SUSTAINABILITY PERFORMANCE IN AMERICAN HIGHER EDUCATION: A MULTIPLE CASE STUDY OF FOUR EXEMPLARY INSTITUTIONS THAT PARTICIPATED IN THE SUSTAINABILITY TRACKING, ASSESSMENT & RATING SYSTEM

by

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This dissertation was prepared under the direction of the candidate's dissertation advisor, Dr. Deborah Floyd, and Dr. Patricia Maslin Ostrowski, Department of Educational Leadership, and has been approved by the members of his supervisory committee. It was submitted to the faculty of the College of Education and was accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy.

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ABSTRACT

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The purpose of this study was to describe the campus sustainability performance at four exemplary higher education institutions, i.e., Doctoral, Master's, Baccalaureate, and Associate's, as measured by the Sustainability Tracking, Assessment & Rating System (STARS). The case-by-case analysis and the cross-case analysis demonstrated the similarities and differences that emerged across the four cases in the area of the institutional dynamics, sustainability performance, the journey of campus sustainability, and challenges, as well as drivers. In addition, the research aims to provide some implication to other institutions that intend to advance sustainability on their campuses.

A multi-site case study was used to investigate the sustainability performance of four exemplary institutions that participated in the STARS program. Two forms of data collection techniques used for this research study were document analysis and in-depth interviews. Nurturing the student, serving the community, taking social responsibility,

and making changes was the internal motivations which drove the four institutions to what they have achieved today. They shared the same purpose of helping students become more aware and informed on how they could apply sustainability into their work, business, and many other places to make the change.

There were four guiding questions for the research. 1) The first research question asked: What are the demographic characteristics of four select higher education institutions that have earned recognition in the STARS program? This question was answered by theme 1: Financial sustainability is the foundation. 2) The second research question asked: What is the status of campus sustainability at these four institutions as measured by STARS in the areas of academia, engagement, operations, planning & administration, and innovation? This question was answered by theme 2: Improvement and achievement coexist. 3) The third research question asked: What is the journey of becoming an institution that earns recognition in the STARS program (academia, engagement, operations, planning & administration, and innovation)? This question was answered by theme 3: Collaboration from all levels is the key. 4) The fourth question was: What are the drivers and challenges that the selected four institutions experienced from a leadership perspective? This question was answered theme 4: Social responsibility motivates institutions to overcome challenge.

DEDICATION

To my husband, Zan, who had not only given me the courage to return to the United States to continue my studies, but also stood by my side through various hardships. To my child, Oliver, who has taught me how to be both a mother and better person overall. To my parents and parents-in-law, who continue to respect my own choices while simultaneously helping me with anything I may ask of them. To my brother, who helps take care of my parents when I am not around, leaving me no concerns pertaining to their health and wellbeing.

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CHAPTER I. INTRODUCTION

Sustainability has become a substantial academic field within the boundaries of traditional disciplines and a field in itself (Larkins, Wright, & Dann, 2018). McNamara (2010) articulated that the charge of cultivating the next generation on sustainability and guiding them how to implement it into quotidian affairs is a milestone. The amalgam of efficacious sustainable application is an indication of practical modifications emerging across academic facilities (Avissar, Alkaher, & Gan, 2018). Financial support is the foundation for schools to take the initiative and implement sustainable actions on campus, especially in the face of obstacles such as budget cuts and rising energy costs (Fonseca, Moura, Jorge, & Almeida, 2018). Despite the difficulties, higher education institutions have made a difference in the journey of sustainability and will be the focus of this proposed study.

"From the1990s onwards, the Declarations on Sustainability at the collegiate level initiated the advocacy of sustainability on campuses" (Albareda-Tiana, S., Vidal-Raméntol, S., Fernández-Morilla, M., 2018, p. 474). After diligent collaboration, the American College & University Presidents' Climate Commitment (ACUPCC) composed 12 original Signatories in 2006 (Second Nature, n.d.) Furthermore, instituted in 2005, the Association for the Advancement of Sustainability in Higher Education (AASHE) became a principal organization towards the cause of sustainability. AASHE houses more than "900 members across 48 U.S. states, 1 U.S. Territory, 9 Canadian provinces and 20 countries" (AASHE, n.d.-a). The Sustainability Tracking, Assessment & Rating System

(STARS) is “a transparent, self-reporting framework for higher education institutions to measure their sustainability performance host by AASHE” (STARS, n.d.-a, para. 1). Over the past few years, the number of participants in the STARS program has grown rapidly around the world. According to Hill and Wang (2018), these efforts burgeoned multifariously to implement the foundations of sustainability within an array of academic disciplines.

The STARS program consists of credits across the sustainability of higher education, including “performance indicators and standards organized into five categories: academia, engagement, operations, planning & administration, and innovation” (STARS, n.d.-b). The platform aims to provide a tool for universities and colleges to communicate and support sustainability on campus. Hill and Wang (2018) pointed out that higher education, particularly public higher education is essential to aid local communities through the transitional periods and therefore create more favorable outcomes for the future of the world. The current issue is to explore the efforts and challenges of higher education institutions in implementing sustainability on campus.

The proposed case study provided an in-depth understanding of the drivers and challenges that higher education institutions encountered while implementing sustainability on campus at four selected institutions that participated in the STARS program. The researcher gained insight from different types of higher education institutions: Doctoral, Master’s, Baccalaureate, and Associate’s.

Statement of the Problem

During the first month of 2013, the National Council for Science and the Environment disclosed Recommendations for Education for a Sustainable and Secure Future. This official document was composed to structure the approaching United Nations Decade of Education for Sustainable Development (2005-2015) (McNamara, 2010). Since the occurrence of such events, what actions have academic institutions forgone to meet and/or surpass the recommendations (McNamara, 2010)?

Several organizations that support higher education sustainability effort (the American College & University Presidents' Climate Commitment, the Sustainable Endowments Institute, and the Green Report Card) have become less active or have been suspended. The Association for the Advancement of Sustainability in Higher Education (AASHE), however, remains a robust organization that comprises of over 900 members around the world.

Even with the support of AASHE, it is difficult for institutions to initiate the sustainability program. Struggling with financial budgets and other challenges, higher educational institutions are searching for resources to support the initiative. The need to better understand how higher education institutions contribute to society in the field of sustainability is urgent. Thus, this research concentrated on the top-performing institutions on how they overcome the various aspects of problems to succeed. Lessons will be learned, and it is likely that more institutions will make progress.

Purpose Statement

This multiple-site case study described the campus sustainability performance at four exemplary higher education institutions: i.e., Doctoral, Master's, Baccalaureate, and

Associate's institutions, as measured by the Sustainability Tracking, Assessment & Rating System (STARS) and to understand the drivers and challenges from the perspective of university leaders.

Research Questions

The research questions guiding this study include:

1. What are the demographic characteristics of four select higher education institutions that have earned recognition in the STARS program?
2. What is the status of campus sustainability at these four institutions as measured by STARS in the areas of academia, engagement, operations, planning & administration, and innovation?
3. What is the journey of becoming an institution that earns recognition in the STARS program (academia, engagement, operations, planning & administration, and innovation)?
4. What are the drivers and challenges that the selected four institutions experienced from a leadership perspective?

Significance of the Study

Casarejos, Frota and Gustavson (2017) indicated that globalization is a catalyst for change, as the conversation on sustainability has created an alternate perspective on the chief concerns in correspondence with proper utilization of resources and its impact on the world. Berchin, Grando, Marcon, Corseuil and Andrade Guerra (2017) agreed that knowledge is an essential product for which the cultivation of adeptness is matured in students. In this regard, Berchin et al. (2017) emphasized that encouraging

sustainability in academic settings brings forth concerns of sustainability issues to the minds of future generations, thus catapulting them into conducive and rightful actions.

This research aims to help higher education institutions better understand sustainability on campus and the dynamics underlying sustainable campus drivers and challenges across various types of institutions. However, assessments such as STARS program measure institutions' performance in a broad scope by self-reporting, which lack the in-depth analysis of cross-campus comparison. As Zhao and Zou (2018) articulated that the situation varies greatly from one institution to another, thus describing various types of institutions' sustainable efforts can fill in the gap to provide the practical inspiration to all institution types.

This research is significant for exploring campus sustainability from the perspective of institutions that participated in the STARS program up to the year 2018. It adds to the literature of sustainability on campus and the drivers and challenges across various types of institutions, providing the in-depth discussion of sustainability in higher education from the leadership perspective.

Conceptual Framework

A conceptual framework was used to guide the study design and analysis. Miles, Huberman, and Saldana (2013) explained that a conceptual framework clarifies the most pertinent aspects of the research target via graphics or narrative. The relevant aspects pertain to the associations between components, liable changes that may occur within the research, or form (as idea or theory) (Miles, Huberman, & Saldana, 2013).

Pragmatism. Creswell (2016) indicated that individuals hold a pragmatic framework of interpretation; therefore, the crux of the matter lies not on prerequisites, but instead the salient aspects envelope the conclusions which were made from the initial inquiry, the set of circumstances, and the overall results. This research addresses the real-world problem of environmental deterioration and searches for appropriate solutions that higher education can implement to change the urgent situation. As Miles et al. (2013) believed that "conceptual frameworks are simply the current version of the researcher's map of the territory being investigated" (p. 20), it serves as a structure to guide the research as seen below (Figure 1).

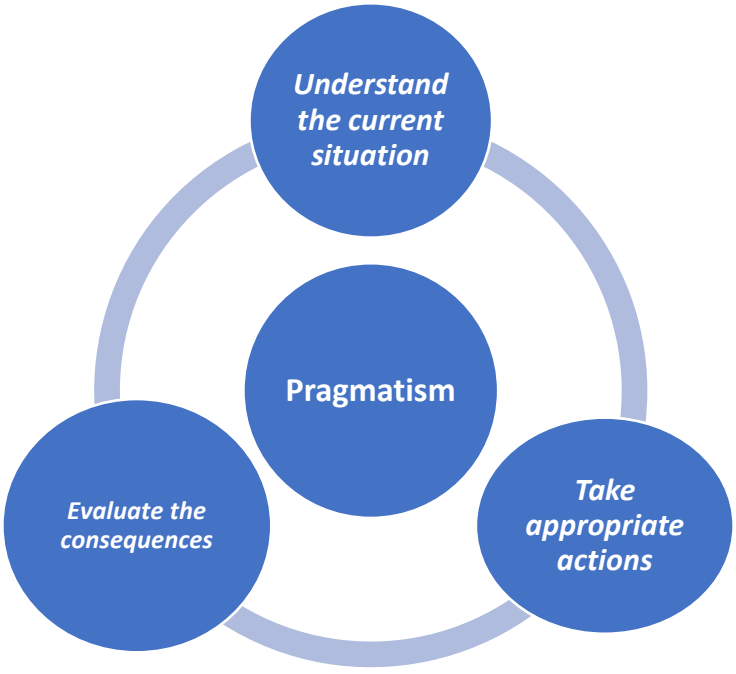

Figure 1. Conceptual framework.

Understand the current situation. Cortese (2003) articulated that the interplay found amongst communities and their affairs, accompanied by technological resources, economical advancements and governmental planning in order to safeguard the future of

the planet is an intricate and interrelated ordeal that society must confront. With the urgency of calling solutions to the environmental problem, McNamara (2010) pointed out academic institutions are consistently challenged to become the leadership prototype, thus advocating, educating, and engaging communities in sustainable practices. This research will describe the current sustainability performance of four higher education institutions.

Take appropriate actions. Weenen (2000) found that higher education institutions should assess their corporation and participation in sustainability practices by asking themselves a series of questions: "Why should we be involved? What could we do? How would it be organized?" (p. 29). This research aims to explore what actions have been taken in four select higher education institutions. Also, it aims to find out why these institutions take the initiative, the process, and what they have accomplished in doing so.

Evaluate the consequences. Despite challenges faced, many higher education institutions have made changes in the path of implementing sustainability on campus. It is essential for higher education institutions to learn from others' experiences (obstacles and success) to better achieve the goal.

The research explores the real-world sustainability issues higher education institutions are facing; appropriately, utilizing a technique which allows a perspective to accurately analyze both the trails faced and the positive results accomplished of university participants is ideal. The conceptual framework permits such measures. (Creswell, 2016).

Limitations

The first limitation is that the institutions of this study were limited to the institutions which participated in the STARS program. All the institutions have initiated a sustainability movement on their campus with various progress. This study applies the criteria for stratifying the number of candidates based on their scores within its institution type (Doctoral, Master's, Baccalaureate, Associate's).

A second limitation is that the STARS program is a self-reporting framework which allows the institutions to measure their overall sustainability performance according to indicators that the STARS provided. Diverse and substantial, it may intimidate some institutions from using the performance tool, as the framework is meticulous and time-consuming (Huber & Bassen, 2018). The third limitation is that the case study interview focused on exploring the commitment from the leadership position, so the students and faculties' views on campus sustainability is not explored. With the limitations stated above, this study is restricted to colleges and universities that have participated in the program who have already implemented some level of sustainability on campus.

Delimitations

This study was delimited to postsecondary education in the United States. The sample was delimited to the top four institutions in each institution type based on the scores they received from the STARS rating up to the year 2018.

The scope of this study on campus sustainability was delimited to the categories of the following: academics, engagement, operations, planning & administration, and

innovation. While other factors may impact the campus sustainability, within the scope of this study, only the five categories will be analyzed based on the STARS program.

Role of the Researcher

The researcher chooses this topic based on the interest in working in higher education with the concentration of environmental education/sustainability. The researcher had two years of experience working as a graduate assistant in the local environmental education center and earned a master's degree in environmental education. The center is the affiliation of a large research/doctoral public university.

The researcher is an active advocate for a more sustainable campus in her current institution. Even though the institution signed the American College & University Presidents' Climate Commitment (ACUPCC) ten years ago, the emphasis of campus sustainability can no longer be founded in the strategic plan in recent years. The institution has not participated in the STARS program up to date. The researcher wishes to explore the current sustainability performance of higher education institutions to encourage her own institution to be a member of the STARS program. Finding out the motivation and the leadership dynamic can help the researcher to provide a proposal to the administrators to participate in the STARS program. The researcher also desires to offer valuable tips to other institution facing the same situation.

With such a background, it may lead to a risk of researcher's bias in selecting and interpreting cases. The criteria for choosing the four institutions is purposely based on the actual scores of the institutions which participate in the STARS program rather than any

connection to the random research sampling. Member checking and data triangulation will also help to construct validity and maintain the quality of the research.

Definition of Terms

Terms used throughout the research are defined below:

Academia: In this research, Academia includes two subcategories, and each subcategory has several credit points: (a) Curriculum (academic courses, learning outcomes, undergraduate program, graduate program, immersive experience, sustainability literacy assessment, incentive for developing courses, and campus as a living laboratory) and (b) Research (research and scholarship, support for research, and open access to research) (The Association for the Advancement of Sustainability, 2017).

American College & University Presidents' Climate Commitment (ACUPCC): In late 2006, twelve visionary college and university presidents initiated the American College & University Presidents' Climate Commitment (ACUPCC). By September 15, 2007, 336 institutions had joined the initiative as charter signatories. By Earth Day 2008, the ACUPCC was a national initiative with signatories in all 50 states and the District of Columbia. In 2015, Second Nature rebranded and expanded the ACUPCC to form the Presidents' Climate Leadership Commitments (Second Nature, n.d., para. 2 -7).

Associate's Colleges: Institutions at which the highest-level degree awarded is an associate degree. The institutions are sorted into nine categories based on the intersection of two factors: disciplinary focus (transfer, career & technical or mixed) and dominant student type (traditional, nontraditional or mixed). This

excludes Special Focus Institutions and Tribal Colleges (The Carnegie Classification of Institutions of Higher Education, n.d.-a).

Association for the Advancement of Sustainability in Higher Education (AASHE): AASHE's roots go back to the Education for Sustainability Western Network (EFS West), which was established by Second Nature in 2001 with funding from the Compton Foundation. In 2004, EFS West held the first North American Conference on Sustainability in Higher Education in Portland, Oregon. The success of this conference and increasing demand for EFS West's resources led it to transition from a regional network to an independent higher education association serving all of North America, the Association for the Advancement of Sustainability in Higher Education. AASHE was officially launched in December 2005, serving as the first professional higher education association for the campus sustainability community in North America (AASHE, n.d.-b, para. 1-2).

Baccalaureate Colleges: This category includes institutions in which baccalaureate or higher degrees represent at least 50 percent of all degrees but where fewer than 50 master's degrees or 20 doctoral degrees were awarded during the update year. (Some institutions above the master's degree threshold are also included.) This excludes Special Focus Institutions and Tribal Colleges (The Carnegie Classification of Institutions of Higher Education, n.d.-b).

College Sustainability Report Card: It was the first comparative and independent evaluation of campus and endowment sustainability best practices at colleges and universities in the United States and Canada. The Report Card focused on policies and practices across nine categories: administration, climate change & energy,

food & recycling, green building, student involvement, transportation, endowment transparency, investment priorities, and shareholder engagement. The Report Card was designed to identify colleges and universities that were leading by example on sustainability with the aim of providing accessible information for students, professors, and staff to establish more effective sustainability policies (Sustainable Endowment Institute, n.d., para. 1).

Doctoral Universities: This category includes institutions that were awarded at least 20 research/scholarship doctoral degrees during the update year (this does not include professional practice doctoral-level degrees, such as the JD, MD, PharmD, DPT, etc.). This excludes Special Focus Institutions and Tribal Colleges (The Carnegie Classification of Institutions of Higher Education, n.d.-c).

Engagement: In this research, engagement includes two subcategories, and each subcategory has several credit points: (a) Campus engagement (student educators program, student orientation, student life, outreach materials and publications, outreach campaign, assessing sustainability culture, employee educators program, employee orientation, and staff professional development) and (b) Public engagement (community partnerships, inter-campus collaboration, continuing education, community service, participation in public policy, and trademark licensing) (AASHE, 2017).

Environmental Education: It is a process that helps individuals, communities, and organizations learn more about the environment, thus developing skills and a better understanding about how to address global challenges (North American Association for Environmental Education [NAAEE], 2017, para. 1).

Innovation: In this research, innovation includes two subcategories: (a) Exemplary practice and (b) Innovation (AASHE, 2017).

Master's Colleges and Universities: Generally, this category includes institutions that were awarded at least 50 master's degrees and fewer than 20 doctoral degrees during the update year (with occasional exceptions). This excludes Special Focus Institutions and Tribal Colleges (The Carnegie Classification of Institutions of Higher Education, n.d.-c).

Operation: In this research, operation includes nine subcategories, and each subcategory has several credit points: (a) Air and climate (greenhouse gas emissions, and outdoor air quality); (b) Buildings (building operations and maintenance); (c) Energy (building energy consumption); (d) Food and dining (food and beverage purchasing, and sustainable dining); (e) Grounds (landscape management, and biodiversity); (f) Purchasing (sustainable procurement, electronics purchasing, cleaning and janitorial purchasing, and office paper purchasing); (g) Transportation (campus fleet, student commute modal split, employee commute modal split, and support for sustainable transportation); (h) Waste (waste minimization and diversion, construction and demolition waste diversion, and hazardous waste management); (i) Water (water use, and rainwater management) (AASHE, 2017).

Planning & Administration: In this research, planning and administration include four subcategories, and each subcategory has several credit points: (a) Coordination and planning (sustainability coordination, sustainability planning, and participatory governance); (b) Diversity and affordability (diversity and equity

coordination, assessing diversity and equity, support for underrepresented groups, and affordability and access); (c) Investment and finance (committee on investor responsibility, sustainable investment, and investment disclosure); (d) Wellbeing and work (employee compensation, assessing employee satisfaction, wellness program, and workplace health and safety) (AASHE, 2017).

Pragmatism: This term refers to an individual holding an interpretive framework based on pragmatism focus on the outcomes of the research, actions, situations, and consequences of inquiry rather than antecedent conditions (as in post-positivism) (Creswell, 2016).

Sustainability Tracking, Assessment & Rating System (STARS): The Sustainability Tracking, Assessment & Rating System (STARS) is a transparent, self-reporting framework for colleges and universities to measure their sustainability performance. STARS is intended to engage and recognize the full spectrum of colleges and universities from community colleges to research universities and encompasses long-term sustainability goals for already high-achieving institutions as well as entry points of recognition for institutions that are taking first steps toward sustainability (STARS, 2019).

Sustainability: AASHE defines sustainability in an inclusive way, encompassing human and ecological health, social justice, secure livelihoods and a better world for all generations (STARS, 2018d).

CHAPTER II. LITERATURE REVIEW

The literature review is presented around five topics. The first part of the literature review provides an overview of the history of sustainability. Research on sustainable leaders will be addressed, as well. In this section, the concept and the definition of sustainability will be explored, along with the characteristics of sustainable leaders. The second part of the literature review will discuss the significance of the social impact of higher education. The role of higher education in enlightening students and the communities in the field of sustainability is addressed. The five factors that STARS use to rate universities will be defined and described.

The third part reviews the challenges that higher education has faced in implementing sustainable initiatives on campus. This section identifies the problems that higher education has encountered. The fourth section provides a review of sustainability achievements at universities and the use of campus sustainability assessment. The fifth and last part of the chapter reviews the performance of various universities. It reviews institutions that participate in the Sustainability Tracking, Assessment & Rating System (STARS) to measure their sustainability performance in academia, admission, engagement, operation, and innovation. Figure 2 illustrates a literature map of the relevant work addressing the five major topics that inform the dissertation.

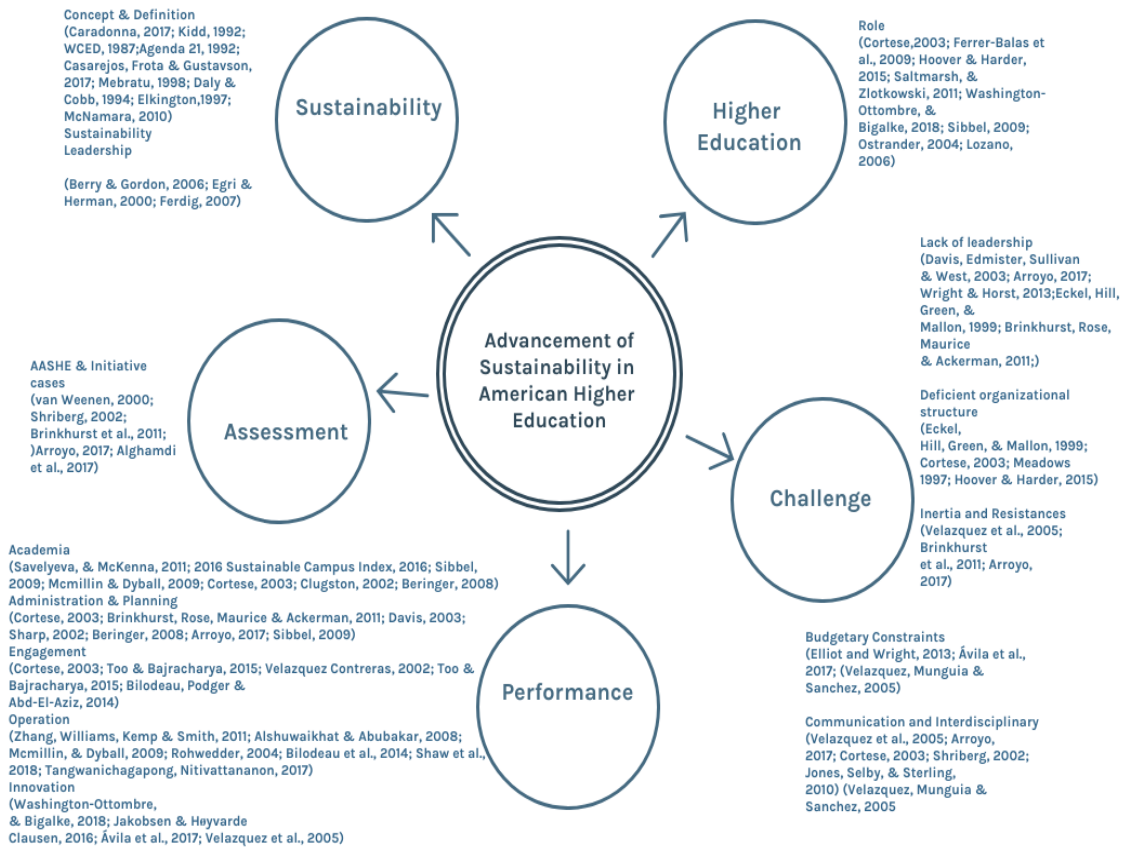

Figure 2. Literature map

The Evolution of Sustainability

Before delving into the crux of the topic, exploring the etymology of sustainability is appropriate. Caradonna (2017) informed that "the *Oxford English Dictionary* states that the adjective sustainable was widely used in 1965 through an economics dictionary that used the phrase sustainable growth" (p. 7). "The term sustainability entered English language in the early 1970s" (Caradonna, 2017, p. 7). Kidd (1992) indicated that society's failure to consider and plan for the potential impact that their advancements have, and will have, on the environment has been a concern voiced by ecologists previous to "the term sustainability being applied to the interrelationship

between man and nature" (p. 5). Arguing that sustainability burgeoned from the unique circumstances presented throughout the world, Caradonna (2017) believed that it was a principle which appeared between the1970s and 1980s.

Casarejos, Frota and Gustavson (2017) realized that particular situations and advantages encouraged the idea of cultivating sustainability. The growth of this ideal, offset by its promotion, occurred gradually over time, thus emphasizing the interconnectedness between the economy, technology, the biosphere and its inhabitants, as well as governmental policy and the imperative to build ethics. Facing severe environmental challenges, the evolution of sustainability will be addressed to understand the urgency of creating a more sustainable world.

Early consumption of forestry. While analyzing the management of the natural habitat, i.e., forestry, during early contemporary times to present, the concept of sustainability became more prominent. Thus, some argue that it emerged from the science of cultivating forests (Caradonna, 2017). Mebratu (1998) added that "from 3000 B.C. to the present, the development of more advanced agriculture has been evident in the increasingly complex social divisions of labor and means of exploitation, and the continual creation of tools to delve and shape the earth and its products are confirmation to such changes" (p. 495). Because forests are self-sufficient, and due to the society's close association to them, naturally, inhabitants can discern its worth and the potential negative outcomes stemming from lack of care (Caradonna, 2017).

Industrial revolution. Caradonna (2017) described that the eighth century experienced exponential growth during the industrial revolution, as well has extraordinary development in economics, and a radical transformation in consumer

production. Consequently, across the globe vast markets have led to the exploitation of the environment (Mebratu, 1998). The existence and prominence of sustainability was closely related to the classical capitalist economics (Caradonna, 2017). While the society was aware of the degradation of natural resources, many critics and debates emphasized the impact of economic growth to the environment.

Insufficient resources. As mention by Kidd (1992), the conclusion of World War II led to the realization that natural resources could not support the growing economies became topical. From 1950 until the present, the conversations surrounding insufficient resources remain prevalent (Kidd, 1992).

Conservation movement. Caradonna (2017) expressed that the prevailing view of the environment in the 1960s and 1970s was copious in concerns to the natural habitat—the actions of the human race were benign (p. 94). He further pointed out that this universal perspective engendered environmentalists to educating the fundamentals of their field in order to change the prevailing attitudes of the public (Caradonna, 2017). Rachel Carson published the book *Silent Spring* in 1962, which revealed the pollution caused by pesticides. In addition, the text raised awareness about the pollution to help spur the environmental movement.

Emergence of sustainability. The United Nations Environmental Program (UNEP) used the term sustainable in a document which was released in 1978, thus being the first occurrence in which the term had ever appeared in their documentation (Kidd, 1992). This was significant, as the topic corresponded to that of eco-development. Additionally, the scope of the term broadened in the 1980s from a selection of text to

"technical articles and reports to a wider range of popular areas and the business planning" (Kidd, 1992, p. 18).

Development of sustainability. The World Commission on Environment and Development (1987) presented the concept of sustainable development to meet the human needs of the present without compromising the ability of future generations to meet their own needs. In 1992, Agenda 21 addressed the pressing problems of the day, as well as provided a locally, nationally and globally comprehensive plan of action to alleviate the negative impact that humanity placed on the environment (United Nations Conference on Environment & Development, 1992). Daly and Cobb (1994) discussed the interdependence between economy, environment and community. Later, Elkington (1997) pointed out that businesses should operate in a sustainable way that includes balancing people, the planet and profits. As a result (summarized in Table 1), "many academic declarations, charters, agreements, reports and treaties suited for sustainability were acknowledged over the years" (Casarejos et al., 2017, p. 997).

Table 1

International initiatives fostering sustainability in society and education

Year	Document title or Initiative	Primary pertinence
1972	Stockholm Declaration on the Human Environment	Society
1975	The Belgrade Charter	Education
1977	Tbilisi Declaration	Education
1987	The Brundtland Report	Society
1990	Talloires Declaration	Higher Education
1991	Halifax Declaration, Canada	Higher Education

Table 1 (continued)

1992	Agenda 21, Ch.36: Promoting Education, Public Awareness and Training and Ch.35: Science for Sustainable Development	Society
1992	Association of University Leaders for a Sustainable Future founded	Higher Education
1993	Swansea Declaration	Higher Education
1993	Kyoto Declaration	Higher Education
1994	CRE Copernicus Charter	Higher Education
1997	Declaration of Thessaloniki	Education
1998	World Declaration on Higher Education for the 21st Century	Higher Education
1999	Report of the Environmental Management for Sustainable Universities (EMSU)	Higher Education
2000	Millennium Declaration, Millennium Development Goals	Society
2000	Earth Charter	Society
2000	Global Higher Education for Sustainability Partnership (GHESP)	Higher Education
2001	The Lunenburg Declaration on Higher Education for Sustainable Development	Higher Education
2002	World Summit on Sustainable Development in Johannesburg (Decade of Education for Sustainable Development and The Ubuntu Declaration)	Society
2004	Declaration of Barcelona	Higher Education
2005	Start of the UN Decade of Education for Sustainable Development (DESD)	Education
2005	The Graz Declaration on Committing Universities to Sustainable Development	Higher Education
2007	Lucerne Declaration on Geographical Education for Sustainable Development	Education
2009	Abuja Declaration on Sustainable Development in Africa: The Role of Higher Education in Sustainable Development	Higher Education
2009	Bonn Declaration	Education
2009	Torino (Turin) Declaration on Education and Research for Sustainable and Responsible Development	Higher Education

Table 1 (continued)

2012	The Future We Want Report (Treaty on Higher Education)	Society
2015	Encyclical Letter of the Holy Father on Care for Our Common Home	Society

Note. Casarejos, F., Frota, M. N., & Gustavson, L. M. (2017, p. 997). Higher education institutions: A strategy towards sustainability. *International Journal of Sustainability in Higher Education*, 18(7), 995-1017. doi:10.1108/IJSHE-08-2016-0159

Caradonna (2017) found that in recent years, almost all definitions of sustainability have emphasized the ecological perspective, in which human society and economy are closely related to the natural environment. Caradonna (2017) further added that the most common model of sustainability that has emerged in recent years, endorsed by the 2005 UN World Summit, is depicted in the Venn diagram, which illustrates the interrelated constituents of the biosphere, its resources, and equality of society (see Figure 3).

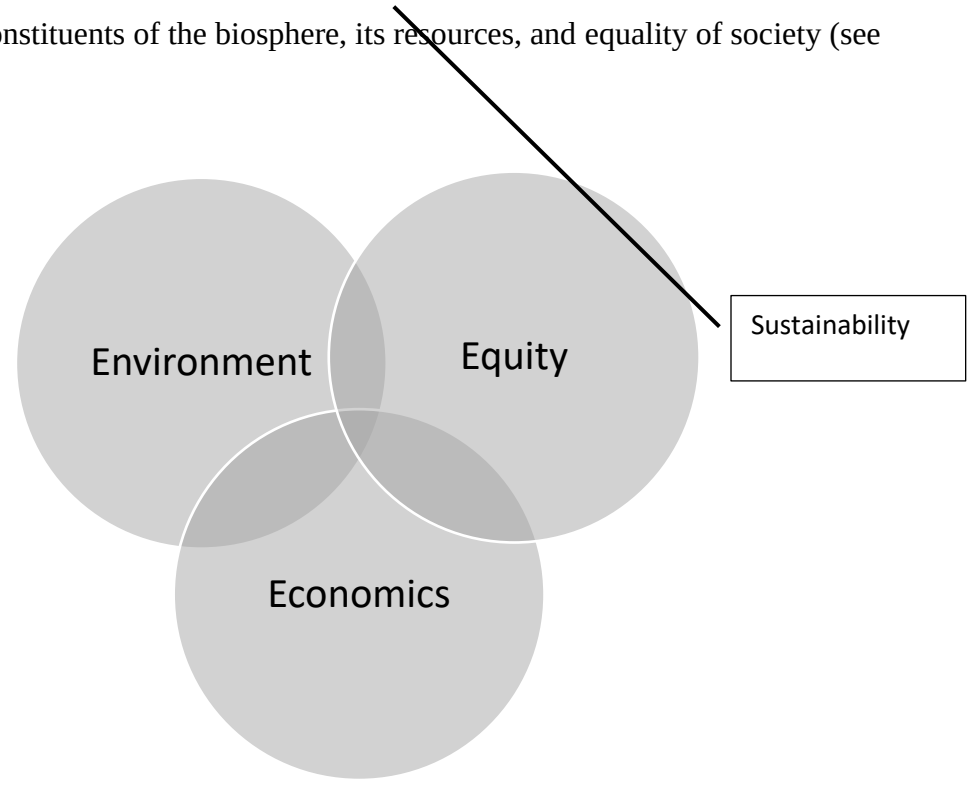

Figure 3. The three Es of sustainability represented in a diagram.

However, Caradonna (2017) shared a new model redefines the graph as a series of concentric circles in which society and its resources are dependent, and therefore found within, the cornerstone of sustainability (see Figure 4). Mirroring the assessment from sustainability economists such as Victor and Daly, the human race and the economy are dependent upon their natural habitat, as humanity would cease to exist without an environment; therefore, sustaining the earth is a "conceptual priority in any model of sustainability" (Caradonna, 2017, p. 9).

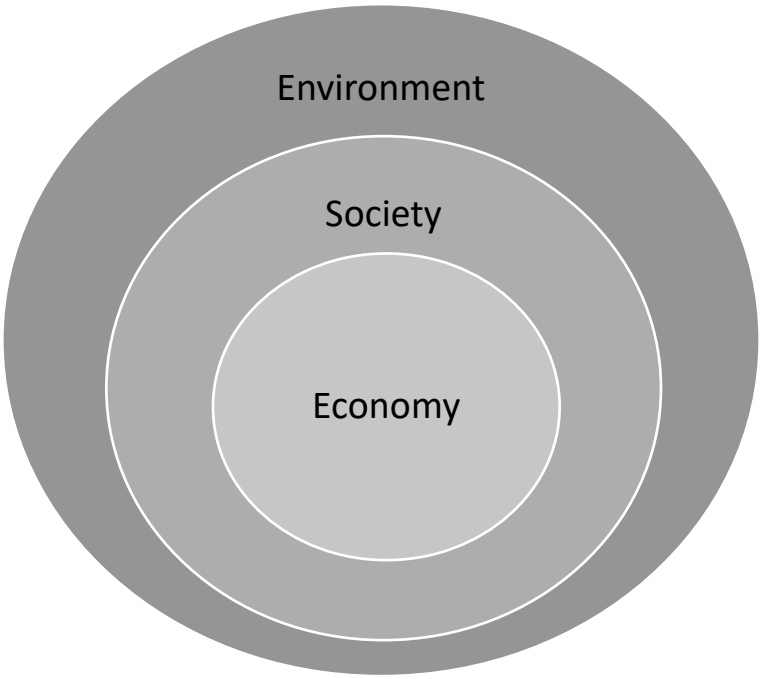

Figure 4. The diagram places the environment at the foundation of the model.

McNamara (2010) pointed out that the brief discussion of sustainable development does not fully capture the importance, depth and complexity of the problem, particularly given the huge and difficult task of higher education to implement. Aspiring towards authentic sustainability is complex due to its fluidity; aiming to comprehend such

an intricate concept only broadens the complexity and further challenges the next generation on what goals need to be met (McNamara, 2010).

Sustainability Leadership

Gordon and Berry (2006) described that environmental problems commonly have six characteristics:

> From perception of the problem to its useful definition and solution; complexity in most dimensions, including required knowledge, types of people involved, and the multiplicity of the effects of any solution; a contentious and emotion-charged context, with definite and different values held by participants; a need for integration across several, and extending to various areas of knowledge; an often frail and disjointed science base that presents few "school solutions" for problems; and the issue of not planning for unprecedented risks, which leads to unintended consequences all unfolding while trying to progress towards the solution. (p. 51)

Gordon and Berry (2006) explained that issues presented in the environment are initially portrayed as typical situations, like pollution in the air or water, or even deforestation. Therefore, Gordon and Berry (2006) admitted leadership is needed when the public needs to take action to address major environmental problems. Due to the severity of the issues, leadership prowess is pertinent. Proper leadership propels the public to act.

Environmental leadership was referred by Egri and Herman (2000) as the extraordinary ability of a single individual or group which cultivates positive outcomes that attribute to a sustainable future. While environmental leadership focuses on environmental issues, economic and social equity components are neglected. Thus, Ferdig (2007) presented sustainability leadership as something that beckons the attention of individuals and their factions to practice sustainability, which in turn positively affects the health and longevity of the earth, its inhabitants, and the economy.

Leaders of sustainability who hold an extensive perspective on the intricacy of the biosphere, understand that paradoxically, differing viewpoints is an innate feature of a fluid system of communication and human activity (Ferdig, 2007). The commitment to sustainability from the leadership position is essential; thus, the study conducted interviews at selected institutions regarding their leadership level support toward campus sustainability.

The Role of Higher Education in Society

Traditionally, academic institutions are held accountable for a significant portion of the sustainability initiative. Higher education institutions are seen as the center hub which provides, circulates, and distributes knowledge and ethical standards throughout society (Cortese, 2003). In addition to passing on skills and knowledge to the next generation of leaders, universities "guide public policy, impact the trajectory of history, contribute to sustainability, innovation and research, and shape the way people see and understand the world" (Hoover & Harder, 2015, p. 176).

Washington-Ottombre, and Bigalke (2018) admitted higher education institutions have supported major social changes to meet significant challenges. Saltmarsh and Zlotkowski (2011) presented the unique position higher education has over the years:

> At the beginning of the twentieth century, building the democracy was a primary function of universities and colleges. Following World War II, American universities expanded, dramatically becoming among much else broadly inclusive and diverse. Toward the latter part of the 20th century, the substantial divisions plaguing American higher education had become widely apparent (p. 10).

The division that most bothers Saltmarsh and Zlotkowski (2011) within colleges and universities is the "growing split between knowledge and commitment" (p. 10). Academic institutions were unable to cultivate their students with the essential tools, education, and motivation to rectify circumstances involving sustainability issues (Sibbel, 2009). Additionally, Sibbel (2009) argued that since the majority of world leaders had completed higher education, yet had not accomplished any sustainability endeavors, this was evidence that academic institutions were not successful in promoting sustainability.

The concerns that researchers find pertinent are applying information about sustainability in society's everyday actions, corresponding learned insights pragmatically, further establishing rapport between scholarship and professionals out in the field, improving areas of concern in the community, and establishing a democratic situation within society (Ostrander, 2004). Cortese (2003) added that the "willful actions among administrative bodies within universities encourage participation and democracy due to faculty and student activism" (p.19). As such, academics is an intricate organism that requires the involvement of all facets of the organization: "students, scholars, and

administrators with their diverse attitudes, skills, experience, and knowledge, as well as learning programs that traditionally transform students into socially responsible graduates" (Sibbel, 2009, p.74). Lozano (2006) agreed that the leaders of the next generations are founded in college and universities across the globe.

Challenges to Sustainability in Higher Education

In 1990, significant efforts were made in the Talloires Declaration to identify the role of higher education institutions in promoting sustainability (Davis, Edmister, Sullivan & West, 2003). However, Davis et al. (2003) pointed out even though the Talloires Declaration is important as a guiding document for a set of ecological commitments, the obstacles to transforming higher education are formidable. Arroyo (2017) articulated that scholars have gone beyond describing the status quo of sustainable development initiatives and examined the main drivers and obstacles. Scholars realized that the most occurring factors which hindered change included the absence of direction and management, inadequate operational structures, "and inertia resistances"; repeated drivers included "communication and interdisciplinary collaboration" (Arroyo, 2017, p. 1764).

Lack of leadership. Because higher education institutions are being held accountable as primary advocates for the global initiative of sustainability, it is pertinent that leaders hold a similar perspective of the concept while also agreeing to the socially expected actions that colleges can take responsibility of in the endeavor (Wright & Horst, 2013). Yet, Eckel, Hill, Green, Mallon, and American Council on Education (1999) found that in order to be more sustainable, institutions struggled to make change.

Brinkhurst, Rose, Maurice and Ackerman (2011) brought up the question about the origins of change. Change makers can hold an array of roles within a university such as administrators (Brinkhurst et al., 2011). Furthermore, Brinkhurst et al. (2011) pointed out that scholars realized that singular advocates are still identified as an integral role; such champions "migrate rapidly" (p. 343). Therefore, Arroyo (2017) recommended analyzing other stakeholder facets, which would allow stability to the shifting priorities and agendas.

The second issue that Eckel et al. (1999) pointed out that once the initiative is understood, assigning personal resources can be a challenge. Such variables cause implementation of new agendas to be intricate though rewarding (Eckel et al., 1999, p. 9).

Budgetary constraints. Velazquez, Munguia and Sanchez (2005) articulated that financial deficiencies can hinder the success of a majority of projects. Velazquez et al. (2005) believed that the economic slowdown has affected higher education institutions in the United States, forcing them to cut their budgets by cutting spending across the college sectors. Institutions had to rethink how they should use the limited funding resources to meet top priorities. Unfortunately, sustainability is normally not considered one of those.

Deficient organizational structure. Cortese (2003) believed higher education offers an original and liberal path in education, instruction to aggrandize experience and skillsets, expands worldviews, and cultivates participation in innovative projects in sustainability initiatives. However, Eckel et al. (1999) admitted that "the tradition and history of the university system, external and internal pressures, competing

constituencies, loose links between units and the lack of adequate reporting mechanisms have all contributed to the complexity of the composition of university institutions" (p. 9). Hoover and Harder (2015) agreed that such issues convolute the change process, causing it to become more challenging; active participants admit that particular orthodox perspectives and contending priorities produce a time-consuming, and at times, frustrating affair.

Inertia and resistances. Velazquez et al. (2005) expressed that the habits are hard to change, and many of university members just don't want to. Brinkhurst et al. (2011) pointed out that long term faculty can play a key role in terms of implementing sustainability on campus because they are not migrating as often as compared to other staff that is less stable. Therefore, Arroyo (2017) believed the possibility of identifying other stakeholder factions that have different influences and resources may be beneficial, as this new sector could manage the university's sustainability assessments.

Communication and interdisciplinary collaboration. Jones, Selby, and Sterling (2010) pointed out "sustainability represents a condition or set of conditions whereby human and natural systems can continue indefinitely in a state of mutual well-being, security, and survival" (p. 19). Shriberg (2002) defined the sustainable campus as those "integrating sustainability concerns into and across their core functions of teaching, research and service as well as in their operations" (p. 53).

Velazquez et al. (2005) highlighted that because university sources of information are dispersed, critical information is often unavailable or dispersed across several departments. Cortese (2003) argued that becoming successful in sustainability

initiatives requires individual academic groups and fields to broaden their networks and produce fluidity and connectiveness between structural viewpoints. Velazquez et al. (2005) further confirmed that the leaders and participants of sustainability in higher education sections must prevail against all odds, placing less emphasize on verbal dealings, and therefore concentrating on the actions required to build momentum and achieve goals.

Assessment of Sustainability in Higher Education & STARS

Weenen (2000) described that universities are tackling the challenges of sustainability in a variety of ways. The approach may be different from targeting environmentally friendly companies, developing principles and signing declarations, building innovative and effective institutions, or focusing the university's mission and management on the pursuit of sustainability. Brinkhurst et al. (2011) emphasized to build a cohesive, motivational platform among participants in sustainability efforts, it is beneficial to regularly assess progress and smaller goals throughout the process. This focuses the team, guides their actions, and creates morale (Brinkhurst et al., 2011).

Arroyo (2017) highlighted that an ideal assessment tool would include five elements, “identifying the most important attributes of a sustainable campus, including computable and comparable measures, going beyond ecological efficiency, measuring processes and motivations, and being understood by a wide range of stakeholders” (p. 1766). Shriberg (2002) agreed that particular assessment techniques portray the present condition of the intuition, but it is advantageous to combine these tools with robust frameworks which evaluate incentive, flow of operations, and results.

Alghamdi, Heijer, and Jonge (2017) indicated there is a myriad of assessment tools. In Table 2, Alghamdi et al. (2017) provided an overview of 12 frameworks with the purpose, scope, function, and state of development.

Table 2

A summary of the 12 selected benchmarking tools

N0.	Tool	Abbreviation	Year
1	Sustainability Assessment Questionnaire	SAQ	2001
2	Graphical Assessment of Sustainability in University	GASU	2006
3	Sustainable University Model	SUM	2006
4	University Environmental Management System	UEMS	2008
5	Assessment Instrument for Sustainability in Higher Education	AISHE	2009
6	Benchmarking Indicators Questions Alternative University Appraisal	BIQ-AUA	2009
7	Unit-based Sustainability Assessment Tool	USAT	2009
8	The Green Plan	Green Plan	2012
9	Sustainable Campus Assessment System	SCAS	2014
10	Adaptable Model for Assessing Sustainability in Higher Education	AMAS	2014
11	Sustainability Tracking, Assessment and Rating System	STARS	2014
12	Green Matric –UI's Green Metric University Sustainability Ranking	GM	2014

Note. Table 2. A summary of the 12 selected benchmarking tools Alghamdi, Heijer & Jonge, (2017). Assessment tools' indicators for sustainability in universities: an analytical overview. International Journal of Sustainability in Higher Education, Vol. 18 Issue: 1, pp.84-115.

According to the Alghamdi et el. (2017) comparison, the Sustainability Tracking, Assessment & Rating System (STARS) meets salient factors of a model assessment tool; "it is able to recognize significant conditions, highlighting comprehensibility, and easiness of comparability and calculability" (p. 108). Shriberg (2002) explained that "the assessment facilitates the discovery of areas in need of aid, as well as hinderances in concerns to sustainability efforts, which in turn creates sustainability strategies, objectives and activities" (p. 255). Higher education institutions from all over the world are encouraged to participate in the STARS program to track,

manage and improve their sustainable activities on campus. This study focused on the institutions who participate in the STARS program within the United States.

Implementing Sustainability at the University

As Cortese (2003) noted, the daily performance of the university is an important demonstration to achieve an environmentally responsible lifestyle and to reinforce the ideals of values and behavior throughout the community. It provides opportunities for higher education to model campus sustainability in the following five areas that are assessed by STARS: sustainability in academia, engagement, admission & planning, operation, and innovation. Each area will be discussed in the following sections.

Sustainability in Academia

Savelyeva and McKenna (2011) indicated that sustainability has imbued all areas of high education institutions. Sibbel (2009) expressed it is important to consider the practicality of developing programs that equip graduates with the necessary knowledge and values, the ability to think critically, and the motivation to deal with issues related to unsustainable states. Mcmillin and Dyball (2009) pointed out that many sustainability related programs are discipline-based, with narrow focus and theoretical boundaries. Thus, Mcmillin and Dyball (2009) asserted that a crucial element in any degree program is a good teaching practice involves showing students the connection between theory and practice so that they can recognize the relationship between their learning and the campus itself and the wider world.

Sibbel (2009) articulated that learning in collegiate settings includes supplying information that is collated in sections known as “subjects or courses” (p.75). Therefore,

Cortese (2003) emphasized that using teachers and students to conduct research as an integral part of the learning experience will greatly strengthen their education and promote strong connections and care with local communities and ecosystems. Beringer and Adomßent (2008) added another important element related to the science of sustainability is that the establishment of research structures and opportunities to promote multidisciplinary, interdisciplinary research related to sustainability and to address research issues in higher education. Sibbel (2009) also pointed out that it is important for every academic to consider how their field of expertise relates to other disciplines, and how their teaching contributes to the development of graduate qualities that lead to sustainable future.

Sustainability in Co-Curricular Engagement

Cortese (2003) highlighted that academic institutions are cornerstones, in that they are facilities in which economic development occurs for local communities, even more so recently, as "the private sector moves facilities, capital, and jobs frequently as mergers, acquisitions, and globalization becomes the norm for corporations" (p.19). The sustainability curriculum helps to integrate sustainability into the campus culture and sets a positive tone for the school; it equips teachers and staff with tools, knowledge and motivation to adopt behavioral changes that promote sustainable development, which is also an essential activity of a sustainable campus (AASHE, 2016). Sustainable university campus was defined by Too and Bajracharya (2015) as:

> […] a higher education institution […] that addresses, involves and promotes […] the minimization of environmental, economics, societal and health negative

> effects in the use of their resources [in] its main functions of teaching, research, outreach and partnership, and stewardship […] to [help] society make the transition to sustainable lifestyles (p. 58).

Cortese (2003) articulated that in addition to campus activities, colleges have an obligation to help the surrounding area and do everything possible to bring about positive change. Too and Bajracharya (2015) also pointed out that to influence local communities to participate in sustainability activities, various factors must come in to play: "knowledge on the subject, engagement to achieve objectives, rapport building, inclusion, and a capable administration" (p.62). Participating in community initiatives aid students to cultivate a leadership perceptive while also expanding their view of circumstances that arise in the world and thus, how to rectify such issues (AASHE, 2016, p. 21).

Bilodeau, Podger and Abd-El-Aziz (2014) emphasized that partnerships between universities and private and public institutions help promote sustainability on campuses and in communities. Leadership plays a vital role in engaging the university community in sustainability (Too & Bajracharya, 2015). Cortese (2003) agreed that partnerships are a beneficial in encouraging sustainability, as it creates a foundation for teamwork and inclusion throughout the university.

Sustainability in Administration and Planning

Cortese (2003) addressed that administrators are quite capable in their area of expertise, as they strategically and robustly support colleges in meeting and exceeding their responsibilities in cultivating a better world (p. 22). Davis et al. (2003) expressed that many higher educational institutions are committed to integrating sustainable

development across the institution. Brinkhurst et al. (2011) admitted that “such largescale academic changes require support from many different facets within the organization.

Sharp (2002) articulated that universities are multi-structured, complex organizations, so, implementing university-wide changes is complicated. Therefore, Beringer and Adomßent (2008) explained that sustainable university work requires leadership from administrators and/or faculty who have a deep understanding of how the university operates as an entity and are empowered. Cortese (2003) agreed that designated leader should comprehend and portray the requirements and benefits of colleges being leaders and establishing a sustainable world while also conveying this information to various conglomerates.

Brinkhurst et al. (2011) affirmed that many top-down change efforts have been successful, particularly in the areas of planning, policy development and assessments of sustainability, as they have been supported by the administration. However, Brinkhurst et al. (2011) further shared that unwillingness may occur among administrators to advocate for change independently, as such aspirations may not be the priority of intuitional groups or university community as a whole. Sharp (2002) pointed out effective ways to engage administrative staff include:

> 1) the provision of centrally administrated, interest free loan money to fund conservation projects with reasonable payback periods; 2) creating partnership with students - such as student internship programs or part-time student employees dedicated to campus environmental projects; 3) creating partnership with faculty to support campus environmental research opportunities; and 4)

> demonstrating high profile signals from the highest levels of the university affirming the importance of campus environmental efforts (p. 140-141).

Besides the support from the top leadership, Brinkhurst et al. (2011) added that the action from the student activity could be influential. Sharp (2002) described that bottom-up activity depends on the presence of enthusiastic, committed students who can work with other students to determine which activities are balanced with their other academic responsibilities. Yet, Brinkhurst et al. (2011) pointed out the challenges that students faced are related to their position in the university society. Also, Arroyo (2017) made the point that students have limited time in school and lack financial support to carry out their sustainability plans over the long term. Furthermore, Brinkhurst et al. (2011) added that students may be discouraged by a lack of adequate institutional support and hostile relationships with those ultimately responsible for implementing change.

To sum up, Brinkhurst et al. (2011) concluded that hierarchal and upturned university initiatives are potentially beneficial; however, for changes to endure, it is necessary that transformation burgeons from the internal efforts of participating faculty and staff. Sibbel (2009) agreed that achieving a sustainable campus requires participation across the institution to lead the next generation to global sustainability.

Sustainability in Operations

Zhang, Williams, Kemp and Smith (2011) expressed that campuses are analogous to small urban areas due to their similarities in population, regional size, and the intricate type of interactions that are found within them. The impact of university activities and

operations on the environment has been recognized (Alshuwaikhat & Abubakar, 2008). Mcmillin and Dyball (2009) highlighted that universities educate students not only through coursework in the classroom, but also through the "principles in administration and management of campus operations" (p. 58).

Buildings. Mcmillin and Dyball (2009) suggested that it is better to think of sustainability not as a big abstract and isolated concept, but as a concrete concept that is relevant to our daily lives. Universities utilizes a substantial amount of energy compared to other organizational building types (AASHE, 2016). Alshuwaikhat and Abubakar (2008) shared that the green buildings initiative projects are designed to reduce waste and hazardous material production, reduce energy consumption levels, and promote energy-efficient building design. One example the AASHE (2016) demonstrated is the Building Sustainability Rating System that Stanford University launched to evaluate building sustainability performance which "over 100 Stanford buildings have been rated through this system, comprising over 8 million square feet of building space" (p. 32).

***Energy Consumption*.** Alshuwaikhat and Abubakar (2008) pointed out that the energy use of the building makes a long-term environmental impact, as both the heating and cooling design and the selection of equipment would differentiate the influence. Bilodeau et al. (2014) agreed that on-campus energy and carbon reduction projects can minimize financial expenses connected to utility usage and improve sustainable business practices. Therefore, the AASHE (2016) suggested institutions to implement innovative measures and switch to renewable sources of energy to save money and reduce energy usage.

Alshuwaikhat and Abubakar (2008) articulated that with the intelligent control systems installed in place, the energy efficiency improves. One example the AASHE (2016) given was the geothermal heating and cooling system created by Onondaga Community College. The system not only help the institution reduce the energy consumption level, but also demonstrate the innovative way to involve students in applying academic knowledge to actual real-world problem solving.

Food purchases. Shaw, Capetola, Lawson, Henderson-Wilson, and Murphy (2018) emphasized that understanding the level of involvement and assistance required for its considerable student population in relation to food is significant; further including "sustainable food economies within this area is ideal" (p. 377). The AASHE (2016) mentioned that "by decreasing waste products and introducing options that place less stress on the environment, as well as sharing sustainable insights with the student body will aid in more sustainable practices" (p. 38).

Campus Grounds. Alshuwaikhat and Abubakar (2008) expressed it is also vital to protect important green spaces, historic sites and landscapes such as rivers, mountains. The AASHE (2016) agreed that "beautiful and welcoming campus grounds can be planned, planted, and maintained in any region while minimizing the use of toxic chemicals, protecting wildlife habitat, and conserving resources" (p. 42). One example the AASHE (2016) showed is the a one-acre plot on the State University of New York at Geneseo campus which is dedicated to education and research.

Goods and Services. According to the AASHE (2016), higher education facilities expenditures on goods and services per year are in the billions; these purchases are

advantageous, as they provide situations in which the university can shift to low-impact products and services, thereby "supporting companies with strong commitments to sustainability" (p. 46). One example the AASHE (2016) given is the University of Connecticut vendor code of conduct which highlight that the institution anticipates that vendors will establish eco-friendly practices within their company's policies and procedures.

Transportation systems. Alshuwaikhat and Abubakar (2008) described "the green campus initiative calls on universities to promote green buildings and transportation facilities on campus, such as sidewalks, bike paths and greenways" (p.1781). Thus, the AASHE (2016) highlighted universities have the ability to pragmatically affect the eco-system and therefore encourage and sustain these economies by including transportation options that aid the sustainability agenda.

Waste reduction. According to the AASHE (2016), "waste reduction mitigates the need to extract virgin materials from the earth and reduces waste flow to incinerators and landfills which produce greenhouse gas emissions, can contaminate air and water, and tend to have disproportionate negative impacts on low-income communities" (p. 54). Tangwanichagapong, Nitivattananon, Mohanty and Visvanathan (2017) mentioned that "implementation of 3R (reduce, reuse and recycle) programs has long been regarded as an alternative approach to traditional waste management practices" (p. 204).

Alshuwaikhat and Abubakar (2008) agreed that the campus recycling system would play positive impact to influence construction contractor and students to save resources. One example the AASHE (2016) given is when students from Clarkson

University created and established a plan that dramatically decreased the number of take-out containers; the reduction was significant - about 37,000 boxes per month. In addition, it cut labor and reduce the number of garbage bags used on a daily basis.

Water usage. According to the AASHE (2016), "water conservation, recycling and reuse, and effective rainwater management practices are important in maintaining and protecting finite groundwater supplies" (p. 58). Water saving can be achieved by collecting rainwater for irrigation and designing drought-tolerant landscapes using natural plants and grasses. (Alshuwaikhat & Abubakar, 2008). One example the AASHE (2016) given is that California state university at Northridge (CSUN) has achieved significant water savings through irrigation innovations to reduce water use.

Institutions of higher education are key venues for learning and research in higher education and have great potential to promote and accelerate the transition to sustainability (Zhang et al., 2011). Thus, Alshuwaikhat and Abubakar (2008) concluded that higher education institutions should be limitedly impaired by unsustainable practices in order to maintain a vivacious and healthy atmosphere within the academic community. This is possible through conserving energy, reducing waste, and managing economic and social affairs, and sharing such ethical tenets on a national and global scale.

Sustainability in University Innovation

Washington-Ottombre and Bigalke (2018) articulated that "the definition of environmental innovations, is the implementation of a new or significantly improved product (good or service), or a process, a new marketing method, or a new organizational method in business practices, workplace organization or external relations" (p. 354).

Hence, Washington-Ottombre, and Bigalke (2018) pointed out that understanding the nature and driving factors behind innovation is crucial to formulating strategies and policies to effectively promote sustainable campus.

Avila et al. (2017) highlighted that the relationship between innovation and sustainability can be better understood if the respective structures and application areas are considered. Avila et al. (2017) further explained that there are two main types of innovation in sustainability: structural innovation and operational innovation.

Structural innovation. Avila et al. (2017) expressed that the structural innovation includes structural shifts within top-down philosophies and organizational changes in governance. For example, assigning a coordinator role for sustainability within the institution to manage initiatives (Avila et al., 2017). To promote effective sustainability, Velazquez et al. (2005) suggested to "establish a functional integrated organizational structure" (p. 385).

Operational innovation. Avila et al. (2017) informed that the operational innovation refers to the adoption of tools that strengthen and maximize the functioning of the institution; for example, the use of energy-saving light bulbs.

Velazquez et al. (2005) brought up that learning, academic inquiry, involvement in the community, and sustainable practices implemented in the university are strategic and therefore utilize in higher education institutions across the globe. Avila et al. (2017) admitted that implementing practices for a sustainable campus can be challenging and appointing a coordinator role may not hold significance due to factors such as the university budget. It would be helpful to analyze the unique circumstances of individual campuses previous to creating and moving forward with initiatives (Avila et al., 2017).

Summary

Soini, Jurgilevich, Pietikäinen and Korhonen-Kurki (2018) stated that a growing number of people are calling on universities to contribute to social needs, especially in the field of sustainability. The existing literature provided valuable perspectives and strategies on how to lead sustainable efforts in higher education. The proposed study intends to select individual campuses that participate in the STARS program, to learn about their practices and discern solutions that may be adapted and implemented in other campuses.

The review of researches introduces the sustainability effort in higher education in the United States. How to overcome unique challenges that higher education institutions encountered still needs additional research. Bridging this gap and learning from the successful individual campuses that have accomplished sustainable initiatives would serve those that are struggling through sustainable practices and improve campus sustainable involvement.

CHAPTER III. METHODOLOGY

The purpose of this multiple-site case study is to describe the campus sustainability performance at four exemplary higher education institutions: i.e., Doctoral, Masters, Baccalaureate, and Associate's, as measured by the Sustainability Tracking, Assessment & Rating System (STARS) and to understand the drivers and challenges from the perspective of university leaders working in the field.

The research questions guiding this study include:

1. What are the demographic characteristics of four select higher education institutions that have earned recognition in the STARS program?
2. What is the status of campus sustainability at these four institutions as measured by STARS in the areas of academia, engagement, operations, planning & administration, and innovation?
3. What is the journey of becoming an institution that earns recognition in the STARS program (academia, engagement, operations, planning & administration, and innovation)?
4. What are the drivers and challenges that the select four institutions experienced from a leadership perspective?

Research Design

A qualitative methodology was used as the primary framework for this research because a complex problem (sustainability in higher education) should be explored and a detailed understanding of the issue is necessary (Creswell, 2016). Mixed method was used within a case study design.

The case study design was chosen as it is an empirical approach that delves into contemporary phenomena contextuality for real-world scenarios, especially when the boundary between phenomenon and context may not be obvious (Yin, 2018). This case study was bounded by institutions that participated in the STARS program up to the year 2018 with in the United States. The multiple case study focusses on one issue but selects multiple cases (Creswell, 2016). This research applied multiple case study because it will provide an in-depth understanding of sustainability in higher education through a comparison of cases. The multiple case study research method is also in alignment with the conceptual framework. A focus of this multiple case study research was to describe how and what four exemplary institutions have experienced when advancing sustainability on their campuses. It helps identify the motivation or roots of the campus sustainability movement in higher education. It describes the complicated implementation process and challenges, as well as illustrate the achievements accomplished by the exemplary institutions.

Sampling

Purposeful sampling was employed. Miles et al. (2013) highlighted that qualitative samples tend to be purposive rather than random because they focus on the unique context of the case.

Site selection. The researcher selected four U.S. sites from the STARS program. The researcher has access to the STARS program final datasheet by obtaining permission from AASHE officials.

The criteria for stratifying the institution of candidates by type was based on their overall scores within institution types: Doctoral, Master's, Baccalaureate, and Associate's. The institution that earns the highest score in its category determined the target sites. Table 3 below outlines the sampling criteria in this research as the purposeful sampling was employed.

Table 3

Site and sampling criteria

Criteria	Rational
Region	The research intends to study the sustainability performance within American higher education. All institutions chosen are within the U.S. territories.
Institution Type	Doctoral, Master's, Baccalaureate, and Associate's (one of each type)
Sustainability Performance Scores	Top scored institutions within its category (preferred within top three)
Interviewee Professional Position	Sustainability office director/ manager, the liaison of the STARS reports or responsive sustainability analyst
Willing to Participate	Participants willing participate in the interview
Member Check	Participants willing to review the transcribed interview and add comments as needed to ensure accuracy

When the recruiting sites and the top institution provided no responses regarding the interview invitation, the one that earn the next highest rating in its category was contacted accordingly until there were four sites according to criteria.

The researcher contacted target institutions in the respect category with an email invitation based on the overall performance score in the database. Several institutions agreed to participate in the interview expressed the preference to the researcher on using the pseudonym for their institution, as well as their own identity. Thus, to protect the confidentiality, the researcher applied pseudonym names for two institutions and kept the real identity to the other two institutions who were willing to share their identity to the public. The final list of the four institutions that agreed to participate in the study are the University of California, Irvine (Doctoral/Research degree program), University of Middle Land (Master's degree program), Northeast Island College (Baccalaureate), and Portland Community College (Associate degree program) (see Appendix B). A total of 13 institutions that offer associate degree participated in the STARS program. One college from Canada earns the highest score among all the institutions that provides the associate degree, but since this study intends to study higher education institutions within the U.S., Portland Community College was chosen as it is the second-highest institution within the institution type. Northeast Island College earns the highest score among the 76 Baccalaureate institutions that participated in the program. There are 122 Doctoral/Research institutions in the program, and the University of California, Irvine earns the highest score within the institutional type. Among the 70 Master's institutions that participated in the program, the University of Middle Land was one of the top institutions that agreed to participate in the research.

Documents & archival records. There were two phases of document analysis. The first was to review archival records of American higher education institutions to

obtain a national profile to determine the four case sites. The second phase was to describe in detail the sustainability performance journey of four institutions.

Phase One: Data source for demographics and sustainability status profile to select sites. The first phase draws data from the Association for the Advancement of Sustainability in Higher Education (AASHE). The AASHE database provides the researcher with the name of each participated institution, the institutional type, the points for the overall performance, and scores for each individual category including academia, engagement, operations, planning & administration, innovation.

Phase Two: Sample for case analyses to describe the sustainability performance journey. The second phase involved choosing documents and artifacts representing the four cases. The documents (see Appendix A for document list) were available from the public access sites: (a) universities websites (including mission and vision statement of the institution, strategic plans, budget report, and organizational structure of the sustainability office; and, (b) the current and past STARS reports contents academia, engagement, administration & planning, operation and innovation.

Examples of archival records collected from the institutions include organizational records, services records, geographic and demographic characteristics of the institutions, etc. The study also explored the online social media resources such as past and current Facebook post, photos and videos, and other audio records.

Interview sample. Leaders working in the sustainability office from each site were interviewed. Liaisons from each case study's institution were contacted for their willingness to participate in the interview. Their emails were obtained by searching the

staff information on each selected institution's website. A recruitment protocol (see Appendix C) was sent by email to each participant to obtain the permission to conduct the interview. When the contacted liaison was not available, the researcher asked him/her to refer to an official that is appropriate to be interviewed in his/her institution

Data Collection

Two types of data collection were used in this research: document review and in-depth interviews. Table 4 presents the method of data collection and date source.

Table 4

Method of data collection and date source

Research Question	Method	Data Source
1. What are the demographic characteristics of four select higher education institutions that have earned recognition in the STARS program?	Document Review	Institutional websites
2. What is the status of campus sustainability at these four institutions as measured by STARS in the areas of academia, engagement, operations, planning & administration, and innovation?	Document Review	Archival records The STARS program reports
3. What is the journey of becoming an institution that earns recognition in the STARS program (academia, engagement, operations, planning & administration, and innovation)?	Interviews Document Review	Liaison who oversees the STARS program Institutional websites
4. What are the drivers and challenges that the select four institutions experienced from a leadership perspective?	Interviews	Liaison who oversees the STARS program

Documents & archival records review. Document and archival records review were conducted in order to illustrate the panorama of campus sustainability in selected institutions. The intent was to describe the previous and current performance of campus sustainability. It helps capture the unique journey of sustainability of the individual institution.

Interviews. Sixty to ninety-minute interviews were conducted in order to understand the drivers and challenges that the institution faced in implementing sustainability on campus from the responsible staff's perspectives.

Pilot testing the interview protocol. Upon receiving approval from the Florida Atlantic University Institutional Review Board (IRB), the researcher selected an institution that participated in the STARS program and earned the Gold recognition for testing the interview protocol (see Appendix D). The purpose was to pilot and examine the interview questions to be used with leaders at the four exemplary institutions to ensure they were addressing the research questions.

After the pilot testing for the interview protocol, the researcher contacted the liaisons from targeted case study institution for their willingness to participate in the interview. After the interview time was set, the researcher emailed the interview questions to the participants to be familiarized with the questions. The consent form (see Appendix E). was also sent to participants ahead of time to obtain their confirmation.

The researcher also informed the participant that they have a choice to identify their name, or they can use a pseudonym in all future documents. Participants signed the consent form before the interview started. The researcher followed the standardized interview protocol while conducting the interview.

The interviews were conducted through Skype or by phone. The interviews were recorded by using the iPhone recording program-voice memos, and the iPad recorder program was used as a back-up to record the interview. The iPhone voice memos recording program is a pre-installed application. During the interview, the researcher informed the interviewee that the transcribed document would be available for the participant to review. To clarify any confusion and to ensure the trustiness of the research, the researcher provided the interview transcription for the participants to review. The researcher transcribed each of the interviews up to 20 hours according to the recorded interview, and a total of 68 pages of interviews were transcribed. Each participant provided comments and revision to their interview to ensure the interview's accuracy. All changes were made to the data, as requested. To protect confidentiality, the researcher provided the participants another opportunity to keep their name or to use a pseudonym for their institution or themselves. The participant from the pilot study, and the Baccalaureate degree awarded institution, as well as the Master's degree awarded institution preferred to use the pseudonym for their institution and themselves, while other institutions (the Research/Doctoral and the Associate's) choose to reveal their name and institutions' identity to the public.

Data Analysis

In this case study, the researcher collected data generated from documents, archived records, and interviews, so it was critical to organize and manage the data. In order to manage and master the flow of data analysis, this study follows the continuous, interactive model articulated by Miles et al. (2013) shown below (Figure 5).

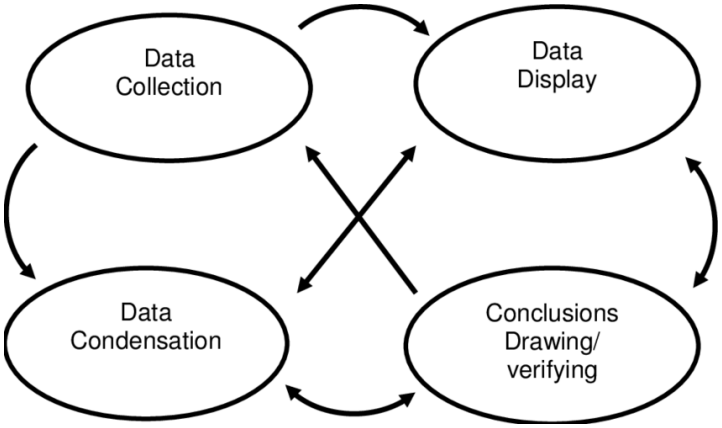

Figure 5. Data analysis model. Miles, M., Huberman, A. & Saldana, J. (2013).

The researcher uses the ATLAS.ti 8 program to manage and organize the pages of data collected from the university's websites, social media posts, the current and past STARS reports, as well as the interview transcripts. Interview were transcribed into a google document and then saved as Microsoft Word. Also, the researcher read and memo emergent ideas and comments from the transcribed interviews. The ATLAS.ti 8 software program was utilized as the primary analytical tool. The researcher started the new project in the ATLAS. ti 8 and named the project based on each institution's name. The representative project serves as a folder to contain all the collected documents, voice recording, and the transcribed interview. There are total of four projects in this study.

Data condensation for case analysis. Data collected from all documents, records and interviews were abundant. Condensing data started with managing the data collected from each institution's website, social media posts, the STARS website, as well as the interviews.

Coding. The researcher uses the "Create free quotation" function in the ATLAS.ti. 8 to highlight the text that represents the meaningful message from the

document. In the first cycle of coding, the researcher applied open coding, in-vivo coding, and code by list methods for all the document. The researcher was able to create codes for all the uploaded documents in the project folder. Open coding was used initially with massive information provided in the document to stratify the text. In-vivo coding was also used when the codes have emerged from the existing text. After using the open coding to form a coding list, the researcher was able to use the "code by list" method when encountering the content that would assign to one or more in the lists of the codes that already existed. From the application of "code by list" the researcher noticed the commonalities evolved across documents. Also, the "code group" function helps to organize similar codes into groups by assigning colors to different code groups. The screenshot in Figure 6 illustrates an example of the coded interview:

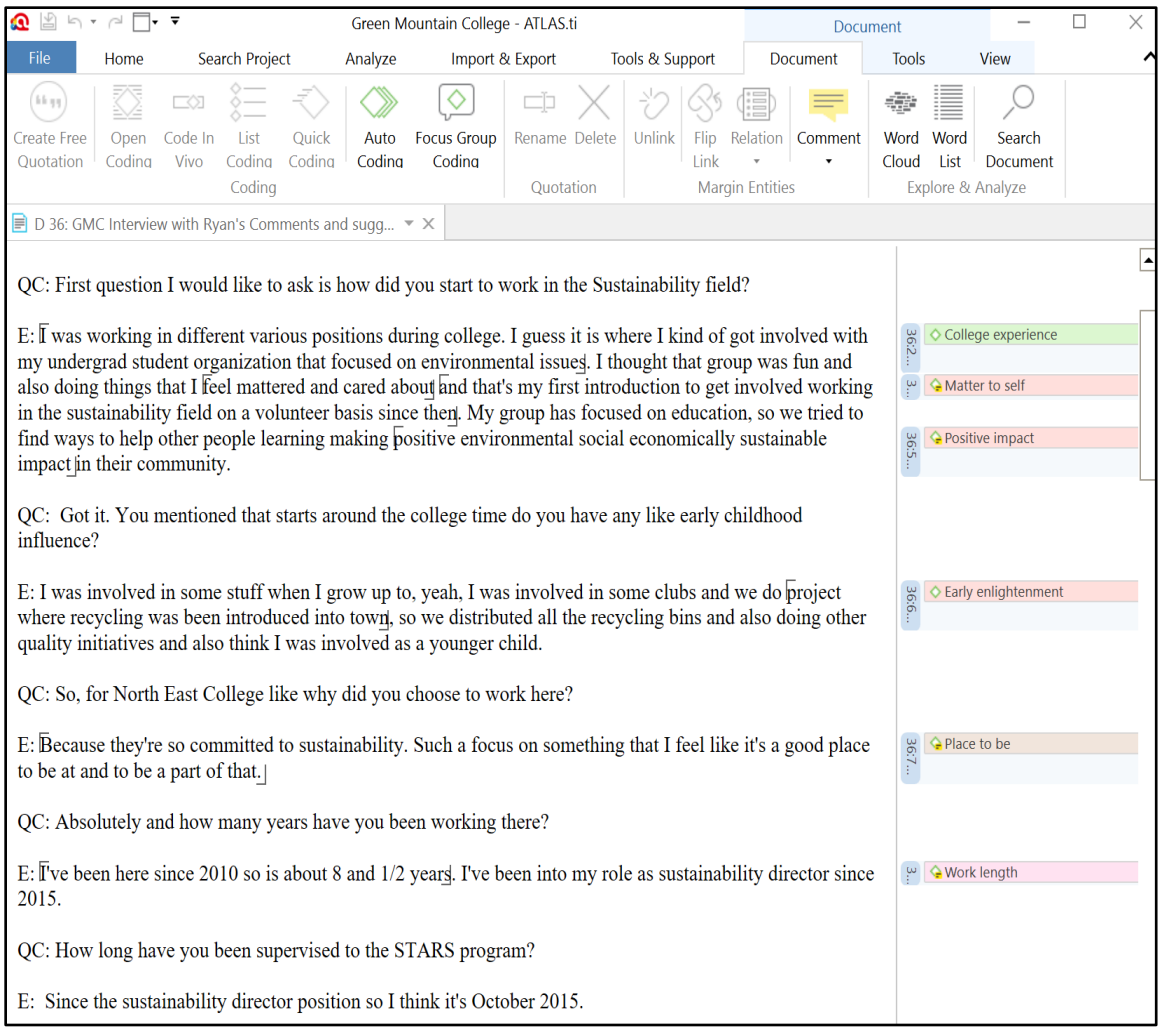

Figure 6. Screenshot of the coded transcript with the ATLAS.ti. 8 programs.

During the process of coding, the memo function in the ATLAS. ti.8 was also used to help the researcher put the comments and ideas into writing. An example of the memo created during the study is provided below in Table 5.

Table 5

Sample memos created by ATLAS.ti.8

Project: University of California Irvine

Memo Report

Selected memos (1)

The difference between other institution

As it shows in the docs, this institution gets more support whether from top leadership or financial aspects. It is more international involvement, and absolutely, I can feel that money is not an issue at all compared to other colleges.

So, I would use the words: "Upper level support" to capture the essence of this institution.

Data Display. After codes, categories and themes are identified. The researcher uses the ATLAS.ti 8 software to display the data. The network function in the ATLAS.ti 8 provides the visual connection to capture the interrelationship of the codes better. The network of the codes is provided below. The frequencies of the codes emerged into categories and helped to identify themes as displayed below in Figure 7. It provides a visualized connection of all the codes and with tables and figures.

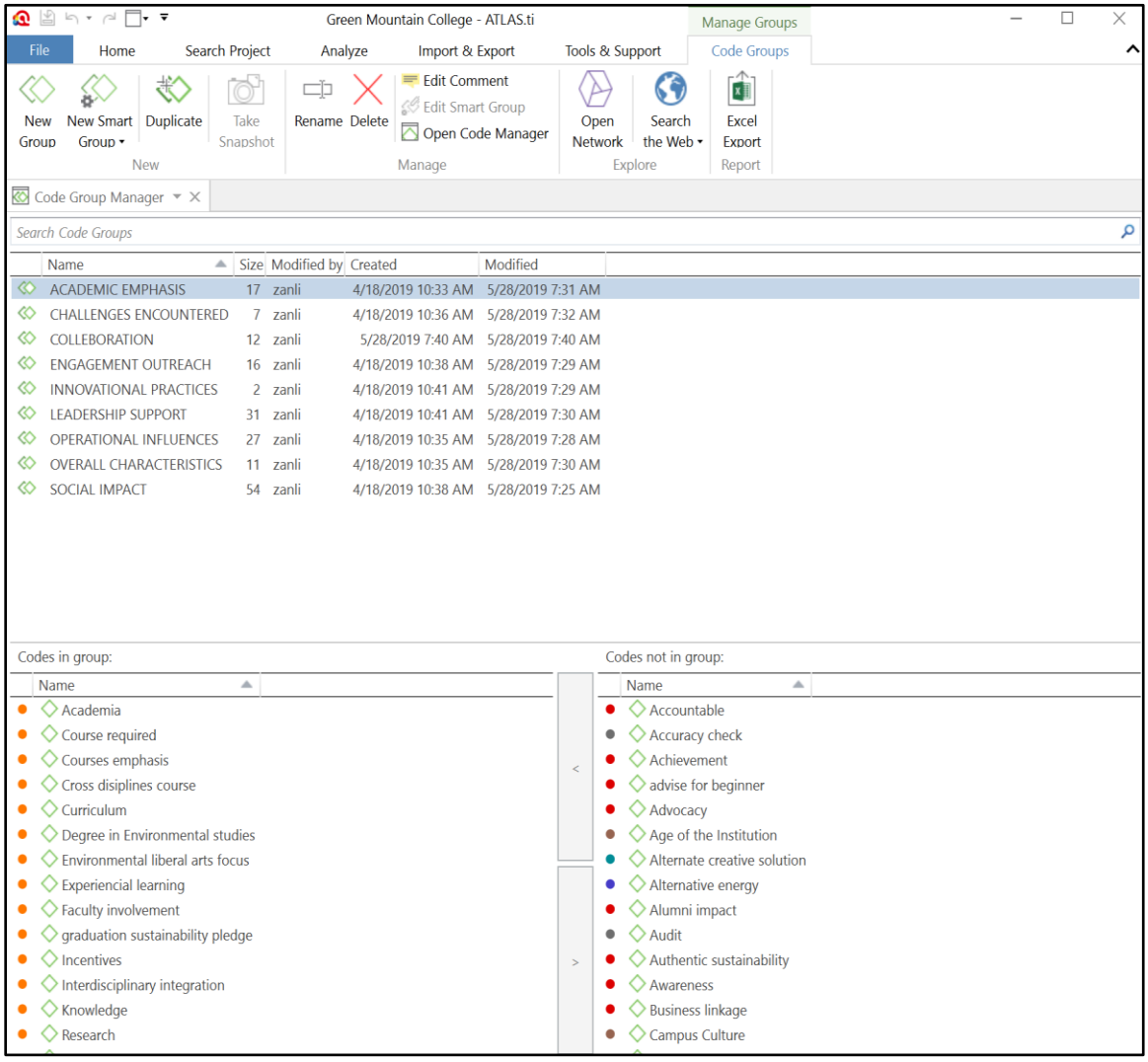

Figure 7. Code group for academic emphasis.

Each of the four sites analyzed followed a detailed sustainability roadmap of each case. The networking mapping was used to display the relationships between codes and the example shown in Figure 8. Then, a cross-case analysis presents the thematic interpretation of the sustainability performance across all four institutions.

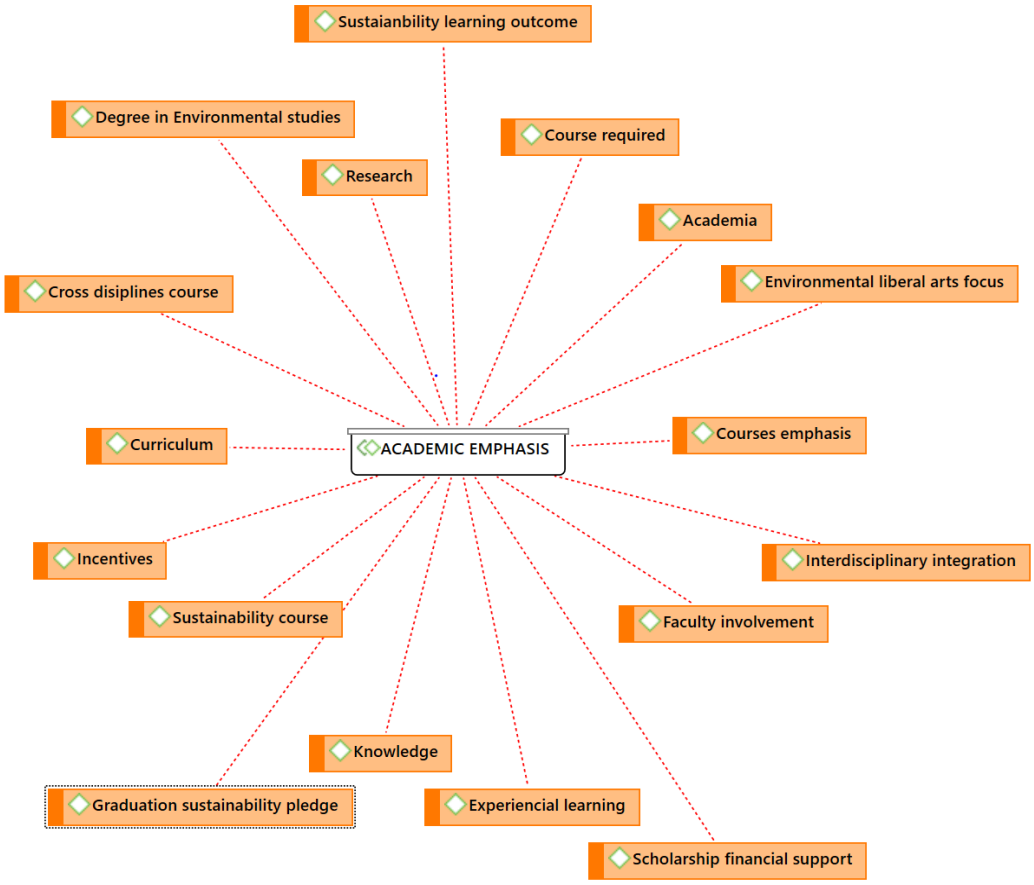

Figure 8. Academic emphasis network map.

Drawing and verifying Conclusions. Conclusions were made after the data collected from the institutions' websites, archival records, and interviews systematically funneled down to findings. Table 6 shows the process of how the themes were generated from codes and categories.

Table 6

Code mapping: Three steps of analysis

First Step			
Learning organization	Academic focus	Campus collaboration	Responsible community citizens
School participation	Business practice	Public policy	Bottom-up support
Awareness	Professional improvement	Recognition	Financial challenge
Attractive program	Active engagement	Sustainable practice	Community needs
Active Students	Action taking	Campus champion	Decision making
Active student body	Action	Building relationship	Social impact
Campus commitment	Achievement	Benchmark success	State commitment
Campus culture	Academic courses	Apply change	Time and staff
Campus impact	Campus engagement	Advocacy and legislation	Economic contribution
Campus policy	Closed loop	Campus stakeholder	Economic growth
Campus value	Collaboration	Community partnership	Education influence
Characteristics	Collaborative partnerships	Continual improvement	Financial support
Choice for college	Community involvement	Setting example	Unclear direction
College function	Engagement outreach	Student lead	Human nature relation
Early child awareness	Financial sustainability	Financial sustainability	Budget
Early education influence	Foundational leadership support	Student needs	Student power
Family influence	Green practice	Support	Leadership support
Support students	Guidebook	Incentive	Make change
Immersive experience	Sustainability champions	Initiative	Top-down support
Goal setting	Innovational practices	International collaboration	Value
Enrollment	Positive recognition	Investment	Slow response
	Operational achievement	Make improvement	Relationship building

Table 7 (Continued)

Second Step			
Learning organization	Academic focus	Achievement	Active Students
Attractive program	Active engagement	Action taking	Advocacy and legislation
Awareness	Top support	Apply change	Building relationship
Campus commitment	Business practice	Benchmark success	Bottom-up support
Campus culture	Campus collaboration	Campus champion	Challenge
Campus impact	Campus engagement	Continual improvement	Value
Campus policy	Community involvement	Financial sustainability	Unclear direction
Campus value	Innovational practices	Incentive	Economic Contribution
Characteristics	Operational influences	International collaboration	Education influence
Choice for college	Outreach campaign	Investment	Financial support
Enrollment	Positive recognition	Setting example	Student power
Early education influence	Green practice	Student lead	Human nature relation
Family influence	Campus stakeholder	Support students	Leadership support
Immersive experience	Professional improvement	Decision making	Make change
			Social impact
			Responsible community citizens
			State commitment
Third Step			
Financial sustainability is the foundation	Improvement and achievement coexist	Collaboration from all levels is the key	Social responsibility motivates institutions to overcome challenges
Research Questions			
RQ1: The demographic characteristics of four select higher education institutions	RQ2: The status of campus sustainability at these four institutions	RQ3: The journey of becoming an institution that earns recognition in the STARS program	RQ4: The drivers and challenges that the select four institutions experienced from a leadership perspective

Issues of Trustworthiness

There are several tactics used to assure the quality of the study, including the following:

Trustworthiness. Trustworthiness was enhanced by triangulating data. Multiple sources of evidence were collected, the document and archival records review and individual interviews.

Credibility. The researcher kept a detailed journal to record the progress of the research. The interview transcript is available for participants to review for member checking.

Dependability. The researcher used a case study protocol and develop a case study database. The database of this research includes notes, documents. Also, the researcher log and journal help the dependability of the study.

Confirmability. The researcher used multiple sources for data triangulation to avoid bias.

Transferability. To enhance transferability, the researcher provided a thorough job of describing the context of the selected institutions. The interview data and documents collected from each institution was presented in the research.

Ethical Concerns

The researcher received IRB approval from Florida Atlantic University (FAU) and the four study sites prior to conduct the research. To avoid bias, the researcher chooses the four institutions purposely based on an individual institution's actual scores in the STARS program database.

Summary

The multiple case study design is used to describe the current performance of sustainability in higher education institutions. The chapter discussed the methodology, research design, sampling methods, data collection, and data analysis. The last section concluded with the issues of trustworthiness and ethical consideration.

In the following chapter, a detailed profile of case-by-case analysis was provided followed by a cross-case analysis.

CHAPTER IV. FINDINGS

This chapter provides a case-by-case analysis of the four institutions that participated in the study. Findings based on an extensive review of documents and in-depth interviews are presented.

With the permission of the interview participants, two institutions agreed to keep their identity open to the public, which are the University of California, Irvine (Research/Doctoral degree program), and Portland Community College (Associate degree program). Pseudonyms were used for the other two institutions to protect the identity of the participants and the institutions, which are called the University of Middle Land (Master's degree program) and Northeast Island College (Baccalaureate degree program).

Institution 1: University of California, Irvine (UCI)

Institutional Characteristics

Located on the southwest coast of California, University of California, Irvine **(**UCI) is one of the most renowned public research institutions around the world. The founding mission of UCI is to "catalyze the community and enhance lives through rigorous academics, cutting-edge research, and dedicated public service" (UCI, n.d.-a, para. 1). Table 7 highlights the institutional characteristics of UCI based on its 2018 STARS report.

Table 8

UCI institutional characteristics

Type:	Doctoral/Research
Public/Private:	Public
Endowment size:	10800000000 US
Total campus area:	1475 Acres
Locale:	Mid-size city
Number of academic divisions (e.g. colleges, schools):	16
Number of academic departments (or the equivalent):	45
Number of students enrolled for credit:	33461
Total number of employees (staff + faculty):	9575
Full-time equivalent student enrollment (undergraduate and graduate):	33093
Number of student residents on-site:	8986

Source: STARS. (2018b).

As indicated in the 2018 STARS report, UCI brings around $5 billion annually to impact the local economy of Orange County. With more than 36,000 students enrolled, UCI offers more than 80 majors and over 70 minors to provide learning opportunities for students. It also has over 180,000 alumni all around the world who are impacting society in all sectors. According to the campus data, Figure 9 shows the full-time student enrollment trend over the past eight years.

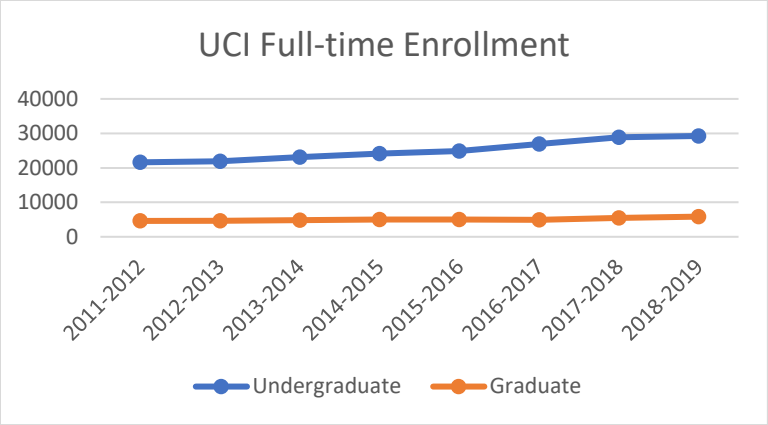

Figure 9. UCI common data set of student enrollment.

Based on the campus data above, the overall full-time student enrollment is growing each year steadily. The cost of attendance depends on students' residency and living arrangements. Table 8 below shows the tuition for in-state and out-of-state students based on the UCI estimated expenses of 2019-20 academic year.

Table 9

Tuition and fees for U.S. and international students

In-State Tuition per Credit	Out-of-State Tuition per Credit
$317	$1,123
# of In-State Students	# of Out-of-State students
29,950	6,792

Source: UCI. (n.d.-b).

The student enrollment has been increasing over the years, especially with the large international population on campus. Tuition revenue has made a large contribution to the financial sustainability of UCI. With the large student body on campus, UCI is committed to excellence through diversity (UCI, 2017). According to the College Portrait report, Figure 10 below shows the undergraduate demographic profile in UCI (UCI, 2017).

UNDERGRADUATE PROFILE

Total undergraduates		29,307
Gender		
Women	15,436	53%
Men	13,871	47%
Race / ethnicity		
Hispanic	7,677	26%
American Indian or Alaska native	41	<1%
Asian	10,377	35%
Black or African-American	483	2%
Native Hawaiian or other Pacific Islander	32	<1%
White	4,090	14%
Two or more races	1,133	4%
Non-resident alien	4,906	17%
Race / ethnicity unknown	595	2%
Geographic distribution		
California	23,454	80%
Other U.S. states & territories	537	2%
Other countries	5,316	18%

Figure 10. UCI College Portrait Fall 2017 Report.

As written in the Strategic Plan, students are "at the very heart of everything we do" (UCI, 2016, para 1). As a learning organization, UCI aims to transform the students to be the change engine through educational opportunities offered at the institution, with a goal to make a positive impact across the world. Sustainability was highlighted in the Strategic Plan of UCI with the commitment to prepare future leaders with skills in solving complex social and ecological issues (UCI, n.d.-d).

Sustainability Performance on Campus

UCI earned the Platinum status as one of the Research/Doctoral institutions out of 283 U.S. institutions that participated in the STARS program measured in the area of academia, engagement, operations, planning & administration and innovation. Table 9

shows the applicable score of the sustainability performance in the five areas based on the 2018 STARS report.

Table 10

UCI 2018 STARS applicable score of campus sustainability performance

Academia	93%
Engagement	91%
Operation	67%
Planning & Administration	84%
Innovation	100%

Source: STARS. (2018b).

Academia. In the 2018 STARS report, UCI achieved 93% of the applicable scores in the academia category; among all the courses in UCI, 20% of courses offer sustainability in 84% of academic departments (STARS, 2018b).

Academic programs. A sustainability component was integrated into interdisciplinary studies across the various academic departments in UCI. It has several undergraduate degree programs, such as Environmental Science and Urban Studies (STARS, 2018b). The master's degree in Conservation and Restoration Science is a collaborative graduate program; the doctoral program in Earth System Science focuses on the science aspect to train scientists and researchers to become experts in specialized areas (STARS, 2018b). Besides the specific program mentioned above, sustainability was highly addressed in the engineering program.

Immersive experience. UCI offers many opportunities for students to explore outside the campus. The Costa Rica Program immerses students in the local culture and wildlife to understand the issue a global scale (STARS, 2018b). UCI is involved in many international movements and initiatives, such as Global Public Health Bridges, to support

global communities (STARS, 2018b). On-campus internships were also provided to encourage students to become leaders in addressing campus operational challenges and solutions.

Research. The institution created various ways to provide incentives to support faculty on conducting research that contains a sustainability component. Cash awards and grants were provided to assist the faculty who would participate in the initiative (STARS, 2018b). As a research institution, around 17% of the faculty and staff in UCI was engaged in sustainable research (STARS, 2018b). Scholarship and fellowship opportunities are also available for students to conduct the research in UCI.

Engagement. In the 2018 STARS report, UCI achieved 91% of the applicable scores in the engagement category (STARS, 2018b).

Student engagement. For new students, UCI offers an orientation that covers the component of sustainability to all students who attend the session; for continuing students, there are many student-government groups focused on sustainability (STARS, 2018b). By involving the four main gardens on campus, students enrich their understanding of food sustainability. The Student Institute for Sustainability offers a residential immersion program to train students in solving complex problems (STARS, 2018b). EarthReps is another opportunity for students to gain leadership skills by getting involved with the mentors working with the residence halls (STARS, 2018b). With the support of the Green Initiative Fund, students can attend research events and projects (STARS, 2018b). Besides engaging students in research, UCI also leads many outdoor adventure programs to enrich students' interactive experience with the natural environment.

Employee engagement. UCI not only engages students to participate in various programs, but it also offers professional development and training to empower staff members. During the new employee onboarding orientation, UCI shares its sustainability resources and the available research opportunities (STARS, 2018b). ***Community engagement.*** UCI partners with teachers from local community colleges to conduct research in addressing the water crisis by providing financial and educational support. Based on the 2018 STARS report, the volunteer tree-planting project has been an ongoing program for over 29 years; more than 26,500 trees planted in the community and over 16,000 students have engaged in local community service program (STARS, 2018b). The continuing education in UCI also offers certificate programs related to sustainability to empower the community members.

Intercampus engagement. The University of California (UC) Cool Campus Challenge is a unique program to measure campus sustainability among all ten UC campuses (STARS, 2018b). UCI ranked number one in this program with a wide range of participation among students, staff, and faculty. It also shares information with other higher education institutions in the network to support the educational community.

Operation. In the 2018 STARS report, UCI achieved 67% of the applicable scores in the operation category (STARS, 2018b). There are certain areas that UCI reached higher achievement, while other areas could continue to improve.

Room for improvement. UCI gathered and analyzed the annual inventory of greenhouse gas emissions on campus over the years to reduce carbon emissions (STARS, 2018b). In this greenhouse gas emissions category, it reaches 6 points out of the total score of 10 points. So, there still is room for UCI to improve in this category and meet the

goal of climate neutrality by 2025. A green building policy was put into place by the leadership committee. All the new construction on campus followed the green building rating system, which includes 17 LEED Platinum and 10 Gold (STARS, 2018b). Renewable solar energy and upgraded LED lights were used to reduce energy consumption (STARS, 2018b). Among the total energy use on campus, only 2% is from clean and renewable sources, and the natural gas provided over 75% of the electricity use (STARS, 2018b). For dining service supply, UCI purchases about 15% of food and beverage through sustainable verified vendors that meet the sustainability standards or are local community based (STARS, 2018b). ***Achievement.*** Even though there are areas that still need improvement, UCI has reached a successful benchmark in many of the operational areas. It changed the energy from predominantly grid delivered electricity to predominantly natural gas delivery (STARS, 2018b).

The cross-campus pre-consumer food waste collection program is another achievement to minimize the food waste and add compost to the composting program. UCI also followed the UC Sustainable Practices Policy to support sustainable purchasing (STARS, 2018b). Students and staff were involved in promoting environmentally friendly transportation in their daily choices. The native plants on campus were intended to minimize the harm to the environment and to maximize the value of natural habitat (STARS, 2018b). The natural area preserve not only reflects the protection to the local biodiversity, but also offers a valuable learning laboratory for students and faculty.

Planning & Administration. In the 2018 STARS report, UCI achieved 84% of the applicable scores in the planning and administration category (STARS, 2018b).

Policy support. In 2007, the University of California adopted a Policy on Sustainable Practices and signed the American College and University Presidents' Climate Commitment (STARS, 2018b). Sustainability is also addressed in the 2016 Strategic Plan of UCI.

Leadership support. UCI formed the leadership committee to discuss and make decisions on sustainability. The committee members include employees from the Chancellor level, to different units such as academic units, facilities, IT department, student affairs, medical center, student organizations, and more (STARS, 2018b). With collaborative teamwork, many achievements have been accomplished.

Bottom-up support. The support is not only from the top leadership; students are also the leading force in implementing sustainability on UCI's campus. Students participated in campus elections, served on various committees, and got involved in the highest governing body to represent the student body (STARS, 2018b). The campus investment decision-making process encourages students, faculty, staff, and other stakeholders to work together to best benefit students and the entire UCI community (STARS, 2018b). Employees on campus were also encouraged to express their voice about the working environment.

Innovation. In the 2018 STARS report, UCI achieved 100% of the applicable scores in the innovation category (STARS, 2018b).

As a research institution, UCI contracted with the industry sector to build a connection for research exploration to be applied in the real world. By initiating an energy-saving program through a partnership with the local community, UCI aims to

develop an energy efficiency model that can be applied beyond the scope of research (STARS, 2018b).

Based on the 2018 STARS report, certified dining and bicycle-friendly transportation also demonstrate UCI's support of green operations on campus (STARS, 2018b). Students lead the program of educating peers on how to cook and live green, with the university providing funding and accessible publications.

The Journey of Campus Sustainability in UCI

UCI's journey of sustainability and participating in the STARS program started in 2013 and earned the Platinum rating in 2018. To better understand the journey of how UCI has achieved its outstanding performance on campus, the researcher contacted the assistant vice chancellor who worked in the sustainability office in UCI. He recommended that the best source for the interview would be Carrie, the sustainability and planning analyst. Carrie worked directly on the STARS report, and she was able to provide demonstrable, first-hand insights into the program.

Carrie was a former student who studied social ecology with a focus in urban planning at UCI and has worked in the office of sustainability for two years. The office of sustainability is led by the associate chancellor for sustainability with six other staff members. There are three aspects that Carrie said summarized the success of their journey: top-level support, the use of STARS as a guidebook, and collaborative effort.

Top-level support. In 2018, UCI rated the highest score in top-level support among all other higher education institutions that participated in the STARS program. Carrie explained this in terms of the UCI leadership and the UC system.

UCI leadership. Carrie's department's requires support from the higher leadership level, and the support of school policy to operate effectively. The campus leadership was highly involved in making sustainability a primary emphasis for the institution. As Carrie stated before her onboarding, Wendell Brase became UCI's first Associate Chancellor for Sustainability. In her opinion, campus leaders who place an emphasis on sustainability has been greatly beneficial. In 2016, the campus wrote the strategic plan, and one of the goals was to implement sustainability on campus. It helped to establish a culture of sustainability at UCI institution wide.

UC system level. Carrie mentioned that the decision of taking the initiative in sustainability couldn't start without the support of the UC system. She said, "one of the most significant reasons is that UCI is part of the University of California system which encompasses ten universities, and so it has been around for a quite a while now." Regarding the support from the UC system, she informed:

> The UC Office of the President established their Sustainability Practices Policy in which all UC campuses are required to adhere to the sustainability policies. And since that has been implemented, going on for quite a while, the importance of reporting progress and being part of rankings and ratings naturally happened. Also, I think a lot of that is because of certain stakeholders on our campus who are the movers and shakers of sustainability, and really want to dive into it. It's always helpful when you come from a big university system to have that higher-level support system-wide as well as campus-wide.

Use STARS program as a guidebook. In five years, UCI has implemented various new initiatives and projects on campus, which helped the institution to earn the

overall best performance. Carrie shared that they approach all the STARS credits as a guidebook to improve their performance. She explained:

> Approaching AASHE STARS as a guidebook and roadmap for sustainability has led us to establish more programs and initiatives, working with academics and with the courses. And no one tells you exactly how to achieve Platinum, but for us using the STARS platform as a guidebook, like many times I can't stress enough, I think that is the most ideal thing.

She mentioned that the reporting method also plays an essential role in getting a better score. She explained that having the new reporting method outlining how they should approach the STARS really went a long way. She added that not overthinking is the key when reporting the efforts. Another improvement during the process was to provide more related and useful resources to have the right amount of information. Carrie identified that they have improved on linking resources, websites, and PDF documents to justify the responses and clarify confusion.

Collaborative effort. In addition, Carrie expressed that developing the report for the STARS program takes not one department, but a campus collaborative effort to make it happen. She described that they collaborated with 27 campus departments, and they were in communication with about 90 individuals. She highlighted out that her office was the gatekeeper of the information and coordination, and they trust the help of other departments who have the information that her department would need for the reports. UCI has been reporting on the STARS program for years, so working together to get the report done seems like a natural process rather than a forced task to the departments involved.

Carrie shows her appreciation to her boss in the office. He is the one providing support to his staff and paves the road to ensure that the whole leadership team shares the same belief. Carrie explained that her boss and the assistant vice chancellor enlisted many offices and units they had not regularly worked with to get them onboard. The assistant vice chancellor has worked there for over 30 years, has many connections, and can create new connections as needed. For the campus stakeholders that Carrie did not know, he would step in and help contact them.

Challenges and Drivers

There are many challenges UCI has been facing over the years in achieving sustainability and completing the STARS report. For each challenge, their office has managed to find the possible solution to make the best of their effort.

Challenge 1: Overwhelming tasks. Carrie said that the process of putting the STARS report together was "quite an undertaking." Her office takes an in-depth review of each credit and compares it with the previous answer to ensure the quality of the content. Carrie revealed one challenge that they faced in particular: identifying every sustainability effort taking place on such a large campus. The workload can be overwhelming as well in preparing the report. Even though it is a big challenge, their office found the solution to overcome this problem, "you need to ask the right questions to get the right answers." Knowing what to ask and the best person to reach out to can help tremendously to handle the situation.

Challenge 2: Reluctance among employees. The departments were supportive of providing the information her office needed; however, the process was not

straightforward. She admitted, “it's definitely not an easy task. It’s a lot of work; it is a big challenge itself for sure.” She described that “sometimes the departments will be late in providing information, or what they would provide us didn't meet the criteria of the credits, so, taking more time to work with that. It was quite challenging for sure.” So, to gather all the information, she said, “you have to have a devoted team who wants nothing but the best to respond to every credit.”

Challenge 3: Lack of student participation. As collaborative as the campus staff can be, the students need to be highly involved too. But the awareness among students is not what she expects, and that is one of the main challenges that Carrie expressed that needs more emphasis. Her office struggled in providing the data and figures to measure the student’s participation in sustainability programs. She shared that the turnout and participation is sometimes not what they expected for an event. They have been creative in how to incentivize and encourage people attend and participate in the sessions such as giving out outreach materials and posting events on social media.

Challenge 4: Communicating the sustainability effort to others. Carrie’s office gives tours and presentations to students, and UCI’s ranking as a sustainability leader seems to have no impact or influence on students’ decision to attend UCI. Students didn't know that UCI was a sustainability leader. Therefore, communicating what they have been doing and getting people interested in being involved is a challenge. The office is aware of the strides they have been making, but better communicating their intentions and aspirations is essential as well.

Even though there are challenges, sustainability initiatives are important to UCI. As one of the most sustainable campuses, there are various drivers that motivate their sustainability initiatives on the UCI campus.

Driver 1: Do the right thing. UCI knows "it is the right thing for the future of our campus and the fact that we are helping to educate the future leaders." Carrie said that higher education plays a vital role in educating the future citizen because there's no greater place than higher education to stress the importance of sustainability and climate.

Driver 2: Trust others. Carrie expressed her gratefulness to all the departments who helped to work on the report together, "we highly, rely upon other campus departments to be part of the overall process." Carrie's office is the central hub on collecting the information, but the individual who provided answers to the assigned sections was the one doing the actual daily work. Carrie expressed the importance of these individual champions.

Driver 3: Social responsibility. Carrie encourages all institutions to take actions together to achieve sustainability because it is a social responsibility. It is because "we can contribute to a lot; it feels good, even though we may not always see it." She continues, mentioning that higher education as the learning laboratory, a place to test things out for research and new technology to empower students. She pointed out, "the whole reason why the sustainability initiative happened is because of our students." Working with future generation on campus, she stated that higher education acts as a living laboratory, setting the right example for students, and being able to inform them, thus giving them the support and encouragement to take this on in the real world.

Driver 4: Making changes. Regarding changes, she said, "people have that feeling that as just one person, how can they really help to reduce the impact of climate change?" But what she has seen in UCI is "power in numbers, and the growth of people as they learn and discern information concerning their future." She shared that sometimes it can seem a little overwhelming as an individual to define their purpose but getting others excited about changes that can be made and working together, is the greatest part of being at an institution.

Institution 2: Portland Community College (PCC)

Institutional Characteristics

Located on the Northwest coast of Oregon, Portland Community College (PCC) is the largest post-secondary institution in the state. There are "four campuses and eight centers, and other independent locations throughout the community offer courses and provide student services" (PCC, n.d.-a, para. 3). The mission of PCC is to "support student success by delivering access to quality education while advancing economic development and promoting sustainability in a collaborative culture of diversity, equity and inclusion" (PCC, 2016, para. 1). Table 10 highlights the institutional characteristics of PCC based on its 2017 STARS report.

Table 11

PCC institutional characteristics

Type:	Associate's
Public/Private：	Public
Endowment size:	3799341 US
Total campus area:	341 Acres
Locale:	Large city

Table 12 (continued)

Number of academic divisions (e.g. colleges, schools):	19
Number of academic departments (or the equivalent):	124
Number of students enrolled for credit:	51474
Total number of employees (staff + faculty):	3255
Full-time equivalent student enrollment (undergraduate and graduate):	28019
Number of student residents on-site:	0

Source: STARS. (2017).

Back in 1961, PCC was an adult education community college. After over 50 years of development, it now serves over 70,000 full-time and part-time students. As a community college, it offers various education programs to benefit the local economic community. According to the campus enrollment reporting data, Figure 11 shows the full-time and part-time student enrollment trend over the past few years (PCC, n.d.-c).

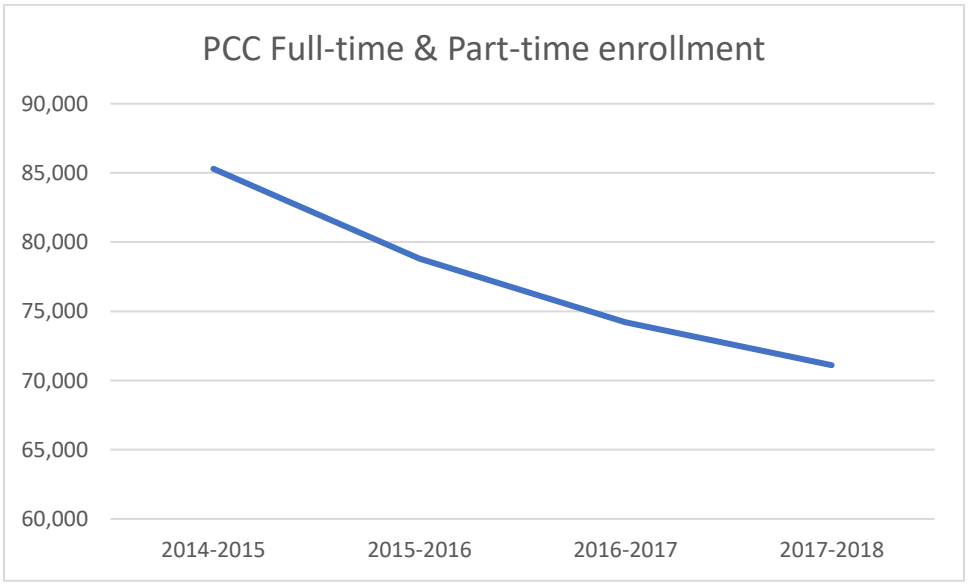

Figure 11. Enrollment reporting data.

Based on the campus enrollment reflected in Figure 11, the overall full-time and part-time student enrollment is decreasing each year. As a community college, there is no graduate program or on-campus housing in PCC. Table 11 shows the tuition for in-state and out-of-state students studying in PCC. The cost of attending is low to ensure open access for the community.

Table 13

Tuition for in-state and out-of-state students

In-State Tuition per Credit	Out-of-State Tuition per Credit
$116	$251
# of Full-time In-State Students	# of Full-time Out-of-State Students
25,084	700+

Source: PCC. (n.d.-f).

As a community college, PCC focuses on how to "educate a skilled workforce and prepare students to transfer to four-year institutions" (PCC, n.d.-a). PCC also serves the community with a commitment to diversity. Table 12 below shows the student demographic profile at PCC.

Table 14

Student demographic profile in PCC 2017-2018

Total students	71,000
Gender	
Women	54%
Men	42%
Unreported	4%
Race/ethnicity	
White	55%
Hispanic / Latino	12%
Unreported	12%
Asian	8%
Multi-racial	6%
Black / African American	4%

Table 15 (continued)

International	3%
Pacific Islander	2%
Native American / Alaskan	1%
Full-time credit students	42%
Part-time credit students	58%

Source: PCC (n.d.-b).

Based on the review of the document, economic development and sustainability were highlighted in the institution's mission. It recognizes the role that higher education plays in leading the change towards a sustainable future (PCC, n.d.-e).

Sustainability Performance on Campus

PCC earned the Silver rating in 2017 among all the institutions participating in the STARS program measured in the area of academia, engagement, operations, planning & administration and innovation. Table 13 shows the applicable score of the sustainability performance in the five areas based on the 2017 STARS report.

Table 16

PCC 2017 STARS applicable score of campus sustainability performance

Academia	64%
Engagement	68%
Operation	57%
Planning & Administration	58%
Innovation	100%

Source: STARS. (2017).

Academia. In the 2017 STARS report, PCC achieved 64% of the applicable scores in this category (STARS, 2017).

Academic programs. Among all the courses in PCC, 10% of courses offer sustainability courses within 21% of academic departments (STARS, 2017). It

encourages faculty to embed sustainability into their curriculum using the inter-disciplinary approach. It has several sustainability-focused undergraduate degree programs, such as Environmental Studies ("Portland Community College Reports: STARS 2.1," 2017). As a community college, the Civil Engineering Technology program and the Electronic Engineering Technology program focus on the practical application of engineering knowledge in the field of the renewable energy system and environmental issues (STARS, 2017). The Sustainability Practices and Resources Council (SPARC) provides stipend support to faculty for developing courses that contain a sustainability component (STARS, 2017). Funding and professional development were also available to faculty to add green outcomes to their classes. Research is not a focus for PCC to pursue in the field of sustainability.

Hands-on experience. Students can learn weather and climate patterns at one of the natural building structures made from clay and straw on PCC campus (STARS, 2017). They also can work with the building construction and renewable energy certificate program to have hands-on experience. Working together with the faculty, students utilize the learning gardens for organic and sustainable food education.

Engagement. In the 2017 STARS report, PCC achieved 68% of the applicable scores in this category (STARS, 2017).

Student engagement. During student orientation, new students can attend various workshops that have resources related to sustainability on campus. The Green Initiative Fund was supported by the student activity fee to help student sustainability projects on campus (STARS, 2017). Sustainability coordinators on each campus organize student-focused events to engage students to participate in sustainability-related activities

(STARS, 2017). The learning gardens provide students with hands-on experience in food production and green application (STARS, 2017).

Employee engagement. Besides students, over 3,000 employees on campus were also served by the peer-to-peer sustainability outreach (STARS, 2017). For existing employees, PCC has green teams meet every month to provide a platform for these campus sustainability champions to reflect on their accomplishments and challenges (STARS, 2017). All new employees are required to attend the in-service where they can get various information, including sustainability programs on campus (STARS, 2017). Faculty and staff also can participate in professional development conferences related to sustainability.

Community engagement. According to the PCC STARS report (2017), there are more than 1,000 continuing education courses are offered at PCC, and 50 of those courses address sustainability (STARS, 2017). About 12% of students are engaged in community services (STARS, 2017). A positive impact has been made through the outreach campaign, such as 10,087 gallons of water saved over the years (STARS, 2017).

Additionally, PCC encourages students and the community to participate in the events and symposiums. One of the coordinators was dedicated in the public sector to advance sustainability with community partnerships (STARS, 2017). Within the region, PCC is a founding member of the Greater Portland Sustainability Education Network, which is a collaboration between educators, students, and other social sectors to advance sustainability (STARS, 2017).

Operation. In the 2017 STARS report, PCC achieved 57% of the applicable scores in this category (STARS, 2017). There are certain areas in which PCC reached many achievements, and while other areas in which they aim to improve.

Room for improvement. PCC adopted the sustainability policy in the year 2006, which is set as the baseline year. There was around a 15% reduction in total waste generated per weighted campus use from the baseline year; and 27% of waste materials were diverted from the landfill or incinerator by recycling, composting, and donating (STARS, 2017). There is room for improvement in the field of waste minimization and diversion.

There are no buildings certified for LEED O+M (operations and maintenance) in PCC, which can be improved in the future (STARS, 2017). Since PCC is not pursuing food and beverage, their score was lower in the food and dining category. Regarding transportation, there were 19% of the employees that use more sustainable commuting options as their primary method of transportation (STARS, 2017). There is an improvement that can be made to increase carpool awareness among employees.

***Achievement*.** Compared with the performance from 2006, PCC has reduced their total CO2 emission tremendously by 2017 (STARS, 2017). For all the new construction on campus, PCC has LEED Silver as the minimum standard; as a result, new buildings are certified LEED Gold or Platinum on campus (STARS, 2017). All buildings are operated with a temperature control system based on the occupancy to promote energy conservation (STARS, 2017).

The students use the learning garden and the forest to practice the closed-loop model by producing food, as well as collecting and composting food waste from the dining service back to the garden (STARS, 2017). The 110-acre Rock Creek Environmental Studies Center was used as part of lab classes for students to explore the biodiversity (STARS, 2017). According to the STARS report (2017), food donating, and pre-and post-consumer composting were available on campus to ensure food security and minimize the food waste to be used in the vermicomposting systems (STARS, 2017). A strong effort has been made with the local food businesses to promote vegan options for the students; the partnership with the city had to make the compost program a collaborative effort for the campuses (STARS, 2017).

The 2017 STARS report also highlighted the innovative vehicle used on the campuses. A carpool matching program is available for students as well. Bike rental and a repair program is available for students (STARS, 2017).

Planning & Administration. In the 2017 STARS report, PCC achieved 58% of the applicable scores in this category (STARS, 2017).

Policy support. In the strategic plan, it highlighted the commitment to meet the LEED standards for all new construction (STARS, 2017). The data-driven decision-making procedure was also highly addressed in the strategic plan on open communication, providing quality services, and maintaining financial sustainability (STARS, 2017).

Leadership support. The Sustainability Leadership Council was formed with the help of the administrators such as the sustainability office manager, facilities department,

auxiliary services, students, faculty, and other employees on campus (STARS, 2017). The president of the college was incredibly supportive of the sustainability initiative on campus. He went to Germany with the sustainability manager to represent higher education in the 2017 United Nations Climate Change Conference.

***Bottom-up support*.** The students in PCC participated in student government to represent the voice of the students. There are many scholarship opportunities for students to get financial assistance. Faculty and staff were encouraged to share their thoughts to improve the working conditions. Both students and employees served on the committee to ensure diversity and equity in PCC (STARS, 2017).

Innovation. In the 2017 STARS report, PCC achieved 100% of the applicable scores in this category (STARS, 2017).

PCC offers a sustainability focus award to recognize students who complete the related course. The learning garden staff partnered with the campus department on donating food, creating a working opportunity to promote food security to students in need (STARS, 2017). An innovative recycling program was implemented to encourage students to change their personal behavior on recycling (STARS, 2017).

The Journey of Campus Sustainability in PCC

PCC's journey of sustainability and participating in the STARS program started in 2012, and it earned the Silver rating in 2017. To better understand the journey of how PCC has achieved its outstanding performance as a community college, the researcher contacted the sustainability manager Briar and the sustainability analyst Stephania at PCC. They both agreed to participate in the interview. Briar worked directly on the

STARS report, and Stephania used STARS as the in-house evaluation tool rather than directly working on the report.

Briar studied sustainability during her master's degree at Arizona State University and has worked in the office of sustainability in PCC for seven years. Stephania started working at PCC about six months ago and has worked in the field of sustainability for around six years. Briar leads the office of sustainability with four other district staff members. Even though Briar and Stephania joined the college after 2012, they shared the history of how the STARS initiative started. There are three aspects that Briar and Stephania said summarized the success of their journey: student initiative, top-level support, and collaborative effort.

Student initiatives. Briar stated that students were the main drive behind the sustainability movement back in 2006. The students went to the board and said they wanted sustainability integrated into all areas of the college, both in curriculum and in operations. Briar emphasized that student leaders are very committed:

> We have student sustainability ambassadors, and our students have the Eco-global Justice grant that has funded over a million dollars in sustainability programming. We just got the student council to create positions for four sustainability coordinators on the council one for each campus, so I think that's a huge success.

Top-level support. Briar said that 2006 is when the president at the time signed on the American College University President Climate Commitment, which is now Second Nature. Furthermore, the board of directors initiated their sustainability policy

and got the ball rolling from a lot of other programs that have developed into what PCC has now. She said:

> The president is on the steering committee for Second Nature. So, I guess just foundational, so we have that support at the top. The board director created the sustainability policies that are part of their mission. We have the climate action fund that is currently founded by our college president.

Collaborative effort. Briar mentioned that besides the students, PCC also has many faculty members that were already focused on sustainability and integrated that into their curriculum, as they were very passionate about the topic. Once the students and faculty expressed the demand in 2006, the president at the time went to sign up on the ACUPCC, and that's when the board of directors created their sustainable resources policy. From where the ball got rolling developed the sustainability leadership council. Briar explained:

> The students and staff members are really what pushed the program to what it is today. It has grown over the 13 plus years program. PCC has so many dedicated folks, like the sustainability leadership council, that do a lot of the effort. So, there's widespread commitment across the college that sped along a lot of the efforts. People care, and they want to get involved. We have a council that is made from district folks from the operational side of the house, so the support is very widespread.

With support from student, top-level leadership, and collaborative effort, PCC has become one of the best community colleges that earned the recognition in the STARS program.

Challenges and Drivers

There are many challenges PCC has been facing over the years in achieving sustainability and completing the STARS report. For each challenge, their office has managed to find the possible solution in making the best of their efforts.

Challenge 1: Overwhelming tasks. Briar said, "STARS specific, I would say knowing it is quite an undertaking." She articulated that it may take months to complete the report. For the report, they must get information from a variety of department across the college, and not everyone gets back to them right away. For this challenge, Stephania mentioned that it is better to "tie any of the STARS metrics into the existing college accreditation process or other progress metrics. Maybe things are there that other folks are already tracking making it simple for them to give you that information." Also, Briar said that deciding how much time and effort they are going to dedicate to reporting is important to get stuff done. These solutions helped the office make preparing the undertaking task easier.

Challenge 2: Funding shortage. Briar said that funding is always an issue as they progress and gather more support. They have some funding available to the office, but there are some programs that they would like to pursue that the office just doesn't have the funding particularly when it comes to renewable energy. Briar said, "when push comes to shove, that program got added. The budget stays the same and the cost has

increased. At certain times these types of decisions have been made, but sometimes that is not the decision we may want." Briar also mentioned that even though the funding is short, they have received some funding supports such as the climate action funds, the college president funds, the sustainability budget out of facilities, and student fee support. It is always beneficial to get many campus departments and stakeholders committed to be involved in the sustainability projects.

Challenge 3: Reluctance among employees. When preparing the answer to the STARS report, Briar said that when they encounter new questions in the report, they will leave it blank and send to the appropriate contact of the college and ask them to provide a response. Sometimes it may take weeks to work on it. In cases like this, Briar discerned that building relationships is very important. She explained:

> It is a lot more difficult for folks not to follow the procedures they are supposed to if they know you and they like you. Building relationships is really important, especially with the folks who struggle with your program, just being collaborative and trying to get yourself involved in as many as departments in college. The key fact is that if sometimes we talked about something for long enough, people would come around to it.

Stephania agreed that it is pertinent to collaborate as much as possible, it becomes imperative to have that kind of will and that collaboration model going forward.

Even though there are challenges, sustainability initiatives are important to PCC. As one of the most sustainable campuses, there are various drivers that motivate their sustainability initiatives on the PCC campus.

Driver 1: Students first. Briar stated that PCC is wonderful at listening to students' wants and needs. Paying attention to students' requests really helps drive the program to where it is now. Stephania added:

> It is helpful to have an active student body. It's helpful to have communicators, administrators, and people who back up the actions. We're really good at communicating how this connects to various strategic goals across the college, including equitable student success: diversity, equity, social justice, inclusivity, and we just collaborate with everybody across the college.

Driver 2: Community involvement. Stephania reported that PCC as a community college, has a special responsibility to empower people so they can get involved, which is just a part of the overall mission as a community college. Briar shared that PCC is passionate about the health and prosperity of communities and concerned about the communities' perspectives. In turn, the community cares about the environmental sustainability stewardship, and equity. PCC is the founding member of the Greater Portland Sustainability Education Network, and the college hosts the annual symposium. Briar proudly said, "we are signatory, the leader and still in commitment. The president and I traveled to Bonn, Germany for COP 23 to represent higher education."

Driver 3: Social responsibility. Stephania mentioned that higher education is a great place to make an influence on the students because "we plant seeds for the future. If we see something we can pursue, we will pave the way to change." Briar also shared that "we are going to have the most lasting impact in regard to addressing some of the major global sustainability crises we face through educating today's and tomorrow's leaders

around sustainability." Briar continued to share that as a community college, developing a great workforce is a big focus for PCC too. More of that kind of operational efficiency is what the institution sees as the biggest impact.

Stephania shared that a good model moving forward is if students are going to work in the Portland area, they will encounter institutions with similar values and know how to behave. If they go somewhere that does not have those values, they know that it is possible to implement such values, translating it into real operational changes and valuable savings for their future employers. These are significant things that can make long term impacts in the world.

Institution 3: University of Middle Land (UML)

Institutional Characteristics

Located on the east coast of the United States, University of Middle Land (UML), a pseudonym, is a part of the four campuses system. It provides students the opportunity to enroll in the comprehensive undergraduate and specialized graduate programs. Student focus is the core of the institutional value. Table 14 highlights the institutional characteristics of UML based on its 2018 STARS report.

Table 17

UML institutional characteristics

Type:	Master's
Public/Private:	Public
Endowment size:	46000000 US
Total campus area:	500+ Acres
Locale:	Large city
Number of academic divisions (e.g. colleges, schools):	6
Number of academic departments (or the equivalent):	27

Table 18 (continued)

Number of students enrolled for credit:	16000+
Total number of employees (staff + faculty):	1500+
Full-time equivalent student enrollment (undergraduate and graduate):	10000+
Number of student residents on-site:	1500+

Source: University of Middle Land Reports: STARS 2.1, 2018

Students and their needs have driven UML to provide them a life-enriching experience. According to the campus data, Figure 12 shows the full-time student enrollment increase trend over the past seven years.

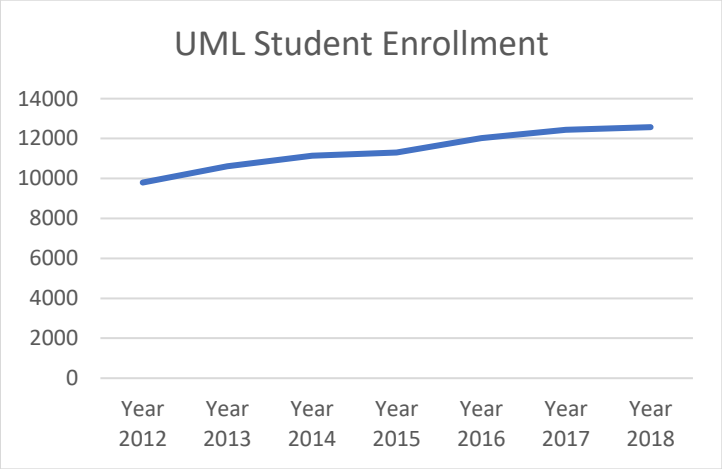

Figure 12. UML student enrollment.

Based on the campus data in Table 14 and Figure 12, the overall student enrollment is growing steadily each year. The cost of attendance depends on students' residency and living arrangements. Table 15 below shows the tuition and fees for in state and out-of-state students based on the UCI estimated expenses.

Table 19

UML tuition and fees for in-state and out-of-state students

In-State Tuition and Fees per credit	Out-of-State Tuition Fees per credit
$300	$800
# of In-State Students	# of Out-of-State Students
12,000+	200+

Source: UML Tuition rates.

The student enrollment has been increasing over the years, which brings a steady tuition revenue to the institution. According to the campus data, Table 16 below shows the undergraduate demographic profile in UML.

Table 20

UMI undergraduate profile

Total number	10,000+
Nonresident aliens	90+
Hispanic/Latino	2000+
Black or African American	400+
White	6000+
American Indian or Alaska Native	30+
Asian	350+
Native Hawaiian or other Pacific Islander	20+
Two or more races	800+
Race and/or ethnicity unknown	190+

Source: UML Common Data sets.

As written in the Strategic Plan, UML aims to provide inspired sustainability leadership and education, and to direct the responsible, informed application of social, environmental and economic sustainability measures in all university activities (UML Strategic Plan, n.d.).

Sustainability Performance on Campus

UML earned the Gold rating in 2018 among all the institutions participating in the STARS program measured in the area of academia, engagement, operations, planning & administration, and innovation. Table 17 shows the applicable score of the sustainability performance in the five areas based on the 2018 STARS report.

Table 21

UML 2018 STARS applicable score of campus sustainability performance

Academia	86%
Engagement	75%
Operation	60%
Planning & Administration	63%
Innovation	100%

Source: STARS. (2018c)

Academia. In the 2018 STARS report, UML achieved 86% of the applicable scores in this category (STARS, 2018c). According to the STARS report (2018), among all the courses in UML, 10% of courses offer sustainability in 85% of academic departments, as indicated in the 2018 STARS report.

Academic programs. UML has several sustainability-focused undergraduate degree programs, such as Geography and Environmental Studies. The master's degree in Applied Geography is a graduate program that allows students to address the local community issues through applied geographic research (STARS, 2018c). The Master of Science in Sports Nutrition enables students to integrate sustainability with the knowledge of food into their practice (STARS, 2018c). The Engineering graduate program focuses on consumption in a real-world setting. Sustainability was highly addressed in the certificate program as well.

Immersive experience. UML offers opportunities for students to explore outside the campus. An Africa trip immerses students in local life to learn about agriculture and public health (STARS, 2018c). The experience helps students understand local issues with a global approach.

***Research*.** According to the 2018 STARS report, around 23% of the faculty and staff were engaged in sustainable research (STARS, 2018c). The institution provides scholarship opportunities for students to conduct the research, especially on topics such as diversity and inclusiveness (STARS, 2018c). There is also funding available for faculty and staff to support their research initiative.

Engagement. In the 2018 STARS report, UML achieved 75% of the applicable scores in this category (STARS, 2018c).

Student engagement. For new students, the orientation session integrated the component of sustainability to ensure that all students were aware of the events and programs on campus (STARS, 2018c). Continuing students were able to attend residency training sessions with sustainability integrated into the program (STARS, 2018c). The office of sustainability provided a waste project for students to get involved, where they were trained to volunteer in various events to promote waste reduction (STARS, 2018c). Nutrition is another field in which students were engaged in. The nutrition seminars were hosted by the wellness center, allowing students to learn about food and wellbeing (STARS, 2018c). In addition, there are student-lead organizations and clubs on campus to promote sustainability. Students had the chance to run projects on campus to practice sustainability in the business world.

Employee engagement. Employees were selected from their departments to attend the sustainability training on the topic of LEED building features in UML (STARS, 2018c). They were encouraged to share the training with other colleagues in their offices. The library staff was highly involved in the green team to implement green initiatives in their department. All new employees attended an orientation that covers sustainability topics. Professional development, such as conferences involvement, was encouraged and supported by UML.

Community engagement. About 18% of continuing education courses address sustainability in UML; about half of the students are engaged in community service (STARS, 2018c). The institution has partnered with multiple organizations to advance sustainability over the years. Working closely with the mayor's office helped to provide recommendations and support for sustainability progress in the city (STARS, 2018c).

Intercampus engagement. Sustainability staff from UML has presented in various conferences hosted by other higher educational institutions. The team from UML mentored other staffs from the local community colleges in the area of waste management and sustainability leadership (STARS, 2018c). Working together with other campuses empowers them to pursue more sustainable efforts across the state.

Operation. In the 2018 STARS report, UML achieved 60% of the applicable scores in this category (STARS, 2018c). There are certain areas that UML reached a certain achievement, while other areas will continue to aim for improvement.

Room for improvement. Among all the sources for electricity use on campus, over 40% was generated by coal consumption; there is a solar panel system on campus to

supply pool operation and water usage (STARS, 2018c). Thus, there is still room for improvement in the energy section. About 6% of the dining services food met the sustainability standards (STARS, 2018c). The dining service is working on increasing the amount of local organic and certified food products they use for supplies.

For landscaping, UML has not adopted an integrated pest management program on campus, but it has done research on the program and is working on the implementation to control the pest population below the economic injury level (STARS, 2018c). Also, there is room to improve in terms of office paper usage. For transportation, only 5% of employees use sustainable commuting options, which could be improved in the future (STARS, 2018c).

Achievement. Even though there are areas that still need improvement, UML has reached a successful benchmark in many of the operational areas. All utilities and water use were measured and recorded in the yearly report to track the performance (STARS, 2018c). Almost all newly constructed or renovated building spaces were certified for design and construction (STARS, 2018c).

UML has a traditional farm, greenhouse, and garden that provides the campus with sustainable produce, which is around 3,000 pounds of food yearly (STARS, 2018c). The dining service practiced trayless dining to help reduce food waste. The institution also has sustainable procurement guidelines for all departments to follow when purchasing goods and services (STARS, 2018c).

Planning & Administration. In the 2018 STARS report, UML achieved 63% of the applicable scores in this category (STARS, 2018c).

Policy support. In the state policy that was recently revised, it requires all the institutions of higher education to follow the US Green Building Council guideline. Therefore, all new buildings and renovations on the UML campus must meet the LEED minimum requirement (STARS, 2018c). Sustainability components were found in the university strategic plan in the areas of academics, development, transportation, climate, and recourses (STARS, 2018c).

Leadership support. The office of sustainability is responsible for most aspects of sustainability on campus, including strategic planning, energy and water conservation, water and recycling, food, transportation, and education (STARS, 2018c). As indicated in the interview, the previous leadership supported the sustainability initiative; however, the upper-level support is inadequate at the moment since new administration is more conservative; extra support from the upper level is still needed.

Bottom-up support. Students acted on the sustainability initiative with the help of faculty to get the STARS program started on UML's campus. Their involvement started over 15 years ago when they created a club to push the green movement on campus (STARS, 2018c). The student government oversees the budget generated by student fees and offers the position of secretary of sustainability (STARS, 2018c). UML formed the sustainability committee to include faculty, staff, and students on board to improve teaching, operations, and other aspects related to sustainability.

Innovation. In the 2018 STARS report, UML achieved 100% of the applicable scores in this category (STARS, 2018c).

The office of sustainability partnered with other offices to develop green labs on campus to promote sustainable practice within institutional laboratories; the program evaluated labs to ensure the efficiency of energy use, hazardous waste disposal, water usage, and employee training (STARS, 2018c).

In 2016, students worked with their academic department to write up a proposal to implement a program on reusing office printing material (STARS, 2018c). It helped offices to reduce costs and aided employees in practicing green behavior on campus.

The Journey of Campus Sustainability in UML

UML's journey of sustainability and participating in the STARS program started in 2011 with a Silver rating and earned a Gold rating in 2018. To better understand the journey of how UML has achieved its outstanding performance on campus, the researcher contacted the sustainability program manager Jamie and the engagement manager Mike at UML. They both agreed to participate in the interview to provide demonstrable, first-hand insights into the program.

Jamie has worked in the office of sustainability for five years, and Mike started working at UML recently. The sustainability director leads the office of sustainability with eight other staff members. There are three aspects that Jamie and Mike said summarized the success of their journey: leadership support, policy support, and collaborative effort.

Leadership Support. Jamie mentioned that for the whole university, the previous chancellor signed the ACCUPC commitment in 2007, being an early signatory of that commitment. Mike added that the director and the former assistant director both sat on

the advisory committee for STARS credits. The former assistant director had a tremendous impact on the climate-energy STARS categories. These supporters ensured STARS was initiated in UML in the early years and also made strides to ensure its continuing growth and success.

State policy support. Mike articulated that the change of state policy may potentially have an impact on the field of the climate, energy, and water credit. Between UML's initial report to now, the State has mandated that all state-buildings must meet the minimum standard of LEED Gold. Those changes have been made because the buildings on the UML campus from 2007 to now have doubled in size. Mike concluded such changes has had a huge impact. Since UML has added more square footage to the campus, the new structures are built efficiently compared to some of the older infrastructure.

Collaborative effort. Jamie shared that the champions on campus includes many students, faculty, and staff members. Mike added that those students and faculty pressure the administration to integrate sustainability, and that's how the office started. Jamie shared:

> Faculties and staffs were giving us different STARS credits to folks in the office. So, all of our students' employees took part, a role in it. And then also working with on-campus partners to not only give the information, but also anything we can do to improve the scores.

Jamie thinks the office and all campus partners do their due diligence to not only include accurate information in the report, but also to use it as the benchmark. Jamie said,

"figure out what we were missing and who needs to be at the table. It broadens our communication structure, definitely bring in folks from other different parts of campus."

With support from leadership, the State, and collaborative effort, UML has become one of the best master's degree awarded institutions that has earned recognition in the STARS program.

Challenges and Drivers

There are many challenges UML has been facing over the years in achieving sustainability and completing the STARS report. For each challenge, their office has managed to find the possible solution to make the best of their effort.

Challenge 1: Changing rubric. Mike highlighted a challenge that arises when creating the STARS report; it is continually changing. He explained, "we are running into problems right now, particularly with the food credit. Because they removed the local food requirement from the new STARS requirement. We were approaching the administration when those got changed or removed, and it impacted the policies efforts on the ground." He asserted that it is necessary to get involved in the STARS government and to help adjust and tweak that tool. The more institutions that are participating and adding in the development, he believed the stronger the program will become.

Challenge 2: Campus structure. UML is one of four campuses under the UM system. Jamie shared a significant challenge: when the four campuses are not involving in implementing or executing goals, this complicates UML's efforts as a single campus to progress. She further explained:

> Like a contract, if the other sister campus got a contract with Zipcar, then we are more likely to make a case for why we should have Zipcar on campus. Whereas no one has a contract in place, then going forward alone can sometimes cause an issue.

To work on this challenge, Jamie ‘s office went to their partners on the other campuses to ask them if they would like to work on things together.

Challenge 3: Secondary priorities. Jamie mentioned that sustainability is within the university’s mission. However, it is not currently one of the higher priorities. Mike added, “sustainability is in the strategic plan; there are elements of sustainability. However, we are in the last year of our strategic plan, so we are currently going through the strategic planning process. It looks like it would be integrated into the new strategic plan, but it will have a very minor tertiary focus of the institution. The institution is moving to more of a smart goal outcome of formatting the strategic planning.” Consequently, their department is not sure how much emphasis will be on sustainability in the new strategic plan.

Challenge 4: Unclear direction. Mike highlighted that UML is in transitional period of the institutional history, with a turnover of leadership in terms of the chancellor and vice-chancellors. He mentioned, “it is really hard to set a specific goal right now because we do not know what the direction and identity of our campuses.” In this circumstance, he stated that their overall goal is continuing to stay the course and remain a leader in the sustainability field, thus persisting positive impact and progress. Jamie added that they are in this position of having to re-educate and remind people why the previous chancellor signed the ACCUPC commitment.

Challenge 5: Pushback. Jamie mentioned that the cross-campus support sometimes could be problematic because "it definitely is the double-edged sword." She agreed there is support, but there was pushback and many questions. She added:

> Our most recent director report was questioning why we're spending money on reporting to STARS and putting so much time and effort on this. And there are so many other folks on campus maybe, who aren't in the reporting structure that sees the benefit in doing the assessment, and like Mike said utilizing the new credit to kind push forward to reach the stretch goal. So, yeah, I think we do get support if it is aligned with efficiency and saving money.

Mike also articulated, "right now we are really struggling. We are going through a new administration that is considerably more conservative with the previous administration. Their values in the area of sustainability is substantially reduced. So, we have to justify the existence of the sustainability initiative in the office a lot more than we would have to in the previous administration." Jamie suggested, "utilizing the different department on campus and letting them help you reach those goals. Moreover, here is how to implement it. That is probably the best way forward."

Even though there are challenges, sustainability initiatives are essential to UML. As one of the most sustainable campuses, various drivers motivated their sustainability initiatives on the UML campus.

Driver 1: Benefit the student. For students who study in UML, Jamie said that it might be the first time that students lived away from either their parents or a guardian and therefore, starting their own habits at least for the traditional-age undergraduate students.

She shared, “we hope that's the kind of ripple effect that students on campus see enough of sustainability even we can't integrate into everything that they are doing. However, they have some sort of connection and are able to then further that connection into their specific professional career.” Jamie said, “anything that we do to benefit students to encourage them to stay for making more accessible, more visible, whatever they need. I think that is where the success is because we are putting time and effort into something that will benefit students.”

Driver 2: Work with the community. Jamie explained that UML has a broad commitment regarding getting the community involved. In order to have a better outcome, the city, the county, and the whole community need to be sustainable as a whole. She shared an example: “what would be like if our county does not have a recycling facility, you know, how can we offer recycling throughout the university?” So, the local community needs to support the university, and in return, the university needs to involve the community in making efforts together. So, UML built a partnership in town to have that town relationship; it also moves the mission forward in terms of sustainability.

Driver 3: Social responsibility. Mike conveyed that he, too, views university as a microcosm of the greater community. Institutions are able to test devices and complete things that really can allow the overall globe to be more sustainable. He understands that such interactions with students, among other factors, provides higher education with the tools that can equip the next generation to succeed in their future endeavors, and hopefully, have some positive impact.

Driver 4: Making changes. In terms of change, Mike stated that it is always a challenge to alter the contentment of familiarity. In other words, it takes time to change old behaviors. However, he believes through certain interactions in relation to sustainability, it would at least push people to ask questions. Moreover, through those questions, there would be some development and positive outcomes. Jamie added, "little things could be changed, like switching out a faucet for low flow texture; or like planning a couple of native plants, so they do not have to water that much but it still brings aesthetic appeal". Jamie shared that the faculty and staff on campus need to see similar projects happening around campus, even though they were not sustainable- related. One needs not to work in the office of sustainability to create positive change.

Institution 4: Northeast Island College (NIC)

Institutional Characteristics

Located on the northeast coast of the United States, Northeast Island College (NIC), a pseudonym, is one of the greenest higher education institutions in the nation. It was founded in the early 19th century over 180 years ago and adopted sustainability as the core value of the institution over 25 years. The mission of the college is to "foster the ideals of environmental and personal responsibility, civic engagement, entrepreneurial spirit, and global understanding" (STARS, 2018a, para 3). Table 18 highlights the institutional characteristics of NIC based on its 2018 STARS report.

Table 22

NIC institutional characteristics

Type:	Baccalaureate
Public/Private:	Private non-profit
Endowment size:	3,018,388 US
Total campus area:	210 Acres
Locale:	Small town
Number of academic divisions (e.g. colleges, schools):	1
Number of academic departments (or the equivalent):	29
Number of students enrolled for credit:	750+
Total number of employees (staff + faculty):	230+
Full-time equivalent student enrollment (undergraduate and graduate):	730+
Number of student residents on-site:	390+

Source: STARS 2.1. (2018a)

As shown in Table 18, NIC is a small private liberal arts college with a small population of faculty and students. It was the largest employer in the area to serve the local community. According to the available data, Figure 13 shows the full-time student enrollment trend over the past few years.

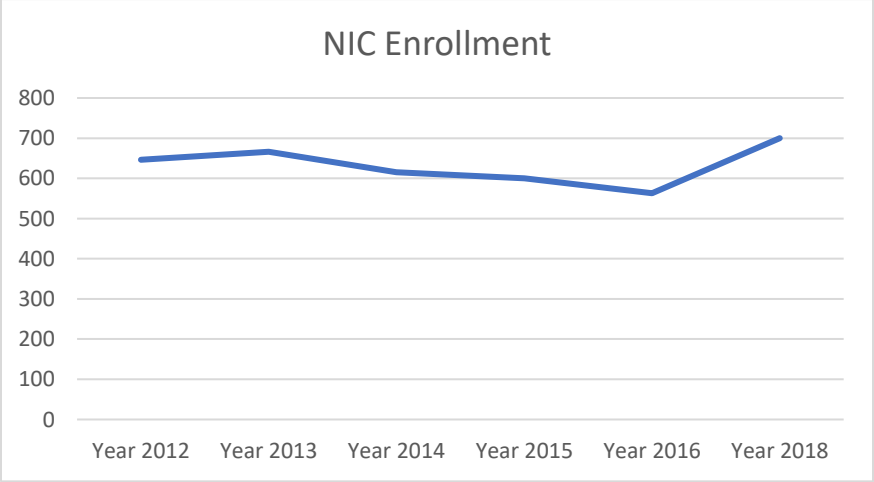

Figure 13. NIC student enrollment

Based on the data above, the overall full-time student enrollment has stayed approximately 700 students over the years. Table 19 below shows the tuition for U.S. students and international students based on the NIC's website.

Table 23

Tuition and fees for in-state and out-out-state students

In-State Tuition and Fees per credit	Out-of-State Tuition Fees per credit
$1,185	$1,185
# of U.S. Students	# of International Students
700+	5

Source: STARS. (2018a)

As a private school, NIC is a tuition-dependent institution. Consequently, the small number of enrolled students has placed the institution in financial difficulty. After many years of struggling, the president announced that NIC will be closing after Spring 2019.

Even though NIC has a small number of students on campus, it is committed to building, harmonizing, and actively encouraging initiatives that advocates diversity throughout various attributes (STARS, 2018a). According to the campus profile, Table 20 below shows the undergraduate demographic profile in NIC.

Table 24

NIC Undergraduate profile

Total	700+
White	300+
Black of African American	25+
Hispanic/Latino	20
Asian	6
American Indian or Alaska Native	5
Non-Resident Alien	5
Ethnicity Unknown	100+

Source: STARS. (2018a)

Even though the college no longer open, it did provide valuable lessons for other institutions to inherit the legacy to advancing sustainability.

Sustainability Performance on Campus

NIC earned the Gold status as one of the Baccalaureate institutions out of 283 U.S. institutions that participated in the STARS program measured in the area of academia, engagement, operations, planning & administration and innovation. Table 21 shows the applicable score of the sustainability performance in the five areas based on the 2018 STARS report.

Table 25

NIC 2018 STARS applicable score of campus sustainability performance

Academia	100%
Engagement	90%
Operation	56%
Planning & Administration	73%
Innovation	100%

Source: STARS. (2018a)

Academia. In the 2018 STARS report, NIC achieved 100% of the applicable scores in the academia category; among all the courses in NIC, 56% of courses offer sustainability in 97% of academic departments (STARS, 2018a).

Academic programs. A sustainability component was integrated into almost every study across the various academic departments at NIC. An undergraduate program, Environmental Studies, was one of the largest and most diverse programs at NIC (STARS, 2018a). This program allowed students to examine the relationship between human, the natural world, and the social world (STARS, 2018a). Several minor programs

enable students to expand their knowledge in the field of chemistry, animal studies, and environmental education (STARS, 2018a). NIC also offered several graduate programs.

Immersive experience. Students at NIC had the opportunity to explore the natural forest, the local foodshed, and the mountains in the region (STARS, 2018a). They worked with local farmers, landowners, businesspeople, policymakers, and educators to develop strategies for the local community (STARS, 2018a). Study aboard was another experience for students to explore the cultural and environmental diversity in Asia. They worked with local people to learn about politics, food, agriculture, and rural development (STARS, 2018a).

Research. To graduate, every undergraduate student needed to conduct a substantive piece of sustainability research and earn a passing grade (STARS, 2018a). Scholarship and research assistant opportunities were also available for students to receive financial support and work closely with faculty at NIC. Around 60% of the faculty and students at NIC were involved in sustainable research (STARS, 2018a). Grants were available for faculty to engage in research on areas related to sustainability. They also received recognition for conduct research, and it was considered as one indicator during faculty promotion (STARS, 2018a).

Engagement. In the 2018 STARS report, NIC achieved 90% of the applicable scores in the engagement category (STARS, 2018a).

Student engagement. All student workers on campus were engaged in sustainability training. Resident assistants received extra training to be prepared to educate residents about sustainability (STARS, 2018a). It also offered an orientation that

covered the component of sustainability to all new students. For continuing students, there were clubs and organizations for students to get involved. Students also operated the school garden daily to explore the field in farming, food waste, and renewable energy use (STARS, 2018a). They were involved in the campus business to serve the community to promote environmental and financial sustainability as well.

Employee engagement. All employees were invited to become peer-to-peer educators for the diversity and inclusion dialogues through campus-wide communications at employee meetings (STARS, 2018a). During the new employee orientation, NIC offered sustainable tours to all new employees (STARS, 2018a). Staff had many chances to get involved in professional development in NIC.

Community engagement. As the largest employer in town, suitability was not only the identity of the college but the identity of the town. Over 60% of students were engaged in community services (STARS, 2018a). NIC hosted the conference to connect the college to the local community to establish sustainability projects for the town. The local farmers, businesses, and organizations were invited to the campus event to support and provide information for the challenges encountered by the community (STARS, 2018a).

Intercampus engagement. Faculty from other institutions brought students to visit NIC for a day-long session to learn how sustainability was implemented on campus (STARS, 2018a). The office of sustainability helped many other higher education institutions when they had inquiries about the sustainability effort on the NIC campus.

Operation. In the 2018 STARS report, NIC achieved 56% of the applicable scores in the operation category (STARS, 2018a). There are certain areas that NIC reached high achievement, while other areas challenged the institution and resulted in the end of their legacy.

Operational obstacles. NIC scored low in this category. Part of the reason is that inadequate financial resources limited the campus. As mentioned during the interview with Eric, the college was over a hundred years old; thus, the cost of maintaining buildings was high. Consequently, the facilities and buildings were not the most efficient due to budget restraints.

Achievement. Even though there were areas that limited the development of the campus, NIC reached a successful benchmark in many of the operational areas. One of the most notable achievement was that NIC became carbon neutral in 2011 (STARS, 2018a). In the greenhouse gas emissions category, it reached full score (STARS, 2018a). Each item in the greenhouse gas emission category has dropped during each inventory to new lows (STARS, 2018a). Clean and renewable energy was another success that over 75% of total energy consumption for NIC was from clean and renewable sources (STARS, 2018a).

Planning & Administration. In the 2018 STARS report, NIC achieved 73% of the applicable scores in the planning and administration category (STARS, 2018a).

Policy support. Sustainability was the primary focus of the institution's strategic plan, and all the specific goals were also sustainability related (STARS, 2018a). The senator of the State where NIC was located has recognized the sustainability achievement

on campus. The senator also agreed that higher education equips the generation with skills to solve the global issues that we are facing in the nation.

Leadership support. NIC has adopted the environmental liberal arts focus over 20 years (STARS, 2018a). It formed the sustainability council over ten years ago to move the campus toward climate neutrality. The provost served on the committee to support the initiative. The members of the board of trustees came with various backgrounds that related to sustainability, with experience in fields such as renewable energy, sustainable business, sustainable design manufacturer, and nature conservancy.

Bottom-up support. The support is not only from the top leadership, but also from students. Students served on the strategic plan steering committee and the presidential search committee (STARS, 2018a). Staff and faculty on campus were involved in the governance process as well.

Innovation. In the 2018 STARS report, NIC achieved 100% of the applicable scores in the innovation category (STARS, 2018a).

NIC connected closely with the local communities to create a model for sustainable rural communities to preserve the local culture, protect the natural environment, and ensure financial security (STARS, 2018a). NIC designed courses on multiple themes to engage the community to participate.

Students enrolled in courses to work with local farmers, businessman, and policymakers to develop strategies to increase the resiliency of the local community (STARS, 2018a). This project empowered students with the first-hand experience to solve the real problem in the region.

The Journey of Campus Sustainability in NIC

NIC's journey of participating in the STARS program started in 2011 and earned the Gold rating in 2018. To better understand the journey of how NIC has achieved its outstanding performance on campus, the researcher contacted the director, Eric, who worked in the sustainability office at NIC. Eric worked directly on the STARS report, and he was able to provide first-hand insights into the program.

Eric had worked in the office of sustainability for more than eight years. He became the director of sustainability since 2015. There are three aspects that Eric said summarized their journey: high commitment, top-level support, and collaborative effort.

High commitment. NIC participated in the STARS program in 2011, but the institution was a part of the initial pilot discussion on how to launch STARS in 2010 or 2009, or even earlier. Eric said it was involved prior to AASHE being the organization. As an active institution which fully committed to sustainability, Eric said that sustainability was integrated across the board, the mission, the strategic plan, anything, and everything, and the identity as an institution. Eric added, "I think that really was the key part; high commitment definitely turned the targeted investment and areas that emphasize some of the values we want to promote that was also supported by a positive score in STARS." He highlighted that there is high level of understanding across the campus with many key members that demonstrate the sustainability commitment. The institution views sustainability as their identity and use the STARS program to measure their overall performance.

Top-level support. NIC started environmental mission focus at the presidential initiative in 1995 when things really switched over to what was called environmental

liberal arts. When asked who started the STARS initiative on campus, Eric said that there's a lot of different people involved; the Provost, for instance was active and made sure NIC was involved. The office of sustainability reported to the Provost since the beginning of the position. The initiative was built during the time when things were growing. Furthermore, the board of trustees, students, faculty, and administration were involved as well.

Collaborative effort. Eric said there is a campus sustainability council at NIC that includes representatives from students, staff, and faculty, and they help guide and progress the agenda. Additionally, he expressed that the support from the campus is extremely strong. There is no question of their commitment; while working on the STARS program, the council would collect, review new initiatives or anything else that might be required. They are quick to respond and support. All parts of the campus are helping. As mentioned, the facility side is obviously involved in making operational pieces. The student organization side is involved in the engagement pieces. Moreover, the faculty engaged in the academic side.

Unfortunately, due to the financial difficulties, NIC was closed in 2019. Its success was worth learning from, but its failure should also be taken seriously by other higher education institutions in advancing sustainability on their campus.

Challenges and Drivers

There are many challenges UCI has been facing over the years in achieving sustainability and completing the STARS report. Shortly after the interview was conducted with the Eric, the college announced it would be closed permanently after

years of struggle. There are many drivers that made NIC one of the greenest institutions in the nation; however, the financial challenges have made its more than one-hundred-year legacy come to an end.

Challenge 1: Decreasing student enrollment. Eric said that one reason that the college was closing was because of the demographic issues in the region. There were not many students enrolling in the programs. As a small liberal art school focuses on sustainability, Eric said, "we may not market ourselves in the correct manner earlier enough to draw students in." He explained the situation:

> We are a tuition-dependent institution, so if there are not enough students here, we are not able to pay the bill at the end. So, we do not have enough students to pay the bills. We cannot start a new semester knowing that we cannot pay the bills, so we are not going to start a new one.

Challenge 2: Increasing operational expenses. Eric said that the costs of running a school are increasing. He explained that:

> As an institution that is over one hundred years, the buildings are old, and there is a lot of maintenance that has not been kept up with. And it has been in the past that the operation for the schools are increasing from different aspects, including staffing, costs continue in this area. So, a lot of hard facts against us.

Challenge 3: Limited financial support. Eric mentioned the funding support shortage, "we do not have a large endowment too, and that is the challenge. In the history of our institution, for many years we are a two-year woman- only college, so our alumni

base is not always having the same capacity of giving as maybe some other institutions." He further shared:

> We don't have a large endowment or large benefactor to help. Moreover, the discount rate is going up, but the amount of financial aid given to students is continuing to decrease and put down the overall revenue.

In terms of other funding support, Eric disclosed that over the past 15 to 20 years the divestment from the States function support like state or federal state dollars coming to institutions is less, which means less money available to support schools.

Even though there were challenges over the past years, sustainability initiatives were important to NIC. As one of the most sustainable campuses, there were various drivers that motivated their sustainability initiatives on the NIC campus.

Driver 1: Identity of who we are. As a small liberal art school, Eric said NIC was doing their best "to identify ourselves as something unique, as the valuable so that people want to come enroll here." He said, "sustainability is pretty much integrated into any aspect of our academic, operational pieces -a breadth of integration. I think that's really the key." He said that many people come to this school, the students and employees because they want to be part of a school that is committed to sustainability.

Driver 2: Transform students. By attending NIC, Eric hoped students are going to walk away with the knowledge of sustainability. Students had the opportunity to lead the sustainability projects on campus. therefore, whether they are sustainability leaders here or not, they are going to have a pretty in-depth understanding of sustainability, nonetheless. Eric articulated:

> Our hope is that there will be a need in the job market and opportunity in students related fields to practice sustainability. Moreover, our hope is that students, too, will continue to apply what they have acquired, thus applying it in their personal lives and communities. They can have a life that is again healthy, and a community that addressing justice and promoting justice that will build environmentally sound ecosystems, addressing the challenges we have regarding our ecosystems at this point. We need to prepare students who can in their careers and the communities so they can help build a more sustainable world.

Driver 3: Social responsibility. Eric said, "I think our place is that if every college and institution went carbon neutral it will have an effect, but honestly it will have limited direct impact our climate change. However, if we educate our students on how to make sustainable changes in a complex institution, they go out into the world, and their impact will be a lot greater." He explained:

> Really integrating students into understanding the knowledge and the science behind sustainability challenges and potential solutions and then how to navigate organizations and communities to influence, listen and understand and turn our community toward a more sustainable world really, I think it's a key piece. I think other pieces higher education can participate is to beta test and being experimental with non-conventional ways which could address sustainability challenges too.

The findings presented in the chapter contain the institutional characteristics, sustainability performance, experiential journey, and the challenges and drivers of four institutions. The cross-case analysis will be presented in the next chapter to understand sustainability across different types of institutions.

CHAPTER V. CROSS CASE ANALYSIS OF THE FINDINGS

This chapter presents a cross-case analysis of the four exemplary higher education institutions: i.e., Doctoral, Master's, Baccalaureate, and Associate's, as measured by the Sustainability Tracking, Assessment & Rating System (STARS). As described in the last chapter, the cross-case analysis will include demographic characteristics, the sustainability performance, the journey of participating in the STARS program, and the challenges encountered, as well as the drivers that motivated the initiatives.

This chapter focuses on the institutional dynamics, sustainability performance, the journey of campus sustainability, and challenges and drivers.

Institutional Dynamics

This research aims to help higher education institutions better understand sustainability on campus across different types of institutions.

Institutional type. The research purposefully demonstrates the sustainability overview across different types of higher education institution: i.e. Doctoral, Master's, Baccalaureate, and Associate's. Table 22 shows the basic institutional facts across sites based on the Carnegie Classification report.

Table 26

Carnegie classification for the four institutions

	UCI	PCC	UML	NIC
Level	4-year or above	2-year	4-year or above	4-year or above
Type	Doctoral/ Research	Associate	Master's	Baccalaureate
Control	Public	Public	Public	Private not-for-profit
Basic	Doctoral Universities: Very High Research Activity	Associate's Colleges: High Transfer-Mixed Traditional/Nontraditional	Doctoral Universities: High Research Activity	Master's Colleges & Universities: Small Programs
Undergraduate Instructional Program:	Balanced arts & sciences/professions, high graduate coexistence	Associate's Colleges: Mixed Transfer/Vocational & Technical	Balanced arts & sciences/professions, some graduate coexistence	Balanced arts & sciences/professions, some graduate coexistence
Graduate Instructional Program:	Research Doctoral: Comprehensive programs, with medical/veterinary school	N/A	Research Doctoral: Professional-dominant	Postbaccalaureate: Arts & sciences-dominant
Enrollment Profile:	High undergraduate	Exclusively undergraduate two-year	Very high undergraduate	Majority undergraduate
Undergraduate Profile:	Four-year, full-time, more selective, higher transfer-in	Two-year, mixed part/full-time	Four-year, medium full-time, selective, higher transfer-in	Four-year, full-time, selective, higher transfer-in
Size and Setting:	Four-year, large, primarily residential	Two-year, very large	Four-year, large, primarily nonresidential	Four-year, very small, highly residential

Source: The Carnegie Classification of Institutions of Higher Education. (n.d.-c).

Based on the classification, it clearly shows the differences of institutions such as the program emphasis, enrollment profile, and the size of the institution. These four exemplary institutions set an example of excellence of pursuing sustainability for other institutions that fall under the same classification. Each type of institution has its priorities, its strengths, and limitations. Different characteristics of schools sometimes perform differently in the STARS program. For example, PCC does not have on-campus housing, and some assessments would not apply to it. Another example is that a Doctoral/Research institution might score differently than other schools in the category of academia.

Financial availability. The closure of NIC was a wake-up call for higher education. An institution that was centered on sustainability turned out to be insolvent. From the following aspects, financial sustainability is vital in advancing sustainability efforts across campuses.

Revenues and Expenses. For UCI, the top three sources that contribute to the total revenues were medical centers, tuition and fees, and grants as well as contracts. Together they contributed about 68% of the total count of the revenues. For PCC, the top three sources were property taxes, tuition and fees, and State FTE (full-time equivalent). Together they provided about 67% of the total count of the revenues. For UML, the top three sources that contributed to the total revenue were tuition and fees, auxiliary fund, and restricted fund. Together they provided about 86% of the total count of the revenues. For NIC, the top three sources were tuition and fees, room and board, and gifts. Together they contributed about 85% of the total count of the revenue. Table 23 shows the primary revenue sources across the four institutions.

Table 27

Primary revenue sources across the four institutions

UCI	PCC	UML	NIC
Auxiliary enterprises	Auxiliary enterprises	Auxiliary enterprises	Room and Board
Grants and contracts	Grants	Grants	Grants
Medical centers	Property taxes	Funds	Investment income
Other	Other	Other	Other
Student tuition and fees	Tuition and fees	Tuition and fees	Tuition and fees
State educational appropriations	State resources		Conference
Educational activities			Gifts
Private gifts			

Source: UCI. (2019); PCC. (n.d.-d); UML. (n.d.); NIC. (n.d.)

For UCI, the expenses primarily came from the following aspects: medical centers, instruction, and research. For PCC, those areas included instruction, student support services, and physical plants maintenance. For UML, instruction, academic support, and institutional support were the areas that contributed to the expenses. For PCC, instruction, dining hall and dorms, and student services were the areas where the money was expended. Table 24 shows the main expenses across the four institutions.

Table 28

Main expenses across the four institutions

UCI	PCC	UML	NIC
Academic support	Instruction support	Academic support	Academic support
Auxiliary enterprises	Physical plant	Operations of plant	Dining hall and dorms
Institutional support	College support services	Institutional support	Conferences
Instruction	Instruction	Instruction	Instruction

Table 29 (continued)

Student services	Student support services	Student services	Student services
Public service	Transfers	Public service	Grant expenses
Research	Contingency	Research	
Student financial aid	Depreciation	Scholarships and fellowships	
Interest payment			
Medical centers			
Other			
Depreciation			

Source: UCI (2019); PCC (n.d.-d); UML. (n.d.); NIC. (n.d.)

Through reviewing their financial reports, UCI's revenue exceeds its expenses, while on the other hand, the revenue from PCC, UML, and NIC was less than their expense. The financial availability was brought up in the corresponding interviews. For example, Carrie from UCI said that they received the UC system-level support for sustainability initiatives. Briar from PCC mentioned that their funds come from the president funds and student fees, and with help from other departments on campus. Jamie and Mike shared that UML was funded through the general fund, including the academic side of the house, and the auxiliary; however, they still need more support in some way. Eric expressed that NIC was funded through the general operating budget, along with other funds, such as the academic initiatives.

Student enrollment. As discussed above, student tuition and fees were the top contributors to the institutional revenue across all four institutions. Thus, student enrollment is a clear indicator of institutional development. Figure 14 shows the for-

credit student enrollment across four institutions. It shows that PCC has the largest student enrollment, while NIC has the smallest number of student enrollment.

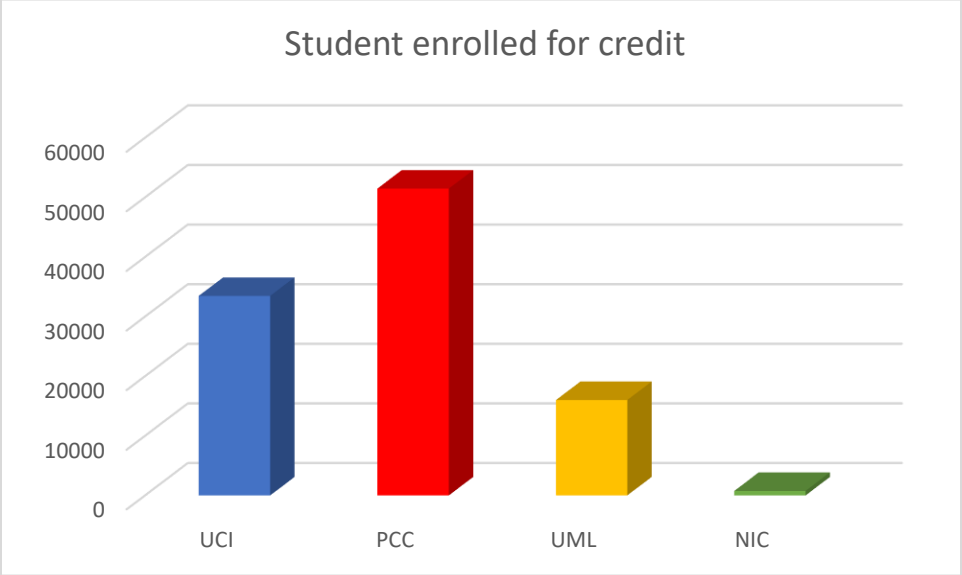

Figure 14. Student for credit enrollment at four institutions.

According to the financial report from the four institutions, in UCI, about 19% of its revenue came from student tuition and fees. For PCC, the number was about 21%, and for UML, it was about 46%. For NIC, about 52% of its revenue came from student tuition and fees. There are many reasons that influences the student's choice in selecting their institution. Their choices will influence the number of students, the amount of tuition revenue, and contribute to the financial sustainability of the institution.

Tuition price. The tuition revenue depends on not only the enrollment number but also students who paid the non-resident tuition. Table 25 shows the price per credit between in-state tuition and out-of-state tuition. The per credit in-state tuition price from PCC is the lowest, while the in-state tuition price of NIC is the highest since it was a private college.

Table 30

Tuition per credit at four institutions

Institution	In-state Tuition	Out-of-state Tuition
UCI	$317	$1,123
PCC	$116	$251
UML	$300	$800
NIC	$1,185	$1,185

Source: UCI (n.d.-a); UCI (n.d.-c); PCC (n.d.-f).

International students are a steady source of revenue for out-of-state tuition, which is three times higher than the in-state tuition. Figure 15 shows that UCI has over 6,000 international students that paid the out-of-state tuition. PCC and UML have a relatively small number of international students on their campus. NIC students paid the same rate regardless of their residence status. The tuition revenue was limited by the small size of the total student body.

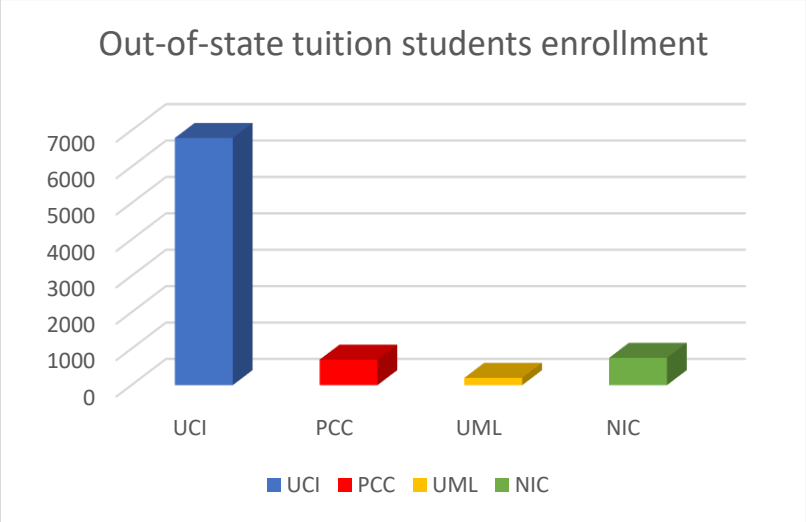

Figure 15. Out-of-state student tuition payment student enrollment.

Thus, even though PCC has the largest student enrollment among the four institutions, but with the difference of the tuition price, UCI was able to generate more revenue from the tuition. The tuition revenue counts only a proportion of UCI's total revenue, while for NIC, it contributed to half of its revenue. Eric mentioned that NIC was

highly depended on tuition, and when the enrollment number was low, they could not operate any longer.

Areas of Study. One of the reasons that NIC closed is because due to the decreasing number of student enrollment. The institution has a smaller range of choices for students to study, thus, fewer students are coming. There are many factors influencing the students' choice of university. The research conducted by Georgetown University (2019) discussed the data shows that STEM field created the highest paying jobs. On the contrary, the arts and education major earns the lowest wage compared to other areas of study. The payback of the degree serves as one indicator when students are choosing to the institution and the program. All three institutions, including UCI, PCC, and UML, offer a comprehensive range of programs, while NIC focused on liberal art field. The small range of available programs, the less comparative job prospects, and the declining overall population in the region contributed to the low enrollment number in NIC.

Endowment size. As shown in Figure 16, UCI has the largest endowment compared with the other three institutions. On the other hand, the 150-year-old liberal art institution NIC announced its closure in spring 2019 due to financial difficulties.

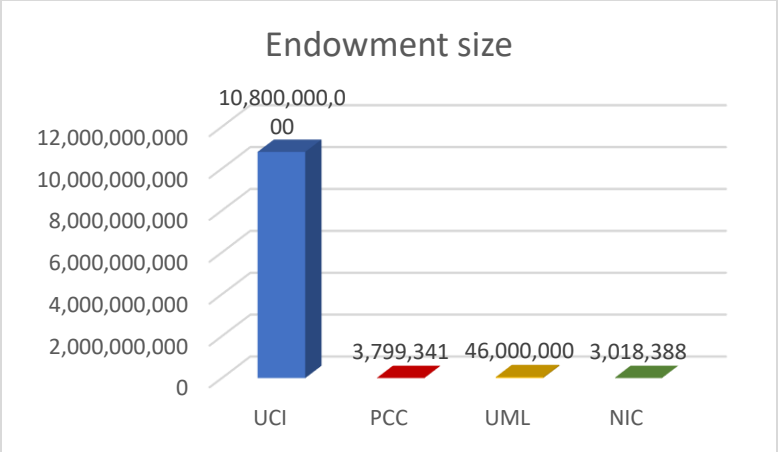

Figure 16. Endowment size of the four institutions.

As mentioned by Eric in the interview NIC did not have a large endowment, and that was the challenge. He explained that NIC was a two-year all-women school early in history. So, the alumni base did not always have the same capacity of giving as maybe some other institutions. As a small liberal art college, the maintenance of the decaying facility was high, simultaneously, student enrollment was declining - the cost added up to run the institution.

Sustainability Performance

In this study, the four institutions were the exemplary institutions within their institutional type. UCI earned the Platinum status, PCC earned the Silver status, while UML and NIC earned the Gold status in their most recent STARS recognition. Table 26 shows the applicable scores achieved across the four institutions.

Table 31

Applicable scores achieved in the STARS program

	UCI	PCC	UML	NIC
Academia	93%	64%	86%	100%
Engagement	91%	68%	75%	90%
Operation	67%	57%	60%	56%
Planning & Administration	84%	58%	63%	73%
Innovation	100%	100%	100%	100%

Academia. According to the financial data presented earlier, academic support was one of the main expenses across the four institutions. NIC and UCI were ranked among the top ten institutions in the category of academia (AASHE, 2018). Figure 17 shows the sustainability performance in the category of academia across the four institutions.

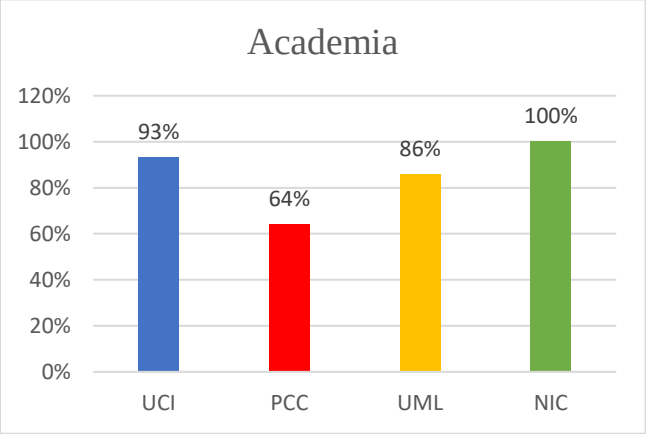

Figure 17. Sustainability performance in the category of academia.

Among all the courses in UCI, 20% of courses offer sustainability in 84% of academic departments. In PCC, 10% of courses offer sustainability courses within 21% of academic departments. In UML, 10% of courses offer sustainability in 85% of

academic departments. NIC achieved 100% of the applicable scores in this category. About 56% of courses offer sustainability in 97% of academic departments.

NIC has adopted sustainability as its core value of the institution. Almost every department offered sustainability courses, which provided the opportunity for every student to acquire the learning outcome. UCI and UML offered the sustainability course in more than 80% of their academic departments, so that about all students can be educated on the topic. As a community college, PCC has the least sustainability courses offered across the departments. It aims to train a skilled workforce with a more broaden focus in the field of health, business, building, machines, media, service, and education.

As a doctoral research institution, UCI's research achievement stands out compared to the other three institutions. It was ranked one of the top institutions that scores the highest in the field of research. There were grants and incentives support for research in the field of sustainability. UML also provided some support to encourage research activity on campus. While for PCC, their programs were built with a technology focus, so students were equipped with hands-on experience to apply the knowledge to the real world, rather than researching. For NIC, each student was required to conduct a substantive piece of sustainability research for the degree.

Engagement. Figure 18 shows the sustainability performance in the category of engagement across the four institutions.

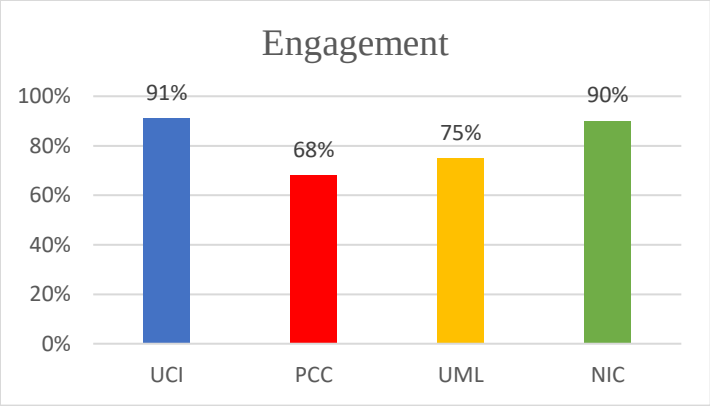

Figure 18. Sustainability performance in the category of engagement.

For all four intuitions, the sustainability component was built in the new student orientation, and it was also integrated into the student's groups for continuing students. The residential program provided a platform for sustainability-related training. PCC has no student residents on-site; thus, this is not applicable to earn the score in this area. On-campus garden and farm across four institutions served as a learning opportunity for students to learn topics on sustainable farming, dining, and waste management. The employee had a chance to attend professional development and training for sustainability as well.

For UCI, it helped the local community college to conduct water crisis-related research. The volunteer tree planting program made a significant impact on the local environment. Students were engaged in the community service program to serve the local community. Community members also had the opportunity to attend the continuing education program that focused on sustainability. Uniquely, the UC system encourages all UC campus to participate in sustainability initiatives.

For PCC, it offered more continuing education compared with the other three institutions. It serves as a founding member of the Greater Portland Sustainability

Education Network, which is a collaboration between educators, students, and other social sectors to advance sustainability.

For UML, the various departments on campus were highly engaged in supporting sustainability initiatives. The institution was involved in the local policymaking process to support the sustainability progress in the city.

For NIC, it was the largest employer in town. Sustainability was the identity of the college, and the identity of the town. Students worked with the local farmers, businesses, organizations to provide information for the challenges encountered by the community. Even though NIC had made significant achievement in engaging the whole campus community, the small enrollment size was not able to sustain the operation of the college.

Operation. Compared with other categories, all four institutions had a lower score in institutional operation. Figure 19 shows that UCI had a higher performance than the other three institutions.

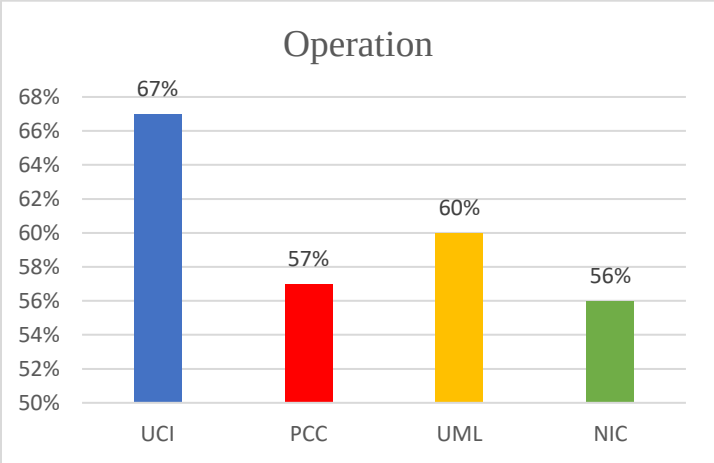

Figure 19. Sustainability performance in the category of operation.

The category of operation includes a wide range of areas, which covers all aspects of campus operation and student life. Certain areas had remarkable achievement. One of the most notable success was that NIC became carbon neutral in 2011. Across the four campus, they have followed the green building guidance to have the new construction certified. NIC was ranked top three in the area of air and climate among all other institutions participated in STARS (AASHE, 2018). UCI was scored high in the area of buildings. Both NIC and UML were ranked high in the area of energy.

For PCC, some of the areas were not included in the community college, so their applicable areas were not as broad as the other three institutions. Compared with the other three institutions that scored low in transportation, UCI had a better score because the students and staff from UCI promoted friendly transportation. Renewable energy was another area that needs to be strengthened soon for UCI. There is still room to improve in the greenhouse gas emission category for the other three institutions besides NIC. However, the cost of maintaining the old buildings on the NIC campus was high since the institution was founded over a hundred years ago.

Planning & Administration. As top performers within each institutional type, sustainability was highlighted in the strategic plan across four institutions. Figure 20 shows that UCI and NIC has a higher sustainability focus in their planning and administration compared with the other two institutions.

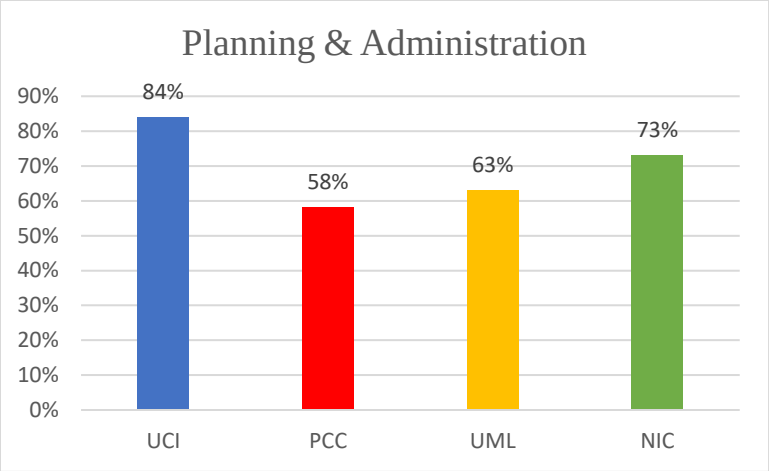

Figure 20. Sustainability performance in the category of planning & administration.

For all four institutions, the upper-level support was fundamental across four cases. The sustainability component was highlighted in the strategic plan of PCC and NIC. UCI got the support from the UC system, which adopted the Policy on Sustainable Practices in 2007. For UML, Mike worked in the sustainability office mentioned the support from the State policy. It required all the state buildings, including higher education to follow the US Green building council guideline.

In UCI, the leadership committee members included the Chancellor, to different units such as academic units, facilities, IT department, student affairs, medical center, student organizations, and more. In PCC, they formed the Sustainability Leadership Council with the various department on campus. The president was supportive; he went to 2017 United Nations Climate Change Conference with the sustainability manager to represent higher education. In UML, the leadership support was not as strong because the new administration is more conservative compared to the previous leadership that used to support the sustainability initiative. NIC has adopted the environmental liberal arts focus over 20 years ago. The sustainability council was established over ten years helped the campus reached climate neutrality in 2011.

Bottom-up support played a vital role in implementing sustainability initiative as well as there were individual champions who practice sustainability daily. Faculty, staff, and students were highly involved across all campuses. Students were the leading force in implementing sustainability on UCI's campus. PCC encouraged the students to express their voice and provided financial assistance and scholarship opportunities. The students in UML initially took the sustainability initiates with the help with faculty to get the STARS program started on campus. They created the student club to promote the green movement on campus 15 years ago. In NIC, students served on the strategic plan committee to express their view in the governance process. Staff and faculty on all four campuses were highly involved across four cases.

Innovation. Figure 21 shows that all four institutions have made high achievement in the category of innovation.

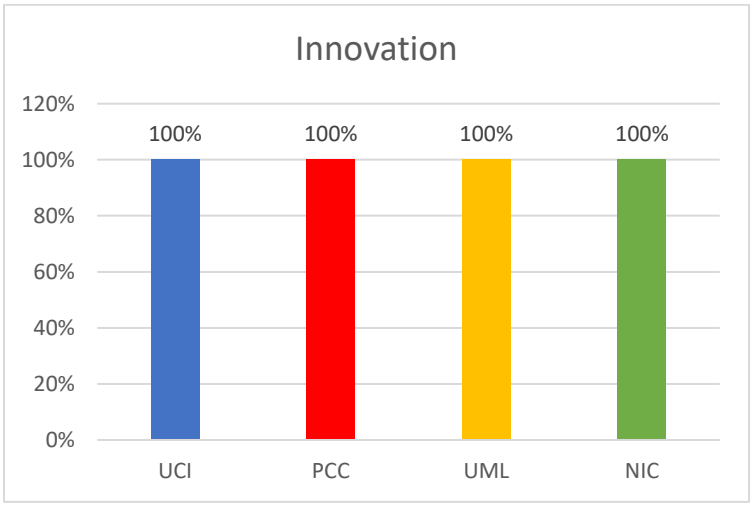

Figure 21. Sustainability performance in the category of innovation.

For UCI, it contracted with the industry sector to build a connection for research exploration to be applied in the real world. Faculty, staff, and students were highly involved across the campus in implementing the programs and activities to impact the

UCI community. In PCC, it offered the sustainability focus award to recognize student's involvement.

Students in UML led the sustainability initiatives such as students worked with their academic department to write up a proposal to implement the program on reusing office printing material. It helped reduce the cost of the offices and promoted green behavior among staff and employees on campus. For NIC, students had the opportunity to work with local farmers, businessman, and policymakers to develop strategies to increase the resiliency of the local community. Despite the variety of institutions, they all agreed that innovation is essential on their campuses.

The Journey of Campus Sustainability

In 2013, UCI started its journey participating in the STARS program and earned the Platinum rating in 2018. The journey's success included higher-level support, the use of STARS as a guidebook, and collaborative effort. PCC's journey of participating in the STARS program started in 2012, and it earned the Silver rating in 2017. For this community college, student initiative, higher-level support, and collaborative effort were the essential elements of their success.

UML's journey started in 2011, and years later they earned the Gold rating in 2018. Their success involved leadership support, policy support, and collaborative effort. NIC's journey started in 2011 and received the Gold rating in 2018. High commitment, higher-level support, and collaborative effort contributed to their success in a high rating for the STARS report. Although they have reached significant achievements over the years, the journey had come to an end in Spring 2019 due to their financial difficulties.

Throughout the four institutions, higher-level support and the collaborative effort were the shared indicators that contributed to their journey.

Higher-level support. Among all four cases, the most crucial factor that contribute to their success is higher-level support. In UCI, the campus leadership was highly committed to sustainability and had made it a primary emphasis of the institution. For PCC, the president serves on the steering committee for Second Nature – it's foundational to have support directly from the president. He also provided the climate action fund to the Office of Sustainability. In addition, the board directors collaborated to implement the sustainability policies into their mission. In UML, the director and the former assistant director of the sustainability office both sat on the advisory committee for STARS credits. However, in recent years, less support was provided by the new conservative administration compared to the previous years.

Even though the higher-level leadership supported the sustainability effort at all four institutions, UCI received more attention from the overarching UC system, which brings an extra layer of support. The UC system provided the financial and leadership support to all ten campuses. The UC Cool Campus Challenge is a unique program to measure campus sustainability among all ten UC campuses. On the contrary, even though UML is also one of four campuses under the UM system, UML experienced different levels of support when compared with UCI. UML had a more difficult time as a single campus to be able to progress on an initiative or project if the other sister campus was not in agreement. Therefore, progressing forward without the consensus of the sister campuses could be problematic. However, the support from all levels was robust at NIC. Everyone shared the same identity.

Collaborative effort. The next factor that contribute to their success is collaborative effort among all the four cases. The process of putting the STARS report together was "quite an undertaking," as conveyed by all those who participated in this study. Therefore, one office does not have the bandwidth or resources complete the report on their own. Instead the responsible department relies on the entire campus to work collaboratively. Furthermore, one office could not know all the answer since the report covers multiple aspects of the institution.

For UCI, the office of sustainability serves as the gatekeeper of the information and coordination, and they trust the help of other departments who have the information for the report. The office had worked with 27 campus departments, and they were in communication with about 90 individuals to complete the STARS report. Getting the right information from the right people on time was not always easy, so building rapport with the departments was fundamental.

At PCC, students and faculty were the pioneers who pushed the program to what it is today. There were dedicated employees that made a daily operational contribution, such as the sustainability leadership council members. There was widespread support across the campus because people cared and want to get involved.

Faculties and staffs at UML were given different STARS credit information to help to complete the report. The students had taken the initiative to promote the sustainability movement on campus over a decade. Together, all the campus partners did their due diligence not only to put accurate information in the report but to also use it as the benchmark in their position.

The campus sustainability council at NIC had representatives from students, staff, and faculty members. Those were the individual champions who helped move the sustainability effort forward at NIC. The support from the college ensured quick response and enough support. Understandably, the end of the legacy has caused different stages of grief within the institution and the surrounding community.

Other factors contributed to the journey of the four institutions as well. For UCI, Carrie mentioned that using the STARS program as a guidebook is essential throughout their journey. The STARS rubric served as the roadmap for sustainability in establishing programs and initiatives on campus. By following the guidebook, UCI was able to get more applicable points in the assessment to earn the highest score among all the participated institutions. Carrie stated that every year after the ratings and the rankings were released, the office would conduct an analysis, completing many comparisons and contrasts with other universities about credits. It helped the office to investigate on what areas could be strengthened in the future. The office had taken detours in the reporting process, such as overthinking. However, they have concluded that the simple on target answers work better than trying to provide superfluous information. It's most conducive to summarize their own and others' experiences, reflect on their shortcomings, and correct their mistakes - these were the lessons learned along the journey.

While PCC had a different approach in using the STARS report, Briar mentioned that STARS has never been a driving factor in their programming. The STARS program was used as a benchmark tool rather than a guiding roadmap. For PCC, students were the main drive behind the sustainability movement back in 2006. They went to the board and expressed the needs of integrating sustainability on campus - the starting of the journey.

Students at UML were very active in promoting sustainability on campus. As mentioned by Jamie and Mike, the State policy was also another factor that had support the sustainability movement on campus. The State where UML was located has mandated that all the state-building must meet the minimum of LEED Gold. Such updates have been implemented and had an expansive and dynamic impact on UML's operation.

NIC became an environmental liberal art institution in the 90s' when it started the environmental mission focus at the presidential initiative. It had a much higher commitment level as sustainability was the identity of their institution. Everyone was involved in advancing sustainability on campus from the board of trustees, students, faculty, and the administration staff.

State involvement. State policy support also plays the important role in contributing to their success. The researcher recalled when UML had a change of the State policy which made an impact on their journey in participating in the STARS program. The 2018 Sustainable Development Report of the United States shows significant geographical variation across the US (Sachs, Lynch, LoPresti, & Fox, 2018). The report presented a sustainable development goals (SDGs) index and dashboards for the 50 states on their attainment of the UN SDGs. Figure 22 shows the overall state performance on SDGs index.

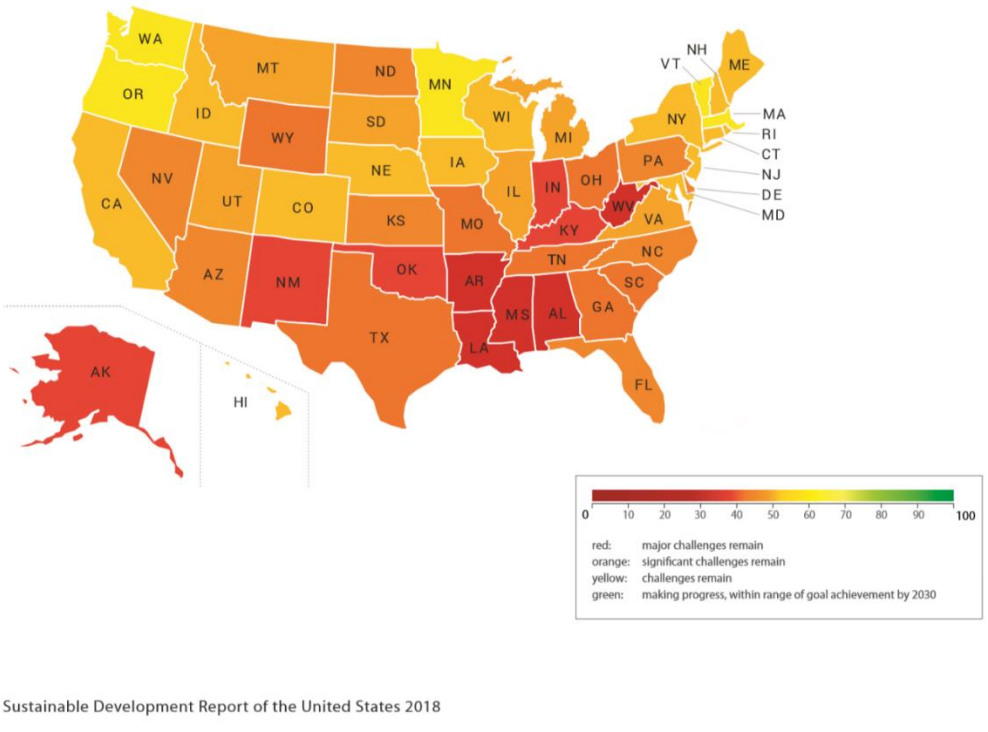

Figure 22. Overall state performance on SDG Index (Sachs, Lynch, LoPresti, & Fox, 2018).

According to the report, all four States ranked within the top 15 on the dashboard. Notably, Oregon and California ranked fifth and sixth on the list. Even though there were goals remained to be met, the ranking indicated that some States had made more progress towards sustainability than the others.

California. California is "reducing its environmental footprint through sustainable state government operations and practice including energy-efficient state building design and construction, renewable energy generation at state facilities, environmentally preferable state purchasing, and sustainable state-owned vehicles" (State of California, n.d.). The executive order signed by the Governor in 2012 that focused on green buildings can be found in Appendix F.

Only a part of the executive order was demonstrated above to show the emphasis of the State policy on green buildings. This executive order focuses on green buildings, and it echoes the field that was built in the category of operation in the STARS report.

Oregon. The Oregon Sustainability Act defines sustainability as "using, developing and protecting resources in a manner that enables people to meet current needs and provides future generations with the tools and resources to meet their own from the joint perspective of environmental, economic and community objectives" (State of Oregon, n.d.). The highlight of the Oregon Sustainability Act (Edition 2017) could be found in Appendix G.

Only a portion of the Oregon Sustainability Act was listed above to show the emphasis of the State policy on administration services. It covers the area of sustainability planning, diversity and equity coordination, sustainable investment. The Act covers some field in the category of operation and engagement such as sustainable purchasing, energy consumption and biodiversity, and hazardous waste management.

Since the other two institutions were kept anonymous, their States would not be discussed in detail in the study, but their legislation has covered an area of sustainability too. Jamie and Mike from UML mentioned that the State policy had made a positive impact on their journey. From the official government sources, it stated that the State Building Program establishes a policy to oversee the construction process at all state agency and higher educational institutions.

At the State where NIC was located, the environmental budget was increased each year steadily since 2012. The state legislature had passed the recent environmental bills.

The US Senate reached out to the office of sustainability at NIC to recognize their achievement.

Challenges and Drivers

The selected institutions had many challenges over the years in achieving sustainability and completing the STARS report. Some of the difficulties were across all four institutions, while some were particularly challenging to the individual institution.

Challenges across institutions. For the four institutions, there were two challenges that they all faced including overwhelming tasks and reluctance among employees.

***Overwhelming tasks*.** Carrie from UCI described the workload was overwhelming in preparing the report. The office of sustainability realized that knowing what to ask and the best person to reach out helped tremendously for the situation. Briar from PCC shared the same challenge - it took them months to complete the report. Completing the report was extensive because it required retrieving information from a variety of departments across the campus. To overcome the challenge, they tied the STARS metrics into the existing college accreditation process so that they could get the information from other departments since those were already tracked.

Reluctance among employees. Carrie from UCI expressed that the departments were supportive of providing the information that her office needed, but the process was not smooth. Sometimes the other department gave late responses, or they provided information which didn't meet the criteria of the credits. A devoted team who wants nothing but the best to respond to every credit was the key to obtain information across

the campus departments at UCI. At PCC, it took weeks to get the data from other departments on campus. Briar mentioned that building relationships were critical. She explained that it was easier for people to follow the procedures they were supposed to if they had a personal relationship with the staff. Building relationships was important, as well as being collaborative with other departments across the college. Jamie from UML mentioned that the cross-campus support sometimes could be problematic because the lack of support and pushback. People in other departments questioned the intention of why UML spent the money and time in participating in the STARS program on campus. Mike articulated they only got support if it is aligned with efficiency and saving money.

Funding shortage. Briar from PCC said that funding was an issue as they progress. The office did not have enough funding to pursue new programs as they planned. However, they received some funding support from the college president, facilities department, and student fees. To get campus departments and stakeholders committed to the sustainability initiatives was beneficial in obtaining financial support for their office. NIC was not as lucky as PCC in terms of funding difficulties. As discussed, NIC relied heavily on tuition revenue as a small private institution. With the limited students' population, the revenue from the tuition and fees was far from what they would need to run the institution. Eric mentioned that NIC did not have a large endowment either. The alumni base in NIC did not have the same capacity of giving as maybe some other institutions. Over the years, the divestment from the States function support such as state or federal state dollars were less, so there were not enough financial sources to sustain the institution. Tragically, NIC had to shut down, leaving only the legacy of once being the greenest institution in history.

Challenges within the individual institution. Besides the challenges shared across institutions, there were some challenges that only particular individual institution faced.

Lack of student participation. UCI has worked collaboratively with many departments on campus to earn the Platinum recognition in the STARS program. However, awareness among students was not high when they found out that being the green campus has not made an impact on students' decision to attend UCI. Carrie shared that the turnout and participation were not what they expected for programs and events hosted on campus. Therefore, they would need to communicate better what they have been doing and getting people interested in the programs and activities.

The constantly changing rubric. Mike from UML said that one difficulty that they faced was that STARS report was continually evolving. He explained that because STARS removed some requirement from the new version, it impacted the policies efforts in UML. He pointed out that getting involved in the STARS government would help adjust and tweak that tool. The framework has made major changes over the years compared with the different versions. Now, institutions understand how the STARS rubric works and have adapted to the changes which might impose a challenge.

The history of the STARS rating system. STARS was first initiated in 2006. It has continued to involve stakeholders and participants to share feedback to modify the rating system. In 2007, STARS 0.4 was released as the draft version. By beginning the pilot project in 2008, the modified version 0.5 was released for the public. Another revision STARS 1.0 was released in 2010, and a year later, the STARS 1.1 was put in use. One year later, STARS 1.2 was released to add more revision to the rating system. In 2013,

AASHE released the STARS 2.0 and two years later, the first institution from Mexico earned the rating. STARS 2.1 was released in 2016 and is the most updated version institutions have been applied for concerning this research. Even though in 2019, the STARS 2.2 was released, most of the institutions would not be submitting the new version within the time frame that this current research is being conducted. Since 2018, Sierra magazine and The Princeton Review incorporate the STARS rating in their ranking system, which simplified the reporting process and unified these different rating organizations to a centralized platform for institutions.

The changes among the STARS versions. In version 0.4, it stated that the submission of the rating is valid for three years. The intention was to engage institutions to measure and grow continuously by resubmitting another report when the current one expires. In this version, the self-scored report did not need a third-party review. A letter from the top leadership of the institution was required to verify the accuracy of the submission. This version used the Tiers indicators which will not be seen in the later 2.0 and 2.1 version. The Tier One indicators were the primary contributors, and Tier Two did not reflect the same magnitude but still contribute to the performance. In this version, the achievement was given with level of Star, such as 1 Star, 2 Stars up to 4 Stars.

After a year, with feedback and responses, version 0.5 narrowed down the four categorizes to three. Trend-based credits have been changed. Some institutions may be disadvantaged by being sustainable at the starting point and making significant improvement that may not apply. This was particularly mentioned by the South East University in the pilot interview. The participant preferred the pseudonym for the institution; thus, it was given the name of South East University. The institution was

involved in the piloting stage of the STARS 0.4 version. It provided the feedback to STARS as a brand-new institution with sustainability already implemented on campus. They were disadvantaged by this trend-based performance indicator. Credits and points were changed for each category based on the discussion of the feedback. The overall score changed from an absolute number in the last version to the percentage of the points.

In the later version 1.0, the score and rating process was modified to the current recognition with Reporter, Bronze, Silver, Gold, and Platinum. The scores were calculated by adding all three categories and averaging the percentage scores. Innovation points could be added up to the overall average percentage of the three categories. Credits were revised within the categories in version 1.1 and 1.2 to provide a more comprehensive and advanced measure process.

In version 2.0, noticeable changes were made in which the three categories become four: Academics, Engagement, Operation, and Planning and Administration. The overall score has also changed significantly while comparing scores from the previous versions. Each category was weighted differently compared to the equal distribution of scores in the earlier versions. Also, Tier two credits were incorporate into other credits, therefore, the wording ‘tier two’ was no longer seen in scoring. For credibility purposes, STARS formed a task force to review the accuracy of the reporting, especially for institutions that were aiming for the Platinum rating. Random auditing and accuracy checking were also considered within the review process of the submission. The latter version 2.1 made editorial changes to the credits, and the scoring has been modified with no significant frame change.

Unclear direction. As one of four campuses under the UM system, UML encountered difficulties within the structure. It was hard for UML as a single campus to move forward. Sustainability was part of the mission of the university, but it was not one of the higher priorities. UML is currently in the last year of its strategic plan, and it was not clear how much emphasis would be on sustainability in the new strategic plan. The institution has experienced a turnover of leadership recently in terms of the chancellor and many vice-chancellors. Mike thought it was tough to set a specific goal right now because they were unclear of the direction and identity of the institution.

Decreasing student enrollment. Eric from NIC said that demographic issue in the region was one reason that the college was closing. The institution was over one hundred years, so the buildings required a high cost of maintenance. NIC was a tuition-dependent institution, so if there are not enough students there, their revenue did not keep up with the expenses.

Drivers across institutions. For all four institutions, some similar drivers motivate their institution in advancing sustainability on their campus. The internal motivations help them overcome difficulties were nurturing the student, serving the community, taking social responsibility, and making changes.

Nurturing the student. As a community college, PCC listens to students on what they want and need. In 2006, students went to the board to express that they wanted sustainability integrated into all areas of the college. This acted as a catalyst; later the president signed the ACUPCC, and the board of directors created the sustainable resources policy. That effort made by the active student body and the supportive personnel really drove the program to where it is now. UML understood that attending

the university might be the first time that students left their parents or a guardian to start building their habits in a new environment. By immersing students in the culture of sustainability, UML aimed to create the ripple effect that makes positive changes on students. While at NIC, students were given the opportunity to practice leadership skills by leading sustainability projects on campus. Being the greenest college, NIC aimed to empower students with the knowledge of sustainability when they graduate. With the knowledge and skills that students obtained from NIC, they would contribute to the community and their personal life as well.

Serving the community. As a community college, developing a great workforce is a big focus for PCC. Briar shared that PCC cares deeply about the community, and what the community thinks. In turn, the community cares about the environmental sustainability stewardship, and equity. The institution served as the founding member of the Greater Portland Sustainability Education Network to promote sustainability education in the region. It offered training on educating students, staff, and faculty, to be active, responsible community citizens. While at UML, Jamie mentioned that their institution has a substantial commitment about getting the community involved. The university could not stand alone, and it needs support from the community. The city, the county, and the whole community need to advance sustainability as a whole. In this way, the local community supported the university, and in return, the university involved the community members in making sustainable efforts together.

Taking social responsibility. Social responsibility is one of the drivers across all four institutions. Carrie from UCI encouraged all institutions to take actions together to achieve sustainability. Everyone has a role to play, whether or not we see the results in

our generation, working together could make a difference. New science and technology consistently evolve, and universities help serves as the learning laboratory to test things out for research and invention. Only by setting the right example could universities benefit students. Stephania from PCC mentioned that there is no better place than higher education to make an influence on students. Briar said that developing the responsible workforce was the focus as a community college. Mike from UML added that higher education is a microcosm of the greater community. He agreed that education could equip students with the tools that they go out into their future life to have some positive impact. Eric from NIC expressed that the critical piece was to integrate students into understanding the knowledge and the science behind sustainability challenges and potential solutions. Then introduce how to navigate organizations and communities to influence, listen, and understand, and turn our society toward a more sustainable world.

Making changes. Regarding making changes, Carrie from UCI pointed out that when the problems faced were so severe on such a large scale, the feeling of being overwhelmed and incompetent always occurred. Therefore, higher education's role as an institution is to empower students to define their purpose, to face the problem, and to work collaboratively on complex issues. Big problems may seem overwhelming, but students could start on a smaller scale such as changing their behavior. Mike, from UML, highlighted that it can be difficult to alter the traditional mindset and behaviors of a community or generation. However, he believed that through interactions with students on the topic of sustainability was a starting point, a way to initiate questions and concerns. Moreover, such inquiries, subtle changes and some positive outcomes would naturally emerge.

Drivers motivate the individual institution. Besides the shared drivers across institutions, some drivers motivate a particular individual institution.

Trust others. UCI believes that promoting sustainability on campus was the right thing for the future of the campus - they were helping to educate future leaders. Carrie expressed that trust was their secret when working with all the departments on campus. Senior leaders trust their decisions, employees trust the leaders, and most importantly, everyone believes that sustainability is the responsible action to take for the institution and its students.

Share the identity. As a small liberal art school, Eric said NIC was doing their best to identify themselves as something unique, as valuable so that people want to come to enroll there. He stated that the students or employees came to NIC because they wanted to be part of the school that was committed to sustainability.

Despite the different types of institutions, they are all committed to nurturing the younger generation to change the world. As shared by all four institutions, higher education plays a critical role in educating the future citizen as there's no greater place to stress the importance of sustainability to the world.

CHAPTER VI: DISCUSSION AND IMPLICATIONS

The purpose of the study was to describe the campus sustainability performance at four exemplary higher education institutions: i.e., Doctoral, Master's, Baccalaureate, and Associate's, as measured by the Sustainability Tracking, Assessment & Rating System (STARS). The following four questions guided the research:

1. What are the demographic characteristics of four select higher education institutions that have earned recognition in the STARS program?
2. What is the status of campus sustainability at these four institutions as measured by STARS in the areas of academia, engagement, operations, planning & administration, and innovation?
3. What is the journey of becoming an institution that earns recognition in the STARS program (academia, engagement, operations, planning & administration, and innovation)?
4. What are the drivers and challenges that the selected four institutions experienced from a leadership perspective?

The case-by-case analysis and the cross-case analysis demonstrated the similarities and differences emerged across the four cases in the area of the institutional dynamics, sustainability performance, the journey of campus sustainability, and challenges as well as drivers. Using pragmatism as a theoretical framework, the focus of the study was on the outcomes of the research- the actions, situations, and consequences of inquiry - rather than antecedent conditions (Creswell, 2016).

A multi-site case study was used to investigate the sustainability performance of four exemplary institutions participated in the STARS program. Two forms of data collection techniques used for this research study were document analysis and in-depth interviews. The researcher conducted a document analysis with the help of ATLAS. ti. 8 software to store all the document in separate folders for each case. The organization AASHE has played an essential role in helping the researcher identify the participants and providing extensive supports for document analysis.

The literature was extensively reviewed with a gap in the literature on how to overcome the unique challenges higher education faced in implementing sustainability on campus. In the study, three main challenges emerged from four cases, including overwhelming tasks, reluctance among employees, and funding shortage. The findings from this study contributed to the literature on how internal motivation help overcome the challenges across different institution types. Bridging this gap and learning from the successful, individual campus that have accomplished sustainable initiatives would serve those that are struggling through sustainable practices and improve sustainable campus involvement.

Discussion of the Findings

Four cross-case findings emerged, which describe the sustainability performance and the journey at selected institutions that participated in the STARS program. The four themes that emerged as a result of answering the four research questions are presented in Table 27.

Table 32

Themes organized by research questions

Research Questions	Theme
1. What are the demographic characteristics of four select higher education institutions that have earned recognition in the STARS program?	Theme 1: Financial sustainability is the foundation
2. What are the demographic characteristics of four select higher education institutions that have earned recognition in the STARS program?	Theme 2: Improvement and achievement coexist
3. What are the demographic characteristics of four select higher education institutions that have earned recognition in the STARS program?	Theme 3: Collaboration from all levels is the key
4. What are the demographic characteristics of four select higher education institutions that have earned recognition in the STARS program?	Theme 4: Social responsibility motivates institutions to overcome challenges

Theme 1: Financial sustainability is the foundation. One of the most notable findings in the study was that financial sustainability is the foundation to achieve sustainability on campus. All four institutions discussed the budget sources during the interview, and three wished to have more financial sources to support sustainability efforts. The factors that contribute to the institutional financial availability discussed in this study involved the nature of the institutional type, revenues and expenses, student enrollment, tuition price, areas of the program, and endowment size.

The closure of NIC showed higher educational institutions that maintaining financial sustainability is the foundation to advance sustainability on campus. Although sustainability was the identity of NIC, the school was unable to keep up with the cash

flow, and unfortunately, such a high achievement disappears. Not only NIC, but other nearby colleges were closing as well.

Different institutional types have their advantages; for instance, when students choose a school, they will comprehensively consider the best choice. As a large public institution, UCI has a steady stream of students and the support of the UC system. Such a research school has the advantages to attract students, and more importantly, it has a wide range of revenue sources, including the large size of the endowment. The UML is another public university with the support from an overarching system. Although the institution does not have the same advantages, such as renewable research achievement as UCI, student number is relatively stable because there are a variety of majors for students to choose. As a community college, PCC has the highest enrollment among these four schools. It offers employment-related majors which prepares a healthy workforce. Tuition is relatively low; the student enrollment is a significant characteristic of PCC. The advantage of NIC was that it has a friendly learning environment and immersive experience, but the high tuition fees and relatively fewer program choices limit the overall development. The income and expenditure imbalance eventually result in the closure of the institution.

Only a healthy financial situation can ensure the existence of sustainability. To achieve sustainability, institutions need to consider the interconnectedness of the environment, economy, and equity which echo the definition of sustainability.

Theme 2: Improvement and achievement coexist. Of the four universities, UCI received the highest Platinum ranking in the STARS program, then NIC and UML were both Gold, and PCC was awarded the Silver rating. They all became leaders among their

respective institutional types. Although the types of institutions are different, each school has achieved remarkable results, with some areas of each institutions requiring improvement.

The STARS program covers five major areas, including academia, engagement, operations, planning & administration, and innovation. In this area of academia, NIC was at the top of the ranking, followed by UCI. Almost every department at NIC offered sustainability courses to ensure that all student had the learning opportunity. UCI had a strong emphasis on research compared with the other three institutions. Students and faculty members from UML had various opportunity to conduct research as well. For PCC, the focus on academia was not as strong compared with the other three institutions, so there would need some improvement for this community college.

In terms of the area of engagement, UCI and NIC were ahead of the other two institutions as well. New student orientation, existing student organizations, and gardening were active student engagement projects shared across the four institutions. Professional development and training were provided for staffs to get involved on campus in all four cases. Regarding the community involvement, there was various engagement, for example, UCI did research collaboration with local schools, PCC offered more continuing programs, UML participated in the local policymaking process, and NIC provided jobs to the community.

In the area of operation, apart from the UCI, which did slightly better, all other three universities scored relatively low. This area covers a wide range of aspects such as buildings, energy consumption, food, purchase, campus ground, goods and services, transportation, water, and waste. Lower scores were distributed in the field of operation

all the four institutions. The overall score is not high compared with other areas in the STARS program. Thus, there is still room for progress.

In contrast, four institutions had better scores in this planning and administration compare with the area of operation, but not as high as academia and engagement. Upper-level support was fundamental across four cases. The bottom-up support played a vital role as well. UCI scored the highest in the area with the support from the upper UC system; on the contrary, UML would need more support from the overarching system.

All four institutions agreed that innovation is vital, so they all earned the full points. The innovation was reflected in the field of research, recognition system, student involvement, and community services among the four institutions. In summary, there were achievements and shortcomings regarding the sustainability performance across the four institutions; the need is to continue to carry out achievements and making up for the shortcomings.

Theme 3: Collaboration from all levels is the key. For these four institutions, they all demonstrated outstanding sustainability performance in the STARS program. The road to success was tedious, but each institution expressed what helped them get to where they are today. Higher-level support and the collaborative effort were the shared factors that contributed to success throughout the four institutions. Even if the level of support varied, obtaining higher-level support was the key to their sustainability journey. For example, UCI was supported not only by the university leadership but also by the upper UC system. The president of the PCC also went to the international conference on behalf of the institution to share their experience in pursuing sustainability on its campus.

Having support from the upper level was a good start but completing the STARS task required the full support across the campus. All the interview participants spoke of the enormity of the task, and the fact that it was possible to achieve what it is today was a collaborative effort as they mentioned that the individual champion involved in the STARS program worked together to provide the information the office needed. Faculty members and students played a vital role in leading the process as well.

Getting the support of the heads of various departments would be twice the result with half the effort. It is the key to have dedicated staff devote their time and effort as well. Working together was not just among departments on campus; the effort expands to their surrounding communities, regions, and even the State level.

Theme 4: Social responsibility motivates institutions to overcome challenges. These four institutions have struggled along the way, but they believed genuinely in their mission and responsibility as an educational entity. Higher education institutions can contribute to the overall sustainability effort to the world, by acting as a learning laboratory for demonstrating new sustainability initiatives and efforts. Higher education is working with the future generation and contributing to the next generation of sustainability leaders by setting the right example for students and being able to inform them and giving them the support and encouragement to take on in the real world. Institutions are going to have the most lasting impact regarding address some of the major global sustainability crisis through educating today's and tomorrow's work force around sustainability.

A learning environment is essential for students to cultivate their habits and behaviors. Institutions integrated students into understanding the knowledge and the

science behind sustainability challenges and potential solutions, and then showed them how to navigate organizations and communities to influence, listen, understand and turn communities toward a more sustainable world. Through the ripple effect, students could have connection and able to then make the change. As a microcosm of the greater community, higher education could equip students with the tools necessary for their future life, which will have positive impact.

Nurturing the student, serving the community, taking social responsibility, and making changes was the internal motivations drive the four institutions to what they have achieved today. They shared the same purpose of helping students become more aware and informed how they could apply sustainability into their work, in business, and many other places to make the change.

These research findings further support the use of pragmatism as the conceptual framework of the study. One theme of Pragmatism is to understand the current situation. The framework has allowed the researcher to understand the environmental, economic, and social problems the society face today, and the reason why higher education institutions were being asked to take on the responsibility of educating future scholars and leaders - to work together in solving complex problems. Many institutions have already recognized the seriousness of the current situation and were willing to participate in seeking more guidance and assessment by joining the STARS program.

Another theme of Pragmatism is to take appropriate actions. This allowed the researcher to explore what actions the higher educational institutions could contribute to advancing sustainability on campus. Furthermore, it allowed the researcher the opportunity to explore their motivation to get involved, and through what aspects to carry

out sustainability performance. In addition, it helped the researcher to investigate the process of implementing the initiatives and what they have accomplished over the years.

The third theme of Pragmatism is to evaluate the consequences. Although each institution discussed in the research has experienced many ups and downs on the road to receive recognition from STARS, they have worked hard to achieve their goals of implementing sustainability on campuses throughout various stages. Through the lens of Pragmatism, the researcher was able to take a holistic perspective of their strengths and weaknesses in the journey of achieving sustainability on campus.

Implications

The findings of the study have many implications that could guide institutions that intend to advance sustainability on their campuses. The sustainability journey of these four cases could assist other institutions by learning from their success and understanding the struggles across different types of institutions.

The implications of the research are for: (1) for institutions who are currently in the STARS program; and, (2) for institutions who had never participated in the STARS program. Each of the implications is discussed below based on the type of institution.

The four institutions were selected because they were the top performers among all institutions that participated in the STARS program. These four cases cover different types of institutions: i.e., Doctoral, Masters, Baccalaureate, and Associate. Their success and struggles may not be replicated but can provide direction to other schools. Although the problems faced by different institutions vary greatly, the case study covers areas that shed light on what difficulties those would be and possible solutions.

Implications for institutions that are currently in the STARS program.

Institutions that are participating in the STARS program need to understand that there are problems, but there are solutions to those problems. Although the journey may be difficult, the impact on students and society could be very beneficial. All the four participants from the interviews could provide some recommendations to institutions on how to improve their sustainability performance.

Use STARS as a guidebook. When it comes to the process of preparing the submission, all participants agreed that the workload is enormous. Thus, in order to avoid detours and make the best preparation within the allotted timeframe, using STARS as a guidebook is the first step. Understanding the scoring mechanism could help the liaison provide concise but accurate answers to each applicable question. It also helps the institution to focus on certain credits to get more significant efforts towards implementing and improving on campus. When the institution gets the score from the STARS program, it is also necessary to conduct an in-depth analysis to see what credits needed to be strengthened. Using STARS as a guidebook and conducting the in-depth analysis would help the institution focusing on a certain credit at a time and making that the set of priorities for the year with limited human and financial resources.

Collaborate with other departments. The STARS program covers areas including academia, engagement, administration, operation, and innovation, which requires a collaborative effort from various departments on campus. It would be a good way for the sustainability office to get the STARS report done with the help of other offices, especially when it does not have the staff and all the information for it.

The institution could tie any of the STARS metrics into the existing college accreditation process or other progress metrics. Consolidate information is the critical step for the liaison when preparing for the submission. In this way, the resistance would be relatively small, as it is simple for other departments to give that information if it was already tracked. The report requires the leading office to get information from a variety of departments across the college, and not everyone gets back to the office right away. Allocated time towards researching which departments housed particular information, in addition to departments not being able to provide certain information because of technological gaps, resulted in setbacks. Building rapport with departments and conveying what is necessary beforehand greatly reduces these types of setbacks. Therefore, building a relationship was part of the process.

Liaisons also require a keen eye to be aware when other offices are building new metrics. It would be a good time to have them become familiar with the STARS program, so the new metrics could have the component that works with the STARS program as well. Thus, relationship building is foundational to any sustainability work. If the sustainability office is not willing to build rapport, the office is going to struggle with the program, especially struggle with getting STARS done.

Celebrate success. Institutions receive different awards after submitting the STARS report ranging from the Platinum, Gold, Silver, Bronze. Moving from one award to another takes much effort, and it could take years to achieve. Nevertheless, that does not mean small, short-term improvements are not important. The office needs to focus on a particular area that they can enhance through their campus. Celebrating the successes is very encouraging to staff who are helping in the process. It helps them to see progress

and feel that their efforts are meaningful. Setting up the sustainability award recognition would enhance the network to allow the institution to grow.

Involve stakeholders. It is essential to have the upper administration to understand and buy into what is going on or have a clear idea of why the sustainability office is doing the STARS report. It is crucial to rationalize sustainability as essential to the administration of multiple different sectors across the institution. The sustainability office needs to involve the upper-level leaders to understand what sustainability could bring to the institution. Also, it is essential to involve a robust group of faculty and students who are very passionate about sustainability and want to see the institution become more sustainable.

Implications for institutions that have never participated in the STARS program.

While there are over 300 institutions that already participated in the program, many have not started the process. There may be institutions that have the idea but do not know where to start. The four cases from the interviews could provide recommendations to institutions on how to begin their STARS journey.

Develop an advisory committee. For institutions that have never participated in the STARS program, the number one thing is that the institution needs to take the time to review the program criteria. The sustainability office staff needs to do a significant amount of reading, using the STARS technical manual as the main guidebook. Reviewing and understanding the criteria scoring methodology content is paramount.

The work of STARS should not be the responsibility of an individual or sole department. It is beneficial to an institution to develop an advisory committee for the

STARS program. The committee could work together once every quarter or every semester to meet and touch base on what is going on. When the time does come around to report to the STARS program, the office is better prepared to do so. Thus, being very aware of the credits and the language and identifying who is going to be leaders and shakers to make it happen is essential. Collaborating and keeping channels of communication open with others is key.

Know what works best. From the PCC case, it was realized that the STARS program does not have to be a starting place. As a non-competitive public institution, PCC did not benefit through admissions the way a private or four-year school might. Therefore, it all depends on the institution's decision to choose what criteria would be the best to focus on for them in the STARS program. If the office engages the communities and the offices that are most invested in sustainability at the school, then reporting all areas to the STARS program would be beneficial. It shows that spending the time to do a STARTS report is helpful to benchmark and then move forward the initiative.

The difficulties that the office may encounter when starting to work on the STARS program is short of budget. Therefore, the sustainability office must decide how much time and effort will be dedicated to reporting and how much staff will dedicate to completing tasks associated with reporting. It is helpful to use STARS as the metrics to show to the executive leadership where the institution is, and the direction where the institution wants to be. The STARS program is an excellent tool to direct the institution on implementing particular initiatives. However, when just getting started, institutions do not have to complete all fields if support is not in place yet.

Get involved in the STARS government. For institutions that have not participated in the STARS program yet, many institutions, first step into sustainability could be either through zero waste and recycling or through climate change and the climate action plan. Knowing where the institution's current performance helps the institution move forward. For institutions that are new to the program, it is essential to get involved in the STARS government and to help adjust and tweak the tool. It will also help the liaison to understand more of the rating mechanism.

The STARS program was developed by and continues to be modified by people in the sustainability field. It is to capture the stage of what institutions are doing as defined by people with leadership positions working in the field of sustainability. Over the years, the STARS program continually modify their rating system, and there both feedback and comments provided back to the STARS when they released the new version. Therefore, if anyone in the institution is willing to sit on the advisory board of STARS, and then express their comments about the program, that feedback then becomes helpful in moving the program forward on campus. Even though the STARS reporting is very time consuming, it shows the institution where it could be strengthened and whom to look for to strengthen them.

Talk to someone that already done the process. For an institution to get started, they should talk to someone that already has experience with the process. Moreover, it would help the liaison to answer the initial question of how much time it would take before taking on the project; in addition to how much time the office is willing to devote to the program. The office could choose to complete a project on a smaller scale that doesn’t take as many resources. If the office can do a more extensive job, that is great,

but if it is going to keep the staff more time and effort, it may not work out. So, it is best to ask the question of who will be responsible for the tasks, and how many people are going to be needed.

Also, it is essential to ask what structures would work to participate in the program. To get started, some institutions have worked with faculty to lead a class related to the sustainability topic. Some institutions started with students taking the initiative, and others may start with a top-down approach. Looking at different models to see what people are doing is helpful to get started. A lot of the time, the responsibilities fall on the shoulder of the liaison who works in the sustainability office. It would be a lot of work, but the liaison would also have more control and more understanding of it. It all depends on the individual institution for understanding which structure works the best. Leadership should be on board no matter what the first step looks like at the beginning. If leadership is not on board, the office will encounter many difficulties along the journey. Because there is data that the office of sustainability will require, and it will be challenging to obtain or require a new system to be developed, the office needs the support of leadership to drive and push such request from departments college wide.

Although it may not be easy at first, once the system is set up, it is less work. It is helpful to go and see what other institutions are doing in a particular area or how that benchmark was being set. Once the sustainability office has set up benchmarks, it could investigate future factors and determine what the office would love to do with STARS currently. The benchmarks helped guide the thoughts on which direction should the institution goes based on the understanding of how other institution works.

Alternatively, if the office would like to implement a specific initiative, it is easier to show the decision-maker that, other institutions are reporting to the STARS program, so should their institution. It is helpful to leverage even though not every institution has all the support in place.

Recommendations for Future Research

This qualitative study was limited to four exemplary institutions that participated in the STARS program in the U.S. It would be worth to conduct further research to include more institutions from other countries that participated in the STARS program. Besides, it would also be interesting to include institutions with low scores in the program to see their struggles and challenges.

Future research could also expand the role of the interview participation, including the upper-level administrator, facility staff, students, and faculty members. One of the themes was that collaboration works as the key to completing the STARS report. So, it would be interesting to hear their voice on how sustainability plays a role in their daily work and study.

Another research that could be worth exploring is to include the institutions that have never participated in the STARS program to understand what hinders the initiative on campus.

Chapter Summary

The multiple-sites case study described the campus sustainability performance at four exemplary higher education institutions: i.e., Doctoral, Master's, Baccalaureate, and Associate's, as measured by the STARS program.

The first research question was: What are the demographic characteristics of four select higher education institutions that have earned recognition in the STARS program? This question was answered by the theme 1: Financial sustainability is the foundation. The second research question was: What is the status of campus sustainability at these four institutions as measured by STARS in the areas of academia, engagement, operations, planning & administration, and innovation? This question was answered by the theme 2: Improvement and achievement coexist. The third research question was: What is the journey of becoming an institution that earns recognition in the STARS program (academia, engagement, operations, planning & administration, and innovation)? This question was answered by the theme 3: Collaboration from all levels is the key. The fourth question was: What are the drivers and challenges that the selected four institutions experienced from a leadership perspective? This question was answered by theme 4: Social responsibility motivates institutions to overcome challenges.

APPENDIXES

Appendix A. Document List

Name of the Document	Rationale for Selection
Institutional mission and vision statement	To explore the institutional value on sustainability
Institutional strategic plan	To find out the leadership emphasis of sustainability
The organizational structure of the sustainability office	To identify the institutional support and cross campus collaboration
Budget report	To determine the sources of financial support for the sustainability office
Campus student's sustainability associations	To examine the influence of campus sustainability among the student population

Appendix B. Study Sites

Institution	Country	Institutional Type
Portland Community College	United States	Associate
Northeast Island College	United States	Baccalaureate
University of California, Irvine	United States	Doctoral/Research
University of Middle Land	United States	Master

Appendix C: Recruitment Email Script for Liaison to Participate in the Interview

Good [afternoon, morning, evening]. My name is Qingqing Chui. I am a Ph.D. student from the Educational Leadership Department at Florida Atlantic University. I would like to invite you to participate in an interview as part of my dissertation research to describe campus sustainability performance from the perspective of participants in the Sustainability Assessment Rating System (STARS) at exemplary institutions. The focus is on understanding and describing the drivers that contribute to sustainability in higher education. The reason why you are chosen for the interview is because your institution earned the highest score in the STARS program within its institution type. Your institution is the star of the STARS.

The phone/internet interview will take around 60-90 minutes. I will maintain your confidentiality. Please confirm you are interested in the interview by replying to the email.

Thank you very much.

Appendix D: Interview Protocol

Good [afternoon, morning, evening] [name]. Thank you so much for agreeing for this interview. As we discussed, the interview is part of my dissertation research (a multiple case study to describe the sustainability performance in higher education). I am specifically interested in describing the campus sustainability performance from the perspective of participants in the Sustainability Assessment Rating System (STARS) at top rated institutions. With your permission, I would like to record this interview. I will maintain your confidentiality and will be using a pseudonym for your name. Do I have your permission? Do you have any questions before we start the interview?

1. How did you start to work in the sustainability field?
    - What influenced you to make such a decision?
2. Why do you choose to work here?
   How many years have you been working at [name] University? How long have you supervised the STARS program?
    - Was sustainability part of the institutions' mission, vision or strategic plan when you came here? If not, when was it established?
3. Tell me about the time when your institution started to participate in the STARS program.
    - Who was leading the initiative?
    - And how was the decision made?
4. What was the original status of your STARS rating? How did your institution move from that all the way to the current status?
    - Who and which departments were involved?
    - How much support and commitment was there in your institution?
    - What are the sources of financial support?
5. Tell me about how you and your office prepare for the STARS program application?
    - Is that part of your daily work or an extra assignment to your workload?
6. What are the major successes of implementing sustainability initiatives on campus?

- What is the secret of your success?
- Since you first started working at the university, is the look of the campus different? How is it different and what are the changes?
- How did the change happen?
- Why are those successful program/activities important to your institution?

7. What are the challenges you faced over the years in supervising the program?
    - How do you deal with the problems?
    - Based on your experience what would you recommend to other institutions that are working on their STARS submission?
    - What would you say to institutions which have not participated in the STARS program? Why should they participate? What should be the first step?
8. Has your institution taken on other sustainability initiatives besides participating in the STARS program? Tell me about that.
9. From your perspective, how can higher education contribute to the overall suitability effort?
    - How do students/staff/administrators benefit from attending an environmentally friendly institution?
10. Could you describe what goal you would like to achieve in the next few years regarding sustainability movement on your campus?
11. Is there anything you want to add?

That looks like the last question that we have time for, so I'd like to thank you again for your time this [afternoon, morning, evening]. If it is convenient, may I follow up with you if I have any remaining questions? Also, the transcribed document will be available for your review to strength the quality of the research. Would you like me to send you a copy to review? [If yes, where shall I sent it?]

Thank you and have a great day.

Appendix E. Consent Form for Interviews

Title of the Study: Sustainability Performance in American Higher Education: A Multiple Case Study of Four Exemplary Institutions that Participated in the Sustainability Tracking, Assessment Rating System

Investigators: Qingqing Chui, Doctoral student; Deborah Floyd, Ph.D.; Patricia Maslin Ostrowski, Ph.D.

Purpose: The purpose of this multiple site case study is to describe the campus sustainability performance at four selected higher education institutions, i.e. Doctoral, Masters, Baccalaureate, and Associate, as measured by the Sustainability Tracking, Assessment & Rating System (STARS) and to understand the drivers and challenges from the perspective of university leaders.

Procedures: To participate in this study, you will complete the following:

1. **Individual Interviews**: You will be asked to take part in the interview at your convenience for approximately 60 to 90 minutes. The interview will be conducted via Skype, google hangout, phone. You will be asked open ended questions regarding the campus sustainability effort, your participation in the STARS program, and the successes and challenges you have experienced at your institution. The interview will be audiotaped with your permission.

Risks: The risks involved with participation in this study are no more than one would experience in regular daily activities. You may refuse to participate in the study or chose to withdraw at any time without penalty.

Benefits: The results of this study will contribute to the literature that will benefit universities and colleges. There will be no incentives for participating in this study. Your participation in this study will assist in gaining insight on sustainability in higher education.

Data Collection and Storage: The interview will be recorded with the online recording program, and the audio data will be stored on the principal investigator's desktop, which is always password protected. Physical copies of data and study records will be stored in the principal investigator's locked room. All electronic data will be stored on the researchers' desktop, which is always password protected . Only the researchers working on the study will see the data. Any information collected about you will be kept confidential and secure and only the people working with or overseeing the study will see your data, unless required by law.

Contact Information: If you have questions about the study, you should email the principal investigators Dr. Deborah Floyd at dfloyd@fau.edu, Dr. Patricia Maslin Ostrowski at pmaslin@fau.edu, or Qingqing Chui at qchui@fau.edu. If you have questions or concerns about your rights as a research participant, contact the Florida

Atlantic University Division of Research at (561) 297-0777 or send an email to researchintegrity@fau.edu.

Consent Statement: I have read or had read to me the preceding information describing this study. All my questions have been answered to my satisfaction. I am 18 years of age or older and freely consent to participate. I understand that I am free to withdraw from the study at any time without penalty. I have received a copy of this consent form.

I agree _____I do not agree _____ be audio recorded.

Signature of Participant: _____ Date: _____

Printed Name of Participant:

First Name _____ Last Name_____

Signature of Investigator: _____

Date: _____

Appendix F: Executive Order. B-18-12

IT IS HEREBY ORDERED that State agencies, departments, and other entities under my direct executive authority (State agencies) take actions to reduce entity-wide greenhouse gas emissions by at least 10% by 2015 and 20% by 2020, as measured against a 2010 baseline.

IT IS FURTHER ORDERED that all new State buildings and major renovations beginning design after 2025 be constructed as Zero Net Energy facilities with an interim target for 50% of new facilities beginning design after 2020 to be Zero Net Energy. State agencies shall also take measures toward achieving Zero Net Energy for 50% of the square footage of existing state-owned building area by 2025.

IT IS FURTHER ORDERED that State agencies continue taking measures to reduce grid-based energy purchases for State-owned buildings by at least 20% by 2018, as compared to a 2003 baseline, and reduce other non-building, grid-based retail energy purchases by 20% by 2018, as compared to a 2003 baseline.

IT IS FURTHER ORDERED that State agencies participate in “demand response” programs to obtain financial benefits for reducing peak electrical loads when called upon, to the maximum extent that is cost-effective for each State-owned or leased facility and does not materially adversely affect agency operations.

IT IS FURTHER ORDERED that any proposed new or major renovation of State buildings larger than 10,000 square feet use clean, on-site power

generation, such as solar photovoltaic, solar thermal and wind power generation, and clean back-up power supplies, if economically feasible.

IT IS FURTHER ORDERED that new or major renovated State buildings and build-to-suit leases larger than 10,000 square feet obtain LEED “Silver” certification or higher, using the applicable version of LEED.

IT IS FURTHER ORDERED that new and existing buildings incorporate building commissioning to facilitate improved and efficient building operation.

IT IS FURTHER ORDERED that State agencies identify and pursue opportunities to provide electric vehicle charging stations, and accommodate future charging infrastructure demand, at employee parking facilities in new and existing buildings.

IT IS FURTHER ORDERED that the Department of General Services work with other State agencies to develop by July 1, 2013, policies and guidelines for the operation and maintenance of State buildings to achieve operating efficiency improvements and water and resource conservation, and to continually update and incorporate these into the State Administrative Manual.

IT IS FURTHER ORDERED that State agencies implement relevant and feasible voluntary measures from Divisions A4.5 and A5.5 of the California Green Building Standards Code, to ensure healthy indoor environments for occupants.

IT IS FURTHER ORDERED that State agencies reduce overall water use at the facilities they operate by 10% by 2015 and by 20% by 2020, as measured against a 2010 baseline.

IT IS FURTHER ORDERED that State agencies purchase and use environmentally preferable products that have a lesser or reduced effect on human health and the environment when compared with competing goods that serve the same purpose whenever they are applicable, perform well, and are cost-effective per Public Contract Code section 12400.

IT IS FURTHER ORDERED that State agencies identify and pursue available financing and project-delivery mechanisms to achieve these goals.

Appendix G. Sustainability, Oregon, 2019

***184.423 Findings and goals regarding sustainability*.** The Legislative Assembly finds and declares the following goals for the State of Oregon regarding sustainability:

(1) In conducting internal operations, state agencies shall, in cooperation with the Oregon Department of Administrative Services, seek to achieve the following objectives:

(a) State purchases should be made to serve the broad, long term financial interests of Oregonians, including ensuring that environmental, economic and societal improvements are made to enhance environmental, economic and societal well-being.

(b) Investments in facilities, equipment and durable goods should reflect the highest feasible efficiency and lowest life cycle costs.

(c) Investments and expenditures should help promote improvements in the efficient use of energy, water and resources.

(d) State operations should be in diverse locations, including rural and distressed communities.

(e) State operations and purchases should help maintain vital and active downtown and main street communities.

(f) State purchases should help support opportunities for economically distressed communities and historically underemployed people.

(g) State operations should reflect partnerships with communities and businesses.

(h) State operations should help reduce adverse impacts on native habitats and species and help restore ecological processes.

(i) State operations should be conducted in ways that significantly increase the efficient use of energy, water and resources.

(j) State operations and purchases should reflect the efficient use and reuse of resources and reduction of contaminants released into the environment.

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