letter to students

E-mail sent to recruit students

RE: Participate in a group interview about [class] on [date]. Pizza provided!

Dear [student],

I am a Doctoral student in College Student Personnel at the University of Maryland. For my dissertation, I am exploring the ways in which colleges and universities engage concepts of sustainability. I am contacting you because you are enrolled in [a class that includes lessons about sustainability], and I am e-mailing to ask if you would be willing to participate in a focus group with other students to discuss the class.

Participation in the study would entail a group interview, or focus group, of no more than 90 minutes at [xx:xx o'clock] on [DD MM] in [on-campus location]. Pizza will be provided. Participation is voluntary and you can stop participating at any time during the course of the study.

Attached to this e-mail is a copy of the consent form. If you are interested in participating, I will go over this consent form in our interview, and you will have an opportunity to ask questions before signing it. Any who participate must be 18 years of age or older.

Thank you for considering. I can be reached at jbuckley@umd.edu or at 256-320-3243. I would be grateful for a reply about your interest or disinterest in participating.

Sincerely,

Jessica Belue Buckley
University of Maryland

APPENDIX C: Student Demographic Information

Student Demographic information

Year in school (sophomore, junior, etc.): _____

Courses you are taking this semester:

Major:

School:

Major activities:

Your involvement with courses and/or activities related to sustainability: _____

Place/region where you grew up:

APPENDIX D: Informed Consent for Educators

Project Title	<i>Education for Sustainability in Higher Education</i>
Purpose of the Study	<p><i>This research is being conducted by Jessica Belue Buckley at the University of Maryland, College Park. She is inviting you to participate in this research project because you instruct a course that incorporates sustainability. The purpose of this research project toward a dissertation is to examine how educators teach sustainability in courses across the curriculum in higher education.</i></p> <p><i>The study proposes to combine classroom observation with participant interviews and focus groups in order to answer questions that concern how educators teach and understand sustainability, how educators learn about sustainability, and how institutional contexts inform educators' teaching.</i></p>
Procedures	<p><i>If you consent, Jessica will be both interviewing you and potentially observing your course on a day arranged in advance and asking students enrolled in your course to consider participating in a focus group. The interview should last about an hour, and Jessica may contact you by e-mail with follow up questions. You will be asked questions, such as what you plan for students to learn regarding sustainability.</i></p> <p><i>To contact your students for the request to join a focus group, Jessica may either ask to make an announcement in class or forward an e-mail for you to send. She will not share information about specific students.</i></p> <p><i>Participation is voluntary and confidentiality will be maintained with use of a password-protected computer. Unless you request otherwise, pseudonyms will be used.</i></p>
Potential Risks and Discomforts	<i>There are no known risks for participating in this study.</i>
Potential Benefits	<i>While the study is not designed to provide direct benefits for participating, possible benefits could include the opportunity for those involved to reflect on teaching and learning.</i>

<p>Confidentiality</p>	<p><i>Only Jessica and her advisors will have access to recordings and transcripts of interviews. All items will be kept on a password protected computer. Investigators will attempt to reframe any clear identifiers (e.g. position in an organization) that might be associated with any particular individual involved.</i></p> <p><i>If Jessica writes a report or article about this research project, your identity will be protected to the maximum extent possible. Your information may be shared with representatives of the University of Maryland, College Park or governmental authorities if you or someone else is in danger or if we are required to do so by law.</i></p>
<p>Right to Withdraw and Questions</p>	<p><i>Your participation in this research is completely voluntary. You may choose not to take part at all. If you decide to participate in this research, you may stop participating at any time. If you decide not to participate in this study or if you stop participating at any time, you will not be penalized or lose any benefits to which you otherwise qualify.</i></p> <p><i>If you decide to stop taking part in the study, if you have questions, concerns, or complaints, or if you need to report an injury related to the research, please contact the investigator, Jessica Belue Buckley at jbuckley@umd.edu 256-320-3243, 3214 Benjamin Building.</i></p>
<p>Participant Rights</p>	<p><i>If you have questions about your rights as a research participant or wish to report a research-related injury, please contact:</i></p> <p style="text-align: center;">University of Maryland College Park Institutional Review Board Office 1204 Marie Mount Hall College Park, Maryland, 20742 E-mail: irb@umd.edu Telephone: 301-405-0678</p> <p><i>This research has been reviewed according to the University of Maryland, College Park IRB procedures for research involving human subjects.</i></p>
<p>Statement of Consent</p>	<p><i>Your signature indicates that you are at least 18 years of age; you have read this consent form or have had it read to you; your questions have been answered to your satisfaction and you voluntarily agree to participate in this research study. You will receive a copy of this signed consent form.</i></p> <p><i>Your signature indicates that you are at least 18 years of age; you have read this consent form or have had it read to you; your questions have been answered to your satisfaction and you voluntarily agree to participate in this research study. You will receive a copy of this signed consent form.</i></p>

	<p><i>Please indicate whether you (select all that apply)</i></p> <ul style="list-style-type: none"> <input type="checkbox"/> <i>Agree for mutually agreed upon course session to be observed</i> <input type="checkbox"/> <i>Agree for students enrolled in your course to be contacted about participating in a focus group (their participation is completely voluntary).</i> <input type="checkbox"/> <i>Agree to be interviewed.</i> <p><i>If you agree to be interviewed, please indicate whether you (select one)</i></p> <ul style="list-style-type: none"> <input type="checkbox"/> <i>Agree for your interview to be digitally recorded</i> <input type="checkbox"/> <i>Decline for your interview to be digitally recorded.</i> <p><i>If you agree to participate, please sign your name below.</i></p>	
Signature and Date	NAME OF PARTICIPANT [Please Print]	
	SIGNATURE OF PARTICIPANT	
	DATE	

APPENDIX E: Informed Consent for Students

Project Title	<i>Education for Sustainability in Higher Education</i>
Purpose of the Study	<p><i>This research is being conducted by Jessica Belue Buckley at the University of Maryland, College Park. She is inviting you to participate in this research project because you are a student in a course that incorporates sustainability. The purpose of this research project toward a dissertation is to examine how educators teach sustainability in courses across the curriculum in higher education.</i></p> <p><i>The study proposes to combine classroom observation with participant interviews and focus groups in order to answer questions that concern how educators teach and understand sustainability, how educators learn about sustainability, and how institutional contexts inform educators' teaching.</i></p>
Procedures	<i>If you consent, you will be a part of a focus group that should last no more than 90 minutes. Jessica will be asking questions of you and other students in the focus group about courses that incorporate lessons on sustainability. If all students consent, the focus group will be audio recorded. If one or more students decline, the focus group will not be recorded. In either case, Jessica will take notes. You will be asked to complete a short demographic questionnaire, and you will be asked questions, such as what you believe your instructors want you to learn about sustainability. Your specific answers will not be shared with instructors, though general trends from focus groups may be shared with instructors in future semesters.</i>
Potential Risks and Discomforts	<i>There are no known risks for participating in this study.</i>
Potential Benefits	<i>While the study is not designed to provide direct benefits for participating, possible benefits could include the opportunity for those involved to reflect on teaching and learning.</i>

<p>Confidentiality</p>	<p><i>Only Jessica and her advisors will have access to recordings and transcripts of interviews. All items will be kept on a password protected computer. Investigators will attempt to reframe any clear identifiers (e.g. position in an organization) that might be associated with any particular individual involved.</i></p> <p><i>If Jessica writes a report or article about this research project, your identity will be protected to the maximum extent possible. Your information may be shared with representatives of the University of Maryland, College Park or governmental authorities if you or someone else is in danger or if we are required to do so by law.</i></p>
<p>Right to Withdraw and Questions</p>	<p><i>Your participation in this research is completely voluntary. You may choose not to take part at all. If you decide to participate in this research, you may stop participating at any time. If you decide not to participate in this study or if you stop participating at any time, you will not be penalized or lose any benefits to which you otherwise qualify.</i></p> <p><i>If you decide to stop taking part in the study, if you have questions, concerns, or complaints, or if you need to report an injury related to the research, please contact the investigator, Jessica Belue Buckley at jbuckley@umd.edu 256-320-3243, 3214 Benjamin Building.</i></p>
<p>Participant Rights</p>	<p><i>If you have questions about your rights as a research participant or wish to report a research-related injury, please contact:</i></p> <p style="text-align: center;">University of Maryland College Park Institutional Review Board Office 1204 Marie Mount Hall College Park, Maryland, 20742 E-mail: irb@umd.edu Telephone: 301-405-0678</p> <p><i>This research has been reviewed according to the University of Maryland, College Park IRB procedures for research involving human subjects.</i></p>
<p>Statement of Consent</p>	<p><i>Your signature indicates that you are at least 18 years of age; you have read this consent form or have had it read to you; your questions have been answered to your satisfaction and you voluntarily agree to participate in this research study. You will receive a copy of this signed consent form.</i></p> <p><i>If you agree to be in a focus group please indicate whether you (select one)</i></p> <p><input type="checkbox"/> <i>Agree for the focus group to be digitally recorded</i></p>

	<input type="checkbox"/> <i>Decline for the focus group to be digitally recorded.</i> <i>If you agree to participate, please sign your name below.</i>	
Signature and Date	NAME OF PARTICIPANT [Please Print]	
	SIGNATURE OF PARTICIPANT	
	DATE	

APPENDIX F: Interview Protocol for Educators

Example Introduction

- Who I am, what I'm studying
- Consent form

Example questions

Introductions

- What has been your path to this institution?
- What is your general teaching and research focus/foci?
- How did you come to teach this class (e.g. you asked/developed; univ/dept needed it)?

Disciplinary interest in sustainability

As I mentioned, I'm looking at education for sustainability, and I found you because of your focus on sustainability in your teaching.

- What sparked your interest in sustainability as it relates to the courses you teach?
- How have you learned about sustainability? (In your graduate work/research/personal interest)
- How do you seek information about sustainability?
- How does the process differ from seeking information in your disciplinary area?
- How has sustainability been discussed in your field, especially over the course of time?
- How do you see that sustainability relates to your course? Your field?

Defining sustainability

- How do you define sustainability?
- What concepts are critical to know in order to work toward sustainability?

Teaching/learning and sustainability

- Pretend I know nothing about the college classroom. Could you paint a picture of what happens in your class (who sits and stands where, who talks and when, who listens and when, what kinds of interactions happen, what are those interactions like?).
- What do you hope your students learn about sustainability?
- How do you teach about sustainability?
- What are the main points you make and what tools/resources (lecture/PowerPoint/trips/activities) do you employ to teach sustainability? Do you regularly use these tools?
- Have you had to reconsider a course or scholarship to incorporate sustainability? Can you tell me about that if so?
- What recommendations would you give to those working to incorporate sustainability into a course?

The institution and sustainability

- What is your understanding of the institutional commitment to sustainability (particularly in the curriculum)?
- What's the general understanding of sustainability on campus?
- How is sustainability "carried out" on campus?
- When does sustainability come up in conversation in your work/service on campus?
- How have you felt supported or hindered in teaching about sustainability?
- How does the institutional commitment to sustainability impact what you do in the classroom, if it does?

Sustainability in higher education

- Some have said that higher education must infuse sustainability across the curriculum. What do you think?

Wrap up

- Do you have questions for me?
- May I contact you by e-mail?

APPENDIX G: Interview Protocol for Students

Jessica Belue Buckley
Student Focus Group Protocol

Example Introduction

(Hand out consent forms as students arrive and ask them to look over and sign if they approve).

Thanks for coming. I'm a doctoral student in the College of Education at the University of Maryland. For my dissertation, I'm researching the process of teaching and learning for sustainability in higher education. I have observed or will observe the following courses here, and I invited any students in these courses to attend this focus group:
COURSE TITLES.

I'm mainly interested to learn from you how your faculty/instructors/educators teach for sustainability and what or how you are learning.

Example Questions

Introductions and sustainability

- First, how about we go around the room, share names, majors (if you are declared), how you choose to take this class.
- Pretend I know nothing about the college classroom. Could you paint a picture of what happens in your class – who sits and stands where, who talks and when, who listens and when, what kinds of interactions happen, what are those interactions like?
- What are some memorable moments in the course for you?
- In what ways have ideas of sustainability been incorporated into the course? Or not?
- There's a continuum of interest in the room related to sustainability – can you share briefly where you are at? (If people are unsure what I mean “As in, all I do is study/think about/live sustainability to I'm not focused on it much, it just happens to be a part of this course.)
- While I introduced this study as looking at sustainability, many people define that word differently. What do you think it means in the context of your class?

Learning

- If you had to share one key lesson from your course, what is it? OR
- What has the course helped you learn?
- How have you learned about sustainability in class?
- Can you tell me about your assignments for class?
- What are you finding most interesting about class? Most dull? Easiest? Most difficult?
- What does one need to learn in order to understand sustainability? Have you learned any of those things in this course?

- What does one need to learn in order to act sustainably? Have you learned any of those things in this course?

Teaching

- Can you describe the teaching style of the faculty member of this course?
- How does teaching in this course compare to others you have taken?
- What are the values that undergird the lessons you learn in class? How did you come to recognize those as the values?
- How do(es) the instructor(s) facilitate your learning?
- What tools does the instructor use to teach?
- What do you think is most important for your professor(s) about students' learning?

About students actions

- What more do you believe you need to know about sustainability?
- How would you teach this course if you were teaching?
- If it does, when and how does this course ever come to mind outside of class meetings?

Institution

- What's the general understanding of sustainability on campus?
- What's your sense of the level of importance the institution places on sustainability?
- How is sustainability "carried out" on campus?
- When does sustainability come up in conversation?

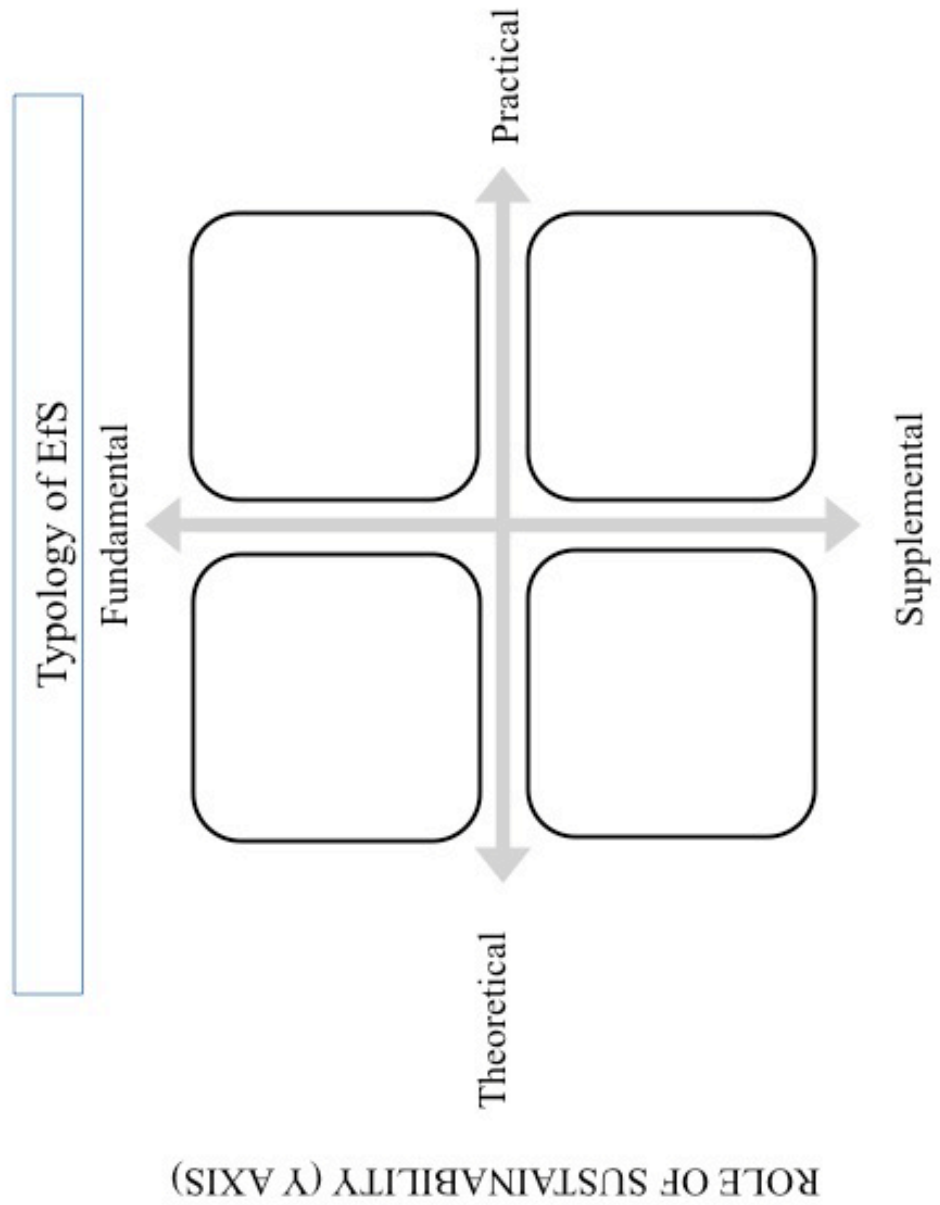
Wrap up

- What questions do you have for me?
- May I contact you by e-mail?

APPENDIX H: EfS Planning Document

	What is the relationship between the environment and humanity?	How have we come to understand the relationship?	What are our responsibilities?
Simplified answers considering equity, environment, and economy			
Important micro-narratives or contexts			
Evidence or sources of knowledge			
Pedagogical partners			
Disciplines needed			
Implied values			
Important historical or futuristic elements			
Ways of engaging in praxis or responding to new knowledge			

APPENDIX I: Typology Worksheet



ROLE OF SUSTAINABILITY (Y AXIS)

TEACHING FRAME (X AXIS)

References

- Abram, D. (1996). *The spell of the sensuous*. New York, NY: Vintage Books.
- Agyeman, J., Bullard, R. D., & Evans, B. (2003). *Just sustainabilities: Development in an unequal world*. London, England: Earthscan Publications Limited.
- American College & University Presidents' Climate Commitment.(2010). *2009 annual report*. Retrieved from <http://www.presidentsclimatecommitment.org/reporting/annual-report>
- American College & University Presidents' Climate Commitment. (2009). *Education for climate neutrality and sustainability: Guidance for ACUPCC Institutions*.Retrieved from http://www.secondnature.org/documents/EducationforClimateNeutralitySustainability_2009.4.30final_000.pdf
- American College Personnel Association. (2008). *Toward a sustainable future: The role of student affairs in creating healthy environments, social justice, and strong economies*. Washington, D.C.: author.
- Anderson, L. W. & Krathwohl, D. R. (2001). *A taxonomy for learning, teaching, and assessing: A revision of Bloom's taxonomy of educational objectives*. New York, NY: Longman.
- Appleby, D. C. (2008). Advising as teaching and learning. In Gordon, V. N., Habley, W. R., Grites, T. J., and Associates (Eds.) *Academic advising: A comprehensive handbook* (pp. 85-102). San Francisco, CA: Jossey-Bass.
- Arbuthnott, K. D. (2008). Education for sustainable development beyond attitude change. *International Journal for Sustainability in Higher Education*, 10(2), 152-163.

Association for the Advancement of Sustainability in Higher Education. (2010a). History.

Retrieved from <http://www.aashe.org/about>

Association for the Advancement of Sustainability in Higher Education. (2012). STARS

Overview. Retrieved from <https://stars.aashe.org/pages/about/>

Association for the Advancement of Sustainability in Higher Education. (2013a). *STARS*

technical manual version 2.0: Administrative update one. Denver, CO: Author.

Association for the Advancement of Sustainability in Higher Education. (2010b).

Sustainability curriculum in higher education: A call to action. Denver, CO:

Author. Retrieved from

[http://www.aashe.org/files/A_Call_to_Action_final\(2\).pdf](http://www.aashe.org/files/A_Call_to_Action_final(2).pdf)

Association for the Advancement of Sustainability in Higher Education. (2013b).

Sustainability Tracking, Assessment, and Rating Systems. Retrieved November,

2013 from <https://stars.aashe.org/>

Association of American College & Universities, & Council for Higher Education

Accreditation. (2008). *New leadership for student learning and accountability: A statement of principles, commitments to action*. Washington D.C.: Authors.

Aurandt, J. K., & Butler, E. C. (2011, April). Sustainability education: Approaches for

incorporating sustainability into the undergraduate curriculum. *Journal of*

Professional Issues in Engineering Education and Practice, 102-106. DOI:

10.1061/(ASCE)EI.1943-5541.0000049.

Barlett, P. F. (2004). No longer waiting for someone else to do it: A tale of reluctant

leadership. In P.F. Barlett and G. W. Chase (Eds.), *Sustainability on campus:*

Stories and strategies for change (pp. 67-87). Boston, MA: MIT.

- Barlett, P.F., & Chase, G. W. (2004). *Sustainability on campus: Stories and strategies for change*. Boston, MA: MIT.
- Barlett, P. F., & Chase, G. W., (2013). *Sustainability in higher education: Stories and strategies for transformation*. Boston, MA: MIT.
- Baxter Magolda, M. (2004a). Self-authorship as the common goal of 21st century education. In M. B. Baxter Magolda & P. M. King (Eds.), *Learning partnerships: Theory and models of practice to education for self-authorship* (pp. 37-62). Sterling, VA: Stylus.
- Baxter Magolda, M. B. (2004b). Learning partnerships model. In M. B. Baxter Magolda & P. M. King (Eds.), *Learning partnerships: Theory and models of practice to education for self-authorship* (pp. 1-36). Sterling, VA: Stylus.
- Birnbaum, R. (1988). *How college work: The cybernetics of academic organization and leadership*. San Francisco, CA: Jossey-Bass.
- Blewit, J., & Cullingford, C. (Eds.). (2010). *The sustainability curriculum: The challenge for higher education*. New York, NY: Earthscan.
- Bloom, B. S. (1984). *Taxonomy of educational objectives. Book 1: Cognitive domain*. New York, NY: Longman.
- Bowen, G. A. (2006). Grounded theory and sensitizing concepts. *Interional Journal of Qualitative Methods*, 5(3), 12-23.
- Boyer, E. L. (1990). *Scholarship reconsidered: Priorities of the professoriate*. New York, NY: The Carnegie Foundation for the Advancement of Teaching.
- Brainard, L., Jones, A., & Purvis, N. E. (2009). *Climate change and global poverty: A billion lives in the balance?* Washington, D.C.: Brookings Institution Press.

- Broido, E. M., & Manning, K. (2002). Philosophical foundations and current theoretical perspectives in qualitative research. *Journal of College Student Development*, 43(4), 434-445.
- Bronfenbrenner, U. (1979). *The ecology of human development: Experiments by nature and design*. Boston, MA: Harvard University Press.
- Bryant, A., & Charmaz, K. (Eds.). (2011). *The SAGE handbook of grounded theory*. Thousand Oaks, CA: SAGE.
- Buckley, J. B. (2013). Re-storing the earth: A phenomenological study of living sustainably. *Phenomenology and Practice*, 7(2), 19-40.
- Bullard, R. D., Mohai, P., Saha, R., & Wright, B. (2007). Grassroots struggles to dismantle environmental racism in the United States. A report prepared for the United Church of Christ Justice and Witness Ministries. Cleveland, OH: United Church of Christ.
- Carp, R. M. (2013). Toward a resilient academy. In L. F. Johnston (Ed.), *Higher education for sustainability: Cases, challenges, and opportunities from across the curriculum*, pp. 223-237. New York, NY: Routledge.
- Charmaz, K. (2003). Grounded theory: Objectivist and constructivist methods. In N. K. Denzin & Y. S. Lincoln (Eds.), *Handbook of qualitative research* (2nd ed., pp. 509-535). Thousand Oaks, CA: SAGE.
- Charmaz, K. (2006). *Constructing grounded theory: A practical guide through qualitative analysis*. Thousand Oaks, CA: SAGE.
- Chase, G. W., & Rowland, P. (2004). The Ponderosa Project: Infusing sustainability in the curriculum. In P.F. Barlett and G. W. Chase (Eds.), *Sustainability on campus:*

Stories and strategies for change (pp. 91-105). Boston, MA: MIT.

Chesapeake Project. (2010). Background. Retrieved from

http://www.sustainability.umd.edu/content/curriculum/chesapeake_project_background.php

Clark, B., & Button, C. (2011). Sustainability transdisciplinary education model: interface of arts, science, and community (STEM). *International Journal of Sustainability in Higher Education*, 12(1), 41-54.

Cortese, A. D. (2003, March-May). The critical role of higher education in planning a sustainable future. *Planning for Higher Education*, 15-22.

Covan, E. K. (2011). Grounded theory in practice. In A. Bryant & K. Charmaz (Eds.), *The SAGE handbook of grounded theory* (pp. 58-74). Thousand Oaks, CA: SAGE.

Creswell, J. W. (2007). *Qualitative inquiry & research design: Choosing among five approaches*. Thousand Oaks, CA: SAGE.

Crotty, M. (1998). *The foundations of social research: Meaning and perspective in the research process*. Thousand Oaks, CA: SAGE.

Cullingford, C. (2010). Sustainability and higher education. In J. Blewit, & C. Cullingford (Eds.), *The sustainability curriculum: The challenge for higher education* (pp. 13-23). New York, NY: Earthscan.

Dautremont-Smith, J. (2013) How many dots to connect? Defining sustainability in the curriculum pt. 1. *AASHE Bulletin* (February 26, 2013). Retrieved from <http://www.aashe.org/blog/how-many-dots-connect-defining-sustainability-curriculum-pt-1>

- Demerath, P. (2006). The science of context: Modes of response for qualitative researchers in education. *International Journal of Qualitative Studies in Education* 19(1), 97-113.
- Department of Education, Secretary of Education's Commission on the Future of Higher Education. (2006). *A test of leadership: Charting the future of higher education*. Washington, D.C.: Department of Education.
- Dewey, J. (1997). *Experience & education*. New York, NY: Touchstone.
- Dey, I. (2007). Grounding categories, in A. Bryant & K. Charmaz (Eds.), *The SAGE handbook of grounded theory*. Thousand Oaks, CA: SAGE.
- Dresner, S. (2010). *The principles of sustainability*. Washington, DC: Earthscan.
- Dunlap, R. E. (2008). The New Environmental Paradigm scale: From marginality to worldwide use. *The Journal of Environmental Education*, 40(1), 3-20.
- Dunlap, R. E., & Van Liere, K. D. (1978). The "New Environmental Paradigm:" A proposed measuring instrument and preliminary results. *The Journal of Environmental Education*, 9(4), 10-19.
- Edgerton, R. (1997). *Higher education: White paper*. Washington, D.C.: Pew Charitable Trusts.
- Edwards, A. (2005). *The sustainability revolution: Portrait of a paradigm shift*. Gabriola Island, British Columbia: New Society Publishers.
- Edwards, A. R. (2010). *Thriving beyond sustainability*. Gabriola Island, British Columbia: New Society Publishers.
- Eldredge, N. (2001). *The sixth extinction*. American Institute of Biological Sciences. Retrieved from <http://www.actionbioscience.org/newfrontiers/eldredge2.html>

- Emerson, R. (2001). *Contemporary field research: Perspectives and formulations*. Prospect Heights, IL: Waveland Press.
- Emerson, R. M., Fretz, R. I., & Shaw, L. L. (2001). In P. Atkinson, A. Coffey, S. Delamont, J. Lofland, & L. Lofland (Eds.), *Handbook of ethnography* (pp. 352-368). Thousand Oaks, CA: SAGE.
- Evans, T. L. (2012). *Occupy education: Living and learning sustainability*. New York, NY: Peter Lang Publishing.
- Evernden, N. (1993) *The natural alien: Humankind and the environment* (2nd ed.). Toronto: University of Toronto Press.
- Fieselman, L., & Lindquist, E. (2013). The emerging environmental sustainability program at Meredith College: Exploring student and faculty interest and participation. In L. F. Johnston (Ed.), *Higher education for sustainability; Cases, challenges, and opportunities from across the curriculum*, pp. 11-26. New York, NY: Routledge.
- Fontana, A., & Frey, J. H. (2000). The interview: From structured questions to negotiated text. In N. K. Denzin & Y. S. Lincoln (Eds.), *Handbook of qualitative research* (2nd ed., pp. 645-672). Thousand Oaks, CA: SAGE.
- Freire, P. (2003). *Pedagogy of the oppressed*. New York, NY: Continuum.
- Frisk, E., & Larson, K. L. (2011). Educating for sustainability: competencies & practices for transformative action. *Journal of Sustainability Education*, 2.
- Geertz, C. (1973). *The interpretation of cultures*. New York, NY: Basic Books.
- Glaser, B. G. (1978). *Theoretical sensitivity*. Mill Valley, CA: The Sociology Press.
- Glaser, B. G., & Strauss, A. L. (1967). *The discovery of grounded theory: Strategies for*

qualitative research. Chicago, IL: Aldine.

- Glesne, C. (2011). *Becoming qualitative researchers*. Boston, MA: Pearson.
- Guba, E. G., & Lincoln, Y. S. (2001). Competing paradigms in qualitative research. In C. F. Conrad, J. G. Haworth, & L. R. Lattuca (Eds.), *Qualitative research in higher education: ASHE reader series* (2nd ed., pp. 57-72). Boston, MA: Pearson Custom Publishing.
- Halfacre, A. C., Byrne, J., Horhota, M., Kransteuber, K., Trombulak, S., DeKnight, B., Andersen, B., & Jenks-Jay, N. (2013). Shaping sustainability at Furman and Middlebury: Emergent and adaptive curricular models. In L. F. Johnston (Ed.), *Higher education for sustainability: Cases, challenges, and opportunities from across the curriculum* (pp. 185-200). New York, NY: Routledge
- Hildenbrand, B. (2011). Mediating structure and interaction in grounded theory. In A. Bryant, & K. Charmaz (Eds.), *The SAGE handbook of grounded theory* (pp. 539-564). Thousand Oaks, CA: SAGE.
- Hirsch Hadorn, G., Biber-Glemm, S., & Grossenbacher-Mansuy, W. (2008). The emergence of transdisciplinarity as a form of research. In G. Hirsch Hadorn, H. Hoffmann-Riem, S. Biber-Klemm, W. Grossenbacher-Mansuy, D. Joye, C. Pohl, U. Wiesmann, & E. Zemp. *Handbook of transdisciplinary research* (pp 19-39). Netherlands: Springer. DOI: 10.1007/978-1-4020-6699-3
- Holton, J. A. (2011). The coding process and its challenges. In A. Bryant & K. Charmaz (Eds.), *The SAGE handbook of grounded theory* (pp. 265-289). Thousand Oaks, CA: SAGE.
- Holzman, L. (2004). What is the “social” in “social development?” Retrieved from

<http://www.eastsideinstitute.org/pdfs/Talk%20Piaget%20Society.pdf>

- hooks, b. (1994). *Teaching to transgress*. New York: Taylor & Francis.
- Hurtado, S., Milem, J. F., Clayton-Pedersen, A. R., & Allen, W. R. (1998). Enhancing campus climates for racial/ethnic diversity: Educational policy and practice. *The Review of Higher Education*, 21(3), 279-302.
- Intergovernmental Panel on Climate Change. (2007). *Contribution of working groups I, II, and III to the fourth assessment report of the Intergovernmental Panel on Climate Change*. Retrieved from http://www.ipcc.ch/publications_and_data/ar4/syr/en/contents.html
- Johnston, L. F. (Ed.). (2013). *Higher education for sustainability: Cases, challenges, and opportunities from across the curriculum*. New York, NY: Routledge.
- Jones, S. R. (2002). (Re)Writing the word: Methodologies strategies and issues in qualitative research. *Journal of College Student Development*, 43(4), 461-473.
- Jones, S. R, Torres, V., & Arminio, J. (2006). *Negotiating the complexities of qualitative research in higher education: Fundamental elements and issues*. New York, NY: Routledge.
- Kates, R., Clark, W., Corell, R., Hall, J., Jaeger, C., Lowe, I., . . . Svedin, U. (2001) Policy Forum: Environment and development. Sustainability science. *Science*, 292(5517), 641–642.
- Keating, M., Bhavsar, V., Strobel, H., Grabau, L., Mullen, M., & Williams, M. (2010, December). Engaging agriculture and non-agriculture students in an interdisciplinary curriculum for sustainable agriculture. *NACTA Journal*.
- Keeling, R. P. (Ed). (2004). *Learning reconsidered: A Campus-wide focus on student*

experience. Washington, D.C.: American College Personnel Association and National Association of Student Personnel Administrators.

Keeling, R. P. (Ed). (2006). *Learning reconsidered 2*. Washington, D.C.: American College Personnel Association, Association of College and University Housing Officers-International, Association of College Unions – International, National Academic Advising Associations, National Association for Campus Activities, National Association of Student Personnel Administrators, and National Intramural Recreational Sports Association.

Kelle, U. (2011). The development of categories: Different approaches in grounded theory. In A. Bryant & K. Charmaz (Eds.), *The SAGE handbook of grounded theory* (pp. 191-213). Thousand Oaks, CA: SAGE.

Kohlberg, L. (1958). *The development of modes of moral thinking and choice in the years ten to sixteen*. Unpublished doctoral dissertation, University of Chicago.

Kohlberg, L. (1976). Moral stages and moralization: The cognitive-developmental approach. In T. Lickona (Ed.), *Moral development and behavior: Theory, research, and social issues* (pp. 31-53). New York, NY: Holt, Rinehart, & Winston.

Kuhn, T. J. (2008). Historical foundations of academic advising. In Gordon, V. N., Habley, W. R., Grites, T. J., and Associates (Eds.) *Academic advising: A comprehensive handbook* (pp. 3-16). San Francisco, CA: Jossey-Bass.

Leiserowitz, A., Smith, N., & Marlon, J.R. (2010) *Americans' knowledge of climate change*. Yale University. New Haven, CT: Yale Project on Climate Change Communication. Retrieved from

<http://environment.yale.edu/climate/files/ClimateChangeKnowledge2010.pdf>

- Lempert, L. B. (2011). Asking questions of the data: Memo writing in the grounded theory tradition. In A. Bryant & K. Charmaz (Eds.), *The SAGE handbook of grounded theory* (pp. 245-264). Thousand Oaks, CA: SAGE.
- Liu, L. (2011). Where in the world of sustainability education is US geography? *Journal of Geography in Higher Education*, 34(2), 245-263.
- Love, P. (2003). Document analysis. In F. K. Stage & K. Manning (Eds.), *Research in the college context* (pp. 83-96). New York, NY: Brunner-Routledge.
- Magolda, P., & Ebben Gross, K. (2009). *It's all about Jesus!: Faith as an oppositional collegiate subculture*. Sterling, VA: Stylus.
- McNeill, J. R. (2000). *Something new under the sun: An environmental history of the twentieth-century world*. New York, NY: W. W. Norton & Company.
- Morrow, S. L. (2005). Quality and trustworthiness in qualitative research in counseling psychology. *Journal of Counseling Psychology*, 52(2), 250-260.
- Morse, J. M. (2011). Sampling in grounded theory. In A. Bryant, & K. Charmaz (Eds.), *The SAGE handbook of grounded theory* (pp. 229-244). Thousand Oaks, CA: Sage.
- National Association of Student Personnel Administrators (2010). Q-List: A faculty fellows research agenda for the profession. Washington, DC: Author. Retrieved from <http://www.naspa.org/divctr/faculty/Qlist/Q-List.pdf>
- National Center for Education Statistics. (2011). Fast facts. Retrieved from <http://nces.ed.gov/fastfacts/display.asp?id=98>
- National Center for Education Statistics (2009, July). Degree-granting institutions, by

control and type of institution: Selected years, 1949-50 through 2008-09.

Retrieved from

http://nces.ed.gov/programs/digest/d09/tables/dt09_265.asp

National Center for Education Statistics (2010, April). Digest of education statistics.

Retrieved from <http://nces.ed.gov/programs/digest/d09/>

National Wildlife Federation. (2010). History of the campus ecology program. Retrieved

from <http://www.nwf.org/Global-Warming/Campus-Solutions/About/History-of-the-Program.aspx>

Norton, B. (2005). *Sustainability: A philosophy of adaptive ecosystem management*.

Chicago, IL: The University of Chicago Press.

Orr, D. (2010). What is higher education for now? In L. Starke and L. Mastny (Eds.),

State of the world: Transforming cultures from consumerism to sustainability (pp. 75-82). New York, NY: W. W. Norton & Company.

Orr, D. (2004). *Earth in mind*. Washington, DC: Island Press.

Perry, W. G., Jr. (1968). *Forms of intellectual and ethical development in the college years: A scheme*. New York, NY: Holt, Rhinehart, & Winston.

Perry, W. G., Jr. (1981) Cognitive and ethical growth: The meaning of making meaning.

In A. W. Chickering & Associates (Eds.), *The modern American College: Responding to the new realities of diverse students and a changing society* (pp. 76-116). San Francisco, CA: Jossey-Bass.

Phillips, D. C., & Soltis, J. F. (2009). *Perspectives on learning*. New York, NY: Teachers College Press.

Polkinghorne, D. E. (2005). Language and meaning: Data collection in qualitative

- research. *Journal of Counseling Psychology*, 52(2), pp. 137-145.
- Redman, C. L., & Weik, A. (2013). Sustainability as a transformation in education. (Ed.), *Higher education for sustainability; Cases, challenges, and opportunities from across the curriculum*, pp. 214-222. New York, NY: Routledge.
- Rees, E. R., & Westra, L. (2003). When consumption does violence: Can there be sustainability and environmental justice in a resource-limited world? In J. Agyeman, R. D. Bullard, and B. Evans (Eds.), *Just sustainabilities: Development in an unequal world* (pp. 99-124). Cambridge, MA: MIT Press.
- Rowe, D. (2002). Environmental literacy and sustainability as core requirements: Success stories and models. In W. L. Filho (Ed.), *Teaching sustainability at universities*. New York, NY: Peter Lang. Retrieved from <http://cf.ncseonline.org/EfS/DebraRowe.pdf>
- Rowe, D., & Johnston, L. F. (2013). Learning outcomes: An international comparison of countries and declarations. In L. F. Johnston (Ed.), *Higher education for sustainability; Cases, challenges, and opportunities from across the curriculum* (pp. 45-59). New York, Y: Routledge.
- Rusinko, C. A. (2010). Integrating sustainability in higher education: A generic matrix. *International Journal of Sustainability in Higher Education*, 11(3), 250-259.
- Savelyeva, T., & McKenna, J. R. (2011). Campus sustainability emerging curricula models in higher education. *International Journal of Sustainability in Higher Education*, 12(1), 55-66.
- Savelyeva, T., McKenna, J. R. (2010). Campus sustainability: emerging curricular models in higher education. *International Journal of Sustainability in Higher*

Education, 12(1), 55-66.

Second Nature. (2010). History. Retrieved from

<http://www.secondnature.org/about/history.html>

Second Nature. (n.d.). Sustainability curriculum framework. Retrieved from

<http://www.secondnature.org/pdf/snwritings/factsheets/framework.pdf>

Spradley, J. P. (1979). *The ethnographic interview*. Orlando, FL: Harcourt Bace

Jovanovich, Inc.

Spradley, J. P. (1980). *Participant observation*. New York, NY: Holt, Rinehart, and

Winston.

Stage, F. K., Waston, L. W., Terrell, M. (Eds.) (1999). *Enhancing student learning:*

Setting the campus context. Washington, DC: American College Personnel

Association.

Stage, F. K., & Muller, P. (1999). Theories of learning for college students. In Waston, L.

W., Terrell, M. (Eds.). *Enhancing student learning: Setting the campus context*,

pp. 25-41. Washington, DC: American College Personnel Association.

Stark, M. R. (2011). Information in place: Integrating sustainability into information

liberacy instruction. *Electronic Green Journal*, 1(32), 1-16.

Sterling, S. (2010). An analysis of the development of sustainability education

internationally: Evolution, interpretation and transformative potential. In J. Blewit

& C. Cullingford (Eds.), *The sustainability curriculum: The challenge for higher*

education (pp. 43-62). New York, NY: Earthscan.

Stern, P. C. (2000). Toward a coherent theory of environmentally significant behavior.

Journal of Social Issues (56)3, 407-424.

- Strauss, A., & Corbin, J. (1990). *Basics of qualitative research: Grounded theory procedures and techniques*. Thousand Oaks, CA: Sage.
- Sustainable Endowments Institute. (2010). Retrieved from <http://www.greenreportcard.org/about/sustainable-endowments-institute>.
- ter Horst, E. E., & Pearce, J. M. (2010). Foreign languages and sustainability: Addressing the connections, communities, and comparisons standards in higher education. *Foreign Language Annals*, (43)3, 365-383.
- Tilbury, D., & Ryan, A. (2011). Education for sustainability: A guide for educators on teaching and learning approaches.
- University Leaders for a Sustainable Future (1990). The Talloires Declaration. Retrieved from <http://www.ulsf.org/pdf/TD.pdf>
- University Leaders for a Sustainable Future (2013). What is the Talloires Declaration? Retrieved from http://www.ulsf.org/talloires_declaration.html.
- UNESCO. (2012a). Five pillars of learning. Retrieved from <http://www.unesco.org/new/en/education/themes/leading-the-international-agenda/education-for-sustainable-development/education-for-sustainable-development/five-pillars-of-learning/>
- UNESCO. (2012b). Four thrusts of ESD. Retrieved from <http://www.unesco.org/new/en/education/themes/leading-the-international-agenda/education-for-sustainable-development/education-for-sustainable-development/four-thrusts-of-esd/>

- UNESCO. (2012c). Three terms and one goal. Retrieved from <http://www.unesco.org/new/en/education/themes/leading-the-international-agenda/education-for-sustainable-development/three-terms-one-goal/>
- UNESCO. (1978). Intergovernmental Conference on Environmental Education: The Final Report. Paris, France: Author. Retrieved from <http://unesdoc.unesco.org/images/0003/000327/032763eo.pdf>
- Van Manen, M. (1990). *Researching lived experience: Human science for an action sensitive pedagogy*. Albany, NY: State University of New York Press.
- Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes*. Cambridge, MA: Harvard University Press.
- Walls, A. E. J., & Blewitt, J. (2010). Third-wave sustainability in higher education: Some (inter)national trends and developments. In J. Blewitt & C. Cullingord (Eds.), *The sustainability curriculum: The challenge for higher education* (pp. 54-74). New York, NY: Earthscan.
- World Commission on Environment and Development [Brundtland Commission]. (1987). *Our Common World*. Oxford, Great Britain: Oxford University Press. Retrieved from <http://www.un-documents.net/ocf-ov.htm>
- Worster, D. (1994). *Nature's economy: A history of ecological ideas*. New York, NY: Cambridge University Press.
- Worster, D. (1996). The two cultures revisited: environmental history and the environmental sciences. *Environment and History* 2, 3-14.
- Zoller, U. (2011). From teaching-to-know-to-learning-to-think for sustainability: What should it take? And how do we do it? *Journal of Modern Education Review* 1(1),

34-40.