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# Experiences of Faculty in the Design and Development of Sustainability Education in Higher Education Curricula: A Case Study of a Southeastern College

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## Abstract

Sustainability is a global concern; sustainability education is a logical and necessary response to that concern. There is very little research regarding the integration of sustainability concepts in higher education curriculum and delivery of instructional strategies. Sustainability education in higher education is a multifaceted phenomenon studied through a variety of lenses. The lens for this qualitative, descriptive single case study was curriculum design and development from the experiences and perspectives of a faculty involved in the process. The case study college was one of several institutions of higher education that responded to campus interest and expectations regarding sustainability education. This faculty took a unique approach in the development of the sustainability curriculum with a program that combined the study of environmental issues with education for sustainability in order to determine solutions. The faculty recommended an interdisciplinary framework that integrates the humanities with both social sciences and natural sciences to educators needing a paradigm for effective sustainability education programs at their higher education institutions. Data was collected from structured interviews, acquired documents, and researcher observations. Themes became evident as data was coded: vision, interdisciplinary framework, process, challenges, accomplishments, and recommendations. Key findings suggested that interest from faculty was integral to the productive discussion for the development of sustainability education in the curriculum. An interdisciplinary framework and adequate funding enabled the faculty to refine their vision and expand the department.



*Keywords:* sustainability, sustainability education, sustainability development

## Dedication

This dissertation is dedicated to my beloved sister and guardian angel Marla Maria Loftis.

**Acknowledgment**

Thank you, Dr. Julie McCann, for your patience and direction as I completed this journey.

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# Chapter 1: Introduction

## Introduction to the Problem

The multifaceted topic of sustainability has influenced higher education in this country and abroad, with interest and application evident in schools of all levels. Awareness of the need for sustainability measures escalated in the 1970s as citizens around the world recognized the impact of a degraded environment on society and its economics (McFarlane & Ogazon, 2011). Sustainability involves a commitment to protect the environment and its natural resources while providing the means for society to thrive economically in both the present and the future (Hansmann, Mieg, & Frischknecht, 2012). The rationale for sustainability education evolved from contemporary challenges of societal issues regarding the environment, citizenship, human rights, global justice, and survival (McFarlane & Ogazon, 2011).

Education for Sustainability (EfS) is instruction that results in academic knowledge and the acquisition of skills that enable students to recognize interdisciplinary relationships, develop systems thinking, participate in sustainability projects both on and off campus, and form community partnerships to advance sustainability objectives that meet the needs of society now and in the future (The President's Council on Sustainability Development, 1993). Sustainability is a global concern. Sustainability education is a logical and necessary response to that concern (Gough & Scott, 2008).

This researcher became interested in sustainability efforts on college campuses during a research project. A relevant article noted the link between higher education curriculum and management of campus facilities. According to Savanick, Strong, and Manning (2008), institutions of higher education impact all local environments. To provide data for pertinent research, students at the University of California, Los Angeles (UCLA), initiated and conducted

the first campus environmental audit in 1988. The results of the report detailed the university's negative environmental impact, including the effects of precipitation falling on campus grounds becoming contaminated storm water flowing into local rivers and streams, and air pollution from greenhouse emissions emitted from cars and buses used by campus communities for transportation. Since the 1988 study, students, staff, and faculty at the UCLA have instituted numerous innovative sustainability projects emphasizing architectural design, development plans, comprehensive sustainability audits, and progressive environmental policies (Savanick et al., 2008).

Sustainability education in colleges and universities provides learning opportunities for students facing one of the most important challenges of the 21st century (Gough & Scott, 2008). College campuses have the capacity to serve as models for sustainability development and maintenance and are well suited to leadership roles in attitudes and policies regarding sustainability (Davis, Edmister, Sullivan, & West, 2003). Educators are beginning to recognize the value of knowledge and the practical application of sustainability in contemporary society (Davis et al., 2003). Faculty in higher education institutions can play a major role in sustainability education by advancing knowledge and training to benefit society (Chiong, Mohamad, & Aziz, 2017). A growing consensus regarding the goal of education has shifted from subject mastery to mastery of the graduates' development and readiness for meaningful participation in their communities (Davis et al., 2003).

## Background, Context, History, and Conceptual Framework

**Background and context**. In 2010, the Association for the Advancement of Sustainability in Higher Education (AASHE) responded to the need to address sustainability in higher education by hosting the *Summit on Sustainability in the Curriculum.* The association

invited faculty from both private and public universities and colleges, representatives from pertinent organizations, and interested parties to discuss development and implementation of previously established sustainability initiatives into the current curricula in higher education. The purpose of the summit was to recognize challenges to a swift and successful integration of sustainability education and recommend methods to overcome those challenges (AASHE, 2010). The outcome of the summit was the consensus for the need for educators in colleges and universities to design and implement feasible frameworks for sustainability education and development to ensure that higher education students graduate with the knowledge and expertise necessary to construct solutions to the challenges of pollution, climate change, diminished biodiversity, increased population and decreased natural resources (AASHE, 2010). Education for sustainability advocates agreed that colleges and universities should model sustainability in campus operations (Calder & Clugston, 2003).

Educators in colleges and universities are recognizing the need for incorporation of sustainability development concepts in operations and research (Davis et al., 2003). Science, architecture, and business are disciplines that complement education for sustainability objectives (Savanick et al., 2008). Administrators of higher education institutions that claim alignment with sustainability objectives indicate evidence in mission statements, curricula, operational practices in energy and purchases, personnel training and hiring of faculty and campus personnel, and community outreach. Supporting measures include the promotion of sustainable activities for campus life and partnerships in either local or global sustainability projects (Davis et al., 2003). Existing studies examined successful sustainability research and instructional programs implemented in colleges and universities, such as nationally recognized Northern Arizona University and the University of South Carolina (Davis et al., 2003). Campus

sustainability projects are exceptional opportunities to link academics with campus operations and facilities management (Savanick et al., 2008).

**History**. Higher education connected with the conservation movement in the 1960s, when green energy and sustainability became issues of concern and examination (Calder & Clugston, 2003). By 1970, student interest and support culminated in the first Earth Day (Calder & Clugston, 2003). Two years later, the Stockholm Declaration recognized the influence of the academic community in addressing and solving environmental challenges (Calder & Clugston, 2003). The 1975 Belgrade Charter advocated education to identify environmental issues and solve problems (Wu & Shen, 2016). The 1987 Bruntland Report responded to environmental concerns (Calder & Clugston, 2003). In 1990, the Talloires Declaration significantly addressed the role of colleges and universities in education for sustainability (Davis et al., 2003). The declaration was a guideline for institutions of higher education committed to the objectives of sustainability development in post-secondary curricula (Davis et al., 2003). After the 1992 Rio Earth Summit, terms such as education for sustainable development and education for sustainability became part of the vocabulary of a movement responding to not only academic aspects of sustainability but also economic and societal perspectives (Calder & Clugston, 2003). From 1996 to the present, the United Nations Educational, Scientific, and Cultural Organization (UNESCO) and the United Nations Commission on Sustainable Development (UNCSD) have supported sustainability for education in higher education (Calder & Clugston, 2003).

**Theoretical framework**. A theoretical framework is based on theories developed by researchers in their respective fields who describe the specific phenomenon and provide perspectives regarding how and why the situations exist (Regoniel, 2015). The contemporary concept of sustainability encompasses awareness of problematic conditions in the environment

that threaten the global well-being and maintenance of ecological, societal, and economic systems. Sustainability theories are responses to concerns regarding contemporary problems in the environment that negatively impact global economics and cultures (Jenkins, n.d.).

**Conceptual framework for sustainability education.** The conceptual framework is a representation of a researcher's understanding of and direction for the investigation of the problem stated in the research proposal. The framework serves as a guide that, based on previous literature and independently acquired knowledge, identifies and connects the significant factors relevant to the problem and its investigation (Regoniel, 2015). This researcher developed the conceptual framework for the investigation as she researched the design and development of sustainability education in higher education curricula. The research was based on previous peer-reviewed literature and synthesized information on the topic that provided data regarding the relevance of the topic in contemporary higher education, its history and background, and challenges in program development and implementation.

## Statement of the Problem

There is a lack of research investigating the drivers, barriers, and challenges that colleges and universities encounter regarding the design of sustainability curricula and its implementation (Davis et al., 2003). Although institutions of higher education have received calls to action from sustainability education advocates, guidance and direction with which to meet sustainability education objectives is minimal (Shriberg, 2009). Definitions of sustainability and methods for integration of sustainability objectives in higher education vary among colleges and universities, making it difficult for educators to design and implement coursework (Davis et al., 2003). Sustainability and sustainability education may be confusing and controversial because the contemporary use of the term predominantly evokes concepts relating to ecological concerns and

overlooks the interrelated issues of economy and society (Shriberg, 2009). However, a rigid definition may inhibit the implementation of education for sustainability because of its subjective and contextual concepts relating to more than one discipline (Shriberg, 2009).

This researcher chose the topic of sustainability education in higher education institutions for her research because she wanted to explore the acquired knowledge and benefits of sustainability education. As she reflected on the research in the literature review, she theorized that colleges and universities that had not implemented sustainability in their curricula lacked information and paradigms that embolden educators to design and develop sustainability education programs or independent sustainability education coursework. The research literature on this topic indicated that there is very little research regarding the integration of sustainability concepts in higher education curricula and delivery of instructional strategies (Davis et al., 2003). Faculty who have a limited understanding of and appreciation for sustainability curricula in higher education may not fully support its implementation (Christie, Miller, Cooke, & White, 2015). Christie et al. (2015) indicated a concern that educators are reluctant to introduce the subject of sustainability in their classrooms because they question its purpose in formal education.

**Purpose**

The purpose of this study was to explore and examine the experiences of a faculty who designed and developed sustainability education in their higher education curriculum. Data may be useful to other colleges needing information or a paradigm to integrate sustainability education in their curricula. This qualitative case study examined the perspectives, observations, and experiences of the faculty of a southeastern U.S. college who designed and developed sustainability education at their institution of higher education. Research questions investigated

design and process, drivers and barriers in design and development, and the program's successes and challenges.

The case study college is a liberal arts institution of higher education in the southeastern United States with a background and history of ecological awareness and response to environmental concerns. Earth sciences have been a priority since the college's founding in the 19th century. The college has a tradition of concern for the environment, which evolved to the design, and development of their environmental studies program with sustainability education. This researcher chose the southeastern U.S. college for a case study because of its membership in the Association for the Advancement of Sustainability in Higher Education (AASHE, 2015). Research suggested that the college met the criteria of The American Association of University Leaders for a Sustainable Future (ULSF, 2008a). The study focused on academic aspects of sustainability development and built on previous studies regarding sustainability in higher education research and operations at institutions such as the University of Texas at Houston and Oberlin College in Ohio (Davis et al., 2003).

**Research Questions**

The research questions in the case study investigated the experiences of the faculty of a southeastern U.S. college who designed and developed sustainability education in the curriculum. The overarching research question in this investigation was:

- What were the experiences of a higher education faculty who designed and developed sustainability education in their curriculum?

The supporting research questions were:

- What was the process used to develop the sustainability curriculum?
- What was the process used to implement sustainability in the curriculum?

**Rationale, Relevance, and Significance of the Study**

Contemporary educators recognize the responsibility to design and implement curricula that not only motivates students intellectually but also engages them on social and emotional levels (Hargreaves & Fink, 2004). Educators also acknowledge that institutions of higher education, as part of society's global economy, have the capacity to impact and influence the direction of business community institutions (ULSF, 2008a). Sustainability education integrates knowledge with practical application for meaningful development of scholarship and participation (Hargreaves & Fink, 2004). EfS is an integral component of academic development that fosters learning situations in problem-solving skills and opportunities to interact with green energy experts and stakeholders in sustainability projects, both on and off campus (Brundiers, Wiek, & Redman, 2010).

Higher education professionals realize the necessity to acknowledge environmental concerns that threaten natural ecosystems (ULSF, 2008a). The Association of University Leaders for a Sustainable Future (ULSF) posited that colleges and universities are fundamentally responsible to not only conduct research in sustainability development, but also instruct and train students in sustainability concepts, objectives, and practical applications (ULSF, 2008a). Interest in and support for sustainability in the business community has increased opportunities in green energy employment (Peterson's, 2013). Graduates may utilize their sustainability development degrees in fields such as engineering, architecture, environmental management, media, and marketing (Peterson's, 2013). Positions in environmental careers include sustainability analyst, sustainable design professional, construction project manager, energy efficiency analyst, and operations manager. The spectrum of sustainability careers continues to broaden. Workplace settings involving technology, agriculture, transportation, horticulture, parks and recreation,

hospitality, communications, and travel and tourism need expertise in sustainability (Peterson's, 2013). As career opportunities increase, students will seek out institutions that offer the education required for the positions (Peterson's, 2013).

**Definitions and Identification of Terms**

*AASHE*: The Association for the Advancement of Sustainability in Higher Education was founded in 2005 in Portland, Oregon. The association was the first professional organization to support North American colleges and universities in sustainability efforts (AASHE, 2017).

*ACUPCC*: The American College & University Presidents' Climate Commitment is an initiative to encourage higher education leadership in sustainability issues. It provides a framework to support institutions of higher education in the U.S. who pledge to make campus sustainability a reality through reduction of emissions from greenhouse gases and acceleration of progressive research and academic endeavors (Dautremont-Smith, Cortese, Dyer, & Walton, 2009).

*Agenda 21*: Agenda 21 is one part of the three-part sustainability document endorsed at the 1992 United Nations Conference on Environment and Development (UNCED). The agenda is a comprehensive action plan that serves as a blueprint for sustainability development worldwide (UNESCO, 1997a).

*Bruntland Report*: The Bruntland Report is the 1987 publication released by the United Nations' World Commission on Environment and Development (WCED). The commission, chaired by Norway's Prime Minister Gro Harlem Bruntland, examined environmental concerns and interrelated connections between economic growth and social equity and developed policy solutions to integrate all aspects. The report, *Our Common Future*, launched the concept of sustainable development and the means with which to achieve it (Jarvie, 2014).

*Earth Summit*: The Earth Summit is the UNCED's informal name (United Nations, 1997a).

*Education for Sustainability*: Education for Sustainability (EfS) is instruction that results in academic knowledge and the acquisition of skills that enable students to recognize interdisciplinary relationships, develop systems thinking, participate in sustainability projects both on and off campus, and form community partnerships to advance sustainability objectives that meet the needs of society now and in the future (The President's Council on Sustainability Development, 1993).

*Education for Sustainable Development*: Education for Sustainable Development (ESD) addresses challenges such as diversity, societal equities, and global development with sustainable measures. ESD utilizes academic theory and practical application to advance sustainability development. ESD is the term most used internationally and by the United Nations to identify education as an essential tool to achieve sustainability objectives (UNESCO, 1997b).

*IISD*: The International Institute of Sustainability Development is an independent organization established in 1990 that promotes environmental sustainability and human development (IISD, n.d.a).

*LEED Certification***:** LEED Certification (Leadership in Energy and Environmental Design Certification) is a globally used system of points that assesses sustainability standards in building design, construction, maintenance, and operation. Levels begin with certified, then silver, followed with gold, and the top-level platinum (U.S. Green Building Council, 2017).

*NESSE*: The Network of Early-Career Sustainable Scientists & Engineers is an international, non-profit organization founded in 2014 to connect with and support young,

interdisciplinary sustainability professionals engaged in solutions to sustainability challenges (NESSE, 2017).

*Resilience*: Resilience is a system's capability to approach and address change with the ability to continue its development. Conservation benefits from both resilience and sustainability (HydroPoint, 2019).

*Sustainability*: Sustainability in the environment is the ability to maintain the state of conditions necessary to support human needs and protect nature both in the present and in the future (EPA, 2016).

*Sustainability Development*: The Bruntland Report (IISD, n.d.b) provides the most commonly acknowledged definition of sustainability development (SD). Sustainability Development (SD) meets the needs of the current society without weakening the capacity for sustainability for future generations. Two concepts emphasize prioritizing the needs of the poor and limiting technology when the environmental concerns are compromised (IISD, n.d.b).

*The Talloires Declaration*: The Talloires Declaration is a 10-point action plan that incorporates sustainability in research, academics, campus operations, and community outreach. The plan created and developed in 1990 in Talloires, France, during an international conference, became the first official commitment to advance sustainability education objectives in institutions of higher education. More than 500 leaders in universities around the world have signed this declaration (ULSF, 2008b).

*ULSF*: The Association of University Leaders for a Sustainable Future supports and advances sustainability in higher education with literature, assessments, and research. The association is the signatories' Secretariat for the Talloires Declaration (ULSF, 2015).

*UNCED*: The United Nations Conference on Environment and Development convened in 1992 after a review of the Bruntland Report to address issues regarding the environment and sustainable development (United Nations, 1997a).

## Assumptions, Delimitations, and Limitations

**Assumptions**. Concepts of sustainability and sustainability development form the foundation for a long-term, systemic approach in higher education development and implementation of sustainability education (Shriberg, 2009). For the case study, this researcher assumed the sample population was familiar with sustainability theories and concepts, and its relevance to sustainability in higher education. She expected both objective and subjective interpretations of this sample population.

**Delimitations**. This case study was delimited to one institution of higher education in the southeastern United States with an established environmental studies program. The sample population was delimited to faculty in the environmental studies program of the case study. The investigation was delimited to faculty experiences in the design and development of sustainability education in their curriculum.

**Limitations**. Mission statements, curricula, operations, personnel training, hiring practices, and community outreach may indicate sustainability objectives in colleges and universities (Davis et al., 2003). This researcher was challenged because the topic of sustainability education is broad, and she recognized the need for focus and direction. The research was limited to a single qualitative case study of the experiences of one faculty in the design and development of sustainability education in the higher education curriculum at their southeastern U.S. college.

## Chapter 1 Summary

The American Association of University Leaders for a Sustainable Future contended that 21st century higher education should advance the sustainability agenda and posited that success of colleges and universities may be ascertained by their ability to promote a progressive agenda with environmental sustainability as a priority (ULSF, 2008a). Education for Sustainability is an ongoing process with objectives that exceed traditional academic instruction regarding the environment (ARIES, 2009). Colleges and universities are in unique positions to model responsible behavior by ensuring that campus life and activities are both environmentally sound and viable now as well as the future (ULSF, 2008a).

Educators in institutions of higher education are recognizing the need for incorporation of sustainability development concepts in operations and research (Davis et al., 2003). Campus life may reflect a sustainable community by demonstrating responsibility in the use of water, food, and energy (ULSF, 2008a). Participating colleges and universities combine classroom lectures with experiential learning situations to engage students and motivate them to utilize knowledge and practical applications to build competencies in sustainability development that benefit contemporary society and build the foundation for a sustainable future (ARIES, 2009).

Education for Sustainability is adaptable and any discipline may incorporate it (Christie et al., 2015). External drivers for the adoption of sustainability in higher education include both international and national directives and policy statements (Ralph & Stubbs, 2014). Internal drivers include higher education's awareness of ethical obligations in, and moral responsibilities for, the advancement of current knowledge and continued research for solutions. Contemporary students are increasingly concerned about the global crisis regarding sustainability and expect universities to lead the effort to promote policy changes (Ralph & Stubbs, 2014).

There is very little research regarding the integration of sustainability concepts in higher education curriculum and delivery of instructional strategies and a lack of research investigating the drivers, barriers, and challenges that colleges and universities encounter in the design of sustainability curricula and its implementation (Davis et al., 2003). This qualitative case study examined the perspectives, observations, and experiences of a faculty who designed and developed sustainability education at their institution of higher education. The purpose of the study was to add to the information available to educators considering the design and development of sustainability education in their institutions and provide a paradigm for colleges considering the integration of sustainability in their curricula.

# Chapter 2: Literature Review

## Introduction to the Literature Review

This researcher studied the literature regarding sustainability education in higher education to examine prior research on the study topic and ascertain an area that would benefit from additional research. There is very little research regarding the integration of sustainability concepts in higher education curriculum and delivery of instructional strategies, and there is a lack of research investigating the drivers, barriers, and challenges that colleges and universities encounter in the design of sustainability curricula and the implementation of the curricula (Davis et al., 2003). The overarching research question that guided this study was:

- What were the experiences of a higher education faculty who designed and developed sustainability education in their curriculum?

The supporting research questions were:

- What was the process used to develop the sustainability curriculum?
- What was the process used to implement sustainability in the curriculum?

In this chapter, data is presented from research to provide context and significance of sustainability education in higher education. The conceptual framework outlines the foundation of the study. The literature review concludes with a synthesis of the literature and a critique of the previous research.

## Context

Nelson Mandela posited that "education is the most powerful weapon you can use to change the world" (UNESCO, 2015, para.1). Education for Sustainability (EfS) and Sustainable Development (SD) are based on values and principles that address not only the environment, but also global cultures, societies, and economies. As environmental concerns and initiatives

motivate global leaders and citizens to seek solutions to sustainability, they recognized the impact of higher education in the awareness, development, and implementation of sustainability (UNESCO, 2015). Numerous declarations from sustainability organizations outline the significance of education for sustainability and sustainability development to meet the challenges of contemporary environmental concerns. University educators are encouraged to make the commitment to integrate sustainability in their curricula and promote sustainability development on campus (Iyer & Andamon, 2016).

All areas of education, including policy and finance, curriculum, and assessment, may integrate education for sustainability and sustainable development, with implementation in numerous programs and coursework. EfS and SD are interdisciplinary, utilizing pedagogical methods and procedures that target contemporary concerns and broaden understanding of the concept and influence of sustainability (UNESCO, 2015).

**Significance**

According to the 1987 World Commission on Environment and Development, the multifaceted concept of sustainability development meets present societal needs while ensuring that generations in the future will be able to sustain their needs (Holmberg & Samuelsson, 2006). Administrators and faculty members of institutions of higher education need to analyze and evaluate issues of sustainability from disciplinary, cultural, and spatial perspectives to create and maintain the systemic change that results from transformative learning. Sustainability development meets the educational challenge that integrates core concepts, complex systems, and systems thinking (Holmberg & Samuelsson, 2006). Proactive university educators recognize the value of integrating separate sustainability courses as well as fully developed programs within traditional higher education curricula (Holmberg & Samuelsson, 2006).

Education for sustainability development courses provide students with a basic understanding of sustainability challenges and solutions, including conceptual paradigms, tools, and methods (Holmberg & Samuelsson, 2006). Programs lead to degrees in sustainability for graduates seeking careers in green energy. In a recent survey conducted by The Princeton Review, two-thirds of the participating students stated that commitment to the environment would be a deciding factor in the college application process. Schools of business and architecture, as well as science, are responding to the need for sustainability curricula. Arizona State University's School of Sustainability have programs leading to a degree as a Bachelor of Arts or a Bachelor of Science in sustainability; the university also awards a graduate degree. Bucknell University in Pennsylvania requires all students to choose one or more courses that examine stewardship of and responsibility for a sustainable environment. Many community colleges offer green technology training (Berman, 2009).

**Sustainability Theory**

Ekardt, an interdisciplinary sustainability scientist and lecturer, identified sustainability as a global form of social and economic security with environmental protections in place. It involves global justice for future generations as well as the current citizens of the earth (Ekardt, 2009). Sustainability encompasses the potential to maintain long-term societal well-being of the environment, economy, politics, and culture. The well-being of society is dependent on a healthy balance between environment and economics (Chiong et al., 2017). Sustainability is the balance in diversity and productivity in a system (Reza, 2016). Emphasis on escalating economic growth has compromised the quality of the environment and affected the well-being of contemporary society; evidence indicates a continuing decline without intervention (Chiong et al., 2017).

Global interest in environmental concerns and support for constructive stewardship has steadily increased over the last 50 years (Davis et al., 2003). Sustainability has become a prominent consideration in both community and industry (Chiong et al., 2017). Sustainability is a complex, interdisciplinary approach to addressing diverse problems (Ekardt, 2009). Sustainability must be a transformative lifestyle that acknowledges the challenges facing the planet and its inhabitants (NESSE, 2017). Policies that support intervention must be permanent (Ekardt, 2009).

**Interlocking levels in sustainability theory**. Ekardt posited that there are levels in the definition of sustainability and its concepts. The need for sustainability and its policies must have an appeal that encompasses both moral and legal viewpoints, along with assessments for objectives in its implementation (Ekardt, 2009). Ekardt expounded on sustainability theory by detailing aspects that enhance the understanding of and appreciation for theory as it applies to the three pillars of sustainability. Changes in policy and implementation begin with defining sustainability and then identifying levels in both its definition and the causes that inhibit implementation. Acknowledging the levels of balance in the three pillars is integral to achieve development and maintenance of sustainability measures (Ekardt, 2009).

Figure 1 illustrates the contemporary concept of sustainability developed by Ekardt. The overlapping circles depict the interdependence of society, economics, and the environment to maintain the sustainability equilibrium.

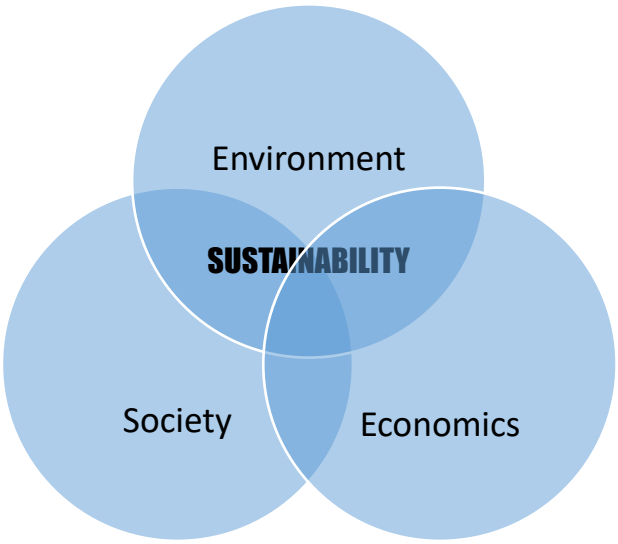


*Figure 1*. Theory of sustainability.

**Sustainability theory and education**. Sustainability education is a process that addresses concerns and attitudes and develops values and abilities to enable students to achieve the next level of leadership in sustainability development and a sustainable future (Reza, 2016). Contemporary universities may expedite this objective by designing instructional programs that facilitate engagement in the classroom and participation in methods of learning to encourage the maintenance of sustainability measures in social systems after graduation from college. The curriculum should foster research (Reza, 2016). Education for sustainable development focuses on the integration of instruction and practical application of essential components of sustainability education, such as conservation of resources, biodiversity, climate change, and reduction of poverty and disaster risks (Reza, 2016).

Tarrant and Thiele (2016) connected contemporary sustainability theory with the philosophy of John Dewey. The authors theorized that Dewey's 20th-century perspectives serve to inspire the contemporary concept of sustainability and the necessary skills to achieve and maintain sustainability (Tarrant & Thiele, 2016). Tarrant and Teale posited that Dewey's

observations regarding the repercussions of the Industrial Revolution indicated his awareness that the negative aspects of technology may outweigh its benefits. The philosopher was concerned that there was "enough intelligence in the physical field to create the new and powerful instruments of science and technology," but had "not as yet had enough intelligence to use this instrument deliberately and systematically to control its social operation and consequences" (Dewey, as cited by Tarrant & Thiele, 2016, p. 55).

Both Dewey and his contemporary, John Muir, expressed awareness of and appreciation for the interdependence of society and the environment. Tarrant and Thiele (2016) noted that Dewey's prolific writings have not only influenced sustainability theory, but also experiential pedagogy and environmental philosophy. Dewey's social theory positions and his aesthetics regarding nature and the interdependence of society and the environment established a theoretical framework for systems thinking in education for sustainability (Tarrant & Thiele, 2016). Research-based findings from institutions of higher education have the capacity to initiate awareness of environmental issues, change policies, and promote solutions. Colleges and universities that are committed to sustainability education and development can provide models for sustainability development and maintenance in their local communities and advise business communities (Reza, 2016).

**Conceptual Framework**

Faculty who design higher education curricula may develop education for sustainability and education for sustainable development by utilizing dialectical constructivist frameworks that focus on experiential learning coupled with social interaction (Armstrong, 2011). A constructivist delivery of instruction enables students to understand sustainability with acquired academic knowledge, observation, and experiences (Educational Broadcasting Corporation,

2004). Educators facilitate learning for students who are actively participating in the acquisition and application of knowledge. Constructivism in sustainability education enables students to understand sustainability concepts and develop values that promote problem-solving skills and responsible stewardship (Armstrong, 2011).

Global interest in environmental concerns and support for constructive stewardship has steadily increased over the last 50 years (Davis et al., 2003). Colleges and universities have the capacity to demonstrate support for sustainability concepts and development in research, curriculum design, and workplace preparation for students (ULSF, 2008a). Institutions of higher education are recognizing the need for incorporation of sustainability development concepts in operations and research (Davis et al., 2003). Educators and administrators in institutions of higher education can play a major role in sustainability education by advancing knowledge and training to benefit society (Chiong et al., 2017). Faculty in colleges and universities have the capacity to demonstrate support for sustainability concepts and development in research, curriculum design, and workplace preparation for students (ULSF, 2008a).

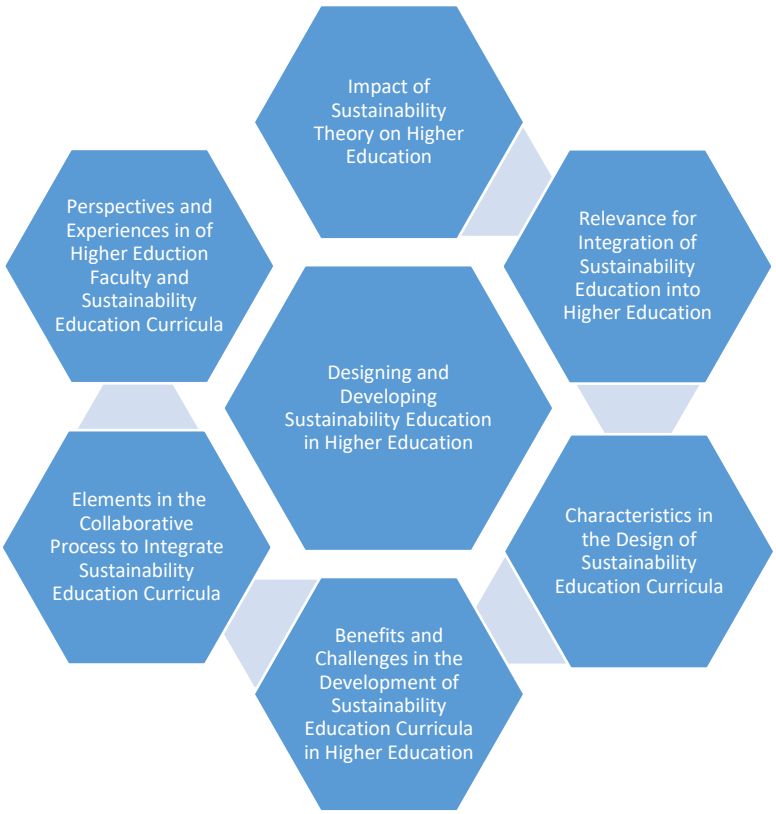


*Figure 2*. Conceptual framework for curricular development of sustainability education.

Figure 2 illustrates the conceptual framework of this qualitative research case study. The sections depict the areas of research used to guide the investigation of the research proposal and add to the literature. The framework was developed during research regarding sustainability in higher education and the need for sustainability education curricula in colleges and universities.

A university education plays an integral part in the shaping of future leaders, professionals, decision-makers, and educators. Institutions of higher education have a unique capacity to promote changes in society and establish new paradigms based on acquired knowledge and research (Christie et al., 2015). Education for Sustainability promotes objectives that prepare students to understand and resolve negative effects on the earth's ecosystems and the environment from national, corporate, and individual activities. EfS not only builds knowledge

and perceptions regarding environmental and societal concerns but also targets essential attitudes and competencies that are necessary to shape sustainable futures (Mintz & Tal, 2014).

Education for Sustainability is not only relevant to students pursuing degrees in environmental studies but to all students enrolled in institutions of higher education (Mintz & Tal, 2014). Meaning, importance, and application is becoming more evident and clarified on campuses around the world as universities progress in the implementation of sustainability coursework and programs (Christie et al., 2015). Colleges and universities are integral forces in the international movement to educate individuals to meet personal, academic, and professional sustainability objectives (Mintz & Tal, 2014). The challenge for institutions of higher education is critical analyses of current practices and orientation to innovative paradigms to develop sustainability education according to the global agenda (Jones, Trier, & Richards, 2008).

Consideration of interdisciplinary, holistic perspectives makes justification for, and relevance of, education for sustainability development apparent (Jones et al., 2008). Further evidence of the relevance of education for sustainability in global policies and practices includes continued networking conferences, increasing higher education membership in AASHE, and the escalating number of available positions in both administrative and academic sustainability coordination (Beringer, 2007).

AASHE (2010) concurred with academics and activists who contend that institutions of higher education are in positions to model sustainability practices and become viable test sites for sustainability development through research, campus operations, and community involvement. Aspects of EfS include goals for students to graduate with an awareness of and a sense of responsibility for environmental stewardship. Graduates would use acquired knowledge and skills to influence a workforce that is able to adapt to changes in sustainability measures.

Graduates would be sustainability advocates who use higher-order thinking skills to make decisions for the good of the community (Mintz & Tal, 2014).

Sustainability for the planet and its citizens is a critical challenge that may be the most significant issue of the 21st century (Mintz & Tal, 2014). As the issue of sustainability in higher education increases in value and significance, international academic communities recognize the need to develop and implement sustainability curricula in coursework and programs. North American colleges and universities, in particular, must consider the inclusion of sustainability coursework to stay competitive (Beringer, 2007). Educators in colleges and universities in countries around the globe are promoting sustainability in a plethora of initiatives, strategies, and educational objectives. Funding and research are important in the United Kingdom and Australia, as evidenced by efforts from the Higher Education Funding Council for England and the Australian Research Institute for Environment and Sustainability (Shephard, 2008). The Higher Education Funding Council for England posited that higher education's graduates may contribute to sustainability in a meaningful way through acquired knowledge and expertise in practices and operations (Jones et al., 2008).

U.S. universities, such as the University of Florida, recognize that institutions of higher education must focus on graduating informed citizens that are prepared to undertake the responsibilities of environmental sustainability (Shephard, 2008). The sustainability studies program at the University of Florida enables students to acquire the knowledge and skills sets that not only prepare them for employment but also local, national, and global stewardship. The program focuses on meeting challenges involving the maintenance of environmental health, pursuit of social justice, and the construction of economic welfare by understanding the interdependency of these three goals (University of Florida, 2010).

Administrators and faculty in colleges and universities demonstrate leadership in sustainability development by exemplifying sustainability principles in facilities management, instruction, involvement in community sustainability projects, and onsite research. Sustainability advocates support the inclusive approach in higher education (Lambrechts, 2015). The challenge for leaders of institutions of higher education is critical self-analysis regarding the present engagement of the sustainability agenda and re-orientation of curriculum design and implementation (Jones et al., 2008). Curriculum changes that incorporate sustainability education provide opportunities for awareness, learning, and application (Shephard, 2008).

Faculty at Germany's Luneburg University developed and embedded a multi-disciplinary sustainability program that serves as a model for other university faculty in need of a theoretically grounded, empirically based addition to the curriculum. The Luneburg Sustainable University Project is an effective paradigm that contributes to significant theoretical study and practical application of sustainability development and implementation. The university meets the Association for the Advancement of Sustainability in Higher Education's rating system for standards in professionalization, internalization, and certification of sustainability in higher education institutions. The Luneburg Sustainable University Project was constructed upon an existing foundation in both environmental and experiential education that followed initiatives set by the United Nations Decade of Education for Sustainable Development (Beringer, 2007). Institutions of higher education in Malaysia have modeled their sustainability curricula after Agenda 21 principles, as evidenced in sustainable structures and green campuses. Coursework is focused in the sciences, including engineering and social sciences; some institutions offer the multidisciplinary format, with research connected to policies. Students are evaluated by the

acquisition of knowledge and preparation for responsibilities after graduation to implement sustainability measures in their lives and in society (Reza, 2016).

**Review of Research Literature and Methodological Literature**

During the 1970s, several international declarations acknowledged the pivotal link between environmental sustainability and higher education (Koehn & Uitto, 2014). The first international initiative by the United Nations (UN) that identified the role of higher education in the advancement of sustainability objectives was the Stockholm Conference in 1972. The Belgrade Charter in 1976 and the Tbilisi Declaration in 1977 continued the efforts of the international community to promote sustainability development through higher education (Reza, 2016).

University leaders around the globe endorsed these declarations and responded with academic programs that addressed contemporary challenges and proposed initiatives. More than 250 institutions of higher education adhered to sustainability objectives outlined in the 1990 Talloires Declaration (Koehn & Uitto, 2014). The 1992 UN Summit reaffirmed the impact of education on sustainability development, which also included the signing of the Framework Convention on Climate Change and the Convention on Biological Diversity (Ryan & Tilbury, 2013). Participating countries agreed with Agenda 21's position that education is integral to the development and maintenance of sustainable societies for future generations. The document itself does not suggest the term, but it receives credit for establishing the concept of education for sustainable development (Ryan & Tilbury, 2013).

In 1997, the Thessaloniki Declaration (UNESCO, 1997a) presented a holistic framework for sustainability education (Koehn & Uitto, 2014). The 2002 Johannesburg Summit addressed the need for and importance of education in sustainability development and maintenance (Ryan

& Tilbury, 2013). The Ubuntu Declaration (World Summit on Sustainable Development, 2002) recommended mainstreaming sustainability development into all levels of educational curricula. Sustainability in higher education became a credible field that emphasizes understanding environmental problems and contributes to solutions benefitting both contemporary and future societies. Many academics considered sustainability education a moral obligation (Wright & Horst, 2013).

The United Nations developed its Decade of Education for Sustainable Development program in 2005, asserting that without education for sustainability development the planet would not be able to create and maintain global sustainability goals and projections (Koehn & Uitto, 2014). UNESCO's World Conference on Education for Sustainable Education (2009) produced the Bonn Declaration, which encouraged institutions of higher education to excel in scientific research regarding sustainability development and share acquired knowledge by networking with colleges and universities worldwide (World Conference, 2009). AASHE (2010) ascertained the challenges confronting institutions of higher education and it hosted the 2010 Summit on Sustainability in the Curriculum; the organization invited faculty and other higher education representatives to the consortium to study past sustainability initiatives and examine infusion of sustainability development into higher education curricula.

In 2012, university leaders in over 40 countries signed the Higher Education for Sustainability Initiative for Rio+20, recognizing the responsibilities of higher education in sustainability objectives and opportunities, particularly by "teaching and enhancing student capabilities, by encouraging relevant research, by disseminating knowledge through public engagement, by adopting sustainable practices, and by building sustainable societies" (Koehn & Uitto, 2014, p. 623). The outcome of the summit was the document *The Future We Want*, which

affirmed the progress made by higher education and the need to continue the impetus for education for sustainability development (Ryan & Tilbury, 2013). Education was universally recognized as integral to an ongoing awareness of issues in environmental sustainability and stewardship solutions. Institutions of higher education were encouraged to promote research and develop specialized instruction (Mintz & Tal, 2014). International drives and initiatives such as the Regional Centres of Expertise and the Promotion of Sustainability in Postgraduate Education and Research Network (ProSPER.Net), both designed by the UN's University Institute of Advanced Studies, promote sustainability education and sustainability development in Asia-Pacific institutions of higher education. Another UN sustainability directive for the Asia-Pacific region was initiated by the United Nations Environment Programme (UNEP) Asia-Pacific Regional University Consortium (Iyer & Andamon, 2016).

In the years prior to global conferences that addressed sustainability, environmental studies focused on conservation. The contemporary focus is an inclusive approach that examines not only environmental concerns but also its relationship to social and economic issues. Education for sustainability advocates sustainable lifestyles and workplaces (Mintz & Tal, 2014). The developing field features terminology that reflects educational initiatives regarding connections between human beings and the environment in which they live. Scholars determine and categorize distinctions in terms such as Environmental Education (EE), Environmental Education for Sustainability and Education for Sustainability (EfS), Sustainability in Higher Education (SHE) and Education for Sustainable Development (ESD), according to design and implementation (Mintz & Tal, 2014).

**Review of Methodological Issues**

Predominant higher education trends have been to build awareness of environmental concerns by learning about sustainability. The focus of education about sustainability is to develop knowledge regarding the environment and issues affecting natural systems. Education for Sustainability includes the knowledge about sustainability and the environment but focuses on conceptual frameworks to provide education that develops necessary skills for students to use to advance needed changes in their personal and professional lives after graduation. Integrating sustainability education in higher education curricula involves not only content but also the knowledge that is contextualized with a methodology that is participatory (Iyer & Andamon, 2016).

In order to design and implement the changes needed to ensure a future that is sustainable, institutions of higher education must establish feasible frameworks for sustainability development objectives to ensure that students graduate with the knowledge and expertise necessary to construct solutions to the challenges of pollution, climate change, diminished biodiversity, increased population and decreased natural resources (AASHE, 2010). Campus sustainability projects are exceptional opportunities to link academics with campus operations and facilities management. The concept is unique, innovative, and compatible with contemporary ecological concerns. Collaborations between academics and facilities provide potential models for other universities and colleges (Savanick et al., 2008).

Support from institutions of higher education is integral to the attainment of sustainability objectives. However, colleges and universities may contribute to environmental contamination and poor management of natural resources. Colleges and universities are a part of society's cultural and industrial modernization; operations contribute to environmental concerns (Togo &

Lotz-Sisitka, 2013). Factors such as rainwater falling on campus grounds that becomes contaminated storm water flowing into streams and rivers impact local environments. Greenhouse emissions from cars and buses used by campus communities for transportation affect air quality. After a 1988 campus environmental audit conducted by students at the University of California, Los Angeles, the academic community recognized the connection between campus operations and local environmental sustainability and instituted numerous innovative sustainability projects emphasizing architectural design, development plans, comprehensive sustainability audits, and progressive environmental policies.

The complexity and multitude of sustainability development concerns make it difficult for faculty in colleges and universities to determine specific agendas for the promotion and advancement of sustainability (Togo & Lotz-Sisitka, 2013). Sustainability projects are viable teaching tools, yet most higher education institutions are not taking advantage of this resource (Savanick et al., 2008). The scope and scale of the challenge to integrate sustainability into higher education are significant (AASHE, 2010).

Sustainability Development curriculum changes, unlike other sustainability issues, are not realized through governmental legislation or policy developments. Curriculum changes must come from the efforts of faculty and their ability to create pertinent syllabi that reflect needed learning outcomes in sustainability objectives, and their willingness to participate in curriculum development and implementation committees (AASHE, 2010). Integrating sustainability into existing multi-curricula in colleges and universities may be complicated because sustainability development accommodates academic aspects involving both undergraduate and graduate education, workplace preparation, education within disciplines, majors and minors, stand-alone programs, and education that is cocurricular (AASHE, 2010). Learning outcomes would require

different assessments and evaluations for competencies in general education, specific courses, and in majors such as political science, biology, or geography (AASHE, 2010). Education for Sustainability is interdisciplinary; it may be difficult for departments and disciplines within higher education institutions, particularly larger ones, to support innovative curricula. The diversity of U.S. colleges and universities presents unique challenges in the development and implementation of educational agendas that apply to the needs of students in large research-based institutions, small faith-based institutions, both private and state-supported schools, community colleges, and proprietary universities (AASHE, 2010).

Science, architecture, and business are disciplines that complement EfS objectives. Campus-based experiential education integrates place-based and situational-educational research concepts, using familiar university facilities to design coursework for campus projects. This hands-on approach may be incorporated into service learning, benefitting students in both academics and career preparation and readiness (Savanick et al., 2008). Curriculum may be considered "a distillation of predominant societal values and beliefs" with planners attempting "to shape human actions by defining the boundaries of what should be known and what knowledge is most important" (Togo & Lotz-Sisitka, 2013, p. 674). Evolution and the evolutionary learning community develops students' awareness of sustainability concerns and potential for productive resolutions. Systems thinking develops and refines the view that society and education are in a co-evolutionary relationship in which both are transitioning toward patterns that are more sustainable. Resilience and systems theories offer meaningful learning strategies to this relationship (Togo & Lotz-Sisitka, 2013).

## Synthesis of Research Findings

One of the challenges to the integration of sustainability education in higher education curricula is that its many core principles necessitate changes in thought processes and practices. This approach indicates a transformation in design and procedures; the model is systemic, participative, and holistic. Learning becoming transformative (Iyer & Andamon, 2016).

For higher education to be effective in sustainability development, it must first question core values and beliefs and then project future challenges. Preparation includes consideration of global consensus that recognizes the value and influence of higher education in sustainability development. Internal drivers include higher education's awareness of ethical obligations in, and moral responsibilities for, the advancement of current knowledge and continued research for solutions. Contemporary students are increasingly concerned about the global crisis regarding sustainability and expect universities to lead the effort to promote policy changes (Ralph & Stubbs, 2014). Factors in curriculum development include conscious evolution, resilience and systems theories, evolutionary learning community, and systems thinking. These progressive methods are integral to the development of transformative coursework and programs (Togo & Lotz-Sisitka, 2013).

Although there is an impetus for sustainability education in higher education, barriers exist that obstruct design and integration of programs and coursework supporting sustainability objectives (Davis et al., 2003). Faculty who lack knowledge and understanding of sustainability concepts hesitate to introduce sustainability in the curriculum. Institutions need resources to provide professional development (Davis et al., 2003). Definitions of sustainability and methods for integration of sustainability objectives in higher education vary among colleges and universities. In the United States, committed members of nongovernmental agencies (NGOs)

and the academic and business communities support higher education for sustainable development (HESD), with limited support from the government. The opposite is true for European colleges and universities, and for some institutions of higher education in developing countries, who receive funding from their governments to support sustainability initiatives (Calder & Clugston, 2003). Sustainability education in Malaysia is supported by the government. Initiatives promoted the development of agendas for sustainability education and sustainability development in the country's higher education institutions. The result of these governmental initiatives was the addition of coursework designed for studies in sustainability. Although the number of sustainability courses is in an adequate proportion to the educational system, several features of sustainability education such as pedagogy, curriculum, campus projects, and extra-curricular activities have not been implemented to date (Reza, 2016).

Colleges and universities that have integrated Education for Sustainability are transforming research, campus operations, and curricula. Coursework is designed with an interdisciplinary perspective (Davis et al., 2003). External drivers for the adoption of sustainability in higher education include both international and national directives and policy statements (Ralph & Stubbs, 2014). EfS is adaptable and may be incorporated into any discipline; commitments of institutions of higher education indicate support for global initiatives that encourage the pursuit of research, instruction in the classroom, and application in campus operations (Christie et al., 2015). Declarations that are relevant to sustainability development in higher education have been acknowledged since the 1972 Stockholm Declaration, which recognized the need for environmental education" (Ralph & Stubbs, 2014). The Talloires Declaration, the 10-point action plan for integrating sustainability in higher education research, outreach, operations, and instruction, has garnered support from more than 400 university

chancellors and presidents since its initial introduction (Ralph & Stubbs, 2014). The amended Higher Education Act recognizes Education for Sustainability as a national priority. Over 600 higher education leaders pledged to integrate EfS by signing the American College and University Presidents' Climate Commitment (AASHE, 2010).

Barriers inhibiting the integration of sustainability into higher education curricula are primarily internal. Colleges and universities must contend with reduced budgets and limited resources; projected long-term savings may not be immediate priorities (Ralph & Stubbs, 2014). Although EfS may be integrated into existing curricula, inclusion has not been readily implemented in many colleges and universities. Notable action has been in the form of campus management and operations. One reason for the slow introduction of EfS coursework may be its controversial concept and definition. Arguments include the position that sustainability must be clearly defined for quantified policies and decisions; the opposite view contends that ambivalence suggests "that sustainability development is a learning process" and "is not so different from other ill-defined concepts taught at university, such as justice, democracy, and beauty" (Christie et al., 2015, p. 656). A rigid definition may inhibit the implementation of education for sustainability because of its subjective and contextual concepts relating to more than one discipline (Christie et al., 2015).

The debate regarding the definition of Education for Sustainability is not the only barrier to curriculum integration; some academics hesitate to teach sustainability because they question it purpose in formal education. Faculty who have a limited understanding of, and appreciation for, sustainability curricula in higher education may not fully support its implementation. Educators with limited knowledge of sustainability concepts tend to teach according to their

expertise, which in turn reduces the understanding and impact of sustainability objectives for students during campus life and beyond graduation (Christie et al., 2015).

Educating faculty and preparing them to deliver effective instruction is integral in meeting education for sustainability objectives (Christie et al., 2015). Workshops such as the bi-annual Curriculum Leadership Workshops hosted by AASHE (2010) provide current knowledge, resources, and tools that enable faculty to develop and implement sustainability in their institutions. Regional efforts that focus on education for sustainability curricula and faculty development include the Washington Center for Improving the Quality of Undergraduate Education Barriers and the Bioregion Initiative at Evergreen State College (AASHE, 2010).

The cognitive domain of learning, based on knowledge, understanding, and application, is the traditional focus in higher education. The affective domain concerns behaviors, attitudes, and values, and commitment to judgment and practices based on evidence. Both domains should be utilized for effective learning outcomes. The introduction of aspects of Education for Sustainability within the affective domain of instructional delivery enables faculty to address and categorize the diversity and multiplicity of projects regarding sustainability and its development and implementation (Shephard, 2008). Learning activities such as "open debate, peer involvement, role playing, problem-based learning, engaging with role models, simulations, games, group analysis of case studies, expert engagement, perspective sharing via reflection," and "appropriate use of multimedia to trigger responses" contribute to mastery of education for sustainability with desired outcomes (Shephard, 2008, p. 91). The framework benefits curriculum planners designing new education for sustainability development and interventions (Shephard, 2008).

Case studies are effective resources for faculty needing suggestions for design and implementation of sustainability curricula (Jones et al., 2008). Northland College, the University of Wisconsin Oshkosh, West Chester University of Pennsylvania, and Bainbridge Graduate Institute are innovators in this new discipline and ideology (McFarlane & Ogazon, 2011). Online questionnaires may have utility in ascertaining the views of academics regarding sustainability and its impact on curricula in institutions of higher education. Research is integral to higher education considerations involving sustainability objectives in campus operations, community relationships, and curriculum development (Cotton, Warren, Maiboroda, & Bailey, 2007).

**Critique of Previous Research**

The concept of education for sustainable development began with an initiative from the United Nations and evolved into a movement that promotes transformative changes in higher education curricula and instructional strategies (Armstrong, 2011). The ambition and commitment of diverse individuals to promote sustainability in higher education is evident in both discourse and practice. There is an awareness that summits and documents are integral to the global movement for education for sustainability but do not prove the occurrence of change (Ryan & Tilbury, 2013).

The movement for education for sustainability development has made progress in areas that pertain to research and management of campus facilities, but curriculum development has been a slower process to design and implement (Armstrong, 2011). Desired learning outcomes are outlined in detail without specific, practical directives for achievement (Armstrong, 2011). A quality system is necessary to effectively integrate systemic, inclusive, and improvement-oriented procedures (Ryan & Tilbury, 2013).

The foundation of the process for teaching and learning is the curriculum. The process involves the development of study programs, strategies of teaching, allotment of resources, and development of faculty (Khan & Law, 2015). Changing curricula in higher education is one of the most challenging aspects of education for sustainability (Ryan & Tilbury, 2013). Sustainability development agendas should include innovative research practices and methodologies in multidisciplinary and interdisciplinary paradigms (Ryan & Tilbury, 2013). Innovative strategies could include updated traditional approaches initiated in the 1930s Progressive Era of Education (Armstrong, 2011). Aspects of the Progressive Era of Education (PEE) included an educational shift emphasizing not only academic success but also the ability to be prepared for responsible citizenship after graduation (Armstrong, 2011). Advocates of PEE supported dialectal constructivism, a paradigm that utilizes social interaction along with instructional engagement, to achieve desired learning outcomes. Constructivism may also serve as a contemporary paradigm to achieve sustainability education goals. Acquired knowledge through active engagement, development of problem-solving skills, interaction with peers and others during the learning process, and independent reflection allow learners to understand sustainability concepts and apply them to sustainability development (Armstrong, 2011).

Projections for the enhancement of teaching and learning in Education for Sustainability include improved understanding of coursework that promotes desired outcomes (Mintz & Tal, 2014). Over the last three decades, sustainability education in Australia has evolved from a focus on scholarship in ecosystems to practical knowledge and skills so that students not only understand the issues but also make informed decisions affecting society, the economy, and the environment. Facilitating the integration of sustainability education in colleges and universities involves the consideration of changes in curricula across the disciplines. Adapting higher

education curricula is integral to the achievement of enduring sustainability objectives (Iyer & Andamon, 2016).

Sustainability research education is an innovative approach that combines classroom theory with real-world problems where students are active participants engaged in specific sustainability curricula, related coursework, separate courses, and research that is extracurricular (Brundiers & Wiek, 2011). Institutions of higher education that have introduced sustainability research education as add-ons to environmental sciences or geography include Lund University, Maastricht University, Arizona State University School of Sustainability, and the University of Tokyo (Brundiers & Wiek, 2011). The solution-oriented method addresses issues such as climate change and overuse of natural resources. Critical thinking skills are essential to successful outcomes (Brundiers & Wiek, 2011). Other academic skills included in the coursework design are written expression and effective interpretation of research. Students analyze current problems regarding sustainability, expressing perspectives and developing solutions in collaboration with stakeholders who support the proposed strategies. The projects prepare graduates for the business sector (Brundiers & Wiek, 2011). Large-scale projects have been successful in engaging not only faculty and students but also stakeholders. Small-scale projects, although rare, have realized successful end results. Students benefit from small-scale projects because they are effective vehicles for responsibility, activity, and accountability (Brundiers & Wiek, 2011).

The lack of a comprehensive curriculum that enables students in higher education to shape a sustainable world hinders meeting the educational goals for a sustainable society (AASHE, 2010). Institutions of higher education should provide specialized training and continual professional development to faculty involved in sustainability development and

implementation. Informal learning experiences are encouraged because they promote sustainability in personal situations (Mintz & Tal, 2014). As higher education continues to design and integrate sustainability into operations and curricula, evaluation frameworks that adhere to the challenges of EfS initiatives are necessary (Koehn & Uitto, 2014). Students benefit from an awareness of social, ecological, and economic systems and the application of holistic practices to real-world situations (AASHE, 2010). Educators must focus on the development of competencies that facilitate learning and application (Armstrong, 2011).

**Chapter 2 Summary**

Implementing sustainability education involves addressing the three interrelated domains of sustainability, namely the economy, environment, and society. The domains must be weighed in proportion to the academic courses being developed for the curriculum. Perspectives of education for sustainability development include the combination of policy aspects and process management within the institutions of higher education. Transformative educators who emphasize the need for widespread changes in university curricula and practices cite the Talloires Declaration (ULSF, 2001) as a guideline to advance curriculum development that embeds sustainability principles and objectives for all higher education students (Shephard, 2008).

Education for Sustainability Development challenges the traditional curriculum formats and paradigms and introduces innovative thought processes and pedagogy. Equity, ethics, and values are part of the dynamics (Reza, 2016). To accomplish sustainability objectives, significant changes in curriculum design and delivery are necessary and prudent (AASHE, 2010). The ideal is a progressive curriculum that prepares students for sustainable living in both their personal and professional lives (AASHE, 2010). Acquired knowledge would enable

participants to appreciate their connection and interactions to the environment and anticipate the consequences of inter-connected actions and decisions (AASHE, 2010). Changes will be successful when the majority of higher education faculty have the skills, support, resources, incentives, knowledge, and disposition to make the transition (AASHE, 2010).

# Chapter 3: Methodology

## Introduction

This qualitative case study examined the experiences of a faculty in a southeastern college who designed and developed a successful environmental studies program that integrated Education for Sustainability (EfS). The study explored the college's relevancy to established sustainability development initiatives by the Association of University Leaders for a Sustainable Future (ULSF, 2008a) regarding research, education, infrastructure, and community connection. The overarching question and supporting questions that guided this case study were developed after careful consideration of pertinent concerns determined from a review of the literature.

This chapter provides a description of the methodology used to execute the study and address the research questions. The detailed description includes the rationale for the decision to utilize a qualitative approach to design the research and determine the target population. Also included are details regarding the selected sampling method and described instrumentation, data-gathering procedures, subsequent data analysis, study limitations, expected findings, conflicts of interest, ethical issues, researcher position, and trustworthiness. This researcher included a brief context of the relevance of sustainability education in higher education and the rationale for this study.

## Context

The motivation to investigate EfS was a global concern regarding environmental issues and the significant need for U.S. institutions of higher education to support sustainability education (Calder & Clugston, 2003). Colleges and universities in the United States influence educational standards around the world and serve the most international students (Calder & Clugston, 2003). U.S. paradigms for sustainability education in higher education have the

capacity to provide both moral and practical perspectives that contribute solutions to sustainability development challenges (Calder & Clugston, 2003).

An international agenda, initiated by the Talloires Declaration and supported by University Leaders for a Sustainable Future, promotes the advancement of competencies that reflect the knowledge, values, and pertinent skills necessary for responsible awareness and application of sustainability measures (ULSF, 2001). Further evidence of the relevance of EfS in global policies and practices includes continued networking conferences, increasing higher education membership in the Association for the Advancement of Sustainability in Higher Education (AASHE), and the escalating number of available positions in both administrative and academic sustainability coordination (Beringer, 2007).

Sustainability Development (SD) is a global movement strengthened by higher education involvement (Wood & Peterson, 2015). Institutions of higher education have unique opportunities to provide leadership in the challenge to protect the environment for both contemporary and future societies (Christie et al., 2015). Colleges and universities are well suited to be models and test sites for sustainability development and practices through conducted research, operations, facilities management, and community involvement (AASHE, 2010). As the issue of sustainability in higher education increases in value and significance, international academic communities recognize the need to develop and implement Education for Sustainability and Sustainability Development curricula in coursework and programs (Akel, as cited by Beringer, 2007). However, there is a lack of research investigating the drivers, barriers, and challenges that colleges and universities encounter in the design of sustainability curricula and its implementation (Davis et al., 2003).

EfS builds knowledge and perceptions regarding environmental and societal concerns and targets essential attitudes and competencies that are necessary to shape sustainable futures (Mintz & Tal, 2014). Institutions of higher education (IHE) must consider changes in curricula to educate students and affect sustainability development (Orr, as cited by AASHE, 2010). AASHE's 2010 *Summit on Sustainability in the Curriculum* acknowledged existing initiatives in higher education and presented recommendations for future strategies for timely and successful implementation of sustainability education in colleges and universities (AASHE, 2010). Establishing clear agendas for collaboration among administrators, faculty, and staff is integral to both initial and ongoing efforts to develop and integrate sustainability education. Identifying barriers to curriculum development accelerate the process of successful design and implementation (AASHE, 2010).

**Research Questions**

This case study utilized research questions that focused on the experiences of a faculty in a southeastern U.S. college who designed and developed sustainability education in their curriculum. The overarching research question in this case study was:

- What were the experiences of a higher education faculty who designed and developed sustainability education in their curriculum?

The supporting research questions were:

- What was the process used to develop the sustainability curriculum?
- What was the process used to implement sustainability in the curriculum?

**Purpose of the Study**

The purpose of the case study was to investigate the experiences of faculty in the development of sustainability education in higher education by addressing the research questions

in this researcher's proposal. This researcher designed the study to achieve the intended results and add to the information available to educators who may be considering the development of sustainability education in their institutions. This study was significant because the data contributes to the literature that educators may use to further the knowledge regarding the relevance of sustainability education in higher education institutions and its curricular development.

Merriam (1988) compared the research design to a blueprint in architecture, with plans for assembly, organization, and integration of data that results in the end product of research findings. Selecting the design involves the determination of the problem, related questions, and desired results (Merriam, 1988). After examining the criteria for both experimental and non-experimental quantitative and qualitative research methods, this researcher chose a qualitative single case study approach and determined that a case study was the best approach to achieve a detailed, extensive understanding of the issue (Creswell, 2013). In quantitative research, the focus in is on variables, outcomes, and, confirmation, which did not fit the needs of this researcher's design (Merriam, 1988). Qualitative case study research is an effective method in the study of complex issues that benefit from an in-depth, holistic investigation (Zainal, 2007). Qualitative case study research benefits the researcher who is interested in the process, context, and discovery (Merriam, 1988).

**Design of the Study**

The qualitative case study is a method used to investigate a specific situation in an authentic setting (Creswell, 2013). The modern researcher may choose from a variety of approaches within the methodology. Case study research has an extensive and highly regarded history that spans several academic disciplines (Creswell, 2013). Case studies may be applied to

many disciplines, including education (Zainal, 2007). A common goal for researchers conducting case studies in education is the understanding of specific issues or problems in practice. The insights gained from case studies in educational practice impact practice, policy, and further research (Merriam, 1988).

**Binding the case.** Advocates of qualitative research maintain that "deep, rich observational data" (Sieber, as cited by Johnson & Onwuegbuzie, 2004, p. 14) provide productive results. Yin (2009) advocates case studies in the development and discussions regarding descriptive, explanatory, and exploratory qualitative research. The case study researcher has the opportunity to concentrate on a phenomenon and detect how relevant factors that are characteristic of the phenomenon interact (Merriam, 1988). Creswell (2013) views a case study as a research design that may be either the product of inquiry or object of the study. The case, or bounded system, may involve one case or multiple cases (Creswell, 2013). This researcher focused on one matter of interest and chose a single case to study and explicate that interest (Stake, 1995).

Several types of case studies are available based on the needs of the researcher, such as interpretive, descriptive, and evaluative case studies. This researcher chose the descriptive case study approach because it fit the direction of the intended research. Descriptive case studies in educational research provide detailed accounts regarding the phenomena to be studied and advance acquired knowledge by providing data in educational areas that lack research (Merriam, 1988).

Binding a case by time frame, setting, and context establishes a feasible range for the researcher to achieve intended results (Baxter & Jack, 2008). This descriptive case study was bound by a contemporary time frame in at a single site. The research questions were limited to

addressing the experiences of faculty in the design and development of sustainability education in higher education curricula. The concrete entity that was studied was a small group.

The foundation of the design was a conceptual framework based on theories of curricular change, utilizing both theoretical and practical application from previous research. Sustainability in higher education is a multifaceted phenomenon studied through a variety of lenses. The lens for this study was curriculum design and development from the experiences and perspectives of a faculty involved in the process. A qualitative, descriptive case study allowed this researcher to address the research proposal questions and explore and better understand the experiences of faculty in the design and development of sustainability education in their higher education curriculum.

This researcher chose the southeastern U.S. college for a case study because of its commitment to and implementation of established sustainability objectives (AASHE, 2015). She developed open-ended questions regarding the design and development of sustainability education within the college's environmental studies program to use in data-gathering interviews. The design included the boundaries between phenomenon and context and explored how global sustainability objectives influenced local sustainability initiatives (Baxter & Jack, 2008).

**Research Population and Sampling Method**

This researcher chose purposive sampling, which is a non-probability sampling technique, to determine the target population for her study. This sampling technique may be termed subjective, selective, or judgmental; the researcher's judgment is the criterion for unit selection. There were several techniques in purposive sampling from which to choose, including homogeneous sampling, total population sampling, critical case sampling, maximum variation

sampling, extreme case sampling, expert sampling, and typical case sampling; techniques render results based on researcher goals.

This researcher needed to determine which type of purposive sampling to use in the study (Laerd, 2012a). After considering the different types she decided that expert sampling applied to her intended results. Qualitative researchers choose expert sampling when data needs to be gleaned from individuals with specific expertise. This type of purposive sampling allows the researcher to choose a target population that is most suitable to achieve the results of the study. The size of the population is usually small (Laerd, 2012a).

This case study focused on the population of faculty from the college's environmental studies department. The total target population of this study was five faculty members actively involved in the program. The population was selected because this researcher determined that the targets should be the most knowledgeable about the college's process in the curricular design and development of the environmental studies program and its successes or challenges. She decided that limiting the population to include only faculty from the environmental studies program aligned with intended results for the case study. The sample was the number of participants who agreed to participate.

The total sample was four participants. The four faculty professors who agreed to participate in the study were adult, mixed gender, White U.S. citizens from the southeastern and southwestern areas of the United States. One faculty member declined to participate; this professor was recently hired by the college for sustainability education and was unable to provide information relevant to the dissertation research questions.

## Instrumentation and Data Collection

The researcher is the primary instrument in qualitative case studies. Interviews, documents, and observations are components of qualitative data (Merriam, 1998). This qualitative case study utilized structured interviews as primary sources of data collection. Documents provided by two participants, documents acquired by this researcher, and written researcher notes and observations were additional sources of data collection. The case study utilized an overarching research question and supporting questions that focused on the experiences of the college's faculty who designed and developed sustainability education in their curriculum.

After securing approval from Concordia University–Portland Institutional Review Board, this researcher began preparation for the field research by contacting the chosen college's president for permission to conduct the case study. She was referred to the department chair of the environmental studies program for the desired approval. After talking to the department chair by phone and communicating by email, this researcher received permission to conduct the research and contact the targeted population. She emailed the targeted population to request structured interviews lasting no longer than one hour. Email addresses were located by researching the chosen college's website and searching for sustainability curriculum faculty. In each email, this researcher introduced herself, explained the purpose of the request, and suggested time frames that could accommodate work schedules. The consent forms and interview questions were attached in the emails for intended participants to review.

Confidentiality was stated in the consent form, which specified that participation was voluntary and could be withdrawn at any time during the process. Included in the confidentiality form was the explanation that there were no risks to the study participation other than providing

information, which would be protected during the study in a locked cabinet and eventually destroyed three years after the conclusion of the study. The consent form stated that privacy would be maintained at all times; personal information would be coded so that none of the data could be linked to the participant. The consent form also explained the benefits of participation; information provided during the interviews would be used to advance the knowledge regarding sustainability in higher education and its integration in the curricula of small colleges. Three potential participants responded within two weeks and agreed to participate. A letter was mailed to the faculty member who had not responded to the email. This potential participant intended to respond by email but met the researcher while she was waiting for another participant and subsequently confirmed participation.

This researcher conducted her first interview with the professor who responded first and made arrangements to meet. The interview took place on the college campus in the professor's office. After the professor signed the consent form, she started the tape recorder and began asking the structured questions. Written notes supplemented the taped interview. The next interview was also conducted on campus in the participant's off ice in the department building. After first securing the consent form, this researcher began the structured interview and took notes while the professor answered the questions. She recorded the interview so that it could be play backed with notes for continued reflection and analysis. The third participant had requested a later time and date to be determined during the college's winter break.

The third interview was conducted the day after the second interview. The interview was scheduled when the intended participant noticed this researcher waiting to begin the second interview and decided to make room on the calendar for the following afternoon. This interview was conducted in a conference room in the campus building of the environmental studies

department. She followed the same procedure as the previous two interviews, securing the consent form first, asking the interview questions, and taking notes to supplement the taped interview. During this interview, the professor shared an article that was pertinent to sustainability and the environment.

The fourth and final interview was conducted off campus at the department's environmental studies center. The professor greeted this researcher at the front door of the building. The interview was conducted in the main area of the center. The same procedure was followed as the procedure utilized in the prior three interviews. The professor signed the consent form; this researcher turned on the tape recorder and began asking the interview questions. The professor provided documents that detailed the history of campus sustainability and sustainability education at the college. Written notes during the interview supplemented the taped recording.

**Data Analysis Procedures**

Data analysis in qualitative research methods begins with the preparation and organization of the data, followed by theme development through a coding process, and concludes with data presentation (Creswell, 2013). Codes in qualitative research are short phrases or single words assigned to prominent portions of collected data. The code evokes the essence of the content portion. Coding serves to reduce data or condense the content and may be accomplished in one or more stages to identify categories and develop patterns (Saldaña, 2013).

The case study focused on linking participant answers from the interviews to the research questions. Data analysis was initiated after the interviews were completed. This researcher transcribed the recordings and prepared the transcripts for member checking by the study participants for their review and approval. The first step in data analysis was reading the

transcripts from the interviews several times and then listening to the recordings along with the written transcripts. This researcher began the coding process by manually highlighting significant terms from each participant, counting the number of responses repeated by each participant, and recording the response numbers. The coding process was continued manually by listing the combined codes and the number of responses from the sample. This list was scrutinized to determine categories.

After analyzing the categories, this researcher was able to discern themes. Data analysis included a synthesis of information from the structured interviews, acquired documents, written notes, and observations. Acquired documents included a history of sustainability education efforts at the college authored by one of the participants, documents that described program initiatives and projects, and a pertinent article on sustainability that another participant utilized in the classroom. This researcher examined documents that described the faculty of the environmental studies department and the program, sustainability projects, and information regarding the college's multi-million-dollar sustainability initiative from a local foundation grant. This data were synthesized and utilized to answer proposed questions and cite areas for future research.

## Limitations and Delimitations of the Research Design

**Limitations**. Limitations are inherent problems or weaknesses in the research process (Simon, 2011). Limitations in research studies identify the circumstances that researchers cannot control. There are limitations to every study. Reliability and validity may be limitations in qualitative research because there are difficulties in replication in natural settings (Simon & Goes, 2013). In natural settings, researchers study issues without manipulating the environment with experimental or control groups (Given, 2008). In case studies, researchers cannot make

causal inferences or generalizations, because the study of one entity may not reflect the data from similar entities (Simon & Goes, 2013). Researchers need to recognize limitations in research because they may affect study outcomes (Simon, 2011). This researcher recognized limitations in the research design, target population, study site, and time frame.

This research was limited to a qualitative, descriptive case study of the experiences of one faculty who designed and developed sustainability education in the curriculum of one local institution of higher education. This researcher expected both objective and subjective interpretations from the sample of the population in the college's environmental studies department. The results may not be generalized since only one faculty's experiences were studied. Although no physical or academic changes were anticipated, the possibility that participants may move from the area or change positions and perspectives were considerations. The time frame was a consideration because this researcher had a time limit regarding the span of the study.

**Delimitations**. The purpose of delimitations is to enable the researcher to narrow the scope of the research by binding the case with boundaries for the study (Simon & Goes, 2013). The researcher considers specific options regarding the research proposal, research questions, method, and participants. Delimitations are controlled by the researcher (Simon & Goes, 2013).

This researcher was challenged because the topic of sustainability education in curricular development is broad, and she recognized the need for focus and direction. Definitions of sustainability and methods for integration of sustainability objectives in higher education vary among colleges and universities (Davis et al., 2003). This study was delimited to the investigation of the experiences of one higher education faculty as they designed and developed sustainability education in a southeastern college in the United States. The research method was

delimited to a qualitative, descriptive case study with specific research questions regarding the topic of the investigation.

## Validation

Creswell and Miller (2000) observed that "qualitative inquirers need to demonstrate that their studies are credible" (p. 124). Researchers in qualitative approaches have a different lens regarding validity than researchers in quantitative studies (Creswell & Miller, 2000). Qualitative research utilizes data trustworthiness to establish reliability and validity. Components of data trustworthiness include credibility and dependability. Member checks and triangulation are primary methods in trustworthiness and commonly used by researchers to address credibility (DeVault, 2018).

## Credibility

Credibility, or trustworthiness, is an important component of qualitative research that encompasses standards such as subjectivity, adequacy of data as well as interpretation of data, reflexivity, and social validity (Morrow, 2005). Credibility focuses on the accurate communication of research results after a rigorous research process. Credibility may be achieved through engagement, observations, reflexivity, and validation. Thick, rich descriptions enhance credibility in research by describing the experiences of the study participants and the context in which they are experienced. Thick descriptions detail the multiple layers of context and culture within participant experiences (Morrow, 2005). This researcher utilized structured interviews from participants, acquired documents, and observations as sources to strengthen the credibility of the data presented in this case study. Interviews with participants provided insight into both individual and shared experiences of the case study faculty as they designed and developed an independent program to integrate sustainability education within an environmental studies

program at their institution of higher education. Additional sources were documents provided by two participants, documents acquired by this researcher, and researcher observations.

**Dependability**

In qualitative research, internal validity is often termed dependability (Laerd, 2012b). Internal validity is a concept that is integral to the accurate reflections in the dissertation research conclusions. Results must be concluded exclusively from the analyzed data (Laerd, 2012b). This researcher utilized member checking and triangulation to ensure dependability regarding transcripts and research conclusions. Member checking involves a review of data by participants. Participants received copies of interview transcripts for correction or clarifications. Triangulation occurs when the researcher collects different sources and uses different methods in order to answer research questions (DeVault, 2018).

**Expected Findings**

This researcher expected to find adherence to established higher education sustainability objectives at the college regarding academics, operations, and outreach. After the research was concluded, the expected findings included substantive answers that explained what drivers were the impetus in the design and development of sustainability coursework and programs and what barriers impeded the development of specific sustainability coursework or programs. The in-depth study reflected faculty perspectives regarding the design and development of sustainability education in the curriculum of their college, including successes and setbacks. This researcher also expected to find evidence of the impact of sustainability and sustainability education on the college campus and in the community. The findings may be useful to small colleges throughout the region that needed a successful paradigm for the design and development of sustainability education and sustainability development in higher education curricula. The findings may also

be useful to educators who needed suggestions for the integration of sustainability courses in their higher education curricula.

## Ethical Issues

**Conflict of interest assessment**. Conflicts of interest occur when a secondary interest influences a primary interest. Conflicts of interest may jeopardize a researcher's professional judgement or actions (Lo & Field, 2009). There were no conflicts of interest during the research. The sample was not compensated for their participation in the case study. This researcher received no benefits to influence the results of the study.

**Researcher's position**. A significant consideration for researchers is their positions in the research process. The researcher position may impact both the design of the study and its ethics (Murphy, 2014). When conducting qualitative research, it is prudent to consider the effect of bias on the investigation. This researcher recognized her personal bias regarding support for sustainability in higher education. This personal bias was recognized and monitored throughout the research process. Introspection and rational identification tempered her personal viewpoints in order to maintain a commitment to diverse data that reflected not only an open mind but also a skeptical one (Machi & McEvoy, 2012). She researched negative aspects in the argument for sustainability in education in higher education curricular development to broaden awareness and maintain objectivity. Case study interview questions probed the setbacks and failures of sustainability education at the college as well as its drivers and successes. Purposive sampling of selected units reduced ethical concerns regarding researcher prejudice and personal preferences. Participants were chosen based on theoretical contributions to the study rather than practical purposes such as convenience or location (Laerd, 2012b).

**Ethical issues in the study**. A fundamental principle in the process to seek out, describe, and analyze a phenomenon is the expectation to conduct research that is ethically sound (Kjellström, Ross, & Fridlund, 2010). Ethical issues include approval from established review boards, confidentiality, informed consent, methods, and information about and rationale for the study (Kjellström, et al., 2010). This researcher observed ethical measures by first securing approval for the research proposal from Concordia University–Portland Institutional Review Board. After receiving approval to conduct the case study at the college, she contacted the target population to request voluntary participation in the research regarding experiences in curricular development in their department with intended interview questions. A consent form was provided that stated participation could be withdrawn at any time; there were no risks other than providing information; participation would take no more than an hour of their time, and confidentiality would be maintained at all times during the process. Each participant from the sample signed the consent form before the interview was initiated.

This researcher transcribed the taped recordings from participant interviews after listening to the recordings multiple times and then transcribing the interviews. She checked the accuracy by listening repeatedly and reading the transcripts. No names of the sample, location, or persons and places to which participants referred were in the data. Instead, participants were identified by letter; locations and other persons were described in generic terms. Only the researcher had access to recordings, transcripts, and notes, which are presently stored in a locked cabinet and will be destroyed in three years.

## Chapter 3 Summary

This qualitative case study examined Education for Sustainability within the environmental studies program at a southeastern U.S. college and investigated the experiences of

faculty in the design and development of sustainability education in the curriculum. Interviews, acquired documents, and observations were synthesized to address the overarching research question and the supporting questions. This researcher described the design of the study and its methodology. The methodology included the selection of the location of the case study, the research population, data collection and analysis, design limitations and delimitations, credibility and dependability, ethical issues, and expected findings.

This researcher expected to find successful adherence to established higher education sustainability objectives at the college regarding academics, operations, and outreach. Colleges and universities are ideal settings in which to promote sustainability objectives and serve as test sites and models for sustainability development (AASHE, 2010). The Association for the Advancement of Sustainability in Higher Education challenges institutions of higher education to embrace sustainability education for both academic and societal benefit (AASHE, 2010).

Aspects and influence of sustainability in higher education include integration of sustainability coursework and campus projects into curricula, programs of study for students entering green energy workplaces, current and projected savings in campus infrastructure expenditures, opportunities to link academics with campus operations and facilities management, and impact in local communities (Savanick et al., 2008). The paradigm used by the faculty may prove useful to other institutions of higher education. This researcher provided details of the case study and presented the data and findings from the research in Chapter 4.

## Chapter 4: Data and Analysis

### Introduction

The objective of this chapter was to present the findings of the qualitative research case study, provide a description of the sample, review the methodology and data analysis procedures, and present the data along with a synthesized summary of the findings. This researcher investigated the experiences of faculty in the development of sustainability education in higher education by addressing the research questions in the proposal. The overarching research question was:

- What were the experiences of a higher education faculty who designed and developed sustainability education in their curriculum?

The supporting research questions were:

- What was the process used to develop the sustainability curriculum?
- What was the process used to implement sustainability in the curriculum?

This researcher was interested in education for sustainability in higher education curricula. Initial interest for this research proposal was sparked during previous coursework research for articles relating to contemporary issues regarding finance and facilities management in higher education. Her broad topic of interest had components regarding the integration of campus sustainability projects in higher education curriculum, benefits of coursework programs of study for students entering green energy workplaces, and current and projected savings in campus infrastructure expenditures. The initial focus for research was the integration of campus sustainability in higher education curricula and its influence on workplace preparation and infrastructure expenditures. After research, reflection, and question refinement, a conceptual

framework was developed for a case study of the experiences of faculty in the design and development of sustainability education in higher education curricula.

Sustainability in Higher Education (SHE) is a multifaceted phenomenon studied through a variety of lenses. The focus of this investigation was curriculum design and development. The research design was a qualitative, descriptive case study. The purpose of this qualitative case study was to examine the experiences of faculty in the design and development of sustainability education in the curriculum and to add to the information available to educators who may be considering the development of sustainability education in their institutions. The case study focused on linking acquired information in the interviews to the research questions in the dissertation proposal and ascertaining outcomes from the analyzed data. Data analysis included a synthesis of information from the structured interviews with acquired documents and observations. This researcher utilized the findings to answer the research questions and cite areas for future research.

**Description of the Sample**

The objective of the investigation was the examination of experiences and perspectives of a higher education faculty in the design and development of sustainability education in their department's curriculum. This researcher chose a non-probability sampling technique, namely purposive sampling, to determine the population and select the sample. Purposive sampling may also be termed subjective, judgmental, or selective; it reflects the judgment of the researcher (Laerd, 2012a). There were several techniques in purposive sampling from which to choose, including homogeneous sampling, total population sampling, critical case sampling, maximum variation sampling, extreme case sampling, expert sampling, and typical case sampling; techniques render results based on researcher goals. Expert sampling was the specific type of

purposive sampling used in this study; this technique was chosen because data needed to be gleaned from individuals with specific expertise (Laerd, 2012a).

This researcher determined that the faculty from the college's environmental studies department had the most specific expertise. The total target population of this study was five faculty members actively involved in the program. This population was selected because the researcher determined that the targets should be the most knowledgeable about the college's process in the curricular design and development of the environmental studies program and its successes or challenges. Limiting the population to include only faculty from the environmental studies program aligned with the intended results for the case study. The sample was the number of participants who agreed to participate.

The total sample was four participants. The four faculty professors who agreed to participate in the study were adult, mixed gender, White U.S. citizens from the southeastern and southwestern areas of the United States. One faculty member declined to participate; this professor was recently hired by the college for sustainability education and was unable to provide information relevant to the dissertation research questions. Collected data enabled this researcher to ascertain that all participants were knowledgeable about sustainability in higher education and had expertise in their specific areas of instructional delivery.

All participants taught in the environmental studies department building on the main campus or off campus in the environmental studies center. All participants had a background in science; three of the participants had a strong background in the social sciences and natural sciences. One of the participants had a strong background in the humanities. Two of the participants were part of the original multidisciplinary team who conceived and designed the environmental studies program with sustainability concepts. One of the participants joined the

faculty four years after the formal implementation of the program. One participant joined the faculty three years ago. The newest member of the faculty, who had been recently hired and was not involved in the curriculum design and development, did not feel there was any pertinent information to offer and did not participate in the case study.

**Research Methodology and Analysis**

A common goal for researchers conducting case studies in education is the understanding of specific issues or problems in practice. The insights gained from case studies in educational practice impact practice, policy, and further research (Merriam, 1988). Researchers conducting qualitative studies rely to a large degree on comprehensive interviews; the goal is to discern a participant's views from the manner in which the response to interview questions is framed and structured (Marshal, 2006). This study utilized structured interviews as primary sources of data collection. A qualitative research methodology enabled this researcher to obtain and identify participant thoughts and sentiments in structured interviews and then develop an understanding of the meaning participants ascribed to those experiences (Sutton & Austin, 2015). This researcher examined Education for Sustainability (EfS) within the environmental studies program at a southeastern U.S. college and investigated the experiences of the faculty who designed and developed sustainability education in their curriculum by exploring the experiences through structured, one-on-one interviews with participants of the sample (see Appendix A). Interview questions addressed the research questions.

**Data collection**. Researchers conduct case studies in authentic, contemporary settings (Yin, 2009). The case study was conducted in both the on-campus and off-campus department buildings of an environmental studies program at a southeastern college. Data collection was initiated after first securing approval from the Concordia University–Portland Internal Review

Board and then from the case study college. After gaining approval to proceed with the case study, this researcher emailed the targeted population to request structured interviews lasting no longer than one hour. The primary data were collected from four individual, hour-long interviews from the sample. This researcher protected the confidentiality of the sample by referring to the participants as Professors A, B, C, and D in the case study, and maintained confidentiality by not disclosing personal or professional information that would identify the participants or the college. Persons or places mentioned by participants during the interviews were identified with generic terms.

This researcher utilized structured interviews as primary sources of data collection. Secondary data were gathered from documents given to this researcher by two of the participants during the interviews, and other documents acquired and examined by the researcher. Tertiary data were garnered from researcher observations and notes.

**Data Analysis**. Data analysis in qualitative research methods begins with the preparation and organization of the data, followed by theme development through a coding process, and concludes with data presentation (Creswell, 2013). The coding process identifies the subject matter, issues, similitudes, and contrasts that are derived from participant accounts and then explicated by the researcher to promote understanding of individual perspectives (Sutton & Austin, 2015). The process of theming involves the assimilation of codes from transcripts in order to convey qualitative research findings in a cogent, significant manner (Sutton & Austin, 2015).

This focus for this study was linking participant answers from the interviews to the research questions. After the interviews were completed, data analysis was initiated by transcribing the recordings and then preparing the transcripts for member checking by the study

participants, who approved the content with no changes. The next step in data analysis was reading the transcripts from the interviews several times and then listening to the recordings along with the written transcripts. This researcher began the coding process by manually highlighting significant terms from each participant, counting the number of responses that were repeated by the participant, and recording that number by the response. She continued the coding process manually by listing the combined codes and the number of responses from the sample. This list was scrutinized to determine categories. After analyzing the categories this researcher was able to discern themes.

The opportunity to review documents enables the researcher to obtain facts and information regarding the setting's context and history. Gathering and analyzing documents provides insight into the circumstances of participants in the study situation (Marshal, 2006). This researcher gathered facts and analyzed them from a participant-authored history of the college's campus sustainability and sustainability education efforts and subject materials regarding department projects; both provided by one of the participants. She discerned perspectives of instructional delivery of sustainability education from an article from another participant. Comments from participants prompted the researcher to acquire documents that provided information regarding the environmental studies department and its faculty, program coursework, and the study college's multi-million-dollar sustainability initiative from a local foundation grant.

**Summary of the Findings**

This qualitative case study examined Education for Sustainability within the environmental studies program at a southeastern U.S. college and investigated the experiences of faculty in the design and development of sustainability education in the curriculum. The

researcher gathered data from structured interviews to answer research questions. The participants shared their experiences during the process and reflected on successes and setbacks. Participants also offered suggestions for interested educators and colleges who may want a paradigm for a sustainability education program. Themes became evident as the data was coded.

Findings from the study indicated that faculty interest and interdepartmental collaboration were driving factors in the impetus to design and develop an environmental studies program. Student interest was another notable factor. The new program was based on a visionary, interdisciplinary framework that integrated the humanities with natural sciences and social sciences. The college has a tradition of concern for the environment. Earth sciences have been a priority since the college's founding in the 19th century. Environmental courses involving sustainability issues had been offered to interested students before the approval of a formal program.

There were challenges during the process. Funding was an early challenge. Generous grants enabled the department to expand the program and hire new faculty. There were delays in the approval of a formal, independent program. The program maintained the vision and design of the original proposal. The program was distinguished by its interdisciplinary framework that integrated the humanities with the natural sciences and social sciences.

The participants agreed that all aspects of the environmental studies program were successful. Over 50 alums have completed the program; there are up to 20 majors every year. All participants recommended an interdisciplinary approach to educators interested in the development of sustainability education programs in their institutions of higher education. Colleges with limited resources may develop successful sustainability education courses without a department if the framework is in place.

## Presentation of the Data and Results

This investigation examined the design and development of sustainability education within the environmental studies program at a southeastern college. This researcher explored faculty experiences through individual interviews with participants of the sample. Interview questions addressed the overarching research question and supporting questions. The overarching research was:

- What were the experiences of a higher education faculty who designed and developed sustainability education in their curriculum?

The supporting research questions were:

- What was the process used to develop the sustainability curriculum?
- What was the process used to implement sustainability in the curriculum?

## Background and History

Two of the participants were part of the multidisciplinary team that designed the environmental studies program. Two of the participants offered input based on observation and acquired knowledge. There was support for a program from the administration and student interest was evident. All of the participants have been involved in program development.

The multidisciplinary team that designed the environmental studies program represented the foreign language department (Spanish professor); business department (finance professor); humanities (English professor); and the science department (biology, chemistry, and geology). The environmental program was developed as an environmental studies program, rather than a sustainability education program. Although sustainability education and sustainability development were conscious considerations, they were not incorporated as a core tenet in the

beginning. Commitment by faculty in the design and development of an environmental studies program with sustainability objectives were supported by the college's administration.

Biology and geology are two of the college's oldest and strongest disciplines. Ecology was introduced to supplement the biology department. The biology department supported an interest in environmental science. New faculty brought expertise in ecosystems and the state's ecology. Geology professors stressed the importance of studying the environment to fully appreciate the science programs and established a foundation for a new method of geology science that combined field work with natural science and interdisciplinary reflection. This successful approach became the antecedent for the college's program in environmental studies.

A grant made it feasible to initiate an environmental program. Sustainability was taught within environmental studies. The college signed The Presidents' Climate Commitment, designed and implemented both a major and a minor in environmental studies, promoted a lecture series regarding sustainability issues and energy concerns, and opened an off-campus environmental studies center to expand the education and experiences of its students. The environmental studies program at the off-campus center is an interdisciplinary approach to sustainability education and sustainability development. Classroom instruction and hands-on activities cover water quality, writing projects, sustainable living, workshops, and research. Funds from two major grants enabled the faculty to advance the program on campus and support its off-campus extension. A recent grant enabled the college to initiate a sustainability-specific program with a sustainability professor. The college also hired a sustainability manager in the facilities department.

**Interview Responses**

**Question one.** The first question asked: How long has the environmental studies/sustainability education program been a part of the curriculum?

***Professor A (PA).*** PA stated that the program began "eight or nine years ago." PA noted that the impetus for an environmental studies program stemmed from his cultivated interest in co-teaching science classes. PA recalled:

> I was in the English department at the time, but I spent about six years teaching with a biologist, a learning community on water, and I discovered that I like to co-teach and team teach with scientists, so we created a committee at the college and we designed an environmental studies program and the college decided to support it. We hired Professor C and they moved me from English. An educator from a local school became a part-time sustainability director, and we began to think about sustainability on campus.

PA elaborated that it was during this time that the college's former president signed the *President's Climate Commitment*, joining about 150 other colleges and universities across the United States. PA went on to explain that "if you signed the commitment you had to come up with a plan to be carbon neutral by some date." The faculty was given an off campus building with four acres of property, and the conversation began "about whether or not, and how, we were going to certify this building, environmentally." PA concluded that after being moved from the English department and being named Professor of Environmental Studies and English, the college also named PA the first director, the founding director, of the environmental studies center.

***Professor B (PB).*** PB stated that "things relating to environmental studies and sustainability have been a part of this the curriculum for many, many years." The formal

program was developed in the 2007–08 academic year, "the first year we formally approved the development." PB noted that "the development of the program goes back farther" than when it was approved. PB explained:

> There was, prior to that time, courses offered that were eventually folded into environmental studies. That included the geology department at one point. The geology program actually became part of the program in 2007–2008. I was chairman of the geology department from 1984–2008. The formal beginning of this program were discussions in 2005–2006 with the dean at the time. Professor A and I had several discussions with the dean; we told him we would like to have an environmental studies program. It wasn't until the next dean in 2007 that we were able to get approval for the development of an environmental studies program.

***Professor C (PC).*** PC stated, "the program began eight years ago before I joined the faculty." The concept for the program "arose from a learning community that was interested in environmental issues and having a green campus." PC noted that the program was initiated by PA, who had "formed a committee with PB, and professors from the biology, chemistry, finance, and Spanish departments." PC added that the collaboration was very productive.

***Professor D (PD).*** PD stated that the environmental studies program has been a part of the curriculum "at least eight years." Interest from faculty and students began the process. PD noted that the program was developed in collaboration with faculty from different departments "that moved the college closer to having an environmental studies program." PD went on to explain that sustainability "is something we have taught, but the more formal involvement of sustainability really started up this year." PD added:

> I don't know if you want to differentiate between things that have sustainability in the name of the program versus the kind of sustainability teaching that we definitely have done for as long as the program has been around. The program itself is relatively young.

**Question two.** The second question asked: Was sustainability a consideration when you began the design of the environmental studies program?

***Professor A (PA).*** PA stated that the college has a long history of environmental literacy and concern for environmental issues and sustainability. PA had chronicled that history and the need for sustainability education in a report compiled for the program proposal. PA, who keeps the history updated, shared the detailed history with this researcher.

***Professor B (PB).*** PB stated that sustainability was involved in the program from the very beginning. PB noted that "sustainability was discussed in classes before the environmental studies program" and added that "I have talked about sustainability in my classes since the 1980s." According to PB, it is important to define sustainability. PB explained:

> A lot of people talk about sustainability but don't understand what it is. People talk about sustainability and resilience like it's something new. The concepts have been around and well understood by some people since the 1960s and 1970s. There are factors relating to sustainability, like population growth, resource exploitation, finite resources, and energy utilization.

PB emphasized that sustainability is a major component of the program. However, PB stated that "we did not want to become identified as a sustainability program. We wanted to be identified as an environmental studies program, which is much, much broader." PB explained that sustainability programs focus on sustainability issues, which are important and relevant. However, this college's program is not sustainability driven. According to PB, "to fully

understand the problem you have to understand the underlying science, the social science aspects, and the humanities aspects." PB concluded that the program has incorporated sustainability in the curriculum and on campus.

***Professor C (PC).*** PC stated that "sustainability was a conscious consideration in the design of the program but not a core tenet." PC added that "it was decided from the beginning of the design that the program would be an environmental studies program with sustainability education." PC recalled:

> The college used a different approach to develop the sustainability curriculum. The environmental studies program combines the study of the environment with education for sustainability to determine solutions. Concepts were taught and are taught; students earn units in sustainability education and sustainability development. We wanted sustainability to be a college-wide effort, rather than the college depending on one department to teach sustainability and resolve sustainability issues.

PC added that sustainability courses were designed "with the intention that its influence would reach and affect the culture of the campus community."

***Professor D (PD).*** PD stated that sustainability had always been a part of the discussion. However, PD also stated that "it was environmental studies from the get-go." PD noted:

> We've talked about sustainability and tried to foster sustainability in a variety of ways since the beginning of the program and surely in the years that the program was being planned; it didn't exist yet. In recent years it's hard to really separate sustainability from the study of the environment. Unless you're being very specific in what kind of issue you're studying, they will surely be around some form of sustainability in the department.

According to PD, sustainability involves "a different angle on the study of the environment." Sustainability involves solutions to environmental issues. PD reflected that "sustainability is about the path forward," adding that sustainability is "a buzz word these days, but there's a reason for that; it's important and vibrant and relevant in our society."

**Question three.** The third question asked: How would you describe the drivers that prompted the design and development of an environmental studies program with sustainability education?

***Professor A (PA).*** PA stated that "a grant from a local foundation" was integral to the development of sustainability education. PA, along with PC, worked with the president to determine "what we would do, or what we could do, with four million dollars to move sustainability to the center of the culture of the college." PA noted that the foundation wanted the college to "rethink sustainability" so that not only traditional aspects would be addressed but also issues such as poverty and crime in community sustainability.

***Professor B (PB).*** PB stated that "PA and I were the two faculty original members of the environmental studies program." The driving factor was interest in and a commitment to an interdisciplinary approach to instruction. PB recalled:

> We knew from the onset that we wanted to have, not an environmental science program, but an environmental studies program. The metaphor we developed later on was the three-legged stool; if you remove any one of those legs it doesn't function as a stool. What I brought to the table initially was a background in science and social science. PA was humanities and science. We needed additional people; we hired PC. We were first a three-person department; then we hired PD, who is involved with campus sustainability.

PB noted that a grant enabled the department to add a fifth member to the faculty this year. The newest member was hired "to specifically teach sustainability and work with sustainability."

***Professor C (PC).*** PC stated that "sustainability education involves social sustainability as well as sustainability regarding resources." PC recounted that "the college received an amazing grant from a local foundation that wanted to establish sustainability measures on campus and in the community." PC continued:

> The generous grant enabled the department to add another faculty professor to teach sustainability. The college also hired green staff to install equipment, collect data, and make informed decisions.

***Professor D (PD).*** PD was in graduate school at the time the program was being developed. PD stated that "my understanding regarding the drivers for sustainability education at the college "came about because there were a handful of people on campus who were excited about the environment and about teaching in an interdisciplinary way about the environment." PD went on to elaborate that "one of our founders, PA, is a poet who was in the English department for a long time and really focused his writing, his thinking, his teaching on nature and the environment." PD noted that there was interest from biologists "who never joined the department but were a big part of its formation." These biologists were more interested in the way the science interacted with environmental issues, rather than the traditional pre-med approach. PD added there that 'there were a few more people like that." PD speculated that student interest was another factor that prompted an environmental studies program. PD suggested that PA and PC could provide more detailed information.

PD concluded that the impetus on their campus occurred within a broader context of awareness in higher education institutions regarding sustainability and its implementation in

higher education curricula. PD noted that there had been an ongoing national discussion regarding sustainability education in U.S. colleges and universities; the college was one of several institutions of higher education that were responding to campus interest and expectations.

**Question four.** The fourth question asked: Did you experience any barriers during the process?

***Professor A (PA).*** PA stated the LEED certification was a challenge and described the "long, arduous process" that began after the decision was made to certify the newly acquired off campus building given to the environmental studies department. PA recounted:

> At that time, the coin of the realm for sustainability was LEED certification. All of the colleges that were moving toward sustainability, two in particular that were leaders in the field in liberal arts colleges, were all LEED certifying their buildings, so we decided that we were going to LEED certify this building as a renovation. I was the one that sat through all the meetings; the engineering meetings, the LEED meetings, the construction meetings. I didn't understand everything. It was a real learning process for me.

***Professor B (PB).*** According to PB, the challenge was getting approval for an environmental studies program. PB explained that the dean of the college at that time "was hesitant for us to develop a program." The dean wanted PA and PB "to build a program that was interdisciplinary, drawing off existing courses from several different departments." This approach continues at the college with students being allowed as well as encouraged to take focus courses, such as biology and chemistry, which are outside of their departments. Environmentally-focused courses are offered in other departments, including anthropology and sociology. PB concluded:

> The program really got started with the change in deans. The change in deans made it possible to again approach the idea of an environmental studies program. The provost was very supportive of an independent program and we were able to make that happen.

***Professor C (PC).*** PC recounted that "it was a challenge in the beginning with no sustainability director; no direction." PC added that "the grant gave us the ability to start the process."

***Professor D (PD).*** PD was not part of the faculty at the beginning of its development and answered the question from experience in writing a grant for funding for the program. PD stated:

> When they were actually forming the program-I really don't know about that, but I can speak a little bit to when we were writing a grant to get more sustainability-specific focus on campus and there were, I wouldn't say barriers, but there was only so much we could ask for and we had to pick our priorities as far as what would suit the funders and on what we wanted to focus our research and time.

PD described the challenge as "not barriers in front of us, but barriers to the side guiding our path"

**Question five.** The fifth question asked: What are the successful aspects of the environmental studies/sustainability program?

***Professor A (PA).*** PA added that funds from the grant were used to purchase a house near the environmental center. According to PA, the house had been leased with funds from an earlier grant "and now we bought it." PA added:

> We're going to take this house and put four labs in it. The new professor of sustainability lives in the house right now. Next month the professor is teaching the very first

> introduction to sustainability at the college, this semester. The four labs are going to be a complete look at this house and figure out what we can do to make it sustainable.

PA concluded that a sustainability architect from a nearby state was slated to lead the sustainability professor and students through an assessment of the house. The assessment and information will be used for a presentation to advise construction. PA noted that the college hired a director of energy management and sustainability, who "works in facilities, runs all the dashboards," and other related duties.

***Professor B (PB).*** PB stated that "the department has really grown. We have added a fifth member who is specifically a sustainability professor." PB noted that the department had been successful in the ability "to reach out and get significant grant funding." Funds from the grant support current departmental initiatives and two community sustainability projects. A previous grant provided the funds for projects including studying a local river. PB continued:

> At this point, we are averaging about 18 students each year that are finishing up with majors in environmental studies. The first student we actually graduated was in 2010. A year ago, we had about 50 majors and 50 alums.

PB concluded that the interdisciplinary "three-legged stool approach" that integrates the humanities with both physical and social sciences is a singular successful aspect of the environmental studies program.

***Professor C (PC).*** PC stated that the interdisciplinary approach has been successful for the environmental studies program, adding that "we have a stronger framework now with resilience along with the interdisciplinary approach." PC explained that resilience is a practical framework in sustainability and is useful for students participating in "hands-on projects

involving energy savings." PC characterized the students as "very creative." PC continued that coursework has produced positive results. PC stated:

> All students take two-semester coursework with more focus on sustainability education. Capstone projects are in the fall to give seniors enough time to complete them for graduation. Juniors have a prep class for the proposal, literature, and project. Students may earn either a B.A. or a B.S.

***Professor D (PD).*** PD stated, "Our successes are everything, really; I think!" PD elaborated:

> To be more modest and specific, we have had success with growing to the size where we have a pretty good core of 15–20 majors graduating each year as seniors. We're not a huge department, but in a school that only has about 1600 undergrads, a little more, maybe, it's reasonably substantial. We've gone from having three people in the beginning to now adding a fifth faculty member. We have courses in the social sciences, the humanities, and the natural sciences.

PD added that the success of the off campus environmental studies center is a source of pride for the department. PD continued that the department's successes include their speaker series, so that "year after year we've been able to get funding to bring all sorts of different voices from different aspects of natural resources," to meet with students to discuss the environment and sustainability. Field classes have been incorporated into classes in Environmental Studies 101 "to get students out in the environment." PD concluded that the successes of the department are "really a lot of these healthy programs that are part of the environmental studies program." PD noted that they "have alumni out doing wonderful things; a lot of different things."

**Question six.** The sixth question asked: Looking back on the beginning of the design and development of the environmental studies program, did you experience any setbacks?

***Professor A (PA).*** PA stated that "being an English professor, I made mistakes in the beginning." PA described the experiences during the renovation of the building given to the environmental studies department. The building needed to be adapted to the coursework needs. PA recalled:

> This building is very limited in size; it's only really four rooms. When we first designed the building, I kept going to the scientists to advise me; we're going to have science out of this building-help me! They were all so busy; said they didn't have time, it's the middle of the semester. So finally, I said, I'll just design it myself! I worked with the architect; we designed the whole interior. The very first floor plan that I put together put the labs up front. In the summer before construction we had a 2-day retreat; I finally got a couple of biologists to go on the retreat and showed them the floor plan. They said it was crazy bad!

PA continued that the biologists recommended changes in lab locations. The biologists suggested having the labs closer to the creek and recommended having a big mud room, a wet room, another lab, and a room for students to spread out their work. The office would need to be located at the front of the building. The biologists also asked PA where the fume hood was located. PA responded with "fume hood?" PA was informed by the biologists that having chemists working in the building required the installation of a fume hood, because "you cannot do any of this work legally without a fume hood." PA concluded:

> I had to go back to the administration and ask for a $45,000 fume hood for the lab. I was in charge of all this. We finally got a floor plan everybody could work with and everybody agreed with, and they started construction. Then it went really smoothly.

***Professor B (PB).*** PB stated that "we didn't really have setbacks; we've been very fortunate." However, PB added that "we would have liked to have started this program even earlier" noting that an environmental science program "could have gotten started in the 80s or 90s." PB reiterated that at the time of the original proposal, the dean hesitated to support an environmental studies program.

***Professor C (PC).*** According to PC, the program is essentially the same now as it was developed in the beginning, with no real setbacks. PC stated that "the structure has not really changed; there was no overhaul." PC added that the program has been successful.

***Professor D (PD).*** PD stated that as faculty hired after the development of the program "my answers wouldn't be helpful."

**Question seven.** The seventh question asked: Did all aspects of the design come together as planned during the development, or would you say that there were some aspects that did not work and were discarded?

***Professor A (PA).*** PA recounted the process of LEED certification for the environmental center. According to PA, the goal was to achieve LEED gold certification. The building "ended up getting LEED platinum, which is the highest designation." At the time of certification, the college "was the only LEED platinum educational building in the state." PA noted that "another area college may have one by now, or somebody else, but when we did, we were it." PA continued that the building was renovated during a recession when it was difficult to get funds for projects. PA stated:

> Another thing that is very interesting is that this building was built during the great collapse of 2008 and 09. We somehow got this building built even though the world was falling apart around us and there was no money for anything. They raised a quarter million dollars and got the building built.

***Professor B (PB).*** PB stated that there "was no real conflict." The curriculum was designed to study the environment and environmental issues along with sustainability with an interdisciplinary approach. PB added that his "liberal arts bias" has continued to reinforce the basic "three-legged stool" framework that incorporated the social sciences and the humanities with the natural sciences for the department's successful program. The three-legged stool metaphor was developed during the formative stages. PB explained that the college's environmental studies program combines environmental science, environmental humanity, and environmental social sciences; PB used the metaphor to suggest that all three components must work together to be functional. PB concluded that "we are not unique, but there is a very small minority that believes that you need science, social science, and the humanities; all bringing those perspectives." The department has been successful in implementing the original intent into the existing curriculum.

***Professor C (PC).*** PC stated that the department has "a stronger framework now with resilience along with the interdisciplinary approach." According to PC, resilience promotes the ability to quickly respond to dramatic, unexpected changes in the environment and manage those environmental shocks or determine alternatives. A resilience framework complements sustainability education by encouraging students to develop a "back-up buffer" when confronted with sudden problems, particularly regarding issues with the conservation of resources.

***Professor D (PD).*** PD reiterated "I wasn't here for that, so I don't know if any of it would be worth mentioning."

**Question eight.** The eighth question asked: Were there any failures that were later corrected?

***Professor A (PA).*** PA reiterated the setback that began with the original design for the renovation of the environmental center. PA was eager to begin the renovation but was unable to readily receive much needed specific direction for science classrooms, so PA decided to "design it, as I see it!" When PA had the opportunity to share blueprint drafts with biologists, it became quickly evident that changes would need to be made. PA recounted that the original plan was to have the office in the rear of the building with a view of the creek; work areas were in the front. PA recalled the biologists advised that students needed to be closer to the creek; it was impractical for students to carry samples to labs in the front of the building. PA noted that the "office with a scenic view" was moved to the front of the building, and labs were relocated for easier access for students and their work.

***Professor B (PB).*** PB reiterated that there were no setbacks in the design and development of the independent program, although "we would have liked to have started this program even earlier."

***Professor C (PC).*** PC stated that PA was "better to answer" questions regarding failures, if any. PC reiterated that the program was successful and that the structure was essentially the same. PC expressed satisfaction in the program as it is now and as it continues to develop.

***Professor D (PD).*** PD was unable to speak to early failures or corrections and stated that "my answers would not be helpful."

**Question nine.** The ninth question asked: What are your present observations regarding sustainability education on campus?

***Professor A (PA).*** PA recounted that "the college became much more sensitive to cost" after paying for LEED certification for the environmental center. The next project, which was the renovation of a campus music building, was not LEED certified. The project after the renovation of the music building received LEED gold certification. After that certification, "nothing has been done with sustainability in the buildings, officially." PA noted that "since we started this building, the building codes have gotten better," adding "the codes are greener now."

***Professor B (PB).*** PB stated that grants awarded to the college made it possible for the department to conduct field projects to study the environment, including a river project in which students conducted an in-depth study with equipment that included "a camera that actually monitors the water." PB added that environmental symposiums by outside speakers are particularly successful.

***Professor C (PC).*** PC noted that sustainability measures are evident on campus. However, the college has not adopted a formal position on sustainable buildings on campus. PC expressed disappointment that the college had not committed to sustainable campus structures that are, including the on-campus environmental studies department building. After the LEED certification of the off-campus environmental studies building, the college has been slow to bring other buildings up to LEED standards. PC added that sustainability discussions come up frequently, so "we'll see."

***Professor D (PD).*** PD responded that "sustainability specific education-that's something that's just beginning." PD noted that the department offers sustainability courses, and "starting shortly, there's going to be a residence hall on the other side of the road." PD added that there

was an upcoming redevelopment program in town "that's going to be focused on social and human sustainability." PD reflected that since the program is still new, "we haven't really done anything yet." PD concluded:

> To the extent that we teach about sustainability in our regular departmental courses, which we certainly do, I'd say we've had some good successes. A lot of the students talk about how they understand the issues differently, and in more depth, and so on.

**Question ten.** The tenth question asked: How would you characterize the success of the program you designed and developed?

***Professor A (PA).*** PA stated, "being an English professor and kind of an environmentalist, I always thought of sustainability in buildings and energy." That perception changed "when the college received this sustainability grant." PA explained that the foundation that gifted the grant expected the college to incorporate human sustainability along with traditional aspects of sustainability education such as conservation of resources and protection of the environment, and "that really interested me." PA continued that human sustainability is an integral part of the department; there are several successful ongoing projects. PA stated that the department is very involved in the community sustainability projects that are underway on two opposite sides of town.

***Professor B (PB).*** PB stated that "we are not unique, but there is a very small minority that believes that you need science, social science, and the humanities; all bringing those perspectives." PB noted that the program continues to utilize the three-legged stool framework that incorporated the social sciences and the humanities with the natural sciences. PB reflected that the department emphasizes teaching students about sustainability by distinguishing what it

is, and what it is not. PB considers that aspect of sustainability education an integral characteristic.

***Professor C (PC).*** PC characterized the students as "very creative." PC continued that coursework has produced positive results. Students may earn units in both sustainability education and sustainability development. PC stated:

> All students take two-semester coursework with more focus on sustainability education. Capstone projects are in the fall to give seniors enough time to complete them for graduation. Juniors have a prep class for the proposal, literature, and project. Students may earn either a B.A. or a B.S.

***Professor D (PD).*** PD noted that field classes have been incorporated into classes in Environmental Studies 101 "to get students out in the environment." PD stated that the successes of the department are "really a lot of these healthy programs that are part of the environmental studies program." PD added that they "have alumni out doing great things; a lot of different things."

**Question eleven.** The eleventh question asked: Are there any upcoming projects or next-step plans for the environmental studies/ sustainability program?

***Professor A (PA).*** PA stated that funds from the grant were used to purchase a house near the environmental center. According to PA, the house had been leased with funds from an earlier grant "and now we bought it." PA added:

> We're going to take this house and put four labs in it. The new professor of sustainability lives in the house right now. Next month the professor is teaching the very first introduction to sustainability at the college, this semester. The four labs are going to be a complete look at this house and figure out what we can do to make it sustainable.

PA concluded that a sustainability architect from a nearby state was slated to lead the sustainability professor and students through an assessment of the house. The assessment and information will be used for a presentation to advise construction.

***Professor B (PB).*** PB stated that "we do have some initiatives now that are part of this most recent grant that we will be addressing." PB explained that the department is involved in community sustainability and cited two projects; one is on the north side of town and the other is on the east side. PB noted that "sustainability is equated with green ideas."

***Professor C (PC).*** PC stated, "We want students to be able to study abroad; to see sustainability development in action in Europe. We are working to make that happen." PC added that "we are planning a review of our program" with an assessment team from a nearby state. PC noted that an "outside perspective and feedback is important." PC concluded with the acknowledgement "two professors are facing retirement, so the department will need to add new faculty."

***Professor D (PD).*** PD enthused that "one of the ones that I'm excited about is part of our grant allows you to get money to fund interim projects focused on sustainability." PD explained that their January semester, called the interim, is just one month long. The interim often features opportunities for students to "take something that is quite different from what everybody ordinarily would do," such as hands-on, field-based classes or travel-based classes. PD stated:

> We're going to now be able to ramp up our sustainability-based courses during the January term, so I'm excited about some of the ones that I personally have planned, at least. Hopefully, they will work out. It should be great to do courses based around food, or based around alternative energies, or forest restoration, and be able to make those

> things accessible to a lot of students, aside from the normal courses during the regular semesters.

PD noted that the grant does not pay for all interim costs. Students pay for the interim and any additional expenses connected to the interim; some are more expensive than others. PD continued that some interims conducted on campus are essentially free, while some like the upcoming trip to Botswana are more expensive. PD concluded:

> We're going to be able to do some really exciting, dynamic sustainability based trips, and make it so that more students are able to take those-not just students whose parents have got money to pay for a trip-but hopefully lots of students who now will be able to go there, and look at geothermal energy, and things like that. It's a couple of years down the road, so we'll see.

**Question twelve.** The twelfth question asked: Do you have any suggestions for small colleges who want to design and develop sustainability curriculum?

***Professor A (PA).*** PA acknowledged that LEED certification is "not cheap." PA explained that certification may be 10% or more of the budget for the building. However, money for LEED certification need not be the deciding factor when determining sustainability measures in construction. According to PA, "there are three levels of LEED certification: silver, gold, and platinum. You can build with LEED standards in mind, even if you're not paying for certification." Where funding for LEED certification is the concern, PA's advice was to secure appropriate certification forms to give to the contractor, and request "to do as many of these things as you can." PA also recommended that educators "tailor the program to the needs of the college" noting that "our program is tailored to the needs of our students. That's what we focus on mostly."

***Professor B (PB).*** PB stated "I have a liberal arts bias. The framework must be a three-legged stool, natural sciences, social sciences, and humanities, to be effective." PB reflected that "programs are vitally needed." However, PB stated that difficulties include worldview bias and a lack of understanding of "core, fundamental issues, like population growth, finite resources, and adaptation, and the need to adapt. PB concluded:

> Adaptation may run counter to your beliefs and your worldview. I think those are the real challenges in any program in sustainability. You have to be able to see that the way we view the world, and the way we like the world to operate or think it operates, is not sustainable on a fundamental level. It's just not sustainable. Is this something we should be teaching in higher education in higher education? Yes!

***Professor C (PC).*** PC's recommendation for colleges that are considering the implementation of sustainability education in their curricula is to begin with the framework. PC added that funding may be a concern but advised that "colleges can design a sustainability program even if resources are limited. There are ways to teach and promote sustainability without a formal program; you could integrate sustainability coursework." PC concluded that LEED certified buildings must be more than symbols of sustainability; colleges need a cultural change towards a sustainable campus.

***Professor D (PD).*** PD recommended that colleges considering the implementation of a sustainability program should adopt an interdisciplinary approach. A college that strives to be interdisciplinary would approach environmental issues and sustainability issues from not only the natural sciences but also the social sciences and humanities. PD explained:

> One of the things I tell my students a lot, and I think it's true, is that studying the environment is about problems and sustainability is presumably about trying to fix those

> problems and minimize those problems. You can't understand an environmental problem fully without understanding the natural issues at hand; how much it matters if a species declines or if a species arrives or if the temperature of a river changes; but you also have to understand the human element to that; policies that make something happen or dominant economic pressures; and lastly and overarching, the way that people feel about these resources and understand the emotional connections that people have to the environment or the emotional reactions that people have to the environment drive those policies and drive those problems, so having people who can teach in the humanities, in the social sciences, in the natural sciences-it is crucial.

PD noted that some higher education institutions focus on a combination of natural sciences and social sciences or natural sciences with humanities, "and they do great stuff, I know they do, the department I graduated from did not really have a humanities element." However, PD emphasized all the elements of an interdisciplinary approach are integral to a successful sustainability program. PD concluded that for "any college, if you're going to set about understanding this stuff, educating people on this stuff, then you have to have all those elements involved."

**Thematic Analysis**

This researcher used structured thematic analysis to identify and organize patterns across the dataset in order to perceive and interpret the meaning of collective experiences, and then applied patterns that are relevant to the research questions (Braun & Clarke, 2012). Thematic analysis is a method utilized by qualitative researchers to attain insight and understanding from gathered information (Komori, n.d.). This qualitative researcher constructed six themes from the coded data. Table 1 depicts the theme on the left and a description of the theme on the right.

Table 1

*Description of Themes*

| Theme | Description of theme |
|---|---|
| Vision | Sustainability Concepts<br>Campus Interest<br>Collaboration |
| Interdisciplinary Framework | Academic Design Components: Humanities; Science; and Social Sciences |
| Process | Design and Development |
| Challenges | Building Construction and Certification<br>Funding<br>Program Approval |
| Accomplishments | Enrollment; Graduation Rate; Field Programs |
| Recommendations | Paradigm and Suggestions for Interested Educators in Higher Education |

**Explication of Described Themes**

**Vision: Sustainability concepts; campus interest; collaboration**. From the first Earth Day Rally to the present, the faculty has acknowledged the need for environmental literacy for the campus community and student-centered programs and coursework. The science department promoted the transition from passive classroom-centered instruction to active student initiatives. Early environmental themes included river projects, field trips, and resource management internships.

The evolution of sustainability education at the case study college began with the vision of two participants in the sample population. The concept and desire for sustainability education were always prevalent at the college, with the impetus provided by a campus community that expressed interest in environmental issues and a green campus. Professor D noted that a group of college faculty "were excited about the environment and about teaching in an interdisciplinary way about the environment." Sustainability was discussed and fostered at the college before the formal program existed. Professor B noted that "things relating to environmental studies and

sustainability have been a part of this curriculum here for many, many years." There had been discussions regarding sustainability in science courses since the 1980s; there was no formal program until the 2007–08 academic year. Prior to the development of an independent program, environmental courses were offered to interested students. Professors A and B were the architects of the vision to design and develop an environmental studies program, not a program that only addressed environmental science.

Collaboration was an integral component in the development of the environmental studies program at the college. Professor A recounted that his experiences with teaching with a biology professor in a learning community studying water led him to realize he liked "to co-teach and team teach with scientists." At the time, Professor A was in the English department. His teaching, writing, and poetry reflected his focus on the environment. Other faculty on campus were concerned about environmental issues and sustainability. Professor A connected with Professor B and invited faculty from departments in finance, chemistry, biology, and Spanish to discuss the development of a new program to study the environment and sustainability with an interdisciplinary approach. Biology professors expressed their interest and support for a program that offered instruction in the interaction of biology with issues in the environment in addition to the traditional pre-med coursework. Professor D explained that the impetus on their campus occurred within a broader context of awareness in higher education institutions regarding sustainability and its implementation in higher education curricula. He noted that there had been an ongoing national discussion regarding sustainability education in U.S. colleges and universities. The college was one of several institutions of higher education that were responding to campus interest and expectations.

**Interdisciplinary framework: Academic design components**. Sustainability education within the college's environmental studies program steadily evolved from courses in science to interdisciplinary coursework to a fully developed program with specific sustainability coursework. Professor B explained that he and Professor A "knew from the onset that we wanted to have, not an environmental science program, but an environmental studies program. We did not want to be defined as a sustainability program; we wanted to be an environmental studies program, which is much broader. Sustainability is a major component." Professor C added that "we wanted sustainability to be a college-wide effort, rather than the college depending on one department to teach sustainability and resolve sustainability issues." Professor B's initial contribution to the program's academic development "was a background in science and social science." Professor A offered his background in English and his experience in co-teaching science courses to develop academic components for an environmental studies program with sustainability education. The college took a unique approach in the development of the sustainability curriculum with a program that combined the study of environmental issues with education for sustainability in order to determine solutions. The courses were designed specifically for the students majoring in the environmental studies program with an intention to impact the campus community culture.

A necessary antecedent to learning about sustainability and applying sustainability measures is the understanding of sustainability theory and the definition of sustainability. Professor B reflected that sustainability was a concern that had been discussed and debated since the 1960s. Before sustainability courses were formally offered at the college in the spring of 2008, Professor B discussed "factors relating to sustainability," such as "physical aspects, ethics of sustainability, and the will to change behavior." Coursework design involved the humanities,

social science, and physical science. The three-legged stool metaphor was developed to explain the balance that is needed in the interdisciplinary framework in order to achieve desired outcomes. Professor B stated that their metaphor is the foundation for the conceptual framework because "if you remove any one of those legs it doesn't function as a stool." The academic components included not only an understanding of what sustainability is but also what sustainability is not. Professor B noted that this inclusive understanding of sustainability concepts and the science behind it has "become an integral part of our program here" at the college. Professor C added that "sustainability education involves social sustainability as well as sustainability regarding resources."

**Process: Design and development**. Professor A and Professor B initiated the development of an independent environmental program with sustainability education at the college. They formed the committee that that discussed and decided that the new program should be an environmental studies program, rather than a sustainability education program. Professor B recounted that "the formal beginning of this program were discussions in 2005–2006 with the dean at the time." Prior to the initiative to develop an independent program, students were offered courses that involved sustainability issues. Those courses became a part of the newly designed and developed environmental studies program. In its early stages, the department added Professor C as faculty chair. The department grew to four members with Professor D, who is involved with campus sustainability.

As the program continued to develop, the entire geology department was added to the environmental studies program. Sustainability was taught within the interdisciplinary environmental studies. A recent grant enabled the college to initiate a sustainability-specific program with a sustainability professor. The environmental science building was renovated to

accommodate coursework. The college added green energy staff in the facilities department to collect data to assist in making informed decisions to implement sustainability measures and install new equipment for energy savings. Students in the environmental studies program are encouraged to participate in projects that advance their expertise and creativity in contemporary sustainability objectives.

**Challenges: Building construction and certification; funding; program approval**. At about the same time that the college president signed the Climate Commitment pledging with 150 other institutions of higher education to become carbon neutral, the new environmental studies faculty were given an off-campus building on four acres to renovate. Professor A was named director of the building. After study, reflection, and conversation they made the decision to have their new center environmentally certified. Professor A stated that "at that time the coin of the realm for sustainability was LEED certification," which was "a long, arduous process." It was an intense learning experience for the new director, who attended all engineering and construction meetings, despite not having a thorough understanding of the mechanics. The building was expected to be LEED certified gold but reached the designation of LEED platinum, the highest certification level. Professor A was proud of the distinction that, at the time of certification, "it was the only LEED platinum educational building in the state."

There were challenges during the process. Professor A recalled his experiences with the renovation of the environmental center and its subsequent LEED certification. Professor A stated that "being an English professor, I made mistakes in the beginning" when the environmental center was designed. He had grown impatient waiting for input from the science faculty and decided to begin the process on his own. Working with an architect, Professor A initially designed the interior "with labs up front with the office." During a summer retreat

Professor A had the opportunity to show his floor plan to "a couple of biologists" who "recommended changing the location of the labs to be closer to the creek" and include "a wet room, a big mud room, another lab, and a room to spread out student work." The biologists asked Professor A where he intended to put the fume hood; at that time Professor A didn't know what a fume hood was or why it was needed. He quickly learned that a fume hood was necessary with chemists working in the building. Professor A recalled, "I had to go back to the administration and ask for a $45,000 fume hood for the lab!" He noted that once the floor plan for the environmental center was agreed upon and approved the actual construction became a smooth endeavor.

Funding was an early challenge. Professor D recalled that during the grant-writing process for sustainability-specific campus programs "we had to pick our priorities as far as what would suit the funders and what we wanted to focus our research and time on." Professor A and Professor C negotiated a four-million-dollar grant from a local foundation and collaborated with the college president to decide the manner in which the funds would be used to "move sustainability to the center of the culture of the college." The faculty was prompted to rethink sustainability with the foundation's request that the funds be used to approach sustainability in more than the traditional manner that encompassed energy conservation within physical structures. The foundation envisioned funding to include human sustainability and consideration for more sustainable lives by addressing poverty, crime, habitats, and landscapes.

Professor A and Professor B conducted several meetings with the college dean at the time to discuss the need for a separate program for environmental studies with sustainability education. The dean was interested and supportive but not yet willing to approve an independent program. The college continued to offer coursework in sustainability education and related

sciences while Professor A and B continued to advocate for a new, separate and independent academic program to be added to the college's curricula. The next dean at the college listened to the proposal and made the decision to approve the newly designed, interdisciplinary program.

The college's environmental studies program with sustainability education was formally approved by the new college dean in 2007. The faculty applied for and received generous grants that funded the implementation of the college's environmental program. The grant provided funds for one new faculty member for sustainability education and then added another new faculty member with a background in sustainability education. The fifth faculty member was hired to specifically teach sustainability. In addition to the education department, the college hired a sustainability facilities manager. The environmental science building was renovated to accommodate coursework.

**Accomplishments: Enrollment; graduation rate; field programs**. All participants agreed that all aspects of the environmental studies program are successful. Since the first student graduated in 2010, the department has had over 50 alums complete the program. At least 18 students graduate with a major in environmental studies every year. There are up to 20 majors each year; graduates are successful. Professor C stated that "all students take two-semester sequence coursework with more focus on sustainability education." Seniors begin capstone projects in the fall in order to provide them with enough time to complete their projects before graduation. Juniors take a prep class for the proposal, literature, and project. Students in the environmental studies program may earn either a Bachelor of Science degree or a Bachelor of Arts degree. Speaker series offer students opportunities to hear sustainability professionals discuss relevant issues. Two buildings are now owned by the college for the use of the department's extension environmental center.

The participants also shared their upcoming projects or next-step plans for the environmental studies/sustainability program. Grant funding will finance future hands-on sustainability projects and trips abroad for students.

**Recommendation, Paradigm, and Suggestions for Interested Educators in Higher Education**

All participants recommended an interdisciplinary approach to the development of sustainability education. Professor D advised that "the school that wants to start up a sustainability program should really strive to be interdisciplinary; to approach environmental issues and sustainability issues from the natural sciences, the social sciences, and the humanities." Professor D posited that "studying the environment is about problems and sustainability is presumably about trying to fix those problems and minimize those problems."

A study of the environment and its sustainability involves the natural sciences, social sciences, and the humanities. A sustainability framework is integral to the structure. Professor C noted that "colleges can design a sustainability program even if resources are limited. There are ways to teach and promote sustainability without a formal program." One of Professor C's recommendations is the integration of sustainability coursework across the disciplines.

Colleges with limited resources may still have successful courses even without a department if the framework is in place. Professor A advises educators interested in sustainability education to "tailor the program to the needs of the college. Our program is tailored to the needs of our students. That's what we focus on mostly." Professor C emphasizes the need for a cultural change towards a sustainable campus. LEED certified buildings must be more than symbols of sustainability. Professor A admits that "the process of certification is not cheap; it's 10% of the budget. There are three levels of LEED certification, silver, gold, and

platinum. You can build with LEED standards in mind, even if you're not paying for certification. You can get the forms and then let the contractors know to do as many of things on the list that they can." Buildings can be LEED certified or just built or renovated with LEED standards in mind. It is helpful to enlist scientists for advice during construction. Science faculty are best equipped to make suggestions for functional floor plans and required equipment.

Professor B reflected that "there are cultural biases; this idea that we can sustain indefinitely. A lot of the difficulties in a program like this is getting people to understand their biases and understand that how they view the world is based more on their desires and expectations than reality." Professor B posited that sustainability education programs are essential in higher education. However, programs should address fundamental environmental issues and challenges, including "population growth, finite resources, and the need to adapt. Is this something we should be teaching in higher education in higher education? Yes!"

**Chapter 4 Summary**

This researcher examined the experiences of a faculty in a southeastern U.S. college who designed education for sustainability in their higher education institution and investigated the development of sustainability education in the curriculum. Sustainability in higher education is a multifaceted phenomenon that is studied through a variety of lenses. The focus of this investigation was curriculum design and development. The research was a qualitative case study with structured interviews that linked the acquired information to the research questions. Data analysis included a synthesis of information from the structured interviews.

# Chapter 5: Discussion and Conclusion

## Introduction

Sustainability education in colleges and universities provides learning opportunities for students facing one of the most important challenges of the 21st century (Gough & Scott, 2008). However, there is very little research regarding the integration of sustainability concepts in higher education curriculum and delivery of instructional strategies. There is also a lack of research investigating the drivers, barriers, and challenges that colleges and universities encounter in the design of sustainability curricula and its implementation (Davis et al., 2003). The purpose of this study is to add to the literature regarding sustainability education in higher education curricula by investigating the experiences of a higher education faculty who designed and developed sustainability education in their curriculum. Data may be useful to other colleges needing information or a paradigm to integrate sustainability education in their curricula.

This qualitative case study investigated faculty perspectives, observations, and experiences. Research questions addressed experiences, design, and process in design through structured interviews with the study sample. This researcher chose a qualitative case study approach with a constructivist framework to advance the knowledge regarding sustainability in higher education curricula. In this chapter, she addresses the overarching question and the supporting questions that drove this case study and then interpreted the findings. The results of the research are summarized and discussed. The results are linked to the literature review, followed by research limitations and the implication of the results for practice, policy, and theory. The chapter ends with recommendations for further research and the conclusion.

## Summary of the Results

This qualitative research case study investigated the experiences of faculty who designed and developed sustainability education in their higher education curricula. This researcher

explored faculty experiences through individual interviews with participants of the sample population. The overarching research question in this case study was:

- What were the experiences of a higher education faculty who designed and developed sustainability education in their curriculum?

The supporting research questions were:

- What was the process used to develop the sustainability curriculum?
- What was the process used to implement sustainability in the curriculum?

In order to design and implement the changes needed to ensure a future that is sustainable, institutions of higher education are encouraged to establish feasible frameworks for sustainability development objectives to ensure that students graduate with the knowledge and expertise necessary to construct solutions to the challenges of pollution, climate change, diminished biodiversity, increased population and decreased natural resources (AASHE, 2010). The process used to integrate sustainability in higher education curricula varies in higher education institutions (Kodama, 2011). The framework used in the study was an interdisciplinary "three-legged stool" framework which suggested that the three major components of the framework, namely the natural sciences, social sciences, and the humanities, were all necessary for successful sustainability education. Professor B explained that he used the metaphor to indicate the equal importance of each discipline in the instruction. Professor B further noted that the metaphor infers that without each leg in operation, the stool could not work properly.

Colleges and universities may offer degrees in sustainability, integrate sustainability education in coursework, or require a sustainability class in general education studies (Kodama, 2011). The case study college had implemented sustainability education within their recently

developed environmental studies program; students may earn either a Bachelor of Arts degree or a Bachelor of Science degree. Students who were not in the environmental studies program were not only allowed, but were also encouraged, to take sustainability coursework for credit in their individual programs.

Initiatives for sustainability education usually start at the department level. Faculty interest and student interest are drivers that prompt formal proposals for programs and coursework. Implementation requires administrative approval and allocation of funds (Brown, 2010). All of the participants noted that interest from faculty and students was the impetus that prompted the vision for the design and development of an independent program with sustainability education at the case study college. The process culminated with the approval of the dean. The college allocated funds to renovate the faculty's newly acquired off-campus environmental studies center and develop the department's program. Professor A and Professor C negotiated a four-million-dollar grant from a local foundation and collaborated with the college president to decide the manner in which the funds would be used to "move sustainability to the center of the culture of the college." The faculty was prompted to rethink sustainability with the foundation's request that the funds be used to approach sustainability in more than the traditional manner that encompassed energy conservation within physical structures. The foundation envisioned funding to include human sustainability and consideration for more sustainable lives by addressing poverty, crime, habitats, and landscapes.

Higher education research and education are integral to the development of sustainability objectives. However, integrating sustainability curricula in colleges and universities has been difficult because aspects are so diverse (Sammalisto & Lindhqvist, 2008). Sustainability education, or education for sustainable development, is often not well understood and may

consequently be poorly implemented in higher education curricula (Reza, 2016). Higher education institutions encountering challenges in the integration of sustainability in their curricula may promote the culture of sustainability in campus operations (Kodama, 2011). Professor D noted that sustainability had been discussed and fostered "in a variety of ways since the beginning of the program and surely in the years that the program was being planned." Professor C observed that sustainability measures are evident on their campus.

A necessary antecedent to learning about sustainability and applying sustainability measures is the understanding of sustainability theory and the definition of sustainability. Professor C posited that "sustainability education involves social sustainability as well as sustainability regarding resources." Professor B observed that there are factors relating to sustainability, like population growth, resource exploitation, finite resources, and energy utilization. Sustainable education and sustainable development in higher education blend pedagogy with policies and process management in campus operations and community projects (Reza, 2016). This college had a full-time sustainability manager in their facilities department.

College campuses have the capacity to serve as models for sustainability development and maintenance (Davis et al., 2003). Institutions of higher education are well-suited to leadership roles in attitudes and policies regarding sustainability (Davis et al., 2003). The culture of the campus should accommodate sustainability goals in energy management and operations (Brown, 2010). Sustainability education was not limited to the college's department of environmental studies. Professor C stated that the department intended "sustainability to be a college-wide effort, rather than the college depending on one department to teach sustainability and resolve sustainability issues."

Integrating sustainability in higher education curricula presents challenges in design, development, and implementation (Brown, 2010). Developing appropriate language for instructional delivery may be a challenge because of variances in terminology (Brown, 2010). Theoretically, sustainability education involves a curriculum that is balanced and scientific and includes sustainability education in research as well as academics, with a holistic approach that increases student awareness and motivation to continue sustainability efforts after graduation (Reza, 2016). According to Professor C, "the college used a different approach to develop the sustainability curriculum. The environmental studies program combines the study of the environment with education for sustainability to determine solutions." Classroom instruction and hands-on activities included water quality projects, sustainable living measures, and energy savings. Students in the environmental studies program were encouraged to participate in projects that advanced their expertise and creativity in contemporary sustainability objectives.

Education for Sustainability is adaptable and any discipline may incorporate it (Christie et al., 2015). The case study college had a long history of environmental literacy and concern for environmental issues and sustainability. The concept for the new environmental studies program "arose from a learning community that was interested in environmental issues and having a green campus." Professor A initiated the proposal by forming a committee with Professor B and other faculty professors from the biology, chemistry, finance, and Spanish departments. The positive and productive collaboration from different departments "moved the college closer to having an environmental studies program." The driving factor was interest in and a commitment to an interdisciplinary approach to instruction.

Funding for the case study's environmental studies program was an early challenge for the case study faculty. Grants from local foundations and gifts from the college enabled the

department to develop and implement the program, renovate an off campus environmental center purchase other off campus department buildings and specialized equipment, and hire additional sustainability personnel. LEED certification for the off campus environmental center was another early challenge. Professor A described the experience as a "long, arduous process." The end result was exceeding the goal for gold certification to earn the highest designation of platinum certification. At the time of certification, the college "was the only LEED platinum educational building in the state." The building was renovated during a recession when it was difficult to get funds for projects.

**Discussion of the Results**

This researcher interviewed the faculty of the environmental studies department of a southeastern college in order to investigate their experiences in the design and development of sustainability education in the curricula. The dissertation research questions were addressed within the structured interview questions. During the interviews, the participants indicated enthusiasm and commitment to sustainability objectives in theory and practice. This researcher discerned themes that were shared by all participants. Participants offered perspectives that provided insight into the vision that initiated the impetus for curriculum change and the process the faculty chose to implement the program.

After analyzing the data from all of the participants in the interviews, this researcher discerned common themes that applied to the research questions: vision, interdisciplinary framework, process, challenges, accomplishments, and recommendations. The findings also illustrated the common observations and perspectives of the participants. Analyzed data identified the impetus for sustainability education as well as challenges in its development at this small, southeastern college. Acquired documents added to the data by providing a history of the

college in its relationship to sustainability and sustainability education, and documents that supported the literature discussion.

**Thematic Analysis**

Two of the participants were original architects of the proposal. All four participants acknowledged that interdepartmental collaboration was an integral component during the conception and design of the environmental studies program. All participants agreed that faculty interest and administrative support were initial drivers for sustainability education. All participants considered the commitment to an interdisciplinary approach to instructional delivery as the foundation for the program's design. The participants noted the college's history of commitment to a green campus and attention to environmental concerns.

One participant recounted building renovation design and LEED certification as challenges during the process. One participant noted that length of time to approve the independent program was a challenge. Two participants shared that funding was an early challenge. One participant cited the inclusion of human sustainability and related community projects as a notable accomplishment for their department. One participant considered the ongoing interdisciplinary framework integrating the humanities with both natural sciences and social sciences as the department's singular accomplishment. The other participants cited emphasis on environmental field trips and sustainability academics as department accomplishments. All participants recommended an interdisciplinary framework that integrates the humanities with natural sciences and social sciences to educators interested in designing sustainability education curriculum in their colleges. One participant emphasized the need to tailor sustainability education programs to the individual needs of colleges. This participant also

recommended adapting LEED certification requirements when prospective colleges have limited budgets.

## Thematic Findings

After analyzing the data from all of the participants in the interviews, this researcher discerned common themes that applied to the research questions. Thematic analysis is a method utilized by qualitative researchers to attain insight and understanding from gathered information, enabling them to more fully appreciate their research groups or circumstances (Komori, n.d.). This researcher identified themes, determined patterns, and then explicated the findings.

**Design and development.** The findings of this case study suggested that interest from faculty is integral to a positive and productive discussion for the development of sustainability education in higher education curricula, as noted by all the participants. Professor C shared that "the concept arose from a learning community that was interested in environmental issues and having a green campus." Data from the interviews indicated that collaboration in a multidisciplinary committee formed the foundation for an analysis of campus needs and relevant environmental objectives. Professor C noted that Professor A, who was a professor of English at the time, initiated the program by forming a committee with Professor B, a geology professor, and professors from the biology, chemistry, finance, and Spanish departments. The vision for the new, independent program was unique in that the curriculum included a humanities component along with social sciences and physical sciences. Professor B posited that the interdisciplinary approach that integrated the humanities with both physical and social sciences was a distinctive aspect of the environmental studies program. Professor D posited that, although some higher education institutions focused on a combination of natural sciences and

social sciences or natural sciences with humanities, all the elements of an interdisciplinary approach were integral to a successful sustainability program.

This researcher ascertained that the history of the college and the campus culture provided a foundation for the discussion for an environmental studies program. Professor B noted that "things relating to environmental studies and sustainability have been a part of this the curriculum for many, many years" and Professor A stated that the college had a long history of environmental literacy and concern for environmental issues and sustainability. The college had a strong science department with professors who stressed the importance of studying the environment to fully appreciate the science programs. Combining fieldwork with interdisciplinary reflection established the antecedent for the eventual environmental studies program. The program evolved from courses in science with discussions regarding the environment and sustainability to interdisciplinary coursework to a fully developed program with specific sustainability coursework. Professor B noted that courses that had already been offered at the college were "folded into environmental studies. That included the geology department at one point." The dean approved the new environmental studies program in 2007. Coursework design involved the humanities, social science, and physical science. The three-legged stool metaphor was developed to explain the balance that is needed in the interdisciplinary framework in order to achieve desired outcomes.

**Challenges**. Perspectives differed regarding challenges in the development of the case study's environmental studies program. Professor B posited that program approval was a challenge because the dean "was hesitant for us to develop a program." This dean was not ready to approve a new program when the college was already "drawing off existing courses from several different departments." The next dean approved the independent program. Professor A's

biggest challenge was in the renovation and LEED certification for the off campus environmental studies center. The "long, arduous process" was a new learning experience for the English professor. According to Professor D, writing grants and allocating requesting funds was an early challenge, noting that "there was only so much we could ask for and we had to pick our priorities as far as what would suit the funders and on what we wanted to focus our research and time." Professor C observed that "it was a challenge in the beginning with no sustainability director; no direction." Professor C credited grants for the necessary funds that initiated the process of program development.

**Funding**. All of the participants cited the value of funding, particularly grants, to advance sustainability education at the case study college. Grants enabled the department to acquire property and equipment, hire new faculty, schedule speakers, and initiate both campus and community projects. Professor C recounted that "the college received an amazing grant from a local foundation that wanted to establish sustainability measures on campus and in the community" which enabled the college to "add another faculty professor to teach sustainability and hire "green staff to install equipment, collect data, and make informed decisions." Professor B noted that the newest addition to department faculty "was hired to specifically teach sustainability and work with sustainability." The college also hired a sustainability manager in the facilities department.

**Accomplishments**. Adequate funding made it possible to plan educational field trips. Professor C stated that "we want students to be able to study abroad; to see sustainability development in action in Europe. We are working to make that happen." Professor D noted, "we're going to be able to do some really exciting, dynamic sustainability-based trips." Professor B further noted that the department's success in its ability "to reach out and get

significant grant funding" enabled them to implement campus and community sustainability projects. Funds from two major grants enabled the faculty to advance the program on campus and support its off-campus extension.

The faculty was proud of the department's accomplishments and successes since the formal approval of the independent environmental studies program. The department provided a regular speaker series that offered students opportunities to hear sustainability professionals discuss relevant issues. The college graduated at least 18 students majoring in environmental studies every year. Seniors began capstone projects in the fall to allow enough time to complete their projects before graduation; juniors took a prep class for the proposal, literature, and project. Professor D noted that in a small department within a small college of approximatley1600 undergraduates, their number of growing majors is "reasonably substantial" with "alumni out doing great things; a lot of different things."

The faculty had grown to five members, one recently hired as a sustainability-specific professor. The department added another building to their off-campus extension, which they own along with the environmental studies center. The college hired a director of energy management and sustainability. Professor B considered the department's interdisciplinary "three-legged stool approach" that integrated the humanities with both physical and social sciences as the singular successful aspect of their designed and developed environmental studies program.

**Recommendations**. Every participant recommended an interdisciplinary approach that included the humanities with both natural and social sciences as the foundation for successful design and development of sustainability education in the college curriculum. Professor D posited that colleges striving to be interdisciplinary should approach environmental issues and

sustainability issues from not only the natural sciences but also the social sciences and humanities. Professor B noted that "programs are vitally needed" and posited that the programs need to have an interdisciplinary approach to be effective; "the framework must be three-legged stool: natural sciences, social sciences, and humanities." Professor C suggested that colleges begin with the framework. Professor C posited that colleges with limited resources may still have successful courses, even without a department, if the framework is in place.

Professor A advised educators interested in sustainability education to "tailor the program to the needs of the college." Professor A stated that the case study's program "is tailored to the needs of our students; that's what we focus on mostly." Professor C emphasized the importance of, and support for, a cultural change towards a sustainable campus, and noted that their department's sustainability courses were designed "with the intention that its influence would reach and affect the culture of the campus community." The curriculum was designed to study the environment and environmental issues along with sustainability education. Professor D noted that sustainability had been discussed and fostered "in a variety of ways since the beginning of the program and surely in the years that the program was being planned." According to Professor D, "it's hard to really separate sustainability from the study of the environment unless you're being very specific" regarding the issue under study; otherwise, sustainability will be represented in some form in the environmental studies department. Sustainability measures were evident in coursework and facilities with ongoing goals for a greener campus.

Professor C posited that that LEED certified buildings must be more than symbols of sustainability on college campuses. PA acknowledged that LEED certification was expensive; certification may be 10% or more of the budget for the building. However, colleges with limited

budgets may "build with LEED standards in mind," even without traditional certification. Professor A advised colleges to acquire LEED certification forms, and then request contractors to follow LEED guidelines accordingly where feasible.

**Discussion of the Results in Relation to the Literature**

Sustainability is a global concern; sustainability education is a logical and necessary response to that concern (Gough & Scott, 2008). Higher education and the conservation movement have been connected since the 1960s, when green energy and sustainability became issues of concern and examination (Calder & Clugston, 2003). By 1990, the role of colleges and universities in education for sustainability was significantly addressed in the Talloires Declaration, a guideline for institutions of higher education committed to the objectives of sustainability development in post-secondary curricula (Davis et al., 2003). After the 1992 Rio Earth Summit, terms such as education for sustainable development and education for sustainability became part of the vocabulary of a movement responding to not only academic aspects of sustainability but also economic and societal perspectives (Calder & Clugston, 2003). External drivers for the adoption of sustainability in higher education include both international and national directives and policy statements. Internal drivers include higher education's awareness of ethical obligations in, and moral responsibilities for, the advancement of current knowledge and continued research for solutions (Ralph & Stubbs, 2014).

Sustainability education in colleges and universities range from the introduction of sustainable development concepts and policy statements to coursework integration and curriculum development (Sammalisto & Lindhqvist, 2008). Definitions of sustainability and methods for integration of sustainability objectives in higher education vary among colleges and universities (Davis et al., 2003). Professor C noted that "colleges can design a sustainability

program even if resources are limited. There are ways to teach and promote sustainability without a formal program." Professor C posited that sustainability coursework may be integrated across the disciplines; a sustainability framework is integral to the structure. The faculty utilized an interdisciplinary framework in its sustainability curriculum. The program was envisioned, designed, and developed as an environmental studies program with sustainability as a major component. Sustainability measures are fostered on the case study campus.

Institutions of higher education that claim alignment with sustainability objectives indicate evidence in mission statements, curricula, operational practices in energy and purchases, personnel training and hiring of faculty and campus personnel, and community outreach. Supporting measures include the promotion of sustainable activities for campus life and partnerships in either local or global sustainability projects (Davis et al., 2003). Institutions of higher education may focus more on green campuses and structural innovations that save energy because of economic impact (Sammalisto & Lindhqvist, 2008). Changes in the curriculum to accommodate sustainability education have had less impact on higher education (Sammalisto & Lindhqvist, 2008).

This researcher ascertained that sustainability objectives were observed and practiced at the case study college. The college had integrated sustainability education into the curriculum with the approved environmental studies program, and subsequently hired a sustainability-specific professor and a sustainability facilities manager, in addition to the two faculty members added to the original department founding faculty. According to Professor A, the sustainability facilities manager was the "director of energy management and sustainability, who "works in facilities, runs all the dashboards," and other related duties." Sustainability objectives were observed on the college campus, and community outreach was an integral aspect of sustainability

objectives off campus. The environmental studies department promoted a speaker series regarding different aspects of natural resources. The speakers met with students to discuss the environment and sustainability. Field classes were incorporated into coursework "to get students out in the environment." The department sponsored sustainability projects in two local communities in the area.

The concept of sustainability is multifaceted, with aspects that involve the environment, economy, and society (Sammalisto & Lindhqvist, 2008). Social sustainability and human sustainability were aspects of sustainability education that complemented the traditional approaches addressing sustainability at the case study college. Professor D noted that there is an upcoming redevelopment program in town "that's going to be focused on social and human sustainability." Professor A stated that "being an English professor and kind of an environmentalist, I always thought of sustainability in buildings and energy." That perception changed when a local foundation gifted the college with a grant, with the expectation to incorporate human sustainability along with traditional aspects of sustainability education such as conservation of resources and protection of the environment. According to Professor A, human sustainability was an integral part of the environmental studies department; there were several successful ongoing projects.

Constructivism in sustainability education enables students to understand sustainability concepts and develop values that promote problem-solving skills and responsible stewardship (Armstrong, 2011). A growing consensus regarding the goal of education has shifted from subject mastery to mastery of the graduates' development and readiness for meaningful participation in their communities (Davis et al., 2003). Sustainability education incorporates relevant sustainability concerns in curricula pedagogy to address environmental issues regarding

climate, conservation, biodiversity, and the reduction of disaster risks and poverty (Reza, 2016). Colleges and universities that offer sustainability programs graduate students who enter the workplace as sustainability professionals in business, government, and education (Kodama, 2011).

Contemporary students are increasingly concerned about the global crisis regarding sustainability and expect universities to lead the effort to promote policy changes (Ralph & Stubbs, 2014). Professor D noted that student interest at the college was part of the ongoing national discussion regarding sustainability education in U.S. colleges and universities; the college was one of several institutions of higher education that were responding to campus interest and expectations. Since the first student graduated in 2010, the department has had over 50 alums complete the program. At least 18 students have graduated with a major in environmental studies every year. There were up to 20 majors each year; graduates were successful.

**Limitations**

This research had limitations, beginning with the size of the sample. The faculty of the case study's environmental program had four members at the time this researcher began to enroll participants. All of the targeted population agreed to participate in the study. The department added a fifth member after the research began, but the participant was not able to contribute to the study and declined to participate. This was a limitation because the fifth member of the faculty was hired specifically as the sustainability professor. Although this professor could not address the study questions regarding the initial design and development of the environmental studies program, the input from current design and development of the specific coursework in sustainability education would have had merit and would have added to the research findings.

The other faculty members communicated that the sustainability professor would have had data that would be different from the responses already given in the structured interviews. This researcher was unable to obtain consent from the new professor to participate in this study. Not having input from the sustainability professor was a limitation.

Another limitation was in the genders of the participants. There were three males in the study and one female. The study was also limited to one southeastern U.S. college. This researcher recognized the effect of the limitation after the interviews were completed and analyzed. Sustainability education within the environmental studies program was relatively new to the college and the process of development and implementation continues to evolve. I was unable to elicit any new information about the specific sustainability courses that were integrated into the environmental studies program after the study was initiated.

**Implication of the Results for Practice, Policy, and Theory**

Sustainability is the balance in the diversity and productivity in a system and encompasses the potential to maintain long-term societal well-being of the environment, economy, politics, and culture (Reza, 2016). Sustainability education is a process that addresses concerns and attitudes and develops values and abilities to enable students to achieve the next level of leadership in sustainability development and a sustainable future. Education for Sustainable Development focuses on the integration of instruction and practical application of essential components of sustainability education, such as conservation of resources, biodiversity, climate change, and reduction of poverty and disaster risks (Reza, 2016). The results of this case study of the experiences and perspectives of a higher education faculty who designed and developed sustainability education in their curriculum had implications for practice, policy, and theory.

**Practice**. This researcher discerned that sustainability education at the case study college involved more than attention to, and concern for, the physical environment and contemporary environmental issues. Although the concept for the case study's environmental studies program "arose from a learning community that was interested in environmental issues and having a green campus," the topics of interest and instruction evolved to include sustainability education that addressed social and human sustainability concerns. According to Professor B, "there are factors relating to sustainability, like population growth, resource exploitation, finite resources, and energy utilization." Professor C noted that "sustainability education involves social sustainability as well as sustainability regarding resources." The faculty of the environmental studies program was prompted to broaden concepts of, and advance instruction in, sustainability education after receiving a generous grant from a local foundation. Professor A and Professor C conferred with the college president to determine "what we would do, or what we could do, with four million dollars to move sustainability to the center of the culture of the college." Professor A noted that the foundation wanted the college to "rethink sustainability" so that not only traditional aspects would be addressed but also issues such as poverty and crime in community sustainability. The program included hands-on projects regarding human sustainability in the community as well as academic instruction in the theory and practice of traditional aspects of sustainability and sustainability development.

**Policy**. Contemporary students are increasingly concerned about the global crisis regarding sustainability and expect universities to lead the effort to promote policy changes (Ralph & Stubbs, 2014). The Association for the Advancement of Sustainability in Higher Education challenges institutions of higher education to embrace sustainability education for both academic and societal benefit (AASHE, 2010). The college took a unique approach in the

development of the sustainability curriculum with a program that combined the study of environmental issues with education for sustainability in order to determine solutions. The courses were designed specifically for the students majoring in the environmental studies program with an intention to impact the campus community culture. Students in the environmental studies program were encouraged to participate in projects that advanced their expertise and creativity in contemporary sustainability objectives.

The case study college was one of several institutions of higher education that responded to campus interest and expectations regarding sustainability education. Professor D explained that the impetus on their campus occurred within a broader context of awareness in higher education institutions regarding sustainability and its implementation in higher education curricula. Professor D noted that there had been an ongoing national discussion regarding sustainability education in U.S. colleges and universities. Their department took a unique approach in the development of the sustainability curriculum with a program that combined the study of environmental issues with education for sustainability in order to determine solutions. The department faculty intended that sustainability be a college-wide effort, rather than the college depending on one department to teach sustainability and resolve sustainability issues.

**Theory**. Colleges and universities are ideal settings in which to promote sustainability objectives and serve as test sites and models for sustainability development (AASHE, 2010). Contemporary universities may expedite this objective by designing instructional programs that facilitate engagement in the classroom and participation in methods of learning to encourage the maintenance of sustainability measures in social systems after graduation from college. The curriculum should foster research (Reza, 2016). Research-based findings from institutions of higher education have the capacity to initiate awareness of environmental issues, change policies,

and promote solutions (Reza, 2016). Constructivist classrooms encourage students to learn from the construction of meaning and active participation in their reality (Liu & Chen, 2010).

Aspects and influence of sustainability in higher education include integration of sustainability coursework and campus projects into curricula, programs of study for students entering green energy workplaces, current and projected savings in campus infrastructure expenditures, opportunities to link academics with campus operations and facilities management, and impact in local communities (Savanick et al., 2008). Colleges and universities that are committed to sustainability education and development are able to provide models for sustainability development and maintenance in their local communities and advise business communities (Reza, 2016). Sustainability education within this college's environmental studies program steadily evolved from courses in science to interdisciplinary coursework to a fully developed program with specific sustainability coursework. Professor B and Professor A "knew from the onset that we wanted to have, not an environmental science program, but an environmental studies program." Professor B stated that "we did not want to be defined as a sustainability program; we wanted to be an environmental studies program, which is much broader. Sustainability is a major component." The courses were designed specifically for the students majoring in the environmental studies program with an intention to impact the campus community culture. Students in the environmental studies program were encouraged to participate in projects that advance their expertise and creativity in contemporary sustainability objectives.

**Recommendations for Further Research**

The purpose of this study was to add to the existing literature regarding sustainability education in higher education curricula. This researcher investigated the experiences of one

higher education faculty who designed and developed sustainability education in the curriculum of their institution of higher education. She recognized the need for additional case study research regarding faculty experiences in the design and development of sustainability education in higher education institutions. Additional research regarding faculty experiences in curricular development of sustainability education will advance the research and encourage dialogue.

After this researcher analyzed her data and reflected on the results, she discerned areas of further research. This study focused on the experiences of one higher education faculty who designed and developed a sustainability education program and integrated it into their curriculum. The sample was limited to the original faculty members and the members who joined the faculty in its early stages of development and implementation. The program was a new addition to the programs at the college. The first recommendation for further research would be to conduct an additional case study that compares the data from this study to current data for a critique of the program progress. This study would benefit from an expansion of the sample to include new faculty and department staff and the sustainability manager. Another study that includes new faculty and department staff and new sustainability personnel, such as the facilities manager, would provide additional pertinent data regarding the present curriculum and campus sustainability objectives. The insight would benefit educators seeking practical data in order to make decisions about integrating sustainability education in their institutions of higher education. Research questions would target the current observations of the sample and the impact of the implementation of sustainability education coursework.

Another recommendation is further investigation regarding enrollment in the environmental studies program. Research questions would address the motivations that attracted students to the college and the environmental studies program, and how they expect to use their

degrees after graduation. A third recommendation for further research is a study that tracks graduates of the program and analyzes their career progress in the workplace or impact in the community.

**Additional recommendations.** Society and economy depend on an environment that is healthy. Sustainability is the balance necessary for the protection of the environment while maintaining social equity and a progressive economy. Institutions of higher education have recognized their impact on sustainability and their capacity for sustainability development (Tare, 2013). Higher education research and education are integral to the development of sustainability objectives (Sammalisto & Lindhqvist, 2008). Students that attend an institution of higher education that integrates sustainability education and sustainability development are better equipped after graduation to meet the global challenges of contemporary environmental concerns (Tare, 2013). Theoretically, sustainability education involves a curriculum that is balanced and scientific and includes sustainability education in research as well as academics, with a holistic approach that increases student awareness and motivation to continue sustainability efforts after graduation (Reza, 2016).

This researcher recommends that colleges and universities recognizing the benefits of sustainability education and considering the development of sustainability education curriculum align with committed colleges and universities and sign the Talloires Declaration, the 1990 action plan for literacy in higher education sustainability and environmental curricula. After signing this declaration, the challenge for the college or university is the implementation of sustainability measures in their programs (ULSF, 2008b). The Association of University Leaders (ULSF) is the Secretariat for the Talloires Declaration. In addition to its duties as secretariat, the independent organization offers services such as sustainability assessment, data

regarding sustainability research, case studies and theoretical models, and sustainability initiative evaluations to assist institutions of higher education in the development of sustainability curricula and support its implementation (ULSF, 2008a). ULSF posits that colleges and universities are uniquely positioned to influence policies in society. The association notes that institutions of higher education provide intellectual, social, and moral instruction to its students and prepare them for the workplace, and works to form partnerships to promote sustainability education in colleges and universities around the world (ULSF, 2015).

Colleges and universities may join the American Association for the Advancement of Sustainability in Higher Education and support their goal to enable students to achieve awareness and understanding of the interaction among environmental, social, economic forces and develop the ability to ascertain contemporary problems. Colleges and universities interested in a commitment to sustainability objectives in their institutions of higher education may join The Higher Education Sustainability Initiative network. HESI is a partnership between UNESCO, UN Global Compact's Principles for Responsible Management Education (PRME) initiative, United Nations Environment, United Nations Department of Economic and Social Affairs, United Nations University (UNU), and UN-HABITAT and UNCTAD. The network was created in 2012 after the United Nations Conference on Sustainable Development, also known as Rio+20. The Higher Education Sustainability Initiative has global commitments from over 300 universities. Colleges and universities that join the initiative commit to developing green campuses and teaching sustainability development in a disciplinary approach. They not only research sustainability development but also disseminate acquired knowledge, and support community sustainability projects. HESI participants commit to engaging with global networks and sharing information with them (HESI, n.d.).

## Conclusion

Education for Sustainability is an ongoing process with objectives that exceed traditional academic instruction regarding the environment (ARIES, 2009). Colleges and universities are in unique positions to model responsible behavior by ensuring that campus life and activities are both environmentally sound and viable now as well as the future (ULSF, 2008a).

Sustainability education in colleges and universities range from the introduction of sustainable development concepts and policy statements to coursework integration and curriculum development. Institutions of higher education may focus more on green campuses and structural innovations that save energy because of economic impact. Changes in the curriculum to accommodate sustainability education have had less impact on higher education (Sammalisto & Lindhqvist, 2008).

There is very little research regarding the integration of sustainability concepts in higher education curriculum and delivery of instructional strategies and a lack of research investigating the drivers, barriers, and challenges that colleges and universities encounter in the design of sustainability curricula and its implementation (Davis et al., 2003). External drivers for the adoption of sustainability in higher education include both international and national directives and policy statements. Internal drivers include higher education's awareness of ethical obligations in, and moral responsibilities for, the advancement of current knowledge and continued research for solutions (Ralph & Stubbs, 2014).

The investigation provided insight into faculty perspectives, observations, and experiences in the curricular development of sustainability education within a new departmental program at a small, southeastern college. This researcher chose a qualitative case study approach with a constructivist framework to advance knowledge regarding sustainability in higher

education. Results indicated the impetus for the program, its design and process, the drivers and barriers in design and development, and the program's successes and challenges. The data were linked to the existing literature.

Institutions of higher education are recognizing the need for incorporation of sustainability development concepts in operations and research (Davis et al., 2003). Campus life may reflect a sustainable community by demonstrating responsibility in the use of water, food, and energy (ULSF, 2008a). A growing consensus regarding the goal of education has shifted from subject mastery to mastery of the graduates' development and readiness for meaningful participation in their communities (Davis et al., 2003). Sustainability education incorporates relevant sustainability concerns in curricula pedagogy to address environmental issues regarding climate, conservation, biodiversity, and the reduction of disaster risks and poverty (Reza, 2016). Colleges and universities that offer sustainability programs graduate students who enter the workplace as sustainability professionals in business, government, and education (Kodama, 2011). Formal coursework and programs in sustainability education benefit students during higher education and beyond graduation by providing opportunities to develop the skills and extended knowledge that are necessary to address environmental concerns and sustainability issues. Graduates will then be better equipped to advocate sustainability development when they enter the workforce (Martins, Mata, & Costa, 2006).

A significant goal in higher education is the preparation of students in the development of productive citizenship. The cultivation of awareness regarding ecological literacy coupled with skills to solve problems regarding environmental concerns must be an integral part of this higher education goal. Educating students about current challenges that exist in the environment will enable them to understand the need for critical participation in responsible global stewardship

(Hensley, 2017). Participating colleges and universities combine classroom lectures with experiential learning situations to engage students and motivate them to utilize knowledge and practical applications to build competencies in sustainability development that benefit contemporary society and build the foundation for a sustainable future (ARIES, 2009). The American Association of University Leaders for a Sustainable Future contended that 21st century higher education should advance the sustainability agenda and posited that success of colleges and universities may be ascertained by their ability to promote a progressive agenda with environmental sustainability as a priority (ULSF, 2008a).

This researcher concluded that the advancement of sustainability education in higher education not only serves contemporary students but also provides academic opportunities for future students. She determined that it is incumbent upon educators to recognize this academic need and design and develop sustainability education curricula in their institutions of higher education. Additional research regarding faculty experiences in curricular development of sustainability education is needed and necessary to advance the research and encourage dialogue.

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## Appendix A: Structured Interview Questions

1. Thank you for taking time to meet with me and discuss your experiences in the design and development of the environmental studies (ENVS) program at your college. May we start this interview by talking about how long the environmental studies/sustainability education program has been a part of the curriculum?
2. I am very interested in sustainability in higher education. Was sustainability a consideration when you began the design of the environmental studies program?
3. How would you describe the drivers that prompted the design and development of an environmental studies program with sustainability education?
4. Did you experience any barriers during the process?
5. May we discuss the successful aspects of the ENVS/sustainability program?
6. Looking back on the beginning of the design and development of (ENVS), did you experience any setbacks?
7. Did all aspects of the design come together as planned during the development, or would you say that there were some aspects that did not work and were discarded?
8. Were there any failures that were later corrected?
9. May we talk about your present observations regarding sustainability education on campus?
10. How would you characterize the success of the program you designed and developed?
11. Please tell me about any upcoming projects or next-step plans for the ENVS/sustainability program.
12. Thank you for spending time with me and sharing your experiences during the design and development of the environmental studies/sustainability education program at this

college. Do you have any suggestions for small colleges who want to design and develop sustainability education?

## Appendix B: Statement of Original Work

The Concordia University Doctorate of Education Program is a collaborative community of scholar-practitioners, who seek to transform society by pursuing ethically-informed, rigorously- researched, inquiry-based projects that benefit professional, institutional, and local educational contexts. Each member of the community affirms throughout their program of study, adherence to the principles and standards outlined in the Concordia University Academic Integrity Policy. This policy states the following:

### Statement of academic integrity.

> As a member of the Concordia University community, I will neither engage in fraudulent or unauthorized behaviors in the presentation and completion of my work, nor will I provide unauthorized assistance to others.

### Explanations:

**What does "fraudulent" mean?**

> "Fraudulent" work is any material submitted for evaluation that is falsely or improperly presented as one's own. This includes, but is not limited to texts, graphics and other multi-media files appropriated from any source, including another individual, that are intentionally presented as all or part of a candidate's final work without full and complete documentation.

**What is "unauthorized" assistance?**

> "Unauthorized assistance" refers to any support candidates solicit in the completion of their work, that has not been either explicitly specified as appropriate by the instructor, or any assistance that is understood in the class context as inappropriate. This can include, but is not limited to:
>
> - Use of unauthorized notes or another's work during an online test
> - Use of unauthorized notes or personal assistance in an online exam setting
> - Inappropriate collaboration in preparation and/or completion of a project
> - Unauthorized solicitation of professional resources for the completion of the work.

**Statement of Original Work (Continued)**

I attest that:

1. I have read, understood, and complied with all aspects of the Concordia University–Portland Academic Integrity Policy during the development and writing of this dissertation.

2. Where information and/or materials from outside sources has been used in the production of this dissertation, all information and/or materials from outside sources has been properly referenced and all permissions required for use of the information and/or materials have been obtained, in accordance with research standards outlined in the *Publication Manual of The American Psychological Association*.

Tina Wilson

Digital Signature

Tina Wilson

Name (Typed)

June 21, 2019

Date