COMMUNITY PEDAGOGY FOR SUSTAINABILITY: A GROUNDED THEORY EXPLORATION OF THE UNIVERSITY OF GEORGIA SUSTAINABILITY CERTIFICATE PROGRAM

by

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(Under the Direction of Kyle M. Woosnam)

ABSTRACT

Education for Sustainable Development (ESD) has grown in prevalence in the U.S. and globally, with nearly 600 major and non-major sustainability programs registered through the Sustainability Tracking, Assessment, and Reporting System (STARS). Sustainability education programs often defy traditional disciplinary boundaries and student-teacher roles. These programs aim to enable individuals to think critically about the interdependence of our human and environmental systems and make connections between local and global actions to address sustainability challenges and adapt to a changing world.

This qualitative study seeks to understand and provide a rich description of the learner's experience in a non-major sustainability certificate program at the University of Georgia (UGA), a large land- and sea-grant university in Athens, Georgia. Constructivist grounded theory methodology was used to interpret learner outcomes and construct a theory describing the context of positive outcome attainment from the perspective of student participants. In addition to demonstrating key competencies for sustainability, students in the UGA Sustainability

Certificate program emphasized personal development and feelings of hope as outcomes of the program, facilitated in part by the sense of community co-constructed among students, staff, faculty, and community members. The findings of this study stress the importance of the socio-emotional outcomes and components of ESD programs, which may in turn support the development of cognitive outcomes. The resultant theory of *community pedagogy for sustainability* furnishes a backdrop for ongoing evaluation and evolution of sustainability education and insight for ESD programs hoping to equip sustainability leaders with the qualities needed to spur social and environmental change.

INDEX WORDS: Education for sustainability, Education for sustainable development, Grounded theory, Program evaluation, Learner outcomes, Student perspective, Key competencies for sustainability, Community pedagogy, Community-based learning

COMMUNITY PEDAGOGY FOR SUSTAINABILITY: A CASE STUDY OF THE UNIVERSITY OF GEORGIA SUSTAINABILITY CERTIFICATE PROGRAM

By

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DEDICATION

Dedicated to the Queen of Normaltown,
who watched the world go by from the backseat,
and it was good.

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When reflecting upon one's gratitude in the context of community-thinking, one could get carried away with thanks. To every individual who played a part in the construction of this complex intellectual and emotional product, thank you. Thanks to the Office of Sustainability, Kevin, Tyra, Andrew, and Jason, without whose support this study would not have been possible and the learning community within it would not exist. To every current and past student in the Sustainability Certificate, thank you for coming to class with a kind heart and an open mind – we couldn't learn without you. I cannot fully express my thanks to Dr. Ron Balthazor, my mentor, friend, and conspirator in the soil; the way that you engage with life is a constant source of inspiration. I thank Dr. Nick Fuhrman for his boundless enthusiasm and for somehow always managing to pluck my abstract thoughts from the sky and organize them neatly into a table. Thank you to Dr. Kyle Woosnam for taking on a surprise student in need of a bit guidance and for giving me free range to explore my own learning through this project. To my dad, for being proud of me for anything. To my mom, for constantly reminding me of who I am and who I want to be. To Rick-chard, for dreaming I was a sustainability champion (could it have come true?!). And to Hadrien, where would I be in this endeavor without your constant support? Thanks for cooking, listening, caring, loving, and leaving me alone.

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CHAPTER 1

INTRODUCTION

> The disorder of ecosystems reflects a prior disorder of mind, making it a central concern to those institutions that purport to improve minds. In other words, the ecological crisis is in every way a crisis of education (Orr, 2005, x).

As environmental pressures from an expanding human population and consumption intensify, societies face a growing number of challenges. Leadership and innovation towards the sustainable use of resources is critical to support continued development in the face of large-scale environmental issues such as habitat degradation, pollution, loss of biodiversity and climate change (Orr, 2013; Ralph & Stubbs, 2014; Sterling, 2002). As defined by the Brundtland Commission of the United Nations in 1987, *sustainable development* involves "meeting the needs of the present without compromising the ability of future generations to meet their own needs" (WCED, p.8). Sustainable development calls for equal consideration of economic, social, and ecological activities and emphasizes the interdependence of these three spheres in what has become known as the 'triple bottom line' (TBL) framework (WCED, 1987). TBL sustainability is now a globally-recognized paradigm for envisioning the future of human progress and a comprehensive expansion of environmental education (Ralph & Stubbs, 2014; Sterling, 2002; Vincent & Focht, 2009). In the context of education for sustainable development (ESD), sustainability remains an amorphous target, challenging to define and apply among the full diversity of academic instructions and frameworks (Shriberg, 2002). The integrative nature of sustainability does not lend itself to orderly classification, as it is not discrete discipline or

prescription for action but a systems-thinking framework for problem-solving in which ecological limits are considered within the context of human values. This perspective heeds at once eco- and anthropocentric values with the ultimate goal of continued ecological support for economic activities which promote social responsibility, justice, and collaboration.

Higher education institutions have a critical role to play in ESD, as they stand uniquely at the forefront of innovation; their research, instructional, and outreach activities serve as powerful agents of social change in a rapidly expanding and industrializing global citizenry (Ralph & Stubbs, 2014; Sandri, Holdsworth & Thomas, 2018a, 2018b). Evidence demonstrates that university students, employers, and employees regard sustainability competencies as desirable traits for employment (Bone & Agombar, 2011; Thomas & Depasquale, 2016; Willard et al., 2010). Student interest in sustainability plays a critical role in moving the institutional needle towards sustainability; in the *Princeton Review's* 2019 College Hopes and Worries survey, 64% of college applicants indicated that an institution's 'green' practices would factor into their decision to apply or attend, regardless of their intended major (Princeton Review, 2019).

In response, universities have begun instituting operational campus sustainability plans, academic programs in sustainability, and campus-wide sustainability requirements within the general curriculum (Shriberg, 2002; Winter & Cotton, 2012). A growing number of schools have begun to offer major and non-major programs in sustainability. According to the Sustainability Tracking, Assessment, and Ranking System (STARS), an international initiative of the Association for the Advancement of Sustainability in Higher Education (AASHE), 257 of its 958 registered institutions now offer at least one undergraduate degree and/or major program in sustainability, 264 universities offer a non-major program with a sustainability focus, and 31 offer a sustainability-focused certificate program (AASHE, 2019).

Sustainability education programs often defy traditional disciplinary boundaries and student-teacher roles. They aim to enable individuals to think critically about the interdependence of our human and environmental systems and connections between local and global actions to address sustainability challenges and adapt to a changing world. Sustainability education necessitates a shift towards experiential, collaborative, and transformative learning models and pedagogical strategies (i.e., instructional approaches). The interdisciplinary, flexible, and non-traditional nature of sustainability education presents a great challenge to instructors and administrators who hope to evaluate their programs and assess student learning (Giefer, 2015; Sandri et al., 2018a). Requirements must remain flexible enough to encourage participation across an array of departments and majors, as student participants often represent a wide array of disciplines and may complete sustainability-focused coursework in areas ranging from ecology to computer science, philosophy to entrepreneurship. Program coordinators indicate that, due to this interdisciplinary breadth, evaluation remains largely unsystematic and one of the more elusive aspects of programming (Giefer, 2015).

Nature of the Problem: What does 'green' curriculum look like?

Literature on sustainability assessment in higher education has extensively considered the impact of its integration across multiple sectors of campus life, though significant focus remains on campus operations. If attaining global sustainability is the ultimate goal of such efforts, the disconnect between "green operations and brown curricula" (Orr, 2012) must be addressed. Further examination of sustainability-specific academic programs is needed (Koehn & Uitto, 2014; Lozano et al., 2017; Shriberg, 2002; Winter & Cotton, 2012), and may lead us to a greater understanding of how embedding sustainability within the general curriculum could achieve such

imposing goals. In-depth evaluation of ESD programs will help establish what Sandri et al. (2018b) identify as "critical feedback loops between learning outcomes, professional practice, learning and teaching and curriculum design" (p. 406).

A growing body of literature provides solid theoretical groundwork for defining ESD learner outcomes (Barth et al., 2007; de Haan, 2010; Wiek et al., 2011; Shephard et al., 2015; Glasser & Hirsh, 2016) and identifying programmatic best practices (Lozano et al., 2017), but little empirical evidence exists documenting the impact of interdisciplinary ESD on students. In sum, ESD programmers have identified *what they hope to do*, but they have not yet painted a clear picture of *what they are doing*. How do we know that we are preparing students with the necessary skills and capabilities to enter a global workforce and become leaders of sustainable innovation? Further still, what instructional and programmatic factors do students attribute to their learning in ESD? The present study addresses these questions through a qualitative case study of the University of Georgia Sustainability Certificate program in order to deepen our understanding of ESD program impact and enhance future planning.

Nature of the Study: Student-centered evaluation

Across Western systems of higher education, Darwin (2016) asserts that "…student evaluation has become increasingly recognised as a valid empirical foundation for institutional assessment…" (p. 2). In-depth examination of student perspectives has been used to identify program strengths and challenges and to increase retention and satisfaction in higher education programs (see Roberts, Gentry, & Townsend, 2011). Despite the ubiquitous and continued use of student feedback for monitoring the quality of teaching and educational programs throughout the diversity of higher education disciplines, little published information exists regarding student

participants' perspectives on ESD program impact and perceived contributors to their knowledge and abilities. Increasing our understanding of the program strengths and challenges from the student perspective will allow us to systematically and justifiably improve program components, instructional methods (pedagogies), and retention and recruitment strategies (Roberts et al., 2011).

The present study seeks to respond to this need and opportunity for deepened understanding of ESD program impact through an exploration of the University of Georgia Sustainability Certificate program (UGA SC). Through the use of constructivist grounded theory methodology (Charmaz, 2014), the research will provide an in-depth examination of the outcomes, instructional approaches, and structural program components perceived as valuable to student graduates as they enter into the next phases of their professional and academic careers. This data will help improve educational programming and inform the continued development of sustainability certificate.

Significance of the Study

As stated by UNESCO (2017, p.57), "Monitoring and evaluation must be improved to secure the evidence for continued and expanded investment in ESD, and for reflexive engagement with ESD as an emerging educational reorientation process." This study addresses the deficit of published information on the evaluation of ESD programming and will provide empirical documentation of a rigorous, non-major sustainability education program at the undergraduate level. Locally, the student evaluation undertaken in this research will aid faculty and administrators in planning for the future of the UGA SC as the program continues to grow and evolve. While the findings of such a locally-rooted study should not be generalized, this

work also seeks to contribute to the advancement of theory in the fields of education and ESD specifically. As stated, theoretical groundwork has been laid, identifying key learning outcomes for ESD, but significant gaps remain in: 1) the relative value of these outcomes as perceived by students and 2) our understanding of the learning process in relation to these outcomes. This study seeks to describe attainment of outcomes through the examination of the student learning experience within the UGA SC. Ultimately, attaining sustainability requires collaboration; therefore, the more that is learned and shared within and among individual programs, the greater our capacity for global success.

Research Goals and Objectives

The purpose of the present research is to explore and describe the impact of a non-major, ESD certificate program in a public university in the U.S. Specifically, this study will examine graduates of the University of Georgia's Sustainability Certificate program at the undergraduate level. Perceived programmatic, personal, and external factors contributing to student learning will also be explored. The research questions guiding the study are as follows:

(1) What outcomes do graduates of the UGA Sustainability Certificate program report and/or demonstrate (including but not limited to key competencies for sustainability)?

(2) Through what mechanisms did learning occur (including but not limited to pedagogical strategies and program attributes, as well as personal strategies, attributes, and life history)?

<u>Specific Objectives</u>

(1) Collect qualitative data through semi-structured interviews from Fall 2017, Spring 2018, and Summer 2018 program graduates

(2) Code qualitative data for themes relating to learning processes, competency development, and emergent factors contributing to sustainability learning

(3) Generate a theory to explain core components and processes of student learning through the UGA Sustainability Certificate

Study Setting

The University of Georgia

The setting for this study was the University of Georgia (UGA), a large public institution situated in the southeastern United States in Athens, Georgia. As of fall 2018, UGA's total student population was 38,652. Following current national trends in higher education, approximately 57% of students were female and 43% were male (U.S. Department of Education, 2017). According to UGA's Office of Institutional Research, the student body was roughly 67.2% white, 10.2% Asian, 8.3% black, 5.5% Hispanic, 3.7% multiracial and 5% other or not reported, with approximately 82% of students identifying as Georgia residents (University of Georgia, 2018).

Sustainability at UGA

As the state's land- and sea-grant university, UGA's impact extends locally and globally through education, extension, service, and research efforts. Listed as a hallmark of the 2020 Strategic Plan, sustainability is an explicit target of the university and serves as the backdrop for Strategic Direction VII: Improving Stewardship of Natural Resources and Advancing Campus Sustainability (University of Georgia, 2012). UGA's commitment to sustainability has become increasingly public-facing in recent years, extending beyond the insularity of campus. UGA now

serves as a Steering Committee member of the newly established Greater Atlanta chapter of the United Nations Regional Centre of Expertise on Education for Sustainable Development (RCE). This regional network was acknowledged by the UN in December of 2017 and is one of 164 RCE's recognized worldwide and one of six within the U.S. ("RCEs-Worldwide," n.d.). The Greater Atlanta RCE lists their primary goal as bridging the gap between education and development through the following objectives as stated by The United Nations University Institute for the Advanced Study of Sustainability (UNU-IAS) (Greater ATL RCE Executive Summary, 2017, p. 4):

> *Objective 1*: Accelerating local and regional solutions to sustainability issues
>
> *Objective 2*: Re-orienting higher education for societal transformation into [sustainable development] SD
>
> *Objective 3*: Developing SD and ESD competencies and capabilities as well as a science-policy interface.

It is the vision and mission of the Greater Atlanta RCE to address regional sustainability challenges through engaged collaboration with a diverse committee of academic institutions, non-profit organizations, businesses, governmental representatives, K-12 schools, community organizations, and an RCE youth network (Greater ATL RCE Executive Summary, 2017). UGA hosted the second committee meeting in February of 2018 and recently delegated two undergraduate interns in the Office of Sustainability with the task of developing the RCE youth network.

Additionally, the university's 2017 submission to STARS demonstrates advancing sustainability efforts. The institution displays a STARS Gold rating with 78.88%, 72.67%,

57.19%, and 46.54% of points earned in the Engagement, Academics, Planning and Administration, and Operations categories, respectively. Within the Curriculum subcategory of Academics, UGA earned 28.33 of 40 possible credits for the 2017 academic year (AASHE, 2018). For five of the eight targets within the Curriculum subcategory, UGA reported full credit. The three Curriculum targets reported for partial credit include Academic Courses, Learning Outcomes, and Sustainability Literacy Assessment, indicating opportunity for improvement in these areas and the potential benefit of the present study to bolster and inform academic efforts.

This study is particularly concerned with *student* perceptions of these academic efforts, in part due to the degree of momentum and enterprise demonstrated by students at UGA in support of sustainability efforts on campus. In 2008, a coalition of environmentally-focused student organizations formed the Go Green Alliance and introduced The Green Initiative Fund (TGIF) campaign for a self-imposed "green fee" paid by students each semester. After a majority vote to approve the implementation of the green fee, these funds facilitated the creation of the Office of Sustainability (OoS) in 2010, housed within the UGA Facilities Management Division. A primary mission of the OoS is to enable students with the support and tools to integrate sustainability on campus, and so the UGA Sustainability Grants program began within the first year of the office's establishment as a means to give green fee funds back to students for sustainability-focused campus and community projects. As cross-campus interest in sustainability grew, students called for the integration of these concepts and practices directly into the curriculum. After four years of development with Office of Sustainability staff, departmental administration, and supporting faculty, the UGA Sustainability Certificate (SC) was approved in the fall of 2016.

UGA Sustainability Certificate Program Overview and Structure

The SC now serves as a growing hub for sustainability-centered academic efforts at UGA. The program provides a focused and structured opportunity for student-led, local sustainability initiatives supported by a diverse band of faculty and a broad foundation of courses and educational opportunities. As stated on the certificate website, the program "enhances opportunities for integrative, applied learning in interdisciplinary settings and prepares students to address difficult global sustainability issues" ("About the Certificate," n.d.). The program gained institutional support in part due to its grounding in experiential learning pedagogy, which reinforces the University's emphasis in experiential learning and the recent addition of the Experiential Learning Requirement for all undergraduate students (Vencill, 2015). The program is housed within the Franklin College of Arts and Sciences, the College of Environment and Design, and the Odum School of Ecology on a three-year, rotating basis. Completion of the online application and approval by the director are required for student admittance into the program; however, there is currently no cap on admission and no student has yet been turned away from the program during the admission process. Applications are reviewed on a rolling basis, and while students may apply at any point during their undergraduate career, the majority of new applicants are traditional undergraduate students in their second or third year of a four-year degree program. As of the summer 2019 semester, enrollment demonstrates a high degree of academic diversity with 12 schools and 66 unique majors represented across 189 undergraduate students.

The certificate program structure resembles the basic outline adhered to by many other non-major sustainability programs as described by Giefer (2015), with the notable addition of two semesters in the Sustainability Seminar (Figure 1) for a total of 17 required credit hours. The

1-credit hour Sustainability Seminar course requirement serves as the certificate hub for communication, team-building, and community networking. Prior to enrolling in the Sustainability Seminar, it is recommended that students complete an Anchor Course on the foundations of sustainability. One 3-credit hour elective course per sphere of sustainability – Ecological, Economic, and Social – is required, and two of the three Sphere Courses must be taken outside of the student's major department of study. This requirement aims to facilitate interdisciplinary awareness and collaboration in support of Wiek et al.'s systems and interpersonal competencies (2011). The Sustainability Capstone is recommended for completion during the student's final semester of the program to allow for the incorporation of all previous sustainability learning. Students may appeal for course substitutions via an online form, which must be approved by the director. Each course requirement category is further elucidated below, and a current listing of approved undergraduate courses is provided in Appendix F.

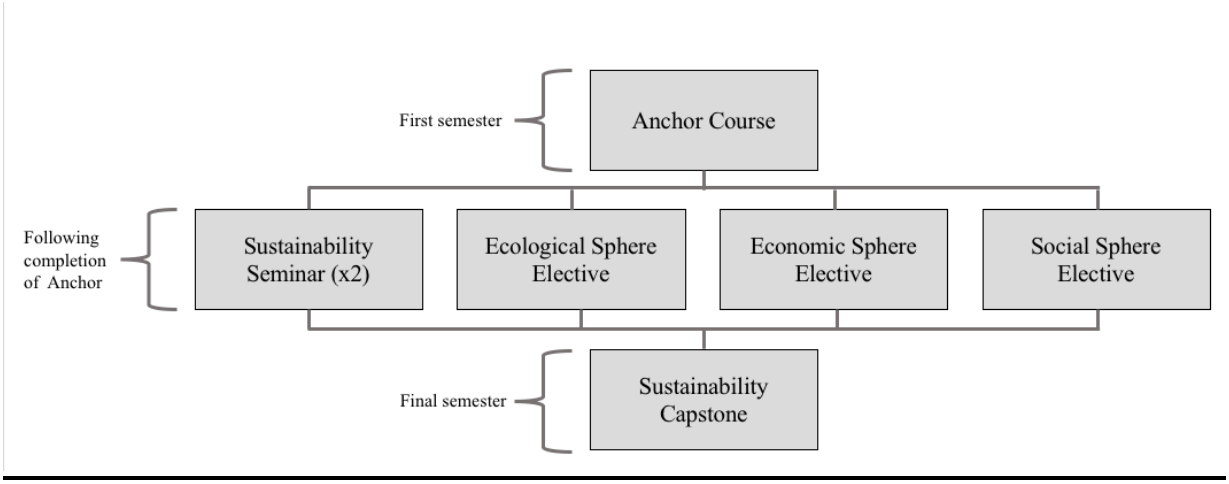

Figure 1. Overview of the UGA Sustainability Certificate Program Structure

Anchor

The anchor course provides foundational knowledge of sustainability, including its definition, history, and many applications. "Courses which qualify as anchor courses for this certificate will challenge students to evaluate their behavior as citizens and consumers and encourage them to think about the interdisciplinary challenges associated with a sustainable future" ("Requirements and Guidelines," n.d.) Possibilities for fulfillment of the anchor course requirement include Foundations of Sustainable Development and Sustainable Development I, offered within the Warnell School of Forestry and Natural Resources, Introduction to Sustainability, offered within the College of Environment and Design, and Field Studies in Natural Resources, offered as a part of the Discover Abroad program also housed within the Warnell School.

Sphere Electives

Sphere electives are offered across various schools and disciplines, taught by faculty with a diversity of expertise. Instructors wishing to have their course included as a sphere elective may submit a syllabus and course outline for approval by the Sustainability Certificate director and advisory board. Course inclusion is based on the AASHE STARS criteria for sustainability courses, which requires a "primary and explicit focus on sustainability and/or…understanding or solving one or more major sustainability challenge" ("Criteria for Course Inclusion," n.d.). Sphere courses are categorized as having a primary focus in one of the following areas:

- Ecological sustainability: These courses cultivate an understanding of fundamental ecological concepts, addressing pressing human and environmental

issues such as climate change, declining biodiversity, environmental degradation and land-use change, and ecosystem services.

- Economic sustainability: These courses introduce students to foundational economic principles with special attention given to the interactions between national and global economic systems and the natural environment.
- Social sustainability: These courses address social science issues which sit at the intersection of culture, economics, and the natural environment. Topics covered in these courses may include globalism and cultural diversity, social and environmental justice, human geography, participation and citizenship, and the built environment.

Sustainability Seminar

Co-facilitated by the director and the graduate assistant for the SC, the seminar exposes certificate students to a diverse array of sustainability efforts being led by individuals and organizations within the University of Georgia and the greater Athens-Clarke County community. Enrollment in the course typically includes only those students actively participating in the certificate, and so the class serves as an important weekly meeting place for the certificate's student community. The class features discussions with a wide breadth of individuals working (explicitly and implicitly) in sustainability, including faculty, graduate students, certificate alumni, and representatives from local businesses, nonprofits, and governmental organizations. This seminar differs from the typical lecture-style departmental seminar in that guests are discouraged from preparing a formal presentation in lieu of a more active question and answer session with the students. Each semester includes two field trips to

locations around the community such as the county recycling center and landfill, the campus bioconversion center, a LEED certified residence, community gardens, and a tiny house constructed as a part of another UGA course. Students also work in teams over a two-week period, engaging in a campus design sprint in which an area of campus is utilized to teach a sustainability lesson and make recommendations for improvement. Reflection is a key component of the course, and students are tasked with contributing to a weekly message board regarding guest speaker content, as well as composing a mid-point and a final reflection essay to holistically examine their learning over the semester.

Community-building is another vital facet of the seminar, and time is spent at the start of each session sharing student news and celebrations of achievement. Tea from the UGA organic garden, UGArden, is brewed at the beginning of each class, and music is often played as students arrive. The constructed yet genuine atmosphere is open and welcoming.

Sustainability Capstone

In this course, students apply their foundational learning from certificate coursework in combination with their major expertise and skillset to a sustainability project on campus and/or within Athens-Clarke County. This semester-long project emphasizes collaborative and experiential learning and serves as an opportunity for professional development and community networking. Students may work individually, though the default structure for projects transitioned to interdisciplinary teams of two to five students in the spring of 2019. The participants in this study completed their capstone projects prior to this change, so all but one of those interviewed worked individually. Before beginning work on a project, a project work plan (i.e., proposal) must be submitted for director approval. Projects may include entirely student-led

initiatives, an applied research project working closely with faculty, or an identified need from a campus or community partner. In some cases, departmental capstone projects (e.g., Landscape Architecture Design Studio, Environmental Engineering Capstone) may be used to fulfill the sustainability capstone requirement if all project requirements are satisfied. All projects, individual or team-based, require a faculty mentor and three hours of associated course credit. The certificate director and graduate assistant co-teach the Sustainability Certificate Capstone course, which provides scaffolding for team-building, project management, research and basic data collection strategies, presentation and communication skills, and professional development.

Growth and Impact

The SC program continues to grow in various ways. Current enrollment far-exceeds the initial estimates of 30-40 students made by the program developers. As course offerings, enrollment, and the number of involved faculty and staff increase, questions of efficacy and impact are inevitable. Too, this growing student demand must be met with growing logistical and financial assistance, and the demand for evidence-based information on public program performance continues to rise as funding agencies and individuals request to know the value of their investments (Newcomer, Hatry, & Wholey, 2015). In order to improve programming and encourage continued support, evaluation is a necessity.

CHAPTER 2

LITERATURE REVIEW

Constructivist grounded theory methodology allows for literature review in two stages. The following chapter represents the initial literature review, which was performed to gain foundational understanding of the current status of ESD in higher education as well as core concepts and terminology of the field. I was particularly concerned with the learning outcomes of ESD (as identified by researchers, educators, administrators, and employers) and the pedagogical strategies typically employed. I begin this chapter by providing a brief overview of the integration of sustainability in higher education institutions in recent decades; I outline the historical context for the global shifts towards sustainability in higher education and discuss current trends and instructional paradigms associated with ESD. Key competencies for sustainability are implicated as a framework for examining learning outcomes within ESD. Barriers to adoption from the perspective of faculty and administration are explored, as well as the benefits of ESD competencies post-academia.

Sustainability in Higher Education

Global Pressure on Higher Education for Integrated Sustainability

In recent decades, the call for incorporation of sustainability into the facilities, operations, and curriculums of higher education institutions has amplified (Orr, 2013; Ralph & Stubbs, 2014; Sterling, 2002). The Talloires Declaration represented the first international contract among university leaders in explicit support of sustainability; this commitment has expanded

from the original 22 signatories to include 502 universities worldwide since 1990, each pledging to educate for an environmentally responsible and literate citizenship while engaging in sustainable development across all levels of the institution (University Leaders for a Sustainable Future, 1994). Spanning from 2005 to 2014, the United Nations introduced the Decade of Education for Sustainable Development, during which time colleges and universities around the globe initiated systemic changes towards sustainability, utilizing ESD as a stage upon which to unite local and world communities (UNESCO, 2012). In the U.S. alone, written commitments in support of sustainability increased by 43% among universities between 2001 and 2008, with half of these statements appearing in the core mission statements of the institutions (Urbanski & Filho, 2015). University commitments to sustainability continue to grow, imploring the creation of assessment and tracking systems to determine just how these universities are engaging with their commitments to lead the call for sustainable development.

Sustainability Tracking and Reporting System (STARS)

The preeminent sustainability campus network organization in North America, the Association for the Advancement of Sustainability in Higher Education (AASHE), provides institutions the opportunity to comprehensively assess and rank their sustainability efforts in order to identify global leaders (Urbanski & Filho, 2015; White, 2014). As of July 2019, 958 institutions have registered to record and make public their sustainability performance across all aspects of campus operations through the AASHE international initiative known as the Sustainability Tracking, Assessment, and Rating System (STARS) (AASHE, 2019). Participating institutions receive an overall STARS rating of Reporter, Bronze, Silver, Gold, or Platinum. These ratings and detailed reports are meant to build a community of sustainability

leaders around the world while providing a template for understanding and approaching sustainability across all areas of higher education and supporting information sharing between institutions. The rating system allows for purposeful comparisons longitudinally and across participating schools and provides incentives for continued improvement (AASHE, 2017b).

Originally created for U.S. and Canadian institutions, U.S. schools continue to vastly outnumber other represented nations, accounting for over 80% of users (AASHE, 2019), though recent research indicates that global participation is amplifying following the 2011 launch of the STARS International Pilot (at which time U.S. schools accounted for 92% of participants). Using STARS data to identify sustainability trends, Urbanski and Filho (2015) highlight this recent growth and its implications among several other key findings. Still perceived as a burgeoning movement among higher education institutions, participants in sustainability reporting through STARS can be seen as early adopters. While vanguard status may provide incentive to enlist, inconsistent interpretations of the term "sustainability" exist among the growing, international body of institutions, indicating that some higher education stakeholders are focused primarily on environmental or "green" campus initiatives rather than on the integration of environmental, economic, and social dimensions, particularly within curricular and co-curricular activities. Progress towards sustainability will require institutions to "look beyond the traditional 'green' focus and address sustainability issues from a systemic perspective" (Urbanski & Filho, 2015 p. 213), as STARS credits are assigned based upon their benefit to all three spheres of sustainability.

The self-reporting framework currently includes 90 targets or indicators across five main categories: Academics, Engagement, Operations, Planning and Administration, and Innovation and Leadership. Each main category includes two or more subcategories, within which the

specific targets provide detailed and transparent data on a wide array of sustainability topics including institutions' energy and water consumption, food and dining systems, transportation, construction, waste management, community partnerships, participation in public policy, support for underrepresented groups, and employee compensation. Institutions receive points or "credits" corresponding to each of their demonstrated targets. Credit allocation for each indicator and category is predetermined by a panel of STARS Steering Committee and AASHE staff and is based upon three major considerations (AASHE, 2018):

(1) the extent to which the achievement of credit ensures that all individuals associated with the institution gain the knowledge, capabilities, and attitudes needed to answer sustainability challenges

(2) the extent to which the achievement of credit contributes to environmental and human health, livelihoods, a sustainable economy, social justice, and equity, and

(3) the positive impacts of the credit not captured in other STARS credits.

Considering the potential of education in facilitating social change (Moore, 2005) it is unsurprising that the Curriculum subcategory contains the largest portion of credits compared to other subcategories. Shifts in academic instruction, assessment, and evaluation have tremendous impacts in working towards sustainability, and STARS recognizes the weight of such efforts within their scoring system. The STARS initiative demonstrates the vast application of sustainability within the institutional setting, with decided emphasis placed on educational endeavors which will ensure that individuals obtain "the knowledge, skills, and dispositions to meet sustainability challenges" (AASHE, 2017b p. 10).

In 2014, the University of Georgia became a participating institution in STARS and currently holds a Gold rating within the system (AASHE, 2017). UGA is part of the growing

trend among U.S. institutions to participate in the initiative, allowing transparent, public scrutiny of their sustainability efforts and direct comparison to other schools.

Current Trends in ESD Programs

A growing number of U.S. schools serve as working examples of the direct integration of sustainability into higher education curricular programming. While there are more ESD programs worthy of mention than could be described for the purposes of this study, examples include Cornell University (NY), which offers an Environmental and Sustainability Science major within the College of Agriculture and Life Sciences, and Furman University (SC), which offers a Sustainability Science major and minor for undergraduates wishing to understand the linkages among human and environmental systems (Cornell, 2018; Furman, 2018;). Schools such as Northwestern University (IL), the University of Wisconsin, and the University of Georgia have begun to offer non-major programs in the form of minors and undergraduate certificates open to students in any department or major of study (Giefer, 2015; "Certificate in Sustainability," 2019; "About the Certificate," n.d.). In Giefer's 2015 survey of non-major sustainability programs in the United States and Canada, the majority exhibited a three-stage structure consisting of an introductory course, a number of elective courses, and a student-led, applied capstone project. This structure supports ESD's grounding in transformative and action-oriented learning, emphasizing inter- and trans-disciplinary learning, problem- and place-based orientation, collaboration and participation, and self-directed learning (UNESCO, 2017). UNESCO reports that "only such pedagogical approaches make possible the development of the key competencies needed for promoting sustainable development" (p. 7).

Models of learning for ESD

'Education for sustainable development' as defined by UNESCO (2017) calls for the integration of critical issues such as climate change and sustainable consumption and production into a holistic curriculum structured for exploratory and applied learning. Sustainability education aims not to teach students *what to think* but rather *how to think* (Brundiers, Fadeeva, Wiek, & Redman, 2010; Savage et al., 2015; Shephard, 2015). For this reason, ESD involves a high degree of openness and adaptability, necessitating shifts from transmissive teaching modes which utilize traditional pedagogical approaches such as lecture, assigned readings, and guided problem solving. In the transmissive classroom, the instructor assumes the role of expert and authority figure, leading students through a 'cognitive apprenticeship' in which knowledge is transferred from teacher to student (Collins, Brown, & Newman, 1988). Alternatively, the two models of learning presented here as integral for facilitating ESD – transformative and experiential – often reject traditional classroom roles and involve the co-creation of knowledge through action, participation, and reflection.

Transformative Learning Theory and Critical Reflection

"The ultimate goal of transformative learning is to empower individuals to change their perspectives" (Moore, 2005). Within adult education literature, an extensive body of work on transformative learning theory is attributed to Mezirow, who defines transformative learning as "the process of learning through critical self-reflection, which results in the reformulation of a meaning perspective to allow a more inclusive, discriminating, and integrative understanding of one's experience" (1990, p. xvi). Here, critical self-reflection involves the thoughtful assessment

of one's framework for interpreting meaning. Learning occurs through questioning and reflecting upon one's assumptions, often through confrontations with disorienting dilemmas.

In the context of ESD, sustainability grand challenges lend themselves easily to the role of the disorienting dilemma – for example, visiting a municipal dump or working directly with individuals affected by water pollution in a low-income community. Activities like these can remove the learner from their comfort zone and initiate new ways of understanding the world around them and interpreting the implications of their actions (Moore, 2005). This operates under the assumption that learning within a paradigm merely reinforces that paradigm, while learning through the examination of a paradigm allows one to make changes to it (Palma & Pedrozo, 2016). Education for sustainability aims to foster this high-order systemic awareness in learners, enabling them to envision and initiate social change.

Experiential Learning Theory

In its most basic interpretation, experiential learning is simply *learning by doing*. Building upon the educational philosophies of Dewey, Lewin, and Piaget, Kolb (1984) is often cited as providing the foundational concepts and theories for experiential learning within contemporary literature in education:

> …the experiential learning theory of development focuses on the transaction between internal and external circumstances, between personal knowledge and social knowledge. It is the process of learning from experience that shapes and actualizes developmental potentialities. This learning is a social process; and thus, the course of individual development is shaped by the cultural system of social knowledge (133).

This process entails engaging in action, observing one's engagement, conceptualizing and interpreting meaning from the action, and then actively experimenting with learned constructs in subsequent engagement. A visual representation of this process is presented in Figure 2.

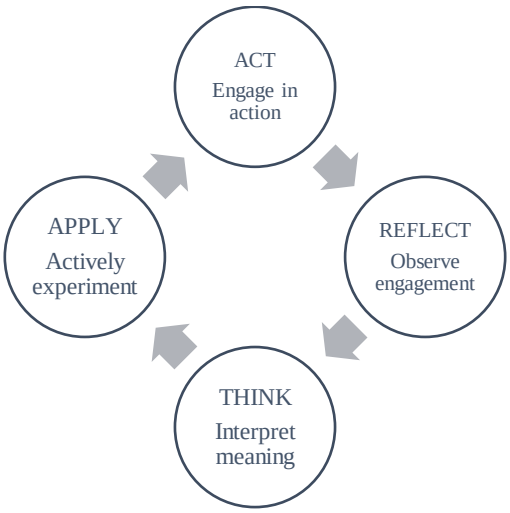

Figure 2. Kolb's Cycle of Experiential Learning (1984)

This process aligns well with transformative education and, too, fits within the constructivist epistemology where knowledge builds cyclically upon prior knowledge through the lived experiences of the individual. The experiential model produces a relationship to knowledge that is intimate and authentic, building competence, working knowledge, community relationships, and responsibilities to social and environmental systems (Kolb, 1984).

Pedagogical Strategies Associated with ESD

Described as the science of teaching and learning, pedagogy can vary depending upon the setting, course material, instructor style and preferences, learner outcomes, and overall educational goals (Lozano et al. 2017). There is no one-size-fits-all solution to classroom and material management.

In support of the UN Education for Sustainable Development Goals, UNESCO (2017) calls for action-oriented, transformative pedagogy through which the learner is empowered.

Pedagogical approaches that support transformative, experiential learning and that are commonly recommended in ESD literature include case studies, project- or problem-based learning, service-learning, participatory action research, cooperative and collaborative learning, place-based learning, concept mapping, life cycle/supply chain analysis, interdisciplinary learning, and jigsaw/team-teaching (Lozano et al., 2017; Mintz & Tal, 2018; Savage et al., 2015; UNESCO, 2017). UNESCO further asserts that "Only such pedagogical approaches make possible the development of the key competencies needed for promoting sustainable development" (p. 7).

Table 1 provides a brief description of pedagogical approaches for ESD. While this list depicts several of the core pedagogies associated with ESD (with specific emphasis on those represented within the UGA SC), it is certainly not exhaustive; many other modalities of instruction can be and are used within ESD, including poetry (Boring & Forbes ed., 2013), story-telling (UNESCO, 2017), participatory action research (Lozana et al., 2017), and concept mapping ("Concept Maps," n.d.).

Table 1: Pedagogical Strategies for ESD (Lozano et al., 2017; Mintz & Tal, 2018; Savage et al., 2015; UNESCO, 2017)

Case studies: Detailed, qualitative descriptions of problems or controversial scenarios in sustainable development at the local, regional, and/or global level are presented. Students are tasked with interpreting these complex, socio-environmental issues through the perspectives of various stakeholders and reaching a concurrent plan of action. This can be done in groups or individually.
Project-/Problem-based learning: Individuals or teams of students engage with stakeholders to solve real-world, interdisciplinary sustainability challenges. This inquiry-to-action process simulates professional consultation in which knowledge, skills, and competencies are developed through their application.
Service-learning: Individuals or teams of students engage in projects that will directly benefit others within the community. Though some aspects of service-learning are shared with volunteer work or charity, service-learning involves prolonged collaboration community partners to facilitate complex, long-term problem-solving to environmental and social justice issues. This could be facilitated through internships with community partner organizations. This strategy overlaps with project-/problem-based learning.

Cooperative/Collaborative learning: Individual students or small groups fulfill unique, disciplinary roles within a larger multidisciplinary student group, which must collaborate in order to accomplish a certain task, teaching goal, or project. The jigsaw method is one cooperative strategy in which each student becomes the "expert" on a different topic and is then responsible for teaching the remaining group members their expertise and relating it back to the larger issue of the group, building confidence, interpersonal skills, and systems thinking.
Place-based learning: A form of experiential learning, this method is used frequently within environmental education as a means to connect subject knowledge to a specific locale. Often facilitated outdoors, this approach hopes to cultivate a deep sense of place and environmental concern.
Life cycle/supply chain analysis: This strategy encourages students to reframe their perceptions surrounding common goods and products used in our everyday lives. This is achieved by following a commodity and its energetic expenditures through its origin, transportation, use, and disposal process and considering the social, environmental, and economic effects of each step.
Interdisciplinary team teaching: Specialists in various fields take turns leading lesson periods. This method explores the interdisciplinarity of sustainability efforts and is particularly valuable for groups of students with diverse areas of study and career aspirations.

Competencies for Sustainability

As defined by the U.S. Department of Education (2001), a competency is "a combination of skills, abilities and knowledge needed to perform a task in a specific context" (p. 1). For sake of clarification, this definition of a *competency* as an outcome of educational programming aligns with the definition of a *capability* as used by numerous researchers, which Sandri et al. (2018a) characterize as the "skills and attributes that enable an individual, and give that individual agency to act, in line with their own values" (p. 6). The present study will employ the use of competencies but acknowledges the interchangeability of both terms.

A substantial body of literature exists on the theory and implementation of competencies for ESD (See Barth et al., 2007; Brundiers et al., 2010; de Haan, 2006, 2010; Lozano, 2017; UNESCO, 2017; Wiek, Withycombe, & Redman, 2011). Recent studies provide in-depth

reviews of the competencies most often identified within ESD literature (Lozano et al., 2017; Sandri et al., 2018b), but these exhaustive lists lack an integrated framework for applying ESD competencies holistically.

Basic v. Key Competencies

Wiek et al. (2011) respond to this tendency to produce "laundry lists" of competencies in sustainability (p. 204). They draw a distinction between *basic competencies* such as critical thinking, which should be included in any rigorous academic program, and *key competencies* for sustainability, which are essential for academic and professional efforts in sustainability specifically. Basic competencies should remain important considerations of ESD, but key competencies "have not been the focus of traditional education and therefore require special attention" (p. 204). Five key competencies are identified (Table 2), along with a conceptual framework for their interconnection and interdependence. Overall competence in sustainability problem-solving necessitates an integrated application of all individual competencies. Previous and subsequent accounts of ESD key competencies lack this holistic approach (see de Haan, 2006; Lozano et al., 2017; Sandri et al., 2018b; Willard, 2010).

Table 2 Key Competencies for Sustainability as adapted from Wiek et al. (2011)

Systems-thinking competence: the ability to perceive and approach sustainability problems across complex, interdependent systems (e.g. environment, economy, and society) and scales (e.g. local and global). Consequences within one system as a result of the actions in another are recognized and evaluated.
Anticipatory competence: the ability to construct and analyze visions of the future in regards to sustainable development, depending upon contextual factors and intervention strategies. Future-orientation highlights the importance of cause and effect, trade-offs between short-term costs and long-term benefits, and intergenerational equity.

Strategic competence: the ability to design and implement transition and intervention strategies for addressing sustainability challenges which avoid unintended consequences. This involves an understanding of feasibility, efficiency, barriers, and system interdependencies. This competence facilitates the transformation of knowledge into action.
Normative competence: the ability to assess situations within the context of sustainability goals and values. The implementation of transition and intervention strategies is based on the premise that undesirable and desirable states for sustainability exist.
Interpersonal competence: the ability to collaborate and communicate effectively across disciplines in order to research and respond to sustainability challenges. Beyond basic communication skills, this competence involves motivating the participation of others to promote inclusive ownership, perceiving and appreciating diverse perspectives, and anticipating potential stakeholders.

This competency framework has been employed in ESD assessment research (Remington-Doucette and Muscgrove, 2015; Savage et al., 2015; Thomas & Depasquale, 2016; Sandri et al., 2018b; Trencher et al., 2018). Key competencies represent applied, higher-order learning outcomes, which ESD certificate programs like the UGA Sustainability Certificate aim to cultivate within student participants, thus the key competency framework will be used as a "starting point" to guide this inquiry.

Understanding the Links Between Competencies and Pedagogies

Recent research indicates that pedagogy choices impact the acquisition of ESD learner outcomes (Mintz & Tal, 2018), and certain pedagogical strategies have been prescribed in order to best deliver ESD (Remington-Doucette & Muscgrove, 2015; Seatter & Ceulemans, 2017). In large part, however, ESD competencies and pedagogies have been examined separately. Through an extensive literature review, Lozano et al. (2017), developed a matrix framework linking ESD competencies with ESD pedagogies. This work indicates that multiple pedagogies are needed in order to cover all ESD competencies, though some may more effectively address multiple competencies at once. For example, case studies and project- or problem-based learning are

correlated with the largest range of competencies, while lecturing and interdisciplinary team teaching cover the narrowest range of competencies. This framework provides a foundation upon which to conduct further investigation and empirical testing linking pedagogies and competencies (Lozano et al., 2017). Enhanced understanding of these associations will aid practitioners in the continued development of educational programming in order to better support the acquisition of ESD key competencies.

ESD Outcomes and Employment

Generally, competency-based education places less emphasis on content instruction of institutionally prescribed subject material and instead makes a case for assessment based on the application and demonstration of skills through student-led learning (Williams, Moser, Youngblood, & Singer, 2015). This approach, which has gained momentum within higher education institutions in the last decade, aims chiefly to ensure workplace preparedness (Williams et al., 2015). The theoretical basis for the use of key competencies in ESD has been discussed at length (Barth et al., 2007; Brundiers et al., 2010; de Haan, 2006, 2010; Lozano et al., 2017; Sandri et al., 2018b; UNESCO, 2017; Wiek et al., 2011), but do these competencies relate practically to employee and employer needs and values?

In a survey of sustainability professionals who had previously completed an ESD program, over two-thirds of respondents reported that all five key competencies as described by Wiek et al. (2011) were important for their careers (Thomas & Depasquale, 2016). Interpersonal and strategic competencies were identified as being most valuable to their current positions, while anticipatory and systems-thinking competencies were also reported as relevant but less emphasized. These findings correspond with Willard et al.'s (2010) study of 385 sustainability

professionals in which strategic planning, systems thinking, interpersonal, and anticipatory competencies were among the top identified needed skills. In both studies, normative competency was given substantially less priority by employees. Drawing from qualitative follow-up questions included in the survey, Thomas and Depasquale (2016) conclude that employer emphasis on economic concerns may contribute to the lack of emphasis given to normative issues. Overall, this evidence suggests that graduates of ESD programs value and apply key competencies for sustainability in their professional careers.

Barriers to the Implementation of ESD

ESD provides benefits for students and society, yet Shephard and Brown, (2016) assert that higher education instructors "are not for the most part educating for sustainability, or for sustainable development" (p. 755). To understand the obstacles at play, we must consider both the structure of sustainability education and the implications of its associations.

First, the inclusion of ESD curricular structures and pedagogical strategies is not prescriptive nor is it uncomplicated. The learning paradigms required to facilitate in-depth sustainability education may be viewed as divergent or uncomfortable and require a certain relinquishment of control. Moore's (2005) examination found that "students…become uncomfortable when alternative models for learning are proposed in classrooms. Many professors are not trained as educators, and transformative learning is a complex teaching method that entails a great deal of time and energy" (p. 83-84). At the university level, Sylvestre, Wright, and Sherren (2014) describe how efforts to grandly reimagine the higher education curricular schema are often met with institutional inertia; "universities have a long historical pedigree, perpetuated by being discursively reproduced in their contemporary context by both

internal stakeholders and the societies in which they find themselves embedded" (1522). Academic institutions may also perceive of their students as stakeholders with narrowly defined and immutable needs (Sylvestre et al., 2014).

Second, sustainability is largely viewed as normative. That ESD may be intrinsically value-laden yet so entrenched in the transformative learning paradigm, which extolls democracy and implores its students to create their own systems of meaning, is challenging to interpret (Shephard & Brown, 2016). Some instructors have expressed discomfort in this paradox, wishing not to force upon students what could be seen as a belief system on the grounds of infringement upon academic freedom (Sylvestre et al., 2014). Whatever the reason for this hesitancy, there has been little demonstration of evidence supporting ESD programs' efficacy in reaching intended outcomes.

Restatement of Purpose

In order to determine what works to improve program efforts and realize the goal of social change, learner outcomes of ESD programs should be evaluated, and the links between outcomes and instructional and programmatic strategies should be examined and described. A case has been made for the use of key competencies as an initial framework for examining higher order learner outcomes as a result of the transformative and experiential learning paradigms associated with ESD. The purpose of the present research then is to explore the impact of a non-major, ESD certificate program in a public university in the U.S. with specific attention to key competency outcomes and to describe the factors perceived as contributing to student learning.

CHAPTER 3

METHODS

The purpose of this qualitative case study was to understand and richly describe the student learning experience within the University of Georgia's Sustainability Certificate program. On a national and global scale, certificate programs in sustainability are few in number and inconsistently evaluated (Geifer, 2015). The UGA SC is unique in its degree of student academic diversity and course interdisciplinarity, as well as its focus on experiential learning and in-program community-building. The program also plays a role in the wide array of larger sustainability initiatives on campus through its association with the university's non-departmental Office of Sustainability.

As program administrators and instructors, we often know what we are *trying* to do, but the full truth of what we are *doing* relies on the meanings ascribed to those efforts by those for whom they are constructed. Thus, this study saught to understand how the program's academic efforts are perceived and integrated by our most valuable stakeholders: the students. For this purpose, I conducted semi-structured interviews with thirteen recent graduates to capture and interpret perceptions of their learning (e.g., changes in knowledge, behaviors, and/or values) and the learning mechanisms which they found impactful. Using Charmaz's constructivist grounded theory methodology (2014), I approached the evaluation of student development in two ways. First, I employed Wiek et al.'s (2011) key competencies and associated pedagogical strategies as a framework to code for learner outcomes and notable learning experiences. Second, I undertook open, phrase-by-phrase coding of the transcripts, followed by focused coding to begin to pare

down to only substantive codes which spoke to my research questions. Constructivist grounded theory acknowledges the fluidity of the coding process (Charmaz, 2014), therefore theoretical coding was not a discrete stage of the analysis but rather was integrated into the focused coding phase, which allowed me to begin organizing substantive codes within categories found to be central to the research. Finally, I identified and validated relationships between these categories and their associated codes to further refine my top-level categories and construct an integrated theory of community pedagogy for ESD within the UGA Sustainability Certificate program.

Research Tradition

Constructivist Grounded Theory as Analytical Framework

Exploratory methods are ideal in cases where the phenomena being studied (in this case, the impact of participation in the UGA SC program, students' perceptions of ESD learning outcomes and the contributing factors to their development) are new, with a limited body of research (Creswell & Plano Clark, 2018). Lozano et al. (2017) and Sandri et al. (2018a) highlight the need for further empirical evidence to support literature-based conclusions regarding ESD competencies and the impact of various ESD pedagogies and other contributing factors to learning.

As a qualitative exploratory approach, "grounded theory methods offer a set of general principles, guidelines, strategies, and heuristic devices rather than formulaic prescriptions" (Charmaz, 2014, p. 3). Grounded theorists attempt to understand what is occurring within the research setting and "what our research participants' lives are like" through the development of theory generated from the data collected (Charmaz, 2014). This study asks: What meaningful changes and growth do students perceive as a result of completing the UGA Sustainability

Certificate, and through what mechanisms or processes did these changes occur? Certainly, there are cases in which students are not consciously aware of their developed knowledge, skills, and abilities, yet those capabilities are beneficially applied despite the lack of conscious recognition; however, if ESD hopes to prepare individuals to enter the workforce and act as agents of change, it is of prime importance that graduates recognize and articulate their own capabilities. Grounded theory methodology is used when the intent of the research is not to test an existing theory but rather to discover or construct a novel theory describing an action, interaction, or process imbedded within a specific context (Creswell, 2013). The results of GT analysis are *grounded in* the data collected, thus we use GT methodology in a case such as this, when the voice of research participants is of principle importance (Creswell, 2013; Charmaz, 2014).

Grounded theory has been situated within a number of philosophical frameworks and employed across a variety of fields within the social sciences. Even in its earliest form, grounded theory was born from a unique marriage of theoretical disciplines. The two primary formative scholars, Glaser and Strauss (1967), emerged from positivist and pragmatist training respectively. Following their classic statement of methods (Glaser & Strauss, 1967), the later works of the two researchers diverged, reflecting their variant schools of thought (see Glaser, 1978, 1992; Strauss, 1987; Charmaz, 2014). Still other scholars link the approach to a postpositivist paradigm (Hatch, 2002). Ultimately, grounded theory methods are tools and processes that may be utilized within a wide range of philosophical traditions in order to inductively, systematically, and reciprocally engage with qualitative data to create rich descriptions and bring new awareness to the complexities of human perception and interaction.

This study applied constructivist grounded theory methodology specifically, which arose as an interpretive response to objectivist forms of GT including, most pointedly, Glaser's

positivist framework. “Constructivist grounded theory highlights the flexibility of the method and resists mechanical applications of it” (Charmaz, 2014, p. 13), allowing for a high degree of adaptation and responsiveness to the unique context of the study. In essence, constructivism assumes the existence of multiple realities and the co-construction of knowledge through interaction among the researcher and the participants. Thus, within the constructivist approach, the researcher is not detached from the data and conclusions generated in the study. There is no neutral, objective observer, and it is important that the researcher acknowledge subjectivity and their role in knowledge creation. From August 2017 to May of 2019, I served as the Graduate Assistant for the Sustainability Certificate and had the opportunity to learn from and develop working relationships with the certificate students. I had previously engaged with all study participants in the classroom as an instructor and/or in small group and one-on-one settings as a project mentor and program advisor. Furthermore, I worked closely with the program director and staff in developing curriculum, student support mechanisms, and program scaffolding; thus, I had a vested interest in understanding the impact of our pedagogical decisions. The information gleaned from this research illuminates the strengths of the program and conceptualizes the inexplicit qualities and processes which may set this uniquely-situated educational experience apart from some other EE and ESD programs.

Statement of Subjectivity

Mirroring the integrative and interdisciplinary approach essential for sustainability, this study draws on traditions from seemingly opposing paradigms: postpositivism and constructivism. Postpositivism assumes ontological realism in which an objective reality is believed to exist outside of human perception, while epistemological constructivism

acknowledges the existence of multiple constructed realities as crafted by the experiences and perceptions of the individual. Maxwell (2013) describes this tenuous combination as the *critical realism* lens, while Creswell and Plano-Clark (2018) label the acknowledgement of singular and multiple realities *pragmatism* and identify this lens as one appropriate for responding to practice-oriented problems in a real-world setting. As the goals of this research include the evaluation and subsequent evolution of educational practice, a pragmatist approach was taken.

The implementation of this pragmatist worldview allows for research that is at once deductive (i.e., using established theory to serve as a guiding framework in interactions with participants) and inductive (i.e., allowing for emergent concepts and themes outside of the scope of extent theory and literature) with the aim of extending and deepening understanding of a social phenomenon (i.e., learning for sustainability), creating space and potential for theory testing, amendment, and/or generation. Pragmatism employs contextual practicality above all else in order to address the purpose and questions at hand.

Having served as the graduate assistant for the UGA Sustainability Certificate Program, a degree of closeness between the participants and myself is assumed and, within the constructivist tradition, regarded as a benefit to the investigation. A high level of direct engagement in the behaviors and perspectives of those with whom the inquiry concerns is required to develop and hone valid interpretations as described by Schram (2006). I do, however, recognize the limiting factors of my position as my participation in and perceived authority over certain elements of participants' learning could result in self-censorship in efforts to prevent a negative personal outcome. To reduce the risk of this potentiality in my interactions with participants, I actively strove to build a sense of shared trust in which participants felt secure in revealing sentiments regarding the program which may be perceived as negative (Roulston, 2011). In order to turn

criticism into opportunity and foster a sense of appreciation and collaboration, I stressed to participants that one of the major goals of these discussions was to grow and evolve the certificate program for future students. I followed conversations about negative experiences or ineffective aspects of the program with questions such as:

How could that be improved, in your opinion?

Is there anything that we could have done on our end to better support you in that?

How might you handle that issue or what changes would you make to the program if you were the director/instructor?

It was my aim for the interview to feel less like an examination or assessment and more like a conversation in which both the researcher and participant would work in tandem to construct novel insights and generate ideas for the future.

Procedures

One-on-one, semi-structured interviews served as the sole source of data for the study, though I undertook an initial literature review in order to gain foundational understanding of vital ESD terminology, core concepts, and its history and current status in higher education. Constructivist grounded theory allows for literature review in two stages. The first review is carried out prior to conducting data collection and analysis to build essential understanding of the field of study and to identify enduring questions posed in or raised by the literature; a second review is conducted following data collection and analysis if the initial concepts reviewed do not provide sufficient grounding and frameworks for discussion of results (Birks & Mills, 2011; Corbin, 2009; Charmaz, 2006, 2014). For the purposes of this study, the initial review included an in-depth look at sustainability education pedagogy and associated learner outcomes, as my

fellow program staff and I wanted to know if the students were advancing through the educational strategies in place and leaving with the intended competencies. We also sought to uncover the meaningful yet covert qualities and mechanisms emerging from the system of program components both consciously- and unconsciously-employed. Following the completion of data analysis, I found it necessary to perform a second, less-extensive literature review to expand the discussion of major themes, theoretical implications, and recommendations.

Participant Selection

The purpose of this data collection was to explore in-depth the learning experiences of UGA Sustainability Certificate program graduates. Potential participants included recent graduates of the SC, where *recent* was defined as any individual who had completed all program requirements by the Fall 2017 semester or later. Among the potential participants, I employed a purposeful, criterion-based sampling strategy (Maxwell, 2013). First, in order to capture a wide range of student experiences, each participant I contacted represented a different major of study (e.g. Ecology, Communications, International Affairs, Genetics, etc.). Second, I used a key-informant strategy to "establish the most productive relationships" (Maxwell, 2013, p. 99) with participants in order to attain rich descriptions of exceptional learner outcomes and valuable feedback on the program. As described by Maxwell (2013), exemplary or successful individuals are less likely to become defensive or present false accounts when asked about their performance or experiences in an academic setting. Thus, participants were selected based upon my observations of their involvement within and commitment to the SC program, as well as their scores on the final portfolio assignment. Scores on this final assignment were assigned previously by the program director, Dr. Ron Balthazor, and myself utilizing a rubric assessment

tool developed in December of 2017 (Appendix G). I initially contacted only graduates who had scored a minimum of 13 out of 16 possible points, but ultimately lowered the minimum to a score of 11.5 or higher in order to expand the pool of potential participants. Due to the structure of the program, portfolio completion occurs at the end of the student's senior year, thus all individuals I interviewed had graduated from the university prior to data collection. Table 3 displays an overview of study participant demographics, gender, school or college within the University of Georgia, and major/minor program of study. Participants' real names have been masked with their chosen pseudonyms. Thirteen schools and colleges offering undergraduate degrees are housed within the University of Georgia, and of those, nine are represented in the data pool.

Table 3: Participant demographics in a case study of the University of Georgia Sustainability Certificate

Participant	*UGA School/College*	*Major program of study*
Sam	School of Public and International Affairs	International Affairs
Daisy	Franklin College of Interdisciplinary Studies	Communication Studies
June	Odum School of Ecology	Ecology (B.S)
Jack	School of Public and International Affairs	Political Science
Greg	Terry College of Business	Finance
Clarissa	Terry College of Business	Economics
Pearl	Odum School of Ecology	Ecology (B.A.)
Sally	College of Agricultural and Environmental Sciences	Environmental Economics and Management
Morgan	Franklin College of Interdisciplinary Studies	Genetics
Bulldawg	College of Engineering	Mechanical Engineering

Rebecca	Terry College of Business	Management
Brittany	Warnell School of Forestry and Natural Resources	Fisheries and Wildlife
Zip	Terry College of Business	Management Information Systems

Data Collection

After review of literature, it was estimated that 10-15 interviews would provide data saturation (Francis et al., 2010; Guest, Bunce, & Johnson, 2006). In total, I conducted 13 interviews before reaching an observable level of redundancy in response to my core research questions; while I was able to provide additional support for previously established codes, I was not able to generate new, substantive codes from the data. Interview discussions explored students' general perceptions of their learning with specific attention to the key ESD competencies described by Wiek et al. (2011), as well as the factors perceived to have contributed to (or detracted from) their learning experience within the program and within their personal lives. Put more generally, I was interested in understanding both the temporal and enduring impacts of the SC program from the perspectives of these individuals and what had made the program successful or unsuccessful for them.

Following approval from the Institutional Review Board (IRB), participants received a request for an interview via email (Appendix A). The interview was not a requirement for completion of the certificate, thus participation was voluntary and no negative consequences were implied for individuals who did not wish to take part. I provided sample interview questions via email at the request of the participant. While I preferred that the interviews be conducted face-to-face at an agreed-upon public location, participant location and scheduling did not allow for this, so interviews were conducted over the phone or via Facetime per the

participant's preference and audio recorded. Though the study was identified as "Exempt from Review" by the IRB, I elected to read each participant an in-depth explanation of the study purpose and participants' rights (Appendix D) and obtained verbal consent from each prior to recording. Responses were audio recorded utilizing the TapeACall application (for phone interviews) or Quicktime audio recorder (for Facetime interviews) and downloaded onto my personal, password-protected computer.

The interview protocol (Appendix B) served to guide each conversation, and I asked follow-up and probing questions to deepen and extend the narrative when pertinent to the research questions. Considering the friendly, working relationships between the participants and myself, some extemporaneous discussion was encouraged in order to establish a tone of authenticity, concern, and trust (Roulston, 2011). I utilized research or *analytic memos* extensively throughout the research process as a tool for enhancing data collection and analysis (Maxwell, 2013). Memos were kept within my research journal and accessible solely to me. I took notes during each interview in order to inform subsequent interview questions and techniques, and to quickly track major themes to approximate data saturation.

A demographic questionnaire was emailed to each participant for completion following the interview (Appendix E). Out of the thirteen participants, ten completed the demographic questionnaire. Personalized letters of gratitude and a reminder to complete the questionnaire were emailed to each participant within 24 hours of the interview.

Microsoft Word was used to transcribe each interview with repairs for increased readability as outlined by Roulston (2010). As this study is not concerned with language, verbatim transcription has not been deemed necessary, and basic transcription was used. To ensure confidentiality, participants were asked to choose a pseudonym as a part of their

demographic questionnaire; pseudonyms were chosen at random for those who did not indicate a preference. Four total faculty members and graduate students within the Interdisciplinary Qualitative Studies program at UGA peer-reviewed masked transcripts of the first three interviews to increase trustworthiness and dependability within the interview protocol and approach. All records were stored on my personal computer, phone, and external hard drive and were accessible solely to me for the duration of the study. Recordings and transcripts will be destroyed four years following the study's conclusion.

Data Analysis

"With grounded theory coding, [the researcher moves] beyond concrete statements in the data to making analytic sense of stories, statements, and observations" (Charmaz, 2014, p. 111). For the purposes of this study, I moved through the data analysis in four iterative and integrated stages identified by Charmaz (2014): *initial deductive coding*, *open coding, focused coding*, and *theoretical coding* to *theory construction*. Prior to beginning the coding process, I listened to the audio recordings and read through the transcripts of each interview multiple times to get a sense for the narrative flow and potential areas of thematic emphasis. I began the coding process following transcription of the first three interviews and continued to code throughout the interview and transcription process. This allowed me to reflect upon and improve the interview guide as I continued data collection. Throughout the entirety of the coding process, *constant comparative* methodology (Glaser & Strauss, 1967) was used to compare the data with: other data, memos, the initial codes, the focused codes, and the theoretical codes and resultant theory. Essentially, as I inductively constructed new codes, these were deductively interrogated by comparing them with initial codes and memos and holding them up against the backdrop of the

raw data within and between interviews. These four distinct yet integrated stages are further elucidated in this section.

For the initial deductive phase of the coding process, I employed a provisional, *start list* of codes (Miles et al., 2014) determined through review of the literature and of the educational objectives as presented on the program's website (University of Georgia, n.d.). The program director also referred me to a number of additional staff and faculty who had played an integral role in the development of program curriculum and structure; these individuals provided input on the start list of codes (Table 4) pertaining to key competencies for sustainability and ESD pedagogical strategies.

Table 4: Initial Deductive Coding Start List

Learning Objectives (Outcomes)

Key Competencies (literature-generated)

1. Systems-thinking [SYS]
    a. Triple bottom line [TBL]
    b. Local-global [LG]
    c. Upstream-downstream consequences [UD]
2. Strategic-thinking [STG]
3. Futures-thinking [FUT]
4. Values-thinking [VLU]
5. Interpersonal competency [INTP]

Learning Mechanisms (Processes)

Program attributes

6. Mentor relationship [MNT] (note director or other)
7. Interdisciplinary exposure [INTD]
    a. Sustainability seminar

Pedagogical styles

8. Transformative learning [TRNS]
9. Experiential learning [EXPR]
    a. Campus as living lab [CLL]
    b. Service-learning [SL]
    c. Community partnerships [CP]
    d. Study abroad [SA]
10. Collaborative learning [COLB] (interdisciplinary)

The second stage involved phrase-by-phrase, *open coding* (Charmaz, 2014; Glaser & Strauss, 1967; Strauss & Corbin, 1990). This time-consuming strategy included process- and value-coding with close attention to the preservation of action within the data (Charmaz, 2014; Miles et al., 2014). Charmaz strongly recommends coding for actions as this reduces the inclination to code for types of people; coding such characteristics can redirect the focus of the analysis from process to categories of individuals, reducing participants to fixed and fragmented representations that are not reflective of the whole and changing person (2014). *In vivo* coding, which retains participants' unique terminology, was used when applicable to encourage an analysis grounded in the perspectives of the participants and to uncover important local factors (Charmaz, 2014; Miles et al., 2014). Guided by my research questions, coding focused on outcomes, learning mechanisms, correlations between outcomes and learning mechanisms, as well as correlations between outcomes and contextual factors (e.g., personal history, extracurricular and other demographic factors). From this stage, I generated over 2000 codes over the thirteen data sources.

The third stage involved a straightforward and fast-paced study of and coding from my initial start list and open codes. This process is identified as *focused coding,* which "brings [the researcher] further into the comparative process" (Charmaz, 2014, p.140) and represents a significant step in organizing the data and managing the developing analysis. I relied on comparative methods throughout this stage to assess the analytic power of the codes by holding them up to the original data. Through this process, I identified codes which carried analytical weight, emphasis and meaning. I utilized analytical memos throughout this process to organize codes, categories, and ideas as they emerged from the data. Once core categories and codes began to percolate, I used a memo technique known as *clustering* (Charmaz, 2014) or concept

mapping to begin drawing relationships within and among these categories and prepare for theory construction. This type of data organization represents the final coding stage, theoretical coding, which I began while continuing to produce focused codes.

The intent of the final coding stage is to "weave the fractured story back together" (Glaser, 1978, p. 72). According to Charmaz (2014), "theoretical codes are meant to be integrative; they lend form to the focused codes you have collected…Hence, theoretical codes not only conceptualize how your substantive codes are related, but also may move your analytic story in a theoretical direction" (p. 150). In this stage, I began to solidify the relationships between my substantive codes, validating them against the data (i.e., grounding) and holding them up to my original research questions. This process overlapped with my focused coding, as relationships and theories began to form and warrant testing. With each theoretical possibility that arose from the coding process, I returned to my initial coding list and raw data to "ground truth" the concept. See Appendix H for the complete theoretical coding framework.

The core findings from this analysis are introduced and expounded upon in the following chapters. As this study sought to understand and characterize a rich picture of the student experience within the UGA Sustainability Certificate program and to evaluate demonstration of ESD outcomes and related pedagogies, I present in chapter four the findings from both the inductive and deductive investigations as a cohesive theory of *community pedagogy for sustainability*.

CHAPTER 4

RESULTS

The fundamental objective of this study was to evaluate and richly describe the experience of student learning within the University of Georgia's Sustainability Certificate program. Through semi-structured interviews with recent program graduates, I explored the attainment of learning outcomes and mechanisms for student development as identified by program staff and relevant ESD literature, while making space for emergent themes from the perspectives of the students, for whom the experience and outcomes of the program matter most. Constructivist grounded theory methodology was used, allowing for analysis that was at once deductive and inductive in nature.

Through a series of coding stages and constant comparison methods, a core theme emerged from the data: *sense of community.* In understanding how the sense of community manifests in the SC program, let us first consider the concept of community. Within social science literature, the definition of sense of community (SOC) remains nebulous. Gusfield (1975) differentiates two primary notions of community: *territorial*, defined by geographic boundaries, and *relational*, defined by relationships built upon shared characteristics of individuals. The SC engages with both relational and geographical notions of community, creating concentric networks of individuals (e.g., those within and those tangentially connected to the program) and embedding those networks into multiple layers of geographically-defined

communities (e.g., the University of Georgia campus and Athens-Clarke County). McMillan and Chavis (1986) identify components important to establishing membership in a community, including emotional safety, sense of belonging and identification, and personal investment, all of which come to bear within the Sustainability Certificate.

This sense of community (SOC) influences and is, in-turn, influenced by three main categories, *inclusivity and sense of belonging*, *interdisciplinary engagement*, and *experiential, place-based learning*. These categories do not discretely contribute to the sense of community for sustainability, rather they work interdependently, producing vital contributing factors to SOC at their intersections: *shared values*, *shared purpose*, and *sense of place*. A final main category, *learning outcomes,* is linked to the core and three main central categories. These outcomes include Wiek et al.'s (2011) key competencies for sustainability, as well as the notable addition of *personal competence* derived from this study. Through an iterative process (i.e., learning), the sense of community helps to establish and reinforce these outcomes, which are then shared and modeled within the community to facilitate their further development. Learning outcomes for sustainability are often interdependent, thus the increasing solidity of the outlines surrounding the outcome boxes in Figure 3 is meant to portray not just the accumulation of outcomes, but the sharpening awareness of the concepts and integration. Finally, *hope* emerges from the nexus of shared values, shared purpose, and sense of place, and is both a product of the community and a wellspring of continued motivation to act within it; a truly regenerative energy source. Collectively, these categories and processes describe the learner experience through a theory of *community pedagogy for sustainability* (Figure 3). The relationships of the data to these categories and associated codes are explained in this chapter, organized into the five sections:

sense of belonging, interdisciplinary engagement, experiential place-based learning, learning outcomes, and hope: a regenerative component of ESD.

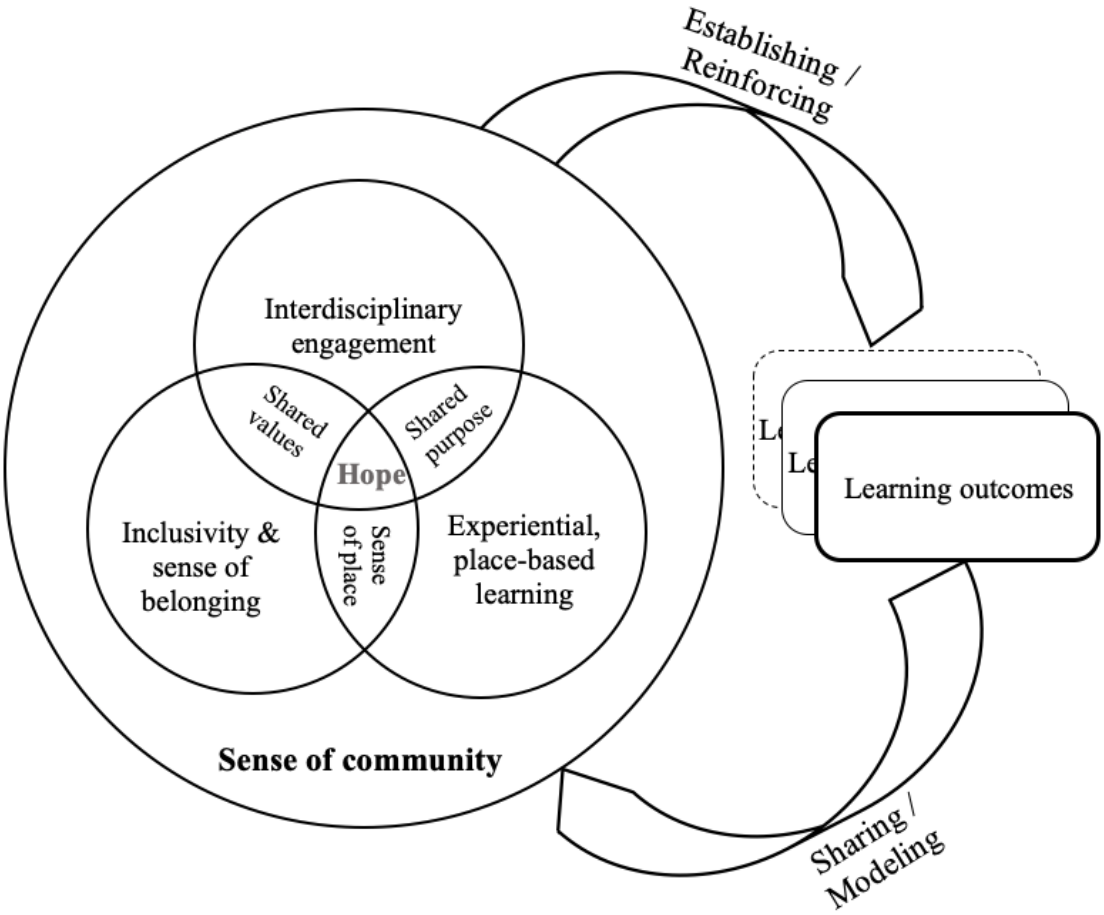

Figure 3. Theoretical model of community pedagogy for sustainability

Inclusivity and Sense of Belonging

"Belonging…is a critical dimension of success in college. It can affect a student's degree of academic adjustment, achievement, aspirations, or even whether a student stays in school" (Strayhorn, 2012, p. 2). According to Strayhorn (2012), a sense of belonging in the context of college, involves a feelings of connectedness, respect, acceptance, and social support. Inclusivity

is a consciously implemented element of the SC program which fosters a sense of belonging in participants. There are several key components through which a sense of belonging was expressed in the data. Participants reported strong feelings of welcome and support from the certificate director, program staff, and faculty, and the program's capstone mentor requirement, which institutionalizes this faculty/staff support, was found to positively affect student success. Sense of belonging was further shaped by interactions with peers, which were characterized as encouraging and inspirational. A deepening sense of place within the UGA and Athens-Clarke County communities and a developing sense of shared values with others in the certificate program also contributed to participants' sense of belonging.

Connection to and support from certificate instructors, associated faculty, and staff was a common thread among participants. Several participants remarked specifically on the engaged leadership and relational teaching style of the certificate director, Ron Balthazor. Balthazor interacts with SC students regularly through the weekly seminar and capstone classes, the bi-annual certificate orientation, twice-monthly walk-in hours held with the graduate assistant, and a newsletter containing events, program announcements, and words of encouragement sent through the certificate listserv every other week. Highlighting the importance of intentional welcome, Clarissa recounted her first class of the program:

> My first day of the seminar with Ron, he asked us to go around and-- it was like the best class day I had in college ever. I was super frazzled because I was trying to tack on this certificate. I didn't know if I could make it. I'd added the class the day before, and I show up at 8 a.m., and I'm like panting, and there's free coffee and snacks, and he's playing jazz. And then we read a poem, and we introduce ourselves by talking about our most impactful interaction with nature that has shaped our view of the world and how we want to live sustainably.

Jack, a graduate of the School of Public and International Affairs with a degree in political science, also narrated an early, deciding moment in his resolution to apply to the program:

> *Jack*: Clarissa**,** who we all love, [laughter] is a friend of mine and recommended we go check it out. So I had a meeting with Ron, and I just kind of went from there.
>
> *Me*: Can I ask, was there anything in particular about the conversation that you had with Ron that you were like, "Yeah! This is my path. This is something I want to do."
>
> *Jack*: I think a huge sway in it was Ron himself. [laughs] He has to be one of the warmest people I've met in academia, and his welcome, the way he got excited about everything I would talk about in my own interests-- and me being from a major that isn't normally seen or wasn't at the time normally seen in the certificate really excited him, and that's something that also got me, in turn, excited. I think just-- I mean I hate repeating words all the time, but just the welcoming-- like how welcoming he was and how excited he was about where I was coming from in terms of my studies and also his ability to help me visualize tying that in to the different things you could do in the certificate really definitely swayed me into going for it.

According to McMillon and Chavis (1986), membership in a community involves a balancing act between conformity and individuality, or *influence*: "Members are attracted to a community in which they feel that they are influential" (p. 12). In the excerpt above, the director engages in and extols Jack's academic interests. As a result, Jack perceives the opportunity to join the program as an opportunity not just to add value *to himself* but to synchronously add value *to the program*.

Instructor compassion and enthusiasm continued to act as motivating factors in students' academic performance and accomplishment. When asked what factored into her success in completing the program, Pearl also focused on the certificate director and sustainability faculty. She makes a point to differentiate this type of faculty support from that received in other academic departments and programs, signaling its conscious and active implementation:

> Honestly, I'd say it's a combination of everything. (R: Yeah.) I definitely-- having people like Ron who are encouraging while you're going about doing what you're doing. I feel

> like not every department or degree has professors who are necessarily going to be so enthusiastic and compassionate about you specifically and what you are doing and what everyone is doing in that same field. It takes a special person to be able to do all that. Also, the community involved so [?many different] faculty, it's really inspiring having other people doing what you're doing in a collaborative way.

Jack reiterated the importance of instructor guidance and interpersonal connection in his ability to complete a particularly challenging and extensive capstone project:

> …having that time to see you and Ron and be able to talk about the project on a really personal basis because it's like more one on one. Not in the literal sense, but you know what I mean. Being able to talk through a project like that was really really valuable in terms of me finishing and succeeding. I look back on that project in hindsight, and I'm really glad I did it, but I definitely think I did a lot. But being able to talk through it I think was one of the only ways I was able to really finish it because if I had just tried to do most of it without any guidance or having that time allotted for guidance, I don't know if I-- I mean I do think I would have obviously finished it, but I don't think it would have been as good as it turned out. So I think that…Honestly that might be the biggest thing I'll say is just being able to have this interpersonal connection throughout certificate, it made the experience a lot easier for myself. And I think that in a university the size of UGA it's really rare to get that kind of feeling from any kind of program. Being able to have that was so valuable, and I definitely think it was a huge part of my success.

This type of individual support and guidance is built into the structure of the program in the form of staff and/or faculty mentorship. Students completing capstone projects are required to select a staff and/or faculty mentor to provide subject expertise and project management supervision throughout the duration of the project. A minimum of three meetings with the mentor over the course of the semester are required. Several participants noted this practice as particularly beneficial in their advancement through the program.

Support came not only from program staff and faculty, but from peers as well. For Daisy, encouragement from her SC classmates gave her the reassurance she needed to step out of her comfort zone and engage in subject material outside of her major area of expertise:

> The other big thing-- I was going say confidence, but I think stepping out of your comfort zone, because I think I, like everyone, when I would walk into a sustainability-centered class, so the capstone class or the seminar, everyone was just really welcoming, which was really refreshing. You could just have conversations, but also, the people around me,

> they would encourage me in whatever I was doing but they would be like, "well why don't you try that?" or "have you tried this? Or "have you tried that?" And that extra little nudge to complete a project, or to get up and present, or looking into a crowd and seeing people cheering you on is really nice because we are in an area that, when you talk with people, you're going to get push back. It's just-- it's going to happen. But so then having people around to encourage you…

Daisy's statement highlights the concept of *emotional safety* vital to one's perceived membership within a community (McMillon & Chavis, 1986). According to McMillon and Chavis (1986), emotional safety is related to the concept of *boundaries*, which "provide the structure and security that protect group intimacy" (p. 10). Daisy hints at these boundaries, the in-group and out-group, in distinguishing those within her "area" who encourage her from those who will deliver push back.

Emotional safety was important for Morgan, as well. Despite not knowing anyone in the SC program when she began, she emphasized the kindness, welcome, and encouragement she felt from her mentors, the director, and other students. For Morgan, the accepting and compassionate traits of the individuals she encountered within the certificate prompted her to characterize the entire community in the same light. When asked to speak about her biggest takeaway from the program, she responds:

> *Morgan*: The knowledge and practical stuff that I learned from the certificate was a big help, but apart from that, the community and all my mentors were a big push for all the decisions that I made in the certificate, and taught me also how to-- I don't know. Everybody I met was so kind. That was the first thing I noticed always. [They] lived so much in harmony with everyone else. Especially Ron. Things like that played a small role. I came to the certificate, but I didn't really know anyone else, and I didn't feel unwelcome. (R: Mhm.) The supportiveness of others, that…even though you've just started on this path, you can still learn, you can still do this. Another thing was, people never looked down on you if you couldn't do something that you really wanted to try (R: Mhm.). They were nice...I don't know. I don't know what I'm saying
>
> *Me*: No, I'm hearing you.
>
> *Morgan*: The big thing was the people.

Emotional security can also arise from meaningful attachments to places (Semken & Freeman, 2008). Within the social sciences, *place* is defined as a social phenomenon arising from the ways an individual relates to a physical or geographical space (Tuan, 1977). When paired with experiential, place-based learning strategies, SOC was further supported through participants' deepening sense of place within the space of the local community. Greg spoke about the certificate program as an access point for learning more about and feeling more connected to his campus through the lens of sustainability:

> …the sustainability certificate gave me a lot of access to the sustainability office where I felt like I got to know what was going on on campus and know… things I wouldn't notice before. Like the bike share program, how that's coming-- that was just really cool to kind of know like, whoa, UGA is really pushing sustainability, and this is how. I was able to tell my friends that, and I was able to say like, look at the Chew Crew, instead of just like, the goats on campus. I knew the story behind it. That was really cool.

A sense of shared values arising from engagement with diverse perspectives was another important component of participants' sense of belonging and a contributing factor to their sense of community. This may largely stem from the value-charged nature of sustainability. Sustainability education asks students to contend with multiple systems of valuation to inform their own normative choices, providing alternatives to the dominant neoclassical paradigm, which concentrates on economic growth in denial of ecological limits (Stubbs & Cocklin, 2008). Evaluation frameworks such as the triple bottom line and ecocentrism introduce concepts of valuing planet and people *with* or *over* profit. It would accord that students choosing to add this intensive, optional program with a focus on large-scale human and environmental challenges likely enter with some degree of interest in mainstream values-reorientation. In a quick summation of her background, Zip alludes to her passions and values:

> …in high school I was the president of the environmental club, and I did a lot of volunteer work and in the social sustainability here. Whenever I went to Valdosta State

> before UGA I was a part of SAVE, which is Students Against Violating the Environment, and we would do campus clean-up every week, and it's always been a passion of mine.

Several participants indicated that their sustainability-minded attitudes, values, and/or behaviors had acted as points of separation from others in the past. Daisy explained how she'd come to terms with being, "that person that kind of sticks out in a crowd," and Sally revealed that she no longer felt "weird" about bringing her reusables since completing the certificate. Through continued engagement and sharing with peers, sense of belonging is enhanced and sustainability-centered values established and reinforced. When asked through what mechanisms had sustainability become part of her personal value system, Morgan responded:

> Seeing that I was not alone in that way of thinking. (R: Yeah.) I was already a little bit like that, but I didn't have any partners in whatever I was doing who wanted to try things like that. But meeting other people who... were conscious about their food waste, cared as much about recycling as I did, all those small things. It's other people who are also as concerned about the same things as I was. And passionately concerned…I could actually have full-length discussions in the seminar class, and have other people around me that actually care. [laughs] (R: Mhm.) That really helped. Seeing people in front of you that care.

Brittany spoke of her surprise and amazement when students outside of environmental fields like her own shared similar attitudes and goals related to sustainability:

> Overall, I probably gained a better grasp of the subject and a better understanding of how everyone can be sustainable. It's not just like, I've studied wildlife biology so that means I have to be the sustainable person. Realizing that it can be incorporated in for people who [are] like, studying marketing, and they *want* to bring that into the workplace, and just learning their mindsets and how that is possible, I thought that was immensely important…it was nice to see that it was a collective effort. There [were] people from all different concentrations just excited about it and wanting to learn how to incorporate in their field, which I thought was amazing to see.

Not all participants shared the same feelings of belonging and connection to the certificate community. Greg addressed his experience as a community outsider. As he explains it, his academic background in finance set him apart from the "science majors and environmental

majors," causing him to feel less able to relate to others in the certificate. Despite this feeling of disconnect, his comments still reveal the power of SOC in personal motivation:

> I'd say it was a little bit harder to kind of, you know, get involved more-- like I don't know what's going on-- because I didn't feel like I knew as many people. Which definitely was-- yeah, it's kind of all over the place. It could be, you know, on me with not meeting them as much or whatever, but it definitely-- I'd say if the community was a little bit stronger it would have been cooler in terms of getting more-- getting really excited about the 8am sustainability seminar [laughter] and stuff like that…I've noticed some other organizations I've been in, the community is really strong-- and sometimes it happens and doesn't, it just kind of depends-- and it really motivates you toward a common goal. But I'd definitely say it really depended on the classes…I noticed when I knew at least one or two people it was a little bit better, and I felt like I paid more attention.

When asked to talk about his capstone project experience, Greg again expressed a sense of missed opportunity and desire to be a part of a learning community. Unable to fit the capstone course into his schedule, he completed a capstone project within the business school with a team of students who were not in the sustainability certificate:

> Yeah, my experience I think definitely was a little bit different because I didn't have the capstone course. I think the capstone course would have helped a lot, just to be around people doing their capstone.

While Greg's experience was comparatively negative, his critical reflection still points to the impact of SOC in facilitating academic success. Had he been able to participate in the capstone class, his SOC may have been altered, and he may have gained a sense of shared purpose with other members of the certificate through more acute engagement. In the next section, I discuss how regular engagement with interdisciplinary perspectives contributed to the experience of students within the SC.

Interdisciplinary Engagement

Compared with traditional higher education, which "focuses on domain-specific knowledge and general skills development," interdisciplinary education involves the integration of various disciplines to promote "the ability to change perspectives, to synthesize knowledge of different disciplines, and to cope with complexity" (Spelt et al., 2009, p. 366). These abilities are seen as essential for engaging with sustainability challenges and are therefore employed by the SC program.

The University of Georgia's student population sits at approximately 38,000, and the main campus stretches over 762 acres with 465 buildings ("UGA by the Numbers," n.d.). Accordingly, for a campus of this size and scope, participants found it rare to have consistent, constructive interactions with students and faculty outside of one's major area of study following completion of the general education requirements. Once students declare a major degree program, the majority of their classes occur within their major department, taken with other students working in their specialty. Three of the SC requirements, however – the seminar, the course elective(s) taken outside the student's major department, and the capstone – offer an unusual opportunity to connect with students from a wide variety of academic backgrounds, knowledge, skillsets, and career goals. Collaborative discussions created space to compare interests, behaviors, and problem-solving approaches. Within the context of a strong SOC, interdisciplinary networks provided extensive support systems for student projects and initiatives. Aspects of systems thinking, strategic thinking, normative, and interpersonal competencies were connected to interdisciplinary engagement as well.

For Bulldawg, interactions with students from diverse academic fields were impactful in identifying shared interests and goals with those he would not have previously considered

relating. When asked if he could recall any instances speaking with and learning from classmates from different academic backgrounds, he narrated a brief, yet significant moment in the seminar course:

> I don't remember all the specifics of that activity, but I remember that I was in a group with a biology major and something else and then a fashion design or fashion merchandising major. (R:[laughs]) The discussions that we had, we all took from my engineering and from her biology and her fashion, and it was really cool to see how these sustainable concepts transcended what our major or field of employment was going to be…I think it was just when we were looking back, it was sort of like a recap of the semester. (R: Ok.) We took our favorite moments and I guess talked about what they meant to us and how we could apply those in our lives…

For June, exposure to diverse ways of thinking expanded her own ways of thinking about problem-solving and the ways in which what is "right" for one group may not be right for another. This demonstrates an integration of systems and strategic thinking as well as interpersonal and normative competency concepts:

> I think that the program really taught me how many different unique solutions there are to problems, that there's always multiple ways of getting a solution to a problem, and whether it be through the social sphere or environment, I mean ideally through all of the spheres, you can kind of get a different solution. And that is really important to collaborate with other people because not everybody has the same perspective or point of view as you, and it really helps to bring other point of views because ultimately our country and our planet is not made up of just one type of person.

Despite feeling like an outsider from the SC community, exposure to others perceived as unlike himself still provided opportunity for self-reflection for Greg. Sustainable behaviors modeled by his peers allowed him to see how sustainability concepts might be applied in one's day-to-day life:

> I really liked being around people that were different than me and have like this different way of thinking. That was I'd say the most beneficial. It really really showed me exactly--you know instead of like reading books or learning about sustainability on my own, it really put me in a position where I was around people that were acting more sustainable and were really living it out. So just having that perspective was really cool.

Several authors point to this engagement with a plurality of perspectives in the development of social awareness, responsibility, and compassion through interdisciplinary pedagogy (Fry et al., 2017; Kahn & Agnew, 2015; Sarath, 2006). In support of this notion, Rebecca surprised herself with an unexpected outcome of the program when reflecting on her takeaways:

> This is one thing that comes- [?honestly] when I was thinking through this question, is that I can probably pinpoint the program as really making me more compassionate towards other humans, which is weird on the surface because it's a program clearly focused on being more compassionate to the planet. You wouldn't think humans would factor into that so much, but, especially coming from the business school where there is a little less diversity, being around-- I think the program is really good at attracting people from different backgrounds and with different goals for being there, so hearing my peers talk I think taught me a lot about listening to other people's perspectives.

The interdisciplinary structure of the seminar was also key for Sally to gain appreciation for others and extend her awareness of how sustainability can be applied to one's life. In this case, Sally recognized the importance of all professions in playing their small part of the larger sustainability picture:

> The students and the staff and everyone was just really big source of inspiration. I think that really comes with how interdisciplinary the Certificate is, how it's not just reserved for people in Warnell or in my college. It's really anyone who has some type of interest is able to get into it. I think it was the community conversations we would all have in class from people from all different-- studying all different things. One made me, I think have a greater awareness and more a shared respect for all professions. I don't know if respect is the right word, but helped me see even more that every single person has such a big role to play.

Applied within the context of a strong SOC, interdisciplinary engagement can produce an expanded network of resources for problem-solving and acts not only as a professional network, but as a family, caring for those in need of help. Zip details the assistance she received from her peers during a challenging time in her capstone process:

> *Zip*: I learned a lot from my peers. Everyone was from different majors and everyone had really good input that was so again, diverse. I keep using that word, but it was more than

> networking, it was like building a family. Everyone was very helpful. I don't think I would have gotten anything-- at least not as much done without everyone's help. So everyone helping each other is what built that community for me.
>
> *Me*: Yeah. Are there any specific instances where that was particularly true that you can remember?
>
> *Zip***:** I remember in class one day during the capstone whenever I told everyone the issues that I was having, and this halt, the weird halt that I had. That week, I got about five or six e-mails from my classmates trying to help, and it was just amazing.
>
> *Me:* {Oh my gosh!}
>
> *Zip:* {So many} different resources. Yeah. Different names for me to contact. Very cool…And because they're from so many different backgrounds they have so many different resources that are helpful.

According to Bolden et al. (2018), local knowledge networks "can encourage community resilience" and "[foster] personal connections" and have been employed to address climate change at the level of the local community. In the next section we see how experiential, place-based learning helped participants' foster a sense of shared purpose, sense of place, and SOC within the local UGA and Athens community.

Experiential, Place-based Learning

In order to determine which pedagogical strategies were either notably impactful or unsuccessful from the perspective of the students, participants were asked to speak about memorable learning experiences completed within the certificate program. In interviews, "learning experience" was defined broadly and could include short-term or one-time activities, major class projects and assignments, and/or entire courses they found particularly effective or ineffective. I analyzed recollected activities within the context of their pedagogical foundations and associated learner outcomes as explicitly indicated or implicitly displayed by participants.

Through analysis of the data, I found that the primary learning strategies emphasized by participants simultaneously exhibited characteristics of experiential and place-based learning.

While the two methodologies are not unrelated, and one may often integrate the other, it was of particular interest to this study to note the impact of their frequent pairing. Place-based learning utilizes the local community as a primary educational resource, seeking to "connect learning to the local ecological, cultural, and historical contexts in which schooling itself takes place" (Elfer, 2011, p. i). Lozano et al., (2017) define place-based learning as a type of experiential education and link the approach strongly to systems thinking and normative competencies, as well as interpersonal and strategic competencies more loosely.

As observed in the SC, the combination of place-based and experiential learning takes many forms, including community-based research, service-learning projects, campus as a living lab, and facilitated discussion with community members working in sustainability-related fields and positions. Reflection on learning is essential within these strategies, and study participants noted the benefits of the primary reflection component of the SC program, the portfolio, which pointed towards the development of personal competency. When paired with a developing sense of personal belonging, these activities promoted an evolving identity and sense of place within the local community, contributing to the larger SOC within the certificate. In combination with interdisciplinary engagement, students working together to accomplish common goals fostered a sense of shared purpose with individuals outside their primary academic cohort, again expanding their SOC.

One major commonality among these learning experiences as recalled by participants was their focus on the student/learner as the driver of the activity, where faculty and mentor facilitation was valued over authority. Bulldawg provides a succinct summary:

> I think that a lot of what I learned came from discussions that I had in the classes. (R: Mhm.) It was almost more impactful than a lot of the lessons or the lectures that I had, was what I learned from my fellow students.

Engaging in active dialogue with others was vital to Bulldawg's learning in the SC, and studies have shown that large group discussion as an active learning strategy leads to increased retention and retrieval of knowledge (Yazedjian & Boyle Kolkhorst, 2007). In addition to supporting knowledge-based learning outcomes, the sustainability seminar provided a meaningful opportunity to make meaningful connections in support of community-building. The course connects students to both people and places in the community. Here key competencies for sustainability are modeled by UGA faculty, alumni, graduate students, local non-profit and government representatives, area business owners, and other members of the community. Students are able to talk openly and ask questions about the diverse and often winding paths these individuals have taken in order to work in sustainability, helping students envision how they might apply and work towards sustainability initiatives in their own careers and personal lives. Field trips are also taken in the seminar class to experience sustainability concepts first-hand on campus (e.g., watershed walk, LEED certified building tour, runoff-mitigating raingardens) and in the local community (e.g., a resident tiny house, the county landfill and recycling center). For Clarissa, the seminar deepened her sense of place and shared purpose within her community and concretized her ideas about the impact of local action. It was also crucial to her understanding of sustainability as an approach in which anyone can play a part:

> Everybody has a role to play, and all of those roles intersect. The certificate, and especially the seminar, is a way for everyone to see that and then to interact and…connect things from their own academic circles or career circle to other people's career and academic circles, and connect those ideas and thoughts to what was happening in the community. Whenever we had someone from the community come and speak, it really spurred thought and action around what's happening here. What can I help with or act on, or just-- what's happening? You don't necessarily have to be involved in every little thing. How does it relate to me and my world? How do other people-- everyone in

> the room was from a different academic background-- we were all interested in it, and it all intersected. The fact that everyone has a pathway to sustainability, every field has a pathway to sustainability, every pathway intersects. That knowledge of an emphasis on being involved in the community, and [when sustainability happens it will be done locally]. It manifests itself locally on a small level before anything else.

Perhaps most importantly, the seminar provided a community hub for SC students to learn from and support one another. Sam identified the seminar classes as the most essential ingredient for her success in the program. Distinguishing the SC from other certificates in which "you only take this class, this class, this class and then boom, you have the certificate," Sam described how in the SC, "the seminars really made it that sense of community, and that was the support system." As Rebecca began to make sustainably-minded behavior changes, the community she'd found in the seminar provided "accountability to stick with it, and not just have it be a passing phase of interest, but actually-- when there are other people around you trying to make better choices, too, you're like, oh yeah I can't let the ball drop on this one."

As a student-led initiative situated within the context of the local community, the capstone project stood out as a hugely important learning mechanism for participants. The project is meant to be guided by faculty and/or community partner mentors, yet predominantly student-driven. This provides opportunities for practicing project management through the creation and implementation of the work plan, collaboration in seeking input from project stakeholders and faculty/staff mentors, and communication in presenting one's work. Through the lens of key competencies for sustainability, strategic thinking was the most strongly implicated competency relative to the capstone. Participants were quick to recall obstacles they had faced within the project and the ways in which they had to adapt to uncertainty and remain flexible. This is demonstrated in Sam's description of her experience:

> …with the capstone project we faced a lot of challenges and barriers like not being an organization to table at Tate or not getting the audience that we wanted on social media,

> and we had to adapt. And that's kind of what sustainability is. You know you have this problem and there's lots of barriers to it, but you find ways to adapt and eventually make it work.

June also demonstrates strategic thinking in her recounting of the challenges she faced with her project, her acceptance of these barriers, and her means of moving forward and finding ways to reshape her project goals and ultimately find success:

> …[dining services] just kind of drag you along, and they make you feel like you're being heard when you're really not. That was kind of hard. But it was cool because I also had this educational component where I was actually presenting to different student groups and stuff, and that was a little bit better…

The completion of the capstone also supported personal competency, as participants indicated pride in accomplishing a long term, largely independent, and, at times, intimidating project. Daisy described how the "nervous fear" she had starting the capstone was assuaged by the reassurance that "we're all in the same boat." After asking for help and guidance from her project mentors and peers, she describes how the capstone "went from this big scary, I really don't know what I'm going to do, to, wow, I really am doing something that I love."

Reflection on learning is another key element of experiential learning (Kolb, 1984). The Sustainability Certificate requires that each student create an in-depth, personal web portfolio documenting their learning for sustainability. Required components include an academic biography, reflections on all coursework completed for the SC, and detailed documentation of the capstone project. The portfolio is meant to be personalized to showcase the unique skills, knowledge, and personality of the individual, and additional content in the form of class artifacts, documentation of extra-and co-curricular activities, academic and professional resumes, and so on are up to the discretion of the student. The portfolio serves three primary functions: 1) a means to deepen one's learning in the program through reflexive investigation of experiences and learned concepts, 2) a professional development tool for continued use in professional and

academic applications, and 3) an assessment tool for program administrators to evaluate the depth and breadth of student learning.

Greg explained how the portfolio requirement prompted him to more thoughtfully examine all he had done and learned in the SC:

> …especially the last semester, there was a lot more conscious thinking with the portfolio about how sustainability as a whole-- throughout my whole college experience-- I didn't realize I did it so long. It was two years, and it didn't feel like that. It wrapped it all together and made me think about what have I done the past few years and really showed me the progress, which is really cool.

For Zip, the portfolio acted as a tangible product to signify her accomplishments in the SC program:

> I think that the creating the online portfolio was amazing. That was great because we all had something to show for the certificate. Even when we're just talking to potential employers.

While the act of writing the reflective essays has the potential to hone any of the key competencies for sustainability, the completion of the portfolio generally was linked to personal competency, as participants were able to look back on the full scope of their learning and appreciate their progress. For example, Brittany's portfolio served as a professional tool and source of positive self-image:

> Yeah, actually I keep it on my resume so when I am applying for jobs they have a reference for that. Sometimes I'll go to the link and look at what I did. I'm very proud of it.

On the other end of the spectrum, classes which relied predominantly on PowerPoint lectures were noted as particularly unsuccessful by several participants; however, it was ultimately difficult for participants to recall negative learning experiences in detail. Several participants noted assignments that they were not particularly fond of, though few patterns

emerged from these remarks, possibly indicating personal preferences rather than themes connecting unsuccessful educational strategies.

Learning Outcomes

Demonstration of several key competencies have been discussed to a limited degree in the previous two sections. In this section, I examine learning outcomes more closely. Using the Wiek et al. (2011) key competencies for sustainability as a deductive framework for analyzing learner outcomes, I found evidence of all five outcomes across the thirteen participants. I found interpersonal competency to be the most widely and richly expressed. Systems thinking, normative and strategic thinking competencies were notably exhibited, while anticipatory competency was the least significantly expressed. Additionally, I found two major outcomes, *personal competence* and *hope*, that were not captured by the key competencies framework. These outcomes have been identified as essential to learning for sustainability by a number of authors (Macharis & Kerret, 2018; Savage et al., 2015; Stevenson & Peterson, 2016). Participant demonstration of key competencies and emergent outcomes is examined and summarized in this section.

Interpersonal Competency

Interpersonal competency was strongly indicated among participants. Major themes related to this competency included empathy (i.e., the ability to understand the perspectives of another), willingness to expose oneself to and engage with diverse perspectives, the ability to inspire and facilitate constructive dialogue with diverse stakeholders, and the recognition of one's strengths and limitations on a team. Sally, who completed her degree in environmental

economics and management within the College of Agricultural and Environmental Sciences, communicated her newfound abilities to facilitate difficult and important conversations:

> …I think going through the certificate program has made me be able to better communicate with individuals who aren't necessarily as environmentally-inclined or motivated. I think that's something I had a hard time-- since it is so personal to me, a hard time being able to have like a calm conversation that goes both ways with people, whether that's my family members or people I just to meet along the way, or friends.

A graduate of the Warnell School with a degree in wildlife and fisheries, Brittany described how her increased understanding of the connections between environmental and economic systems (i.e., systems thinking) inspired her career goals in corporate environmental consulting. She hopes to act as a communicator of scientific concepts and facilitator of change within the corporate sector:

> I've always kind of had a negative thought on the corporate side of the world, and it made me realize that's not accurate, it's more a lack of understanding-- through this class, so it taught me how the mechanisms that run the world work, which is basically profit and creating an industry. It was learning how the business worked, but how with incorporating economics and sustainability it could actually make it run smoother and more efficient, and how there is a need for people to implement that. (R: Mhm.) So it really inspired me to be that person. I felt like if I do that I can make such a huge change. If I can be that person who is able to connect the business world and the environmental world and speak in terms that they can understand. This class spoke in my environmental terms so I can understand the business terms and it made such an impact on me. So just thinking of the possibilities of being able to do that on other people was probably one of the biggest pushers for that.

Bulldawg, a graduate from the College of Engineering with a degree in mechanical engineering, too, described the ways in which he has begun to facilitate dialogue for sustainable change in his current career as a manufacturing design engineer:

> In my company, a lot of the projects we work on are not identical to old projects but they're kind of similar to them. And so we go off those as I guess-- they're kind of go-by's for us to start for the next project. (R: Mhm.) A lot of the things that I've come across, I start to ask questions, well why is it done this way? The answer is often, because that's how it was done last time. (R: Huh.) That's how it was done the time before. I think that having a sustainable approach is a lot of times for me there just saying well, what about if

> we did it this way? I know this isn't how it was done last time, but I think this would be a more efficient design.

Integral to the facilitation of transformative dialogue, interpersonal competency includes the ability to motivate and inspire others towards sustainable attitude and action. Daisy, a graduate of the Franklin College of Interdisciplinary Studies with a degree in communication studies, spoke about her abilities to spotlight sustainable behaviors using positive reinforcement and enthusiasm:

> It's one of those things that, like I said, going around from day to day people just surrounded me and inspired me every day, and I just hoped that I could do that with others. Even today at work, this one guy was like, "Daisy, I just love how much you love to recycle. I just appreciate your appreciation for that." And I was like, "wow! Well, I appreciate your appreciation for that!" So it's little things like that…

Lastly, interpersonal competency also involves the recognition of one's strengths and weaknesses within a team setting (Wiek et al., 2011). Accepting the limitations of her own skillsets, Sam, a graduate from the School of Public and International Affairs with a degree in international affairs and a minor in French, sought help from those with the appropriate expertise to help complete a sustainability consulting project for biotechnology company, Athens Research and Technology:

> *Me*: …What were some of the recommendations that you wrote about in the report?
>
> *Sam*: Basically, [it was] an office-style sustainability plan. So increased recycling, don't buy what you don't need, and then also-- I'm not really a techy or chemical person, and so I had to get the help of some scientists…

Systems Thinking Competency

ESD hopes to instill within learners the ability to recognize and engage with multiple lenses to approach problems which include a wide variety of stakeholders and actors, systems and subsystems. In support of systems thinking, graduates were quick to make connections

across multiple scales (e.g., local to global) and domains (e.g., environment, technology, society, economy) (Wiek et al., 2011). The interdisciplinary, triple bottom line framework employed by the program altered their perceptions of what sustainability pertains to and how sustainability concepts may be applied. Most often, students entered the program with perceptions of sustainability which focused primarily on environmental issues and subsequently experienced a broadening and balancing of understanding to incorporate multiple domains and identify links between them. June, who received her B.S. in ecology from the Odum School of Ecology, speaks about her expanded understanding of sustainability issues:

> Through the coursework and things it changed a little bit because I became a little bit more aware of other social issues and also saw how they intertwined with my own passion for advocating for animals and the environment… it allowed me to take more socially-oriented classes, which is something I'm very passionate about, social issues. So I really do wish that I had done a little bit more in terms of like doing more like an interdisciplinary major rather than just science.

Furthermore, participants acknowledged the existence of multiple ways of understanding and approaching problems. Sam explains the complexities of marine debris from various lenses:

> I think during my internship with Coca-Cola and looking at marine debris and how a company could help with that, and you have to look at just the problem of marine debris in general. There's an economic problem because there's all this recyclable stuff that we could just recycle, but it's not being recycled, and that's a huge thing for recycling companies and recycling industry. And it also has an impact on local fishing towns, because when plastic gets in the fish, no one's going to buy the fish anymore. And then, socially there's-- marine debris also comes hand in hand with the waste problem…in the world. You have all these issues, like waste pickers and conditions in recycling facilities and waste facilities. And then environmentally, it impacts the ocean and living organisms…so much. I think understanding the problem from all those different perspectives was really interesting.

Daisy provides a simple remark underscoring the tension which often exists among stakeholders from different domains:

> …there are so many different levels. And like I said, with each class you got a different lens of what that would look like, so I think now I can see, ok, this may be sustainable in this way, but if you looked at it through this other lens, they might not agree.

In a discussion about the sources of his learning, Greg, a graduate of the Terry College of Business with a degree in finance, also acknowledged the complexity of sustainability issues and the frequent lack of a "right" answer to a given problem. He described how the SC prompted him to look beyond the "surface-level" of issues to understand what the "rest of the iceberg looks like." Greg goes on to provide examples, connecting localized issues to larger, more complex systems and consequences:

> *Greg*: I think one was the idea of electric vehicles-- how everyone-- I guess electric vehicles are good, but then if you think about where the electricity is coming from, if it is not coming from a good source, like coal or something, then it kind of negates using an electric vehicle. It's little things where you see the initial-- like, oh, this is really good, but then you look behind the scenes and don't notice that it's maybe further off-- it's not exactly-- I don't know [4 syllables unclear]
>
> *Me*: Yeah. So thinking about those further upstream or further downstream consequences of something--
>
> *Greg*: Yeah. Exactly.
>
> *Me*: Mhm. Asking those tough questions. Sometimes you just want to be excited, but sometimes you still need to ask like, OK, but really how beneficial is this?
>
> *Greg:* Yeah exactly. And like you see all these crazy-- I guess like things that just make sense, like they're finally getting rid of plastic straws. Or at least a lot of places are. But, I don't know-- it's interesting to see. Normally I would have only seen that and really been like, OK! But now it's kind of like, you know what, let's look more into it and see why everyone's just getting rid of the plastic straws now. Like what else could we get rid of too?
>
> *Me*: Mhm. And along with that, from what I've seen they're getting-- at least Starbucks for example, they're getting rid of plastic straws, but that means they're adding a different kind of plastic top.
>
> *Greg*: Yeah, I heard it's more plastic, too…

Sam uses plastic straws to elucidate yet another facet of systems-thinking competency, highlighting the relationships that exist across scales from local to global, a major concept emphasized by participants. For Sam, local actions are intrinsically tied to global challenges.:

> *Sam*: …before the certificate I was also only thinking of environmental conservation on the global scale, you know, *all* the whales, *all* the turtles--
>
> *Me*: Right, it can be overwhelming.
>
> *Sam*: Yeah, but with the certificate I really learned to appreciate the local initiatives because, you know, there are a lot of local initiatives, then it turns into something bigger. I think an example would be, maybe if we had done this with our capstone-- having something that local businesses could do like, "don't use a straw anymore." That could contribute to the bigger problem of marine debris.

The impact that localized action, personal choice, and the "small things" can have on facilitating momentum towards global change was frequently expressed. This connection speaks to systems thinking concepts such as tipping points, cumulative effects, and synergy. Bulldawg shared his take on the collective effect of numerous small changes:

> Throughout my different seminar classes and sustainable building design classes I had learned about VOC's in paint, and using local material, and about different LEED accreditation things, and really just an array of small things again that can make a big difference when you combine all of them and then look at the overall energy usage change in the building.

Other systems thinking concepts addressed included an understanding of social system components which directly and indirectly impact environmental issues such as policy, law, and governance. Through one of her sphere elective courses in environmental law, Clarissa, a Terry Business College graduate with a degree in economics, highlights this connection:

> *Clarissa*: That class was my frickin' favorite class, one of my favorite classes ever.
>
> *Me*: {Awesome.}
>
> *Clarissa*: {It was} great. We basically learned about the Environmental Protection Act, Clean Water Act, Clean Air Act, and Endangered Species. I knew about all these things, but we had case studies where I realized-- it was a way for me to see that policy at the highest level affects small decisions in the south and in local communities. It affects small businesses and things like that, when you're making decisions about agriculture and farming-- but you've got to protect wetlands.

Normative Competency

Normative or values-thinking competency is characterized by the abilities to articulate, apply, and negotiate sustainability values and assess actions, systems, and outcomes for their degree of sustainability or unsustainability. Key concepts of normative competency include fairness, justice, happiness, safety and assessments of risk and harm, responsibility, and reinforcing gains or "win-wins" (Wiek et al., 2011). When asked if they had incorporated their personal definition of sustainability into their value system, all participants replied positively, though some demonstrated this concept more acutely. In her current position working with a sustainable development and green building nonprofit organization in Georgia, Clarissa explained the complexities of evaluating policy decisions for their degree of sustainability or unsustainability. She framed these decisions in terms of their relative responsibility:

> …in my work I think about policy decisions in that framework. Are we doing the most responsible thing? It's hard because there's politics to policy, I've learned. In the city of Atlanta, they're trying to pass some ordinance about land use and zoning and removing or moving affordable housing to a different location in the city. Is that the most responsible decision? Is it the best and highest land use? If you're talking about putting solar in rural Georgia, what's the best land use? Is it a solar field that will bring tax benefits to the county, or is it agriculture that will fulfill tradition even if they're both harmful to the actual wildlife that may live in the area? It's all a balancing act, and you really just have to think about what's the most responsible decision.

Morgan, a Franklin College graduate with a degree in genetics, also framed her personal definition of sustainability in terms of responsibility and with a "bigger purpose:"

> For me, it means doing every action responsibly. Not just thinking about your own convenience, but also thinking about people around you and the earth. I don't know. A lot of the arguments against living sustainably comes from like, oh, but it's so inconvenient. It is inconvenient for a reason. (R: Right.) That's where my idea of sustainability comes in. You do things with a bigger purpose than just convenience or just putting that as the first priority or whatever.

Rebecca, a Terry College of Business graduate with a degree in business management and an emphasis in supply chain management, reflected on shifts in her personal value system.

She described her move towards valuing happiness derived from reducing consumptive behaviors:

> I've been working hard the past couple of years to really simplify my life and get down to the bare essentials of what I actually need. (R: Yeah.) As I've gotten rid of old stuff and stopped buying so much new stuff I really have found that contentment and environmental responsibility go hand in hand. As I've been more environmentally responsible I find myself more content with what I have, and as I'm more content with what I have I then make better choices because I have all I need.

Rebecca went on to consider the positive impacts that her own sustainability values-based decisions may have on others, exemplifying the win-win concept:

> *Rebecca*: To me I think sustainability, it really starts on a personal level. I think the very core of it is wanting what you have and knowing that that's enough and getting away from that mindset of more and more and more. That has bigger implications for businesses and for society, but I really think sustainability is primarily about your personal choices to be content.
>
> *Me*: Hm. Yeah. To not take more than what is needed to sustain, essentially.
>
> *Rebecca*: [laughs] Yeah, to have just your fair share, so that other people can also be content and actually have what they need, too.

Bulldawg also demonstrated normative competence, defining sustainability in terms of inter- and intra-generational equality:

> I think sustainability is living our lives in a way that we can be happy and have successful lives, but at the same time allow our children and our neighbors to have the same right to have happy and successful lives.

Overall, sustainability was presented as something personal, meaningful, and not easily subject to compromise. This characterization of personal sustainability value systems is further demonstrated in the following section on strategic thinking competency.

Strategic Thinking Competency

Facets of strategic thinking competency were displayed by all participants, often in reference to their work in the capstone project or within their current professional career. Of the major concepts related to strategic thinking presented by Wiek et al. (2011), the most emphatically demonstrated included intentionality, intervention and transformation, logistical and temporal feasibility, recognition of institutional barriers and adaptation for success.

When asked if they would be willing to work for a company or organization that did not align with their personal values in regard to sustainability, several participants offered responses which spoke to both strategic and normative competencies. Unwilling to set aside their sustainability values, several participants were quick to point out the opportunity to intervene and transform culture from within "the system:"

> *Clarissa*: ...maybe not an organization or company that worked *against* my sustainability beliefs and principles, but I could see myself working in, for example, local or state government or some sort of research division for government that is not necessarily prioritizing those things but where I can do work within the organization…Working within the system, if you will.

> *Jack*: I would work with those places, but I would work to change the culture, and I would work to change their approach to things because it's just-- I don't think it's right. I don't think it's right to go against this grain when in a lot of ways, in my eyes, [sustainability is] one of the few options left.

> *Sally*: That's tough. I think that's tough, a hard question. I think there's something-- a company that I don't quite agree with morally-- there's the option of getting to go in there and maybe help-- being able to make a change. But if it's...I don't know, Dow Chemical, someone that it's just-- their foundation is that. (R: Yeah.) But I guess it depends what I get hired as well. (R: Yeah.) I think the certificate has helped me, I feel like I can go into any type of job, or at least hope, and be able to bring my passion for sustainability into it. And maybe if it's not even my specific title, not even in my job description, I think I will try my hardest to kind of weasel [laughs] my way into bringing that into the company or even just into the office. It really depends on the company, what the job is, what they do. I don't know if I'd be able to work for a company if it was a drastic difference. I don't think I'd apply there. [laughs]

Acting with careful deliberation and intent are essential to strategic thinking for sustainability. Bulldawg described how his approach to sustainability and his decision to incorporate the SC into his academic path were made with intention:

> I felt that there was something that I was missing in all of my mechanical engineering classes…where I felt like I could make something and learn how to build it, but that there needed to be some sort of intentionality to the work that I was going to be doing. I felt like a sustainable approach to it would be some way that I could get a more intentional approach to the design work that I'd be doing in my future and design it in a way that would be sustainable and good for the environment and good for the people that I would be designing for.

Perhaps more than any other one source, the capstone project offered a crucial setting for the application of strategic thinking. Themes relating to temporal and logistical feasibility and adaptation in the face of obstacles were emphasized. Details of this experiential, place-based learning method and its associated outcomes are presented later in the *Methodologies* section of the chapter.

Anticipatory Thinking Competency

Anticipatory thinking considers present actions within the context of past and future and includes concepts of generational equity, risk, and uncertainty (Wiek et al. 2011). Overlapping with systems thinking, the concept of nonlinearity is also important. Anticipatory thinking involves the abilities to craft detailed future scenarios and evaluate these for plausibility and degree of sustainability. While all participants offered visions of their ideal sustainable future when prompted, anticipatory competency was the least supported by the data, hardly expressed outside of these pointed instances. Furthermore, plausibility was not meaningfully addressed in participants' future scenarios.

One notable demonstration of anticipatory competency was seen in Rebecca's response to why she first became interested in sustainability and the SC program. Integrating normative and anticipatory thinking, Rebecca projects a precarious vision the future for her grandchildren, incorporating values from her past and present:

> Growing up I had always really enjoyed being outside and wanted to spend as much time outside as possible, and it wasn't until I got to college that I really realized that that might not be something I could do forever and might not be something that would be available to my grandchildren, at least in any quality, enjoyable kind of way. Primarily I wanted to seek out a program because I wanted to protect something that I loved so much. (R: Mhm.) That was probably the primary motivation.

On four occasions, explicit regard for future generations was evidenced in participants' personal definitions of sustainability. Early in the interview, Clarissa shared her personal definition of sustainability as, "Not necessarily thinking about what's going to benefit you and your tribe of people…in the moment…but thinking about the future when you make choices and trying to be responsible." Pearl, a graduate of the Odum School of Ecology with a B.A. in ecology, shared a similar definition of sustainability:

> Sustainability would be planning ahead in an effective manor where you are [3+ syllables unclear] of producing and thriving not only currently but for future generations to come. So looking three or four generations ahead and asking, are my practices going to be able to be used in the next generation or will they have to change their [3 syllables unclear] because of how we acted now.

Because anticipatory thinking was not well-articulated within other contexts, it could be argued that students are simply paraphrasing the Brundtland Commission's definition, which identifies *sustainable development* as "meeting the needs of the present without compromising the ability of future generations to meet their own needs" (WCED, p.8). Potential factors explaining these limited findings and methods to increase anticipatory competency are explored in the Chapter 5.

Personal Competency

An emergent theme generated from the data expands upon Wiek et al.'s (2011) key competencies for sustainability. Strong narratives of mindfulness, self-efficacy, and drive to move forward as a result of program experiences appeared throughout data collection and analysis. I categorized these evolving capabilities as a sixth, vital competency for sustainability: *personal competency*. This corresponds with Savage et al.'s (2015) evaluation of a sustainability leadership certificate program in which personal growth, including well-being, self-awareness, and self-acceptance, was not captured as a programmatic outcome by Wiek et al.'s (2011) key competencies.

For graduates of the UGA SC, mindful, self-awareness came in the form of reflexivity regarding one's personal, daily behaviors:

> *Brittany*: Sustainability isn't a destination for people, it's supposed to be a lifestyle. So learning how to incorporate it into every little day things-- I think that is how you can make the biggest impact is by carrying these mindsets with you every day and just always being a conscious consumer, a conscious-- just a conscious person in general.
>
> *Jack*: I think that value system evolved with the Certificate. I already, before I joined, tried to live off of my own perspective on what a sustainable lifestyle is. But I do think the definition that I gave you was heavily influenced from the Certificate and my time in it, and it evolved with it. I think that the application of that evolved during, and today I still try to live by the words that I preach.
>
> *Rebecca*: …once you open up the flood gate of trying to think more ethically, it's hard to put a stop to that. When you start questioning, how have I been lazy? What can I be doing more for the environment? You also can't help but think, well what are the other areas in my life where I haven't done enough? I definitely realized once I started being kinder to the environment, it was really easy to think of all the ways I wasn't taking action, and I wasn't loving my neighbor. I think there are a surprising amount of classes [in the SC] that don't just teach that as a soft byproduct but actually focus on it.

Outcomes related to self-acceptance and self-efficacy were displayed by many participants as well. Zip, a Terry College of Business graduate with a degree in management

information systems, shared how her personal accomplishments continue to fuel her drive and hope for the future:

> What gives me hope is that I can actually accomplish the goals that I set for myself and seeing myself here where I didn't even believe that I would be. It gives me hope that anything is possible. If I can do this, if I can be in Atlanta being a sustainability consultant, anyone can do anything.

Sam reflected on the way in which the SC program helped her to rebuild confidence in applying her passion for environmental conservation to her life's path. After dropping the chemistry class required for the ecology major she had initially pursued and instead switching to international affairs, the SC allowed Sam to engage and excel in her environmental interests:

> …when I couldn't do chemistry I was like, alright science is not for me. Then when I did the Sustainability Certificate, I was like, oh my gosh, there are all these other things that I'm really great at that I can also involve sustainability in.

Clarissa illustrated self-acceptance in her willingness to forgive herself and others for imperfections and failures in regard to living more sustainably:

> I think forgiveness is a big thing, too. I have to forgive myself every day little things that I do. I forgive my parents for eating a lot of meat or whatever. You've got to meet people where they're at, and that's the view that I have.

Daisy explained the self-acceptance she found as a result of her connection to and inspiration from the SC program and local communities:

> …sometimes people can laugh at me and just be like, oh my gosh, you are such a tree-hugger. And I will say, yes. I proudly will say, yes I am. And just being able to accept that you may be that person that kind of sticks out in a crowd…because maybe not many people know about the subject-- it's really great because you can be that person who kind of sheds the light for them. For me, being able to be a part of this community where there were so many people who, wherever they went, they were that little light that inspired someone else or opened the door for someone or started a conversation-- that really inspires me. You look around, and sometimes the big pictures you see in the news of really some sad things-- but then when you look locally and may see little things going on, and those little small things, the little victories are just quite nice.

Daisy's words begin to clarify the necessary context for what could be identified as forward movement, drive, or *hope*.

Hope: a regenerative component of ESD

As evidenced in the data, hope is an integral component of the certificate program. In many cases, it is the fuel for continued learning within the process of ESD and reroutes feelings of despair and apathy. When asked to speak about his biggest takeaway from the SC program, Bulldawg described a program outcome not captured in Wiek et al.'s (2011) key competencies for sustainability. In one word, the enduring principle gained from participation in the SC program for him was *hope*:

> I think that I gained the sense of hope in the change that each of us can make. I know in some of the environmental engineering classes that I was in there [were] a lot of like-minded people that weren't a part of the certificate, but we still had a lot of these discussions. It always-- I left with this feeling of doom and gloom, of, well we've already done all this damage, at this point it's so hard to reverse it, who knows where we're going to be. (R: Yeah.) In the certificate, we talked a lot more about the little things that we can do to help change it, and we've already done a lot of damage, specifically looking at the environment, but we can still make these small changes and make a big difference and make a big impact. Together we can make all the small changes, and it left me with a lot more hope than I had leaving some other discussions about environmental sustainability.

Each of the thirteen participants was asked if they were hopeful about the future and if so, to share what gives them hope. All answered positively, and at the core of thirteen responses stood a singular source: people. Hope was garnered through participants' exposure to others mobilizing and shifting their patterns of attitudes and behaviors towards sustainability. Hope was often found at the local level, then diffused outward to a global scale. In the following excerpts from these conversations, each component of the SOC is indicated in the creation of the necessary conditions for hope in a field often defined by "wicked" problems of inconceivable proportion.

Finding hope in a sense of solidarity and shared purpose with others, Sam, Brittany, and Zip counter feelings of despondency and overwhelm:

> *Zip*: …growing up being so invested in my own sense of trying to save the world in the ways that I can made me very depressed as a child. I was so hopeless, but being a part of this community and especially the seminar courses hearing the good things that people are doing, I walked away from the certificate with so much hope and excitement for the future that I didn't really have before.
>
> *Sam*: If anything, the SC gave me inspiration because I think that sustainability is…it's a great field to be in, but it's also a really tough one to be in to because you feel like you have so many obstacles you have to get through and sometimes it feels like you're not making a difference, just one person recycling one plastic bottle, um, but it, yeah, it made me feel like I'm a part of something bigger that a lot of people are trying to do also.
>
> *Brittany*: I think what gives me hope is the fact that I feel like there are so many people striving for this…and it's not you against the world, it's like the world working together to do this.

For Rebecca, hope takes the form of excitement in the growing awareness of and interest in sustainability – from the local level of the UGA SC and her workplace to the national and global levels through mainstream and social media. She chooses to focus on those who want to make change:

> *Rebecca*: I think...listening to other people. I think hearing the way other people are getting excited about sustainability and the fact that the program just keeps growing, and just the way it's talked about now-- random YouTube people, and it shows up on TV, and you hear it mentioned in the workplace, and I think just the fact that people are waking up! It just gets me really excited, and I think there might be-- it's easy to get bogged down in doom and gloom, but I think there's a lot of people who want to make changes and that's what gets me excited.

June indicates a sense of shared values found through engagement with diverse perspectives. She is encouraged by the hard work of others and the message of love she sees being shared on a grand scale:

> What gives me hope is... that there are a lot of different people with diverse perspectives and different people are working hard right now more than ever to actually be heard. And a lot of people are understanding more of the importance of understanding and raising

> other people, and a larger message of love. And I'm hopeful that people will begin, more people will begin to extend their circles of compassion to include non-human species.

In her response, Daisy indicates a sense of shared values, purpose, and sense place. She looks to individuals and efforts in her local community for inspiration and in turn, uses her own sense of hope to encourage those around her:

> …being able to be a part of this community where there were so many people who, wherever they went, they were that little light that inspired someone else or opened the door for someone or started a conversation – that really inspires me. And I don't know, you look around, and sometimes the big pictures you see in the news…of just really some sad things, but then when you look locally and may see little things going on, and those little small things, the little victories are just quite nice. And if you ever…there are definitely little bits of happiness that you can find that will help you, so whatever your values are just keep going forward.

Similarly, Sally's expanding sense of hope originates from her exposure to those working towards it at the level of the local community. Her desire to channel this inspiration and use it to motivate others again demonstrates how hope might be thought of as both an output and input of ESD:

> I think it's kind of an answer that a lot of people give, which is lame, but really it's the community. [It] inspires me, it makes me work harder, and it-- when I work that hard because I want to inspire others, makes me really proud of myself. Seeing how big of a group there is just on one campus from all different walks of life really inspires me. That, as time continues, the group is only just going to get bigger and bigger. With more and more ideas, and more and more people to support you.

In close, I will use a final passage from Sally to summarize the core, grounded theory of community pedagogy for sustainability. Her remarks below describe how the sense of shared values and belonging she found in the certificate community bolstered her confidence in her ability to communicate her passions and participate publicly in sustainable behaviors:

> I think...seeing that there was such a big community interested in the things that I was interested in made me a lot more confident in myself and the subjects I am passionate about. That helps me better be able to talk with others and not feel as weird bringing my reusables to somewhere where people are going to-- it's just like making me more confident and more vocal about my passions…

> Maybe before the certificate, it was something that was there, but going through it and going through all the classes and my classes for my major has made me, not pushy, just more outwardly there and more willing to have conversations with people, to hear their side which can then kind of improve how I go on moving forward with the better [?understanding]. To sum that up, the certificate has made me a lot more confident and a lot more vocal about these things. I think that's one of the biggest takeaways. Seeing that there was such a big group also interested made me want to get others in or involved or just share my thoughts on things more.

In addition to underscoring the impacts the community within the certificate program, the preceding passage demonstrates strong interpersonal competence. Much like Weik et al. (2011) "recognizes the special function of the interpersonal competence in sustainability as it cuts across the other four key competencies (systems thinking competence, anticipatory competence, normative competence, strategic competence)," the grounding theory of the SC program, the sense of community, helps facilitate the construction and interconnection of all competencies for sustainability. With the exception of anticipatory competency, the sense of community supported and reinforced Wiek et al.'s (2011) key competencies for ESD, as well as the emergent outcomes of personal competency and hope. From the data presented in this report, the SC community appears to provide the fabric into which complex patterns of growth can be threaded. It is both mindfully constructed and organically regenerated – at once consumptive, productive, and regenerative. The following chapter summarizes and discusses the implications of this community pedagogy for sustainability.

CHAPTER 5

DISCUSSION

> "All ethics so far evolved rest upon a single premise: that the individual is a member of a community of interdependent parts. His instincts prompt him to compete for his place in that community, but his ethics prompt him also to co-operate (perhaps in order that there be a place to compete for)." (Leopold, 1949, p. 203-204)

In this chapter, essential information and findings from the previous chapters are discussed. The theory of community pedagogy for sustainability is summarized, and the theoretical and educational implications are explored. As indicated in chapter three, an additional literature review was conducted to facilitate deeper discussion of key themes which emerged from the data analysis. I discuss the limitations of the study and make recommendations for future scholarship. In conclusion, I share closing thoughts on the research.

Summary of Study Context

The objectives of this study were to explore and characterize student learning and development within the Sustainability Certificate (SC) program at the University of Georgia. In essence, the study sought to answer the following questions within the context of the program: *What is going on here? Is it working? If so, how?* Education for sustainable development (ESD) remains relatively new as an explicit educational entity. Resulting from the UN's 1992 Earth Summit, Agenda 21 called for the use of education to promote sustainable development (United Nations, 1992). More than a decade of loosely defined educational implementation followed

until the UN General Assembly announced the UN Decade of Education for Sustainable Development (UNDESD), which would span from 2005-2015 as an initiative of UNESCO. ESD is still within its first two decades of implementation, and the UGA SC ranks among only 31 other universities offering certificate programs in sustainability. As originally conceptualized by UNESCO, ESD is intended to be incorporated into existing educational systems rather than treated as a distinct area of study.

This broad, interdisciplinary integration elicits assessment and evaluation challenges (Giefer, 2015; Sandri et al., 2018a). Some higher education institutions have employed the use of sustainability literacy assessments, and in fact, the Sustainability Tracking and Reporting System (STARS) initiated by the Association for the Advancement of Sustainability in Higher Education (AASHE) awards points within their ranking schema to institutions who administer a sustainability literacy assessment to a portion of or the entire student body. While these assessments reflect students' understandings of common terminology, concepts, and behaviors associated with sustainability, they miss the mark in truly assessing education *for* sustainable development. The preposition "for" denotes an act or process performed *with the object or purpose of something*; in the case of ESD, the process of teaching and learning is done with the purpose of facilitating the major social changes needed to progress within our present and future means. Through the process of education, ESD should, then, enhance students' abilities to *act* as sustainability problem-solvers and agents of social change. The knowledge, skills, attitudes, and capabilities necessary for such immense change are not easily articulated, much less captured in a brief survey. A growing body of work has centered around identifying the learning outcomes necessary to progress society towards sustainability. This field of literature has been dominated by "laundry lists" of competencies; however, a set of interdependent, theoretically nested

competencies for sustainability was developed by Wiek et al. in 2011. When engaged together, these competencies (systems thinking, strategic thinking, anticipatory/futures thinking, normative/values thinking, interpersonal) form the foundation for moving towards sustainable development and serve as an important jumping-off point for this study.

Summary of Study

Using Wiek et al.'s (2011) key competencies for sustainability as an analytical framework and starting point, I examined meaningful learner outcomes and program components as expressed by recent graduates of the SC program. As outcomes of ESD remain largely under-assessed, my investigation was both evaluative and exploratory, purposefully left open to emergent themes. I wanted the students to guide me towards an understanding of their learning experiences within the SC and the enduring impacts of these, perhaps pointing to blind spots within the literature. I conducted thirteen semi-structured interviews with the aim of qualifying the learning experiences of these participants. From my analysis of the data, *sense of community* arose as the core theme. For students, this sense of community was developed through specific program characteristics and components, supported key competencies in many cases, and promoted additional outcomes not accounted for in the key competency framework. Altogether, the contextual factors, methods, and outcomes found to be central to students' learning and success in the program comprise a *theory of community pedagogy for sustainability* (see Figure 3). Introduced in chapter four, this theory is summarized and further discussed in the following sections.

Summary of Findings

Theory of Community Pedagogy for Sustainability & Resilience

Within the UGA Sustainability Certificate, sense of community (SOC) was found to be central to the learning experience. SOC is formed as students develop a sense of place, shared purpose, and shared values, which arise from the interaction of three primary components implemented by the program: inclusivity and sense of belonging, interdisciplinary engagement, and experiential, place-based learning. This SOC helps to establish and reinforce learning outcomes including key competencies for sustainability. When sustainability learning is shared and modeled within the certificate community (i.e., by students, faculty, staff, and community members), SOC is further enhanced. Hope was found to be an emergent property of this regenerative process.

The SOC generated within the certificate program included both forms of community as described by Gusfield (1975): relational and territorial. The relational community includes students, program staff, sustainability faculty, Office of Sustainability staff, and seminar guest speakers (additional faculty, staff, and community members involved in sustainability work). Interdisciplinary engagement across these individuals facilitated exposure to diverse perspectives while instilling a sense of shared values and shared purpose, further bolstered by a learning environment which cultivates a sense of inclusivity and belonging. The territorial community includes the UGA campus and Athens-Clarke County. Experiential, place-based learning within these communities nurtured an expanded sense of place in participants and created a sense of shared purpose while working in academically diverse teams.

The learning experiences which participants found most valuable were not only experiential and place-based but notably student-led or student-focused. Lecture-style strategies

were indicated as least valuable. High impact areas in order of emphasis included the sustainability seminar (including class discussion, field trips, and campus as a living lab activities), the capstone project, and the sustainability portfolio. More broadly, the co-construction of the SOC within the program was influential in participants' enjoyment of the program and attainment of learning outcomes. The sense of community is an integral component of the program and one that is both consciously and unconsciously co-constructed among staff, faculty, community members, and students.

In regard to the assessment of program outcomes, Wiek et al.'s (2011) key competencies were used as an evaluative analysis framework. Through coding the data for evidence of these competencies, I found components of interpersonal, systems thinking, strategic thinking, and normative competencies at significant levels of occurrence and richness, while anticipatory competency was notably less expressed. Personal competency and hope were identified as major outcomes of the certificate not captured by the key competency framework. These outcomes may bolster social and individual resilience.

Theoretical Implications

This study reflects a theory of learning for sustainability within the context of the UGA Sustainability Certificate program. Drawing from participant data, a strong sense of community was central to participant experience and learning within this ESD program. Hope emerged as both a product and continued driver of the SOC and subsequent learning. While we must be careful not to generalize the findings herein, the results do have theoretical implications.

The emergence of hope through engagement with others in the community counters the prevailing theory of hope construction. Snyder, Irving and Anderson (1991) define hope as "a

cognitive set that is based on a reciprocally derived sense of successful (a) agency (goal-directed determination) and (b) pathways (planning of ways to meet goals)" (p. 571). This theory assumes individualistic determination of hope relying predominantly on an individual's perceived capability to achieve the goals they have set for themselves through the pathways determined most suitable for goal attainment. This conception of hope is particularly problematic within the field of sustainability because sustainability challenges assume a need for large-scale social change, thus perception of goal attainment is largely based on collaborative action rather than individual determination. One step beyond an ill-fitting definition, Aronson (2017) identifies the ways in which a dubious "privatization of hope" leads to individual entitlement based on consumptive behaviors. This study proposes a divergent understanding of hope as an emergent property of social interaction wherein a sense of shared purpose, shared values, and sense of place are construed. Building from Aldo Leopold's Land Ethic, Jennings (2013) provides a reimagined definition suitable for the task ahead of sustainability change agents: "Hope denotes an active stance in the world, not simply an emotional orientation toward it. Hope's geography is best understood as a public, outer engagement, not as a private, inner mental state." (p. 4)

This study also offers an expansion of Wiek et al.'s (2011) theoretical model of the key competency framework. In this model, five key competencies for sustainability (systems thinking, strategic thinking, anticipatory thinking, normative, and interpersonal competency) are considered imperative to learning for sustainability and are delineated from what are referred to as basic competencies (e.g., critical thinking, basic communication skills, data management). Personal competency is not identified as a key competency for sustainability nor as a basic competency; however, personal competency, including elements of self-efficacy, self-acceptance and forgiveness, emotional/self-management, and self-awareness/reflexivity, emerged in this

study as a crucial outcome of community-centered sustainability education and a vital competency for continued engagement and mastery. As described by participants, self-acceptance (personal competency) allowed them to feel comfortable publicly sharing sustainability-related knowledge, attitudes, and behaviors with others (interpersonal competency). When June's capstone project was met with institutional barriers, self-management and self-forgiveness (personal competency) in combination with adaptation and mitigation (strategic thinking) allowed her to move forward without discounting her hard work. This supports findings from Savage et al.'s (2015) study of learning outcomes in a sustainability leadership program in which researchers found personal development "to nourish growth in the five key sustainability competency areas" (p. 699). Similar to Greg's recounting of the benefits he gained from the portfolio assignment at which he was able to look back and appreciate his personal growth (self-efficacy), students in their sustainability leadership program described how self-reflection led to increased self-confidence.

Lastly, in the eyes of some scholars, the field of sustainability stands at the edge of a great and inevitable transition. They claim that societies have not been able to make changes at the rate necessary to avert large scale environmental crises, and some have called for a shift from thinking in terms of sustainability to terms of *resilience* (Lerch, 2017). "Resilience is the ability of a system…to cope with short-term disruptions and adapt to long-term changes without losing its essential character" (Lerch, 2017, p. 1). As a compliment to or maturation of sustainability education, resilience education "builds individual and community capacities to flourish in times of tremendous transition" (Throop, 2017, p. 247). In this study, outcomes of personal competency and hope arising from community-based, sustainability learning may indicate movement toward resilience. As disturbances and changes within a system occur, individuals

able to employ components of personal competency such as self-efficacy and seek a way forward through hope may be more likely to recover and adapt.

Educational Implications

As a pedagogical model for ESD, the results of this study have implications for educational practitioners. Primarily, it begs consideration of community-based pedagogy to facilitate learner success in ESD programs which hope to motivate social change. It also underscores the importance of experiential and place-based learning communities in achieving sustainability learning outcomes. Hope as a component of ESD is discussed, and specific program recommendations for improving anticipatory competency are made.

The theory presented in this study demonstrates how community pedagogy helps to establish and reinforce sustainability competencies. This model shares characteristics with several sustainability education approaches identified in the literature. The Burns model of Sustainability Pedagogy (Burns, 2009) involves multidisciplinary and co-created content situated within a context that is place-based and experiential, woven together with a transformative ecological course design. These strategies were not explicitly tied to ESD learning outcomes, but a later study conducted by Burns (2016) demonstrated that learning outcomes in a sustainability leadership course were positively impacted by place-based and experiential learning strategies. Commonalities are also seen in a sustainability energy research program at the University of Memphis, in which learning communities were integral in the development of diverse perspectives, and "field trips and seminars focused on exploring sustainability were identified as key influences in developing multifaceted and more complex conceptions of sustainability"

(Griswold, 2017, p. 286). This provides further support for the implementation of community-based pedagogical strategies for ESD.

Among the primary objectives of ESD is to develop in students the abilities to adapt to a rapidly changing world and become agents of social change (Barth et al. 2007; Savage et al. 2015; Wiek et al. 2011). The results of this study indicate SOC as an integral component of learning for sustainability in order to facilitate social change, expanding upon recent scholarship regarding pro-environmental social change. Many efforts to motivate social change assume that providing more information will result in positive change (see: Ranney & Clark, 2016; Lorenzoni, Nicholson-Cole, & Whitmarsh, 2007). Problems with this approach have been identified (Corner et al. 2015), and recent research points to community-based approaches which recognize the role social ties play in increasing learning for sustainability (Bolden et al., 2018; Smith & Stevenson, 2017) and promoting pro-environmental social change (Videras et al., 2012). This study also suggests there may be a link between SOC and personal competence in facilitating movement towards sustainability; this echoes Skarin et al.'s (2019) study in which social support and self-efficacy were linked to behavior change in the context of reduced car use in favor of public transportation (Skarin et al., 2019).

In addition to personal competency, this study revealed an emergent theme of hope arising from the SOC within the specific context of sustainability learning. As discussed previously, hope may be an essential component in preparing students for large-scale socio-environmental transitions requiring social and individual resilience. Several studies highlight the importance of fostering hope in sustainability education programs (Macharis & Kerret, 2018; Stevenson & Peterson, 2016) and in promoting pro-environmental behaviors (Ojala, 2012). Caution must be taken, however, to refrain from instigating naive optimism, lacking in

understanding of consequences and ability to recover from disturbance. Pihkala (2017) explains, "The prevailing attitude in EE writing is right in emphasizing positive matters and empowerment, but the relation between hope and optimism must be carefully thought about and a certain sense of tragedy must be included" (p. 109). Accordingly, Ojala (2012) found that hope based on denial had a negative influence on pro-environmental behavior, while hope based on worry, or *constructive hope*, had a positive behavioral influence.

Lastly, while personal competency was expressed significantly by participants, demonstration of anticipatory competency was under-represented in the data. This could be due to several factors. First, this could be a result of qualitative error due to ill-chosen wording and lack of exploratory follow-up in the interview questions concerning anticipatory thinking. Rather than asking participants to provide a descriptive visual of their *ideal, sustainable* future, more pertinent data may have been generated by a question concerning their views on the course of our future, or by following responses with an open question such as, *How would this sustainable future be made possible?* Results could also indicate a lack of teaching strategies which cultivate anticipatory thinking. In a study of a sustainability course designed specifically for the development of anticipatory competence in college students, Gardiner and Rieckmann (2015) found that backcasting was found to be the most impactful methodology for anticipatory thinking. This involves the development of desirable future scenarios at some identified point in the future, from which students work backwards along the timeline to identify how this might be achieved and what obstacles and risks may be encountered. It is of interest to note that Gardiner and Rieckmann (2015) included hope as an indicator of anticipatory competence, while Wiek et al. (2011) do not include hope among the major competency concepts. If hope had been

considered in this manner during data analysis, the results of this study regarding futures thinking may have been altered.

Limitations and Suggestions for Future Research

The research presented here is limited in a number of ways. The scope of the study is limited by its timeframe, as I could only interview graduates of the program spanning a one-year period. A longitudinal study is recommended to determine if the SC is reaching its goal of preparing students to as sustainability change agents. This study might assess professional placement and re-evaluate learning outcomes through follow-up interviews with participants to investigate the long-term sustainability of the ESD learning outcomes. Are graduates still applying what they learned in the SC? Have they sparked change in others?

In critical review of the data collection methods used, I acknowledge the potential for key-informant bias highlighted by Maxwell (2013). While he asserts that subsequent systematic sampling can be used to further test and validate the data gleaned from exceptional cases, this study did not generate such samples.

There were also limitations to data collection concerning the successes and failures of specific learning experiences within the program. As students in the SC typically spread the seventeen hours of required coursework over two or more years of their undergraduate career, many of the participants in this study had completed the majority of their certificate classes one or more years prior to the interview. Specific course assignments and teaching strategies were often difficult for them to recall; therefore, any course details that participants were able to summon stood out as immediately significant. Evaluation of data collected through the students'

publicly available sustainability portfolios could provide additional insight on impactful learning experiences as well as outcomes.

These outcomes could also be analyzed quantitatively, allowing for quick comparisons across participants and subsequent graduates. The codes generated and identified as indicators of key competencies in this study could be input into qualitative analysis software, and student portfolios could be analyzed to determine the relative demonstration of these outcomes determined by inclusion and frequency of coded concepts.

Further still, it would be of great interest to test what correlation exists between key competencies for sustainability and a student's level of hope. To test this, one could develop a study similar to Ojala's (2012) assessment of the relationship of hope to pro-environmental behaviors. The interaction of hope and key competencies for sustainability could be tested, advancing our understanding of the role hope may play in ESD programs.

Additional investigation of community-based pedagogical strategies should be undertaken, as well. Within the UGA Sustainability Certificate, SOC was strongly linked to the interdisciplinary sustainability seminar and the capstone project and course, but this may be achieved through different means in the contexts of other programs. SOC and its contributing factors should be analyzed and compared across various ESD programs to develop additional strategies and best practices for facilitating community-based learning for sustainability.

This prompts a remaining critical question: how large can a program grow before SOC is altered or even lost altogether? Within the fields of anthropology and sociology, the number of individuals within a given community directly influences interaction frequencies and emotional closeness (Roberts, Dunbar, Pollet, & Kuppens, 2009). Human communities are often found to be organized in cumulative layer sizes of 15, 50, 150, 500 and 1500 (Dunbar & Sosis, 2017).

According to Dunbar and Sosis (2017), “This fractal structure suggests that there might be natural fission points that result in organisations having distinct sizes, with these representing optimal values that maximise some quantity such as coherence, and hence stability through time” (p. 106). If SOC is a critical component for the attainment of sustainability learning outcomes, and the number of participants within an ESD program impacts this SOC, this could have implications for program structure design and management.

Conclusion

The objective of this study was to explore and qualify the learning experience within the UGA Sustainability Certificate from the perspective of the student participant. The research questions guiding this work were concerned with understanding the meaningful outcomes of the program and identifying the mechanisms and processes through which this meaningful learning was perceived to have occurred. Using a constructivist grounded theory methodology, semi-structured interviews with recent program graduates were conducted and analyzed through an extensive series of coding stages. The result of this analysis is a community pedagogy for sustainability, which suggests that learning outcomes including key competencies for sustainability, personal competency, and hope are reinforced through the sense of community co-constructed among program staff, faculty, students, and involved community members.

This work has implications for the field of ESD and the growing field of education for resilience. A program built upon a character of inclusivity, diversity, and local action provided the foundation for inspiring confident, forward movement and radiating continued social and environmental change through continued interpersonal engagement. The qualities and outcomes which resonated most strongly with the students were the intangible connections – the feelings of

shared purpose, shared values, and sense of place, found through interactions and transformative engagement with a diverse community of interdisciplinary actors. As Smith and Stevenson (2017) eloquently explain:

> …it is easy to get caught up in content and assessment and to a lesser extent instructional methods. These are all significant, but institutional culture may be far more pivotal. The challenge is that dealing with cultural issues is so dependent on the dispositions and gifts of the people found in specific schools. This is a challenge, however, that will be the case in any community, as well. At issue is our perspective about human beings, institutional change, and where we place our attention… The most important resources in any community are the talents and life-enhancing passions that their members possess.

It is the work of educational facilitators then to identify, bring together, and celebrate those hoping to overcome our great societal challenges, and to explore the emergent properties which arise from these learning communities. Community pedagogy for sustainability offers a road map for initiating emergence, but the system's ability to power and sustain itself over time will require dedicated and adaptable individuals.

Final Thoughts

It could be argued that Wiek et al.'s (2011) key competency framework provides the intellectual response necessary to approach sustainability grand challenges. Key competencies prepare students to enter into the workforce with the skills, abilities, and knowledge necessary to become agents of social change. However, this framework does not speak to the emotional barriers which often halt progress, depress motivation, and stifle inspiration. Community pedagogy for sustainability (and resilience) may fill in the emotional gaps of the key competency framework with the additions of personal competency and hope through the co-construction of SOC. These additional outcomes may help educators prepare to lead toward resilience, instilling

the ability to bounce back from disturbance and to carry on in the face of the inevitable and great losses our world will endure.

> But it is not enough to weep for our lost landscapes; we have to put our hands in the earth to make ourselves whole again. Even a wounded world is feeding us. Even a wounded world holds us, giving us moments of wonder and joy. I choose joy over despair. Not because I have my head buried in the sand, but because joy is what the earth gives me daily and I must return the gift. (Kimmerer, 2013, p. 327)

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Appendix A. Participant Recruitment Emails

Sustainability Certificate Graduate Evaluation Interview Recruitment Materials

Email 1: Initial Recruitment

Hello [name],

I hope your summer is going well! As you know, I am currently working on my master's thesis, for which I am conducting research on the impact of the UGA Sustainability Certificate. Student voice is of upmost importance to the program, and I would greatly appreciate your time and input.

My study examines the impact of the sustainability certificate program on undergraduate students. I am emailing to ask if you would be willing to participate in an interview regarding your experience in the UGA program. The interview will take approximately 45-60 minutes of your time. Participation is completely voluntary, and your responses will remain anonymous (except to me).

I am hoping to begin interviews next week (June 18th). If you are interested, please respond to this email to schedule an interview time, date, and format (in-person or phone-call) in accordance with your schedule and location. If you have any questions, please do not hesitate to contact me.

Many thanks,

Melissa Ray
MS Candidate & Graduate Assistant for the Sustainability Certificate
Warnell School of Forestry and Natural Resources
University of Georgia
Athens, GA 30602
Tel: 423.605.6347

Email 2: Follow-up Recruitment

Hello [name],

Last week, I sent an email offering the opportunity to share details regarding your experience and learning in the UGA Sustainability Certificate.

This information will help improve certificate programming and increase our understanding of sustainability education within the greater scientific community. Even better, your input will help guide the paths and experiences of future students who share your commitment to sustainability.

If you are interested in participating, please respond to this email to schedule an interview time, date, and format that best fits with your schedule and location. If you have any questions, please do not hesitate to contact me. If you would like to opt out of future emails, please respond "opt out" to be removed from the mailing list.

Many thanks.

Melissa Ray
MS Candidate & Graduate Assistant for the Sustainability Certificate
Warnell School of Forestry and Natural Resources
University of Georgia
Athens, GA 30602
Tel: 423.605.6347

Appendix B. Interview Protocol

Sustainability Certificate Graduate Evaluation Interview Protocol

The researcher will begin the session by sharing the following:

1. Statement that the interview is part of a research project
2. Explanation of the purpose of the research
3. Expected duration of the interview
4. Description of procedures
5. Description of risks/discomforts
6. Description of benefits
7. Confidentiality
8. Who to contact with questions regarding the research (the researcher) and their rights as a participant (IRB)
9. The voluntary nature of participation in the study

I: Personal story

1. To get warmed-up, we'll just start with some basic questions about you – your story. If you don't mind, tell me a little bit about yourself:
    a. Where are you from?
    b. What are some of your interests and hobbies?
    c. What is your current position or role?

2. What led you to pursue the Sustainability Certificate during your time at UGA?

II: Exploring Outcomes of the UGA Sustainability Certificate

Now I'd like to ask you some questions about your experience in the Sustainability Certificate program.

3. Let's start broad; overall, what do you think you gained from the program?
    a. Most significant learning
    b. Biggest take-aways

4. How might what you learned in the Certificate carry into or be valuable in your professional/academic career, if at all?

5. How might what you learned in the Certificate carry into or be valuable in your personal/everyday life, if at all?

6. Is there anything that you wish you had gained from the certificate program that you did not?
    a. If it were up to you to run the program, how might you promote that?

7. Capstone project experience

8. Mentor experience

9. A friend has come to you expressing interest in the Certificate, and wanting your opinion and advice. How would you describe the program to them?

10. Could you articulate what an ideal sustainable society would look like?

III: Key Competencies

Within the goals and objectives listed for the Certificate program, there are several key outcomes that we hope our students will leave with to help them in their future careers and personal lives. I'm going to ask you now about some of these objectives. This part may feel a little more structured – a bit like filling out a verbal questionnaire. Again, I want to stress that there are absolutely no right or wrong answers. If what I mention doesn't sound like anything you gained or experienced through the program, please let me know so that we know where we need to step up our game. If you agree with the statement, I may ask you to provide an example of a specific instance that stands out to you.

Do you feel like the program helped you to…
Statements read out of order below.

11. Systems Thinking
    a. better understand and analyze problems from multiple perspectives or disciplines?
    b. connect local actions to global consequences and vice versa?

12. Strategic Thinking
    a. put ideas into action?
    b. anticipate and adapt to uncertainty and challenges when moving forward with a project or action?

13. Normative
    a. evaluate a system for its degree of sustainability or un-sustainability?
    b. understand your own strengths and weaknesses as a sustainability leader?

14. Interpersonal
    a. work with/seek input from people from all different backgrounds or disciplines?
    b. inspire & motivate positive change in others?

15. Anticipatory
    a. anticipate possible future consequences of decisions and actions?
    b. understand the future as open and something that can be shaped with our help?

IV: Barriers to and factors for success in learning within the program

We've talked about the outcomes of the certificate, now I'd like to ask for your insight on some specific aspects of the program itself.

16. Let's think about all the different aspects of the certificate program as ingredients for your success, learning, and growth. (e.g. classes/class assignments, people – faculty/students/speakers, events, program structure, projects, experiences) What would you say were the most important ingredients in your "recipe for success" in the program?

17. Were there any classes within the program that you would identify as being particularly valuable?
    a. What set those classes apart?

18. What were some of the least effective or valuable classes or academic experiences in your certificate process?

19. Any class activities/projects that are particularly memorable because you <u>loved</u> them? Because you <u>hated</u> them?

20. Thinking back on the classes you took for the certificate and thinking specifically about the style of instruction or types of work/assignments you did in those – were there any noticeable differences in the classes you took for the Certificate and your other classes while at UGA?

21. Could you talk a bit about the Certificate community (body of students, faculty, staff) and your experience as a part of it?

V: Closing

22. What gives you hope?

23. Is there anything else you'd like to share?

If phone interview: I will be sending a brief demographic questionnaire. Again, all of the responses are optional, so if there is anything you wish not to answer, please feel free to abstain. The document will ask you for a preferred pseudonym which I will use to mask your responses. If you have no preference, I can assign the pseudonym for you.

Thank you!

Appendix C. Informed Consent Form | In-person Interview

University of Georgia
Informed Consent Form
Sustainability Certificate Impact

Researcher's Statement
I am asking you to take part in a research study. Before you decide to participate in this study, it is important that you understand why the research is being done and what it will involve. This form is designed to give you the information about the study so you can decide whether to be in the study or not. Please take the time to read the following information carefully. Please ask the researcher if there is anything that is not clear or if you need more information. When all your questions have been answered, you can decide if you want to be in the study or not. This process is called "informed consent." A copy of this form will be given to you.

Principal Investigator: Dr. Kyle Woosnam
Warnell – Natural Resources Recreation and Tourism
kmw@uga.edu

Primary Contact: Melissa Ray
Warnell – Natural Resources Recreation and Tourism
423.605.6347 | m.ray@uga.edu

Purpose of the Study
The purpose of this work is to examine the impact of non-major sustainability education programs on students in higher education. We hope to increase our understanding of the outcomes associated with such programming and to evaluate the strengths and weaknesses of teaching and learning methods for sustainability from the student perspective. Based on your completion of the UGA Sustainability Certificate program in [term, year], you were included in the pool of eligible participants and selected at random.

Study Procedures
If you agree to participate, you will be asked to respond to open-ended questions centered around your experience in the UGA Sustainability Certificate. The expected duration of the interview is 45-60 minutes. I want this interview to be as conversational as possible, so I may ask follow-up questions prompted by your responses.

I want to emphasize that there are absolutely no right or wrong answers, nor undesirable outcomes. The interview is being conducted in order to better understand the strengths and weaknesses of the sustainability certificate program with the ultimate goal of improving student learning and experience.

Risks and discomforts
We do not anticipate any risks from participating in this research.

Benefits
This information you provide will help improve certificate programming and increase our understanding of sustainability education within the greater scientific community. Even better, your input will help guide the paths and experiences of future students who share your commitment to sustainability.

Audio Recording
An audio recording device will be used in order to support a conversational interview setting and facilitate in-depth data analysis. Recordings will be destroyed after 4 years.

Privacy/Confidentiality
Data will be audio recorded on the researcher's personal phone and then downloaded and stored on the researcher's personal computer and external hard drive, accessible only to the researcher. The results of the research study may be published, but your name or any identifying information will not be used. The published results will be presented in summary form only.

Researchers will not release identifiable results of the study to anyone other than individuals working on the project without your written consent unless required by law. The project's research records may be reviewed by departments at the University of Georgia responsible for regulatory and research oversight.

Taking part is voluntary
Your involvement in the study is voluntary, and you may choose not to participate or to stop at any time without penalty or loss of benefits to which you are otherwise entitled. If you decide to withdraw from the study, the information that can be identified as yours will be kept as part of the study and may continue to be analyzed, unless you make a written request to remove, return, or destroy the information.

If you have questions
The main researcher conducting this study is Melissa Ray, a graduate student at the University of Georgia. Please ask any questions you have now. If you have questions later, you may contact the researcher at m.ray@uga.edu or at 423.605.6347. If you have any questions or concerns regarding your rights as a research participant in this study, you may contact the Institutional Review Board (IRB) Chairperson at 706.542.3199 or irb@uga.edu.

Research Subject's Consent to Participate in Research:
To voluntarily agree to take part in this study, you must sign on the line below. Your signature below indicates that you have read or had read to you this entire consent form, and have had all of your questions answered.

_____	_____	_____
Name of Researcher	Signature	Date
_____	_____	_____
Name of Participant	Signature	Date

Please sign both copies, keep one and return one to the researcher.

Appendix D. Informed Consent | Phone Interview

Phase 1: Phone Interview Consent Eligibility Script

Study Title: Assessing the impact of non-major sustainability education programs
Principal Investigator: Kyle Woosnam
Interviewer/Point of Contact: Melissa Ray

Hi [name]! Thank you for agreeing to speak with me today. As you may know, I am conducting research as a part of my master's thesis. The purpose of this work is to examine the impact that non-major sustainability education programs have on students in higher education.

I am asking for your participation in a phone/video interview as part of this research study. The interview will take approximately 45-60 minutes of your time, and your participation is totally voluntary. You can decline to participate or choose to end the interview at any time without penalty. If you agree to participate, you retain the right to respond only to questions of your choosing.

There are no foreseeable risks involved in participation, and all information that I receive from you, including your name and any other information that can possibly identify you, will remain strictly confidential and will be accessible solely to the researcher (me).

I want to emphasize that there are absolutely no right or wrong answers, or undesirable outcomes. The interview is being conducted in order to better understand the strengths and weaknesses of the sustainability certificate program with the ultimate goal of improving student learning and experience. The questions will center around your experience in the UGA Sustainability Certificate. I will start with some basic questions about yourself then about your experience, the activities and projects in which you participated, and your opinions on what might be improved. The interview is meant to be semi-structured and conversational, so I may ask follow-up questions prompted by your responses.

Do I have permission to ask you these questions?
[ ] No: *Thank you very much for you time.*
[ ] Yes: *Thank you.*

Do I have your permission to record our phone call?

[ ] No: *Thank you very much for you time.*
[ ] Yes: *Thank you.*

Great! Do you have any questions for me before we begin?
If you have questions regarding the study, you can contact me at m.ray@uga.edu or 423.605.6347 any time or my Faculty Advisor, Dr. Kyle Woosnam at kmw@uga.edu. If you have questions about your rights as a study participant, you can contact the UGA Human Subjects Office at irb@uga.edu or 706.542.3199.

Appendix E. Demographic Questionnaire

This survey will be provided to each participant following the interview and returned via email or face-to-face.

Sustainability Certificate Impact
Demographic Questionnaire

Please take the opportunity to complete the participant demographic questionnaire for this study. All responses are optional, though you will be assigned a pseudonym if you choose not to select one. Thank you!

Personal Background

1. Please select a pseudonym:

2. What is your place of birth?

3. In what year were you born?

4. Where is your current place of residence?

5. Please describe your parents' or guardians' highest educational level and profession:

Mother or other guardian	**Father or other guardian**
Profession:	Profession:
(select one)	*(select one)*
No diploma	No diploma
High school diploma/GED	High school diploma/GED
Some college	Some college
Associates' Degree	Associates' Degree
Bachelors Degree	Bachelors Degree
Graduate Degree	Graduate Degree
I don't know	I don't know

Education

8. What type of high school did you attend? (*select one*)

Public
Private

9. Undergraduate Institution Graduation Year:

10. Undergraduate Major:

11. Undergraduate Certificates:

12. Year you joined the Sustainability Certificate:

Additional Information (optional)

12. Extra-curricular clubs, organizations, etc:

13. Political alignment, if any:

14. Religious affiliation, if any:

15. With what gender do you identify:

Appendix F. UGA Sustainability Certificate Undergraduate Course List

Table A.1: UGA Sustainability Certificate undergraduate course list by program requirement. Courses denoted by an asterisk are cross-listed for graduate credit. Courses in bold are provided and lead exclusively by staff of the Sustainability Certificate program. Service-learning (S), honors (H), online learning (E), and writing-intensive (W) courses are designated by the appropriate suffix following the course number.

Requirement	Course Number	Course Title	Department
Anchor	FANR 1500	Fundamentals of Sustainable Development	Forestry and Natural Resources
	FANR 4020*	Sustainable Development	Forestry and Natural Resources
	FANR/ANTH/ECOL/ GEOG/INTL 4271*	Field Studies in Natural Resources	Forestry and Natural Resources/Anthropology/Ecology/Geography/International Studies
	LAND 2310	Introduction to Sustainability	Landscape Architecture
Seminar	**FCID 4200***	**Sustainability Seminar**	**Franklin College Interdisciplinary**
Ecological	ANTH 1102	Historical Ecology	Anthropology
	BIOL/FANR 3460H	Natural History of the South Pacific	Biology/Forestry and Natural Resourcces
	CRSS/FANR 3060	Soils and Hydrology	Crop and Soil Science/Forestry and Natural Resources
	ECOL 1000	Ecological Basis of Environmental Issues	Ecology
	ECOL 3530	Conservation Biology	Ecology
	ECOL 3770S	Urban Ecology	Ecology
	ECOL/FANR 4220*	Foundations of Restoration Ecology	Ecology/Forestry and Natural Resources
	EDES 4650*	City Planning	Environmental Design
	EHSC 3060	Introduction to Environmental Health Science	Environmental Health Science
	ENGR/LAND 4660*	Sustainable Building Design	Engineering/Landscape Architecture
	ENVE 2610	Introduction to Environmental Engineering and Sustainability	Environmental Engineering
	ENVE 4230*	Energy in Nature, Civilization, and Engineering	Environmental Engineering
	FANR 1100	Natural Resources Conservation	Forestry and Natural Resources
	FANR 4273*	Field Studies in Sustainable Development	Forestry and Natural Resources
	FANR/ANTH/ECOL/ GEOG/INTL 4271*	Field Studies in Natural Resources	Forestry and Natural Resources/Anthropology/Ecology/Geography/International Studies
	FANR/MARS 4272	Antarctica: The fragile continent	Forestry and Natural Resources/Marine Sciences
	GEOG 4020	Fluvial Geomorphology	Geography
	GEOG 4350	Remote Sensing of Environment	Geography
	GEOG 4460	Field Methods in Remote Sensing	Geography
	GEOG/ECOL/FANR	Natural History of Georgia	Geography/Ecology/Forestry and Natural Resources
	HORT 2000€	Horticulture Science Perspectives of Sustainable Planet Production	Horticulture

	HORT 3300E	Organic Gardening	Horticulture
	HORT 4030S*	Sustainable Community Food Production	Horticulture
	LAND 1500	Design and the Environment	Landscape Architecture
	LAND 4360	Applied Landscape Ecology	Landscape Architecture
	LAND 4730*	Issues and Practices in Sustainable Design	Landscape Architecture
Economic	AAEC 4720	Applied International Development Economics	Agriculture and Applied Economics
	AAEC 4730	The World Food Economy	Agriculture and Applied Economics
	CSCI 1210	Computer Modeling for Sustainability	Computer Science
	ECON 2100	Economics of Environmental Quality	Economics
	ECON 4150	Environmental Economics	Economics
	ENVE 4540	Economics of Energy and Sustainable Development	Environmental Engineering
	ENVM 4380	Environmental Management and Sustainable Business	Environmental Economics and Management
	ENVM 4650*	Environmental Economics	Environmental Economics and Management
	ENVM 4660	Environmental Valuation: Methods and Applications	Environmental Economics and Management
	ENVM 4800*	Water Resource Economics and Management	Environmental Economics and Management
	ENVM/AAEC 4150	Energy Economics	Environmental Economics and Management/Agriculture and Applied Economics
	FANR/ANTH/ECOL/ GEOG/INTL 4271*	Field Studies in Natural Resources	Forestry and Natural Resources/Anthropology/Ecology/Geography/International Studies
	INTB 5100	Special Topics in International Business: Compatative Analysis of International Environmental Law	International Business
	MIST 4550*	Energy Informatics	Management Information Systems
Social	AESC 2050	Effects of Global Agriculture on World Culture	Agricultural and Environmental Sciences
	ALDR 3820	Reflections on Fighting Hunger	Agricultural Leadership
	ALDR/AFST/LACS 4710*	International Agricultural Development	Agricultural Leadership/African Studies/Latin American and Caribbean Studies
	ANTH/ECOL/FANR/ SOCI	Natural Resource Governance	Anthropology/Ecology/Forestry and Natural Resources/Sociology
	ANTH 3200	How the World Works: The Anthropology of Consumption and Globalization	Anthropology
	ANTH 4070*	Cultural Ecology	Anthropology
	ANTH 4400*	Culture and Tourism in Bali	Anthropology
	ANTH/FANR/SOCI 4842	Institutional Dimensions of Sustainability	Anthropology/Forestry and Natural Resources/Sociology
	ANTH/GEOG 4275*	Conservation and Development in Costa Rica	Anthropology/Geography
	CRSS 4020S*	Social Sustainability in Agricultural and Food Systems	Crop and Soil Science
	ECHD 4015*	Environmental Psychology	Counseling and Human Development Services

	EETH/AESC 4190*	Agricultural Ethics	Environmental Ethics/Agricultural and Environmental Sciences
	ENVE 4530*	Energy and Environmental Policy Analysis	Environmental Engineering
	ENVM 4250*	Environmental and Public Health Law	Environmental Economics and Management
	ENVM 4930E*	Environmental Law and Governmenal Regulation	Environmental Economics and Management
	FANR/ANTH/ECOL/ GEOG/INTL 4271*	Field Studies in Natural Resources	Forestry and Natural Resources/Anthropology/Ecology/Geography/International Studies
	FANR/ECOL 4810*	Natural Resources Law	Forestry and Natural Resources/Ecology
	GEOG 1125	Resources, Society, and the Environment	Geography
	GEOG 2250H	Resources, Society, and the Environment (Honors)	Geography
	LAND 4095	Sustainability in Design	Landscape Architecture
	LAND 4440	Plant Communities of the Cherokee Landscape	Landscape Architecture
	NRRT 5900*	Ecotourism and Sustainable Development	Natural Resource Recreation and Tourism
	PHIL/EETH 4220*	Environmental Ethics	Philosophy/Environmental Ethics
	SOCI/ANTH 3400	Environmental Sociology	Sociology/Anthropology
	TXMI 4390	Studio VI: Advanced Residential Design Method	Textiles, Merchandising, and Interiors
	WMST 4170*	Environment, Gender, Race, and Class	Women's Studies
Capstone	AAEC/ENVM 4990	Special Topics in Agricultural and Applied Economics	Agricultural and Applied Economics/Environmental Economics and Management
	ARID 4650	Senior Exit in Interiors	Art Interior Design
	BIOL 4940	Internship in Biology	Biology
	CMLT 3990	Directed Study in Comparative Literature	Comparative Literature
	COMM 4910	Internship in Communication	Communication Studies
	DANC 4810	Applied Research	Dance
	DANC4900	Choreographic Project and Concert Production	Dance
	ECOL 4900	Environmental Practicum	Ecology
	ECOL 4940	Internship in Ecology	Ecology
	ENGL 4840	Internship in Literacy Media	English
	ENGL 4990H	Honors Thesis	English
	ENGR/PHYS 4921	Engineering Physics Design Project	Engineering/Physics
	ENGR 4920	Engineering Design Project	Engineering
	ENTR 5500	Entrepreneurship and New Venture Formation	Entrepreneurship
	ENTR 5520	Implementing New Venture Plans	Entrepreneurship
	FACS 3010	Directed Study in Family and Consumer Sciences	Family and Consumer Sciences
	FANR 4500	Senior Project in Forestry and Natural Resources Management	Forestry and Natural Resources
	FANR 4600	Senior Thesis in Forestry and Natural Resources	Forestry and Natural Resources

FCID 4500*	**Interdisciplinary Sustainability Capstone**	**Franklin College Interdisciplinary**
FILM 5700	Internship in Film/Media	Film
GEOG 3990	Internship in Geography	Georgraphy
HIST 4800	History Internship	History
HORT 3920	UGArden Internship	Horticulture
HORT 4125*	Organic Agricultural Systems	Horticulture
LAND 4900	Senior Project in Forestry and Natural Resources Management	Landscape Architecture
MATH 4950	Research in Mathematics	Mathematics
MUSI 4000	Directed Independent Study in Music	Music
PBIO 3900	Readings in Plant Biology	Plant Biology
PBIO 4940	Internship in Plant Biology	Plant Biology
PHIL 4950	Directed Readings in Philosophy	Philosophy
PSYC 4850	Directed Readings in Physchology	Psychology
RELI/NAMS 4710	Directed Reading and Study in Native American Studies	Religion/Native American Studies
RELI 4800	Reading and Research in Religion	Religion
SOCI 4950	Internship Experience	Sociology
SOWK 5850	BSW Senior Capstone Experience I	Social Work
SOWK 5851	BSW Senior Capstone Experience II	Social Work
STAT 4950	Undergraduate Directed Study in Statistics	Statistics
STAT 5010	Statistical Capstone Course I	Statistics
STAT 5010W	Statistical Capstone Course I (Writing)	Statistics
STAT 5700	Internship in Statistics	Statistics
THEA 5700	Internship in Theatre/Film/Animation	Theatre

Appendix G. Sustainability Certificate Analytic-Holistic Portfolio Rubric

Date:
Student:
Reviewer:

Criteria	Emerging (1)	(2) Developing (3)	Accomplished (4)	Points
Positionality	The portfolio demonstrates an initial awareness of the author's sustainability learning and the three spheres of sustainability. One or more spheres may be weighted more heavily than others. The portfolio reflects on previous learning.	Demonstrates an initial awareness of the author's sustainability learning and the three spheres of sustainability, though the balance and connections between the three may remain unclear. Reflects on previous learning with a growing awareness of future engagement with sustainability.	Demonstrates an in-depth awareness of the author's sustainability learning and understanding of the balance and interconnectedness among the three spheres of sustainability. Reflects on previous learning and shows continuing integration of that learning with an eye toward future engagement.	
Context	No obvious theme or central goal is present among the included elements.	A theme or central goal is indicated, but not consistent throughout all elements of the portfolio.	Demonstrates meta-cognition that provides context across the portfolio and within individual elements. All elements consistently show evidence of a coherent goal/purpose.	
Content	Elements of the portfolio as required by the student handbook are incomplete or missing.	All required elements of the portfolio as required by the student handbook are present, though may not be complete. Further development and revision could enhance the final product.	All required elements of the portfolio are present and complete, demonstrating careful development and revision. Clear and specific, the portfolio avoids vagueness and generalizations within and across elements	
Design	The portfolio adheres to the template provided.	The portfolio displays author's choices concerning selected elements and the overall architecture of the portfolio (photos, documentation of capstone process, etc.). Demonstrates preparation for presentation to the professional community (e.g. graduate schools, potential employers, etc.) but may include some spelling/grammatical errors.	Displays author's choices concerning selected elements and the overall architecture of the portfolio (photos, documentation of capstone process, etc.). Demonstrates exceptional preparation for presentation to the professional community (e.g. graduate schools, potential employers, etc.) and is free of spelling/grammatical errors.	
			Total	

Appendix H. Theoretical Coding Framework

Table A.2: Coding framework and related theory components. **Bold** codes indicate overlap with another category. *Italicized* codes indicate competency outcomes.

CATEGORY TYPE	CATEGORY LABEL	FOCUSED CODE/THEME
Mechanisms		
	Inclusivity & Sense of belonging	
		Feeling important/valued (Influence)
		Feeling welcomed by director/in class
		Feeling supported by mentor(s)/staff
		Feeling supported/encourage by peers
		Feeling inspired by peers
		Feeling part of a community
		Sharing values
		Sharing behaviors
		Previously feeling like an outsider
		Developing sense of place
		Personal competency
		Interpersonal competency
	Interdisciplinary Engagement	
		Exposure to diverse perspectives
		Exposure to diverse behaviors
		Looking through multiple lenses (Empathy, values)
		Feeling compassion
		Broadening perspective of sustainability (TBL)
		Redefining sustainability
		Relating any topic to sustainability
		Stepping outside of comfort zone
		Forming diverse support networks
		Sharing purpose
		Sharing values
		Interpersonal competency
		Normative competency
		Systems thinking competency
		Strategic thinking competency
	Experiential, place-based learning	
		Seeing local examples of sustainability in action
		Applying sustainability concepts locally/in capstone
		Engaging in dialogue

		More than "just lecture/PowerPoint" **Developing sense of place** **Sharing purpose** Campus as a Living Lab (Watershed UGA, Seminar Design Sprint) *Strategic thinking* *Systems thinking* *Normative competency* *Interpersonal competency* *Personal competency*
Outcomes **(and inputs)**		
	Interpersonal competency	
		Motivating/inspiring others Engaging with divergent perspectives Sharing sustainability concepts and behaviors with friends/family Empathy Recognition of role within a team (strengths, weaknesses)
	Systems thinking competency	
		Broadening perspective of sustainability Seeing connections/interdependence between local and global (Scale) Seeing connections/interdependence between spheres (Domain)
	Normative competency	
		Fairness/Justice Responsibility Happiness Assessing level of sustainability Recognizing existence of multiple valuation systems Win-win
	Strategic thinking competency	
		Adapting/rerouting (Barriers) Intentionality Feasibility Intervention/transformation
	Anticipatory thinking competency	
		Generational equality

Personal competency	
	Connecting own actions to global consequences
	Self-awareness/reflexivity
	Self-efficacy/drive
	Self-acceptance/forgiveness
	Increasing self-confidence
Hope	
	Rerouting from despair
	Making a difference
	Exposure to community
	Feeling others' passion
	Local action/**Sense of place**
	Shared purpose
	Shared values
	Sense of growing support for sustainability