

Sustainability Education at the University of Colorado, Boulder:
An analysis of the attitudes and interest of students and faculty regarding increasing opportunities for
undergraduate sustainability education

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Abstract

This thesis provides a report on the current attitudes and interests of sustainability education at the University of Colorado, Boulder. Past research has shown other schools leading the country in sustainability education, along with great student benefits from the education. The objectives are to analyze three different sets of respondents using different surveys at the university. I surveyed eighteen sustainability educators, 55 Environmental Studies majors, and 100 non-Environmental Studies majors from November 2019 to February 2020 regarding sustainability education at CU Boulder. Results displayed whether students and educators stated interest in increasing educational opportunities, what opportunities already are available, and other questions about benefits, challenges, and thoughts on increasing sustainability learning opportunities.

Analysis of results implied educators at the university believe there are great benefits to students learning sustainability skills, and support increasing opportunities. There are many internal and bureaucratic challenges that impede this implementation. Environmental Studies, non-Environmental Studies students show great interest in attending curriculum-based sustainability at many different levels including classes, minors, and majors of sustainability.

Preface

I am an Environmental Studies major at the University of Colorado, Boulder and an active member of the sustainability community at CU Boulder. I became interested in sustainability through working for the Southwest Conservation Corps, property management, outdoor education, and much more. I continued this skill building at CU Boulder.

I arrived at the university after spending two years at Colorado State University looking for a hands-on, community based, and teamwork-oriented version of the Environmental Studies program, while remaining in my home-state of Colorado. Most environmental studies programs, and similar degree paths are research-based, and faculty are focused on researching environmental problems. I was very interested in the brief mentions of sustainability in Environmental Studies coursework. My interest only grew after taking the Sustainability Leadership Program through the Environmental Center, and I became very intrigued with the question of whether CU should provide more curriculum in sustainability education to all undergraduate students.

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I could not have done this without my family. My dad and mom were instrumental in getting me to the point where I am, and they were some of the biggest cheerleaders in this process. I had my biggest inspiration come from my grandmother, Gail Shepherd as she wrote a thesis at Colorado State University, and I wanted to make her proud.

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Introduction

The United Nations considers sustainability education as part of their sustainable development goals (Osman et al, 2017). Sustainability education is widely practiced with over 140 degree seeking programs in the United States alone (Boone 2015). The University of Colorado, Boulder does not have an undergraduate degree seeking program in sustainability as many other schools do. CU Boulder's vision: The CU Flagship 2030 Strategic Plan is an attempt to become a leader in a 21st century education system that include tackling challenges such as climate change and sustainability (*Flagship 2030*, 2014). Educators believe learning opportunities in sustainability are critical as there are many benefits including job marketability, with studies showing significant employer interest in students with sustainability backgrounds (Sayce, Clements, & Cowling, 2009).

Sustainability education is a very important topic to the United Nations, other universities, CU Boulder, students, and educators. The thesis cannot discuss every facet of education in sustainability although will be focusing on one area at the university that requires research. I have longstanding interest in learning about sustainability and have many friends who stated support. I decided to research whether students at the university also had support for increasing opportunities.

If I were a prospective student, parent, or faculty interested in sustainability learning opportunities I would first go to the sustainability portal at CU's web site, which is a great resource not many universities provide. The portal would lead me to the *academics* tab where there would be no specific mention of a sustainability program, only engineering, research, and a leadership program that focuses on the environment. This suggests a lack of organized

sustainability education at the university. The objective of this paper seeks to understand support for increasing organized curriculum-based sustainability learning opportunities at the university.

The project begins with background research and a review of literature which first defines sustainability education and its main organizations. I then illuminate benefits of sustainability learning opportunities in higher education to show the importance of a program. After reviewing benefits, I discuss resistance in implementation to examine possible reasons why there is not currently a sustainability program at the university. There is then a brief overview of exemplary schools in the United States to compare the difference between CU Boulder and country leading sustainability education programs. The background section concludes with a summary of existing sustainability, education, and student support at CU Boulder to understand the current atmosphere and opportunities for sustainability learning at the university.

I then describe the methodology used in this research project. First surveying sustainability professors and educators to understand the real-life benefits, challenges, and support for increasing sustainability education. It is important to survey educators due to their role in facilitating education in sustainability to students. The next step surveys ENVS and non-ENVS students at CU Boulder understanding whether students are interested in attending sustainability education, along with the status of current sustainability learning opportunities. I refined the student survey into two categories as the Environmental Studies program is the stated “sustainability” major at the university and have higher exposure to sustainability topics. I did not limit the research to ENVS students to understand the interests of a wider range of students. This report will end with a discussion, recommendations for future development, limitations, and conclusions.

In order to understand sustainability education at CU Boulder this research project sought to answer the following questions: What do professors at CU Boulder regard as the benefits of sustainability education opportunities for students? What do educators believe are the roadblocks in implementing sustainability education? What are the opinions of educators as compared with students regarding the opportunities for sustainability learning at the university? What level of education do students wish to receive in sustainability? Are ENVS students happy with their sustainability knowledge received from the Environmental Studies program at CU? This research answered these questions to provide a report on the status of education in sustainability at the university, along with recommendations for further development.

Background and Review of Literature

I will define sustainability education, identify benefits, resistances, summarize exemplary universities in the United States, and existing sustainability education at the University of Colorado, Boulder.

Defining Sustainability Education

Sustainability education, as defined by me, is the passing along of the skills necessary for sustainable societies to either students or those willing to learn from these leaders and teachers. Sustainability challenges and topics are the main focus of sustainability education. These challenges include, but are not limited to climate change, global poverty, inequality, natural resource depletion, and environmental degradation (*STARS Technical Manual*, 2019). There are more challenges in which sustainability-oriented educators can focus on and are included in the UN Sustainable Development Goals (Osman et al, 2017).

Sustainability was first an idea, a way of living, a project that could help the human environment to keep people living for longer (Caradonna 2014). This has moved into the classroom, academics, and full-fledged degree paths in universities (Caradonna 2014 and Andrews, 2012). The United Nations among others define sustainability as meeting the goals of the current generation, without impacting the needs of future generations (Caradonna 2014; Andrews, 2012; *United Nations: Sustainability*, 2014). Sustainability is a constantly evolving and changing term with a host of nuances I will not delve into. The United Nations provides sustainability through their Sustainable Development Goals or “SDGs” (*Sustainable Development*, 2020). These goals are based upon the “three pillars of sustainable development” which are economic, social, and environmental work (*Sustainable Development*, 2020). SDGs have 17 goals for “people and the planet,” and all of these goals have arisen around the three pillars (*Sustainable Development*, 2020). Education is one of the sustainable development goals (*Sustainable Development*, 2020).

Curricular based education has evolved through large scale action, and the most publicized is expressed in this paragraph. At the 2015 UN Summit for Sustainable Development Goals, sustainability education was one of the main points of emphasis to help achieve their SDGs (Osman et al, 2017). The summit led to the creation of a curriculum framework for sustainability education, which framework promotes the application of learning about sustainability including knowledge, skills, values, and attitudes (Osman et al, 2017). The knowledge and programs can be applied and adapted for different countries and cultures as needed (Osman et al, 2017). Osman et al. noted:

The purpose of the framework is to develop successful learners, confident individuals, and responsible citizens who are resilient and uphold the core values and principles... which recognizes that ‘sustainable development can help to eradicate poverty by pursuing inclusive growth whilst preserving and conserving

natural ecosystems and promoting social equity'. Pursuit of sustainable development requires educational and learning curricula that inspire thinking, doing, being and becoming agents of change (p.15).

Sustainability Education became promoted in higher education first at the UN Conference of Parties in Rio+20 with the incorporation of sustainability education and leadership in the UN SDGs (Osman et al, 2017). The UN's goals were to mobilize higher education universities to act toward providing sustainability education, action, and leadership (Simon & Haertle, 2014; Vincent, 2012). The turn toward making sustainability a goal of higher education created an increase in sustainability curriculum universities provide for their students (Simon & Haertle, 2014). Shifting values created a change from miniscule numbers of sustainability programs to 73% of 272 universities increase sustainability curriculum in 2014 (Simon & Haertle, 2014). Along with helping universities across the world adopt sustainability actions and education, the UN helped raise awareness in how academia influences sustainable development (Simon & Haertle, 2014; Vincent, 2012). As of 2012 in the U.S alone sustainability degrees increased 57% (Vincent, 2012). In the US there are over 140 degree seeking programs in sustainability as of 2015 (Boone 2015). The Association for the Advancement of Sustainability in Higher Education provides an overview of the extent of sustainability related degrees in universities and colleges, and their research showed 464 academic programs in sustainability studies and sciences in 2019 (Academic Programs, 2019).

Another sustainability organization, based in the United States, the Association for the Advancement of Sustainability in Higher Education (AASHE) in 2009 created their assessment for higher education sustainability through the Sustainability Tracking, Assessment, and Rating System (STARS) tool (Horvath, Stewart, & Shea, 2013). The program is not limited to academic education, although a significant part of AASHE STARS sustainability research promotes

increasing educational opportunities (Horvath, Stewart, & Shea, 2013). STARS determine the quality and extent of sustainability in universities through rating different categories including education, research, operations, planning, administration, and engagement (Horvath, Stewart, & Shea, 2013).

AASHE STARS provides points/credits where institutions complete their documentation for including certain requirements as stated in their manual. Regarding the educational components of STARS assessment there are two factors to this credit (*STARS Technical Manual*, 2019). First is the sustainability course offerings which is calculated by the percentage of courses that are sustainability “focused” or “inclusive” (*STARS Technical Manual*, 2019). AASHE describes sustainability focused as courses needing to include a course title or description with a “primary and explicit focus on sustainability” (*STARS Technical Manual*, 2019). The second factor is the inclusion of sustainability topics or sustainability-related topics (*STARS Technical Manual*, 2019). Inclusion means the course “incorporates a unit or module on sustainability or a sustainability challenge, includes one or more sustainability-focused activities, or integrates sustainability challenges, issues, and concepts throughout the course” (*STARS Technical Manual*, 2019).

Sustainability education, as compared with environmental education, focuses on applicability through interventions and solutions. Students are drawn to sustainability because of focuses on solutions, and feelings of hope that come with sustainability (Boone 2015).

Sustainability in many universities use projects to show the application of interventions and solutions (Boone 2015). The projects focus on interventions to environmental problems which create sustainable solutions through student learning about path dependency (Boone 2015).

Students are able to practice hands-on solutions-based projects which put knowledge learned in

the classroom to use in the real world where students can see the influence the projects are having (Boone 2015).

As the United Nation and AASHE both place value on specifically sustainability education in the university setting, there needs to be an examination of what sustainability education means for students. If large institutions and groups put investments into sustainability research and implementation, students must gain benefits from skills provided by educational opportunities. The next section will cover the existing literature and background research on benefits students receive from sustainability educational opportunities.

Benefits in Higher Education

Why is curriculum-based sustainability education important for students? What sustainability education provides students is more than the sum of all parts (Sterling et al., 2010). Whereas one can use a degree in environmental studies without education in sustainability, the introduction and application of sustainability education through student's careers can open many pathways (Sterling et al., 2010). Sustainability education increases the value of a workforce, creates conscious citizens, increases civic dialogue, and prepares students for a future where sustainability jobs will be at a premium (Beyond the Right Thing to Do, 2017; Gadotti, 2008).

Students can use sustainability education to build skills as they graduate in a world with many different variables that coincide with a changing climate (Armstrong et al., 2016). The introduction of education for sustainability and sustainable development has created a shift in knowledge gained at Green Mountain College for many students of higher education (Armstrong et al., 2016). The study showed students receiving education increased their knowledge for science, anthropology, the triple bottom line, their sense of place, systems thinking, incorporated empathy in decision-making, interdisciplinary collaboration, and techniques with self-sufficiency

(Armstrong et al., 2016). Knowledge received from attending education in sustainability, can create attractive resumes for employers.

Students have historically been put off of pursuing “sustainability” degrees because the perception that sustainability, environmental studies, and geography degrees are unprofitable, with limited career opportunities and benefits (Sterling et al., 2010). Contrary to that fact, a UK study showed that out of 55 employers 22 were interested in employing people with a background and specialization in sustainability (Sayce, Clements, & Cowling, 2009).

The University setting is uniquely prepared to provide education for sustainability, as students can develop problem solving, leadership skills, and solutions for environmental problems in relation to sustainability (Sterling et al., 2010). Universities provides an opportunity for students to develop skills in what arguably is the greatest challenge in modern history (Sterling et al. 2018). Providing students degrees that “matter” leads to greater citizenship, and enthusiasm in tackling environmental problems that will continue to grow into the latter part of the 21st century (Sterling et al. 2018).

As sustainability education can be valuable to students as well as employers, there needs to be offerings in sustainability education for students to obtain the benefits. The history of growing implementation of sustainability has been shown through the UN projects as stated in the last section, and AASHE research suggests there are numerous opportunities across the country which provides many benefits for students. There is resistance to implementing these opportunities in sustainability education. Sustainability can be stifled by different factors which will be discussed in the next section that highlights these resistances educators face in attempting to provide the benefits to students through learning opportunities in sustainability.

Resistance

Although there is great promotion of sustainability education in national and international communities, and great benefits from learning opportunities, there is resistance to sustainability education. Resistance and challenges are important to understand as it can be used to hinder projects in sustainability education, such as the College of the Environment at CU Boulder.

In Sterling, Jones, and Selby's book *Sustainability Education: Perspectives and Practice across Higher Education* they touch on many of the main challenges and resistance to implementing curricular sustainability programs. Schools and students readily move ahead in sustainability focused projects such as "greening campuses" which advance further than sustainability curriculum (Sterling et al., 2010 p. 5). Sterling et al suggests that adverse stakeholders could be the problem, where actors such as faculty, students, or administrators resist new curriculum (Sterling et al., 2010). Higher education has a history of dragging their feet with the introduction of sustainability education and is partially due to faculty not understanding the complete impacts of sustainability education and the necessity of sustainable development in the modern age (Sterling et al., 2010).

Another resisting factor to sustainability education is the current accepted pedagogical practice. Education can seem to be ingrained, appearing as there is only one way to teach students, and sustainability does not seem to fit into the paradigm of examinations and lectures (Sterling et al., 2010). Sipos, Battisti, and Grimm in the article *Achieving transformative sustainability learning: engaging head, hands and heart* brings to light some problems with sustainability learning as current education perpetuate consumerist model of education, which sustainability education tends to critique (2008). Sustainability education must go through challenges of navigating a community incorporated in the current education practice, as sustainability is attempting to change current power structures (Sipos, Battisti, & Grimm, 2008).

The attempted change of the educational model could lead to push back from the educational bureaucracy and faculty as it not only seeks to change the social, and cultural norms, but education structure. Pushback from the pedagogy possibly leads to underfunding of education in sustainability.

Students also can be resistant to sustainability education, as students believe to have a higher knowledge of sustainability that they actually possess. In one study, students attending a multi-week co-curricular course on sustainability students in entrance surveys stated higher belief in their knowledge of sustainability skills than in exit surveys (Simmons 2018). This implies that students believe they have strong sustainability skills and might not take classes offered on sustainability.

Administrative leadership is another resisting force in sustainability education. Leadership sometimes needs “champions” of sustainability to further sustainability curriculum at the university (Sterling et al., 2010 p. 5). These champions of sustainability work from top down to progress an agenda in sustainability to bring coordination and cohesions to universities that do not have focused initiatives (Sterling et al., 2010 p. 5).

Sustainability at the University of Colorado, Boulder has also gone through resistance and need for leadership assistance. The university has a plan to become a leader in the 21st century through innovation of education practices which tackle modern challenges that include the challenge of climate change and sustainability (*Flagship 2030*, 2014). One innovation was a project to create a “College of the Environment” by the Environment and Sustainability Visioning Committee (Collinge & Neff, 2014). The college would have provided many benefits to students and the reputation of CU Boulder (Collinge & Neff, 2014). The final report stated

how to create a focused major and program for sustainability education, although it is implied there were political gridlock counteracting the program as the project was never completed.

There are challenges in sustainability learning opportunity implementation and education, but students receive great benefits to their knowledge, leadership, skill building, and job marketability. In the U.S. there are universities pushing through these challenges to provide high quality and extensive opportunities in sustainability education, where CU Boulder is falling behind. The United Nations and AASHE both state there are opportunities available for students and the next section will highlight two exemplary universities.

Exemplar Universities

Summarizing two exemplar universities that provide high quality and expansive opportunities is important to understand the current opportunities in higher education. I chose these schools because they show examples of how sustainability education is practiced with widespread opportunities and strong leadership. Arizona State University (ASU) and Yale are exemplar universities in the United States due to a longstanding history of providing quality and “top of the nation” education in sustainability (Boone, 2015). These schools have current curricular sustainability learning opportunities including classes, majors, and minors.

ASU is home to the Julie Ann Wrigley Global Institute of Sustainability: a first of its kind institute for sustainability, and sustainability education with a focus on urban development (About ASU, 2019; Boone, 2015). The roots of sustainability at ASU can be traced as far back as the 1950s with the Association for Applied Solar Energy headquarters in the Tempe campus, and continued in the 1970s with the creation of the Center for Environmental Studies (Julie Ann Wrigley, 2019). Continuing over half a century of work in environmental sciences the Julie Ann Wrigley Global Institute for Sustainability was founded in 2006 through the leadership of

Michael Crow (Boone, 2015). Michael Crow has been a champion of sustainability since arriving to ASU in 2002 and helped facilitate growth in sustainability education at the university (Boone 2015).

The institute has changed the way sustainability was viewed at ASU to become more inclusive and accepting of sustainability values among the general student body and began adding sustainability in general curriculum (Boone, 2015). After the creation of the sustainability institute, ASU now offers Bachelor of Arts, Bachelor of Science, Master of Arts, Master of Science, and Ph.D. degrees in Sustainability (Boone, 2015). In June of 2015 there were 1700 students attending school at ASU enrolled in sustainability programs (Boone, 2015). ASU currently has at least 18 different pathways to be involved in sustainability education (Academic Programs ASU, 2019). Other than general sustainability programs the university includes business-oriented sustainability, undergraduate sustainability leadership, master of biomimicry, food systems certificate, energy and sustainability certificate, public service and policy program, and a complex adaptive system focus (Academic Programs ASU, 2019).

Yale was one of the first major universities in the United States to begin teaching long term environmental education. It began in the year 1900 with Gifford Pinchot creating the Yale School of Forestry (“History Yale Sustainability,” 2019). Pinchot was instrumental in leadership to create a first of the nation environmental learning in the university setting. Initial education included teaching about the continuing use and management of the United States natural resources, mainly forestry (“History Yale School of Forestry & Environmental Studies,” 2019). Yale then added environmental studies focuses to the college and in 1972 the college was renamed the Yale School of Forestry and Environmental Studies (“History Yale Sustainability,”

2019). The same year the college added environmental degradation and costs to economic models in environmental studies programs (“History Yale Sustainability,” 2019).

In 1994 the Yale Center for Environmental Law Policy is created jointly by the Yale Law School and the Yale School of Forestry and Environmental Studies (“History Yale Sustainability,” 2019). The center is an organization focused on expanding critical thinking on all scopes and scales in environmental decision and policy making (“About Us Yale Center for Environmental Law & Policy,” 2019). In 2006 the university also added the Center for Business and the Environment, which created a way for student to jointly obtain business and sustainability education, with a mission to educate and inspire sustainability leaders with seminal business solutions for environmental problems (“Our History,” 2018). Yale also has a program called Climate Change Communication which grew from a climate conference in 2005 (“The Program,” 2019.; Abbasi, 2005). The program diagnoses problems which stifles climate change education and created a research based educational tool to help with climate communication (“The Program,” 2019; Abbasi, 2005). Yale is implementing a sustainability framework created in 2016, lasting until 2025, that includes leadership, empowerment, sustainability, and sustainability education related goals for the future (“History Yale Sustainability,” 2019; “Yale Sustainability Plan 2025”, 2019).

The two schools showcase leadership in sustainability and opportunities. It is very helpful to see the framework other universities across the country provide to compare with CU Boulder. As these universities provide an enormous extent of education opportunities in sustainability, it is interesting to see how the University of Colorado, Boulder compares to these exemplary universities. CU Boulder has a plan for implementing education with the 21st century problems and solutions yet has not facilitated growth in organized sustainability education programs. I am

providing research on whether students support growth of organized sustainability education like these exemplary universities. The opportunities and attitudes of sustainability education at the University of Colorado, Boulder will be discussed in the next section.

CU Boulder Sustainability Education

CU Boulder is one of the biggest schools in Colorado, a public research university founded to provide a diverse education to over 27 thousand undergraduate students (“How Does University of Colorado” 2019). The university has a lengthy reputation as being very focused on sustainability. In 2017, CU was ranked 10th in public schools for sustainability by the Princeton Review’s “Top 50 Green Colleges” (*Pushing Boundaries*, 2017). The headline states the review was a “sustainability” ranking, and the articles cited sustainability focused pursuits by the institution including climate and energy research, the interdisciplinary Environmental Studies program, recycling, and leadership (*Pushing Boundaries*, 2017). Surprisingly, when I clicked on the link in the article it brought me to the 2020 green colleges where CU Boulder was not on the current list by the Princeton Review (*Top 50 Green Colleges | The Princeton Review*, 2020).

In 2009 the Sierra Club named CU Boulder the top ranked “green” university in the nation (*CU-Boulder Named Top “Green” University*, 2009). These results were collected from a 39-question survey ranking and measuring sustainable “practices and initiatives” in the different categories of academics, administration, efficiency, energy, food, purchasing, transportation and waste management (*CU-Boulder Named Top “Green” University*, 2009). It was notable when clicking on the article to the Sierra Club’s web site it provided an error message (*Sierra Club*, 2020).

CU has a goal to become a leader for the current and future problems that face universities worldwide with the Flagship 2030 (*Flagship 2030*, 2014) The university will call on

faculty and administration to facilitate student learning for the ongoing crisis of climate change, and energy problems of the future (*Flagship 2030*, 2014).

Both articles above were provided through the university's newsletter called CU Today and were written by the university itself. The Flagship 2030 program was created by the university. The university has strong goals and intentions to be a leader in sustainability, although there is no organized program of sustainability. The seeming discrepancy of goals verses implementation by the university calls for further analysis and research of more current sources, and in-depth data to show whether students and educators care about sustainability education.

Campus Sustainability Survey

The Campus Sustainability Survey was completed in 2018 and researched in 2017. The survey was sent to all students and faculty at the university at the time and researched the attitudes around sustainability. It is a helpful tool in understanding the attitudes of students and faculty around sustainability, although is not focusing on sustainability.

The survey was completed by 310 to 284 students as every question was not completed (*Annual Report*, 2018). 90% of students stated sustainability was either "very" or "somewhat" important to them before attending the university (*Annual Report*, 2018). Ninety seven percent of students stated sustainability was either "Very" or "Somewhat" important to them now they are CU Boulder students (*Annual Report*, 2018). Ninety two percent of students indicated importance that CU Boulder has a "strong commitment to environmental sustainability" (*Annual Report*, 2018). Forty percent of students indicated they came to CU Boulder in part of its sustainability reputation (*Annual Report*, 2018). These numbers show large student support for sustainability at the university. Although it is not a survey on student's attitudes surrounding

specifically sustainability education, education on sustainability heavily depends on student's attitudes on sustainability itself. I will dive deeper into precisely what are student's interest in sustainability education, and the levels of education they wish to receive in the results and discussion sections.

Educators also have interest in sustainability, as shown in the 2017/2018 sustainability survey. Eighty-eight percent of staff and faculty stated sustainability was "very" or "somewhat" important to them before working for CU Boulder (Oliker, Simmons 2017). Ninety-eight percent of staff and faculty responded sustainability is "very" or "somewhat" important to them now they are CU Boulder employees (Oliker, Simmons 2017). Ninety-two percent of staff and faculty indicated they are attempting to make environmentally sustainable lifestyle choices (Oliker, Simmons 2017). Ninety percent of staff and faculty responded: "it was important to them that CU Boulder has a strong commitment to environmental sustainability" (Oliker, Simmons 2017). Seventy-two percent of staff and faculty report they feel pleased or proud to work at the university in part because of its sustainability reputation (Oliker, Simmons 2017).

Students and educators show interest for sustainability at the university. Although the Campus Sustainability Survey was not specifically showing support for educational opportunities. This thesis fills a gap in knowledge at the university stating student and educator support for sustainability education opportunities. Although there is support for sustainability in general, supporters need clear and easily accessible opportunities for sustainability programs and education. There needs to be effective outreach for these students to gain access to sustainability programs and educational opportunities. The next section analyzes the CU Sustainability Web site which is an exceptional form of reaching a large number of students that are interested in

these sustainability education opportunities. The sustainability portal shows different academic opportunities in sustainability.

CU Sustainability Web Site

The most accessible way to find sustainability data from the university is through the CU Boulder sustainability portal. Based upon assessment of the sustainability web site undergraduates at the university do not have clear opportunities to pursue “sustainability” focused majors, minors, focuses—only classes (“Home: CU Sustainability,” 2019). In examination of the CU Sustainability portal provided by the university there is no specific targeted way for students to access curricular sustainability education (“Academics | Sustainability” 2019). Under the *academics* tab there are only mentions of environmental engineering programs, master’s degrees, and the INVST leadership program, without mentioning of ENVIS (“Academics | Sustainability” 2019). The same web site tells us that there are 474 sustainability related courses offered at CU Boulder yet offers no way to investigate the programs and courses (“Academics | Sustainability” 2019). It is notable that The Environmental Studies program at CU Boulder is not listed on the campus wide Sustainability portal, but the ENVIS program web site states one of their goals is “facilitating interdisciplinary collaboration in environment and sustainability” (“Environmental Studies Program,” 2019; “Home: CU Sustainability,” 2019).

The web site shows although there are highly publicized sustainability programs in providing sustainability, although there are weaknesses in this web site. There are very few mentioned programs that provide curricular sustainability education, only numbers, and no pathways to obtaining any sustainability educational opportunities such as majors or minors. The web site elucidates that sustainability educational opportunities exist yet does not provide to

students any easy ways to obtain sustainability knowledge. Although the portal mentions specific learning opportunities such as the engineering and business programs, but no general sustainability education opportunities. The web site also mentions graduate level sustainability educational opportunities, although no inclusion of general undergraduate opportunities which this research is examining. There are no mentions of the Environmental Studies program, which is what CU and AASHE determines as the undergraduate opportunity for sustainability education. The next section analyzes the Environmental Studies program at CU.

Environmental Studies Program

The University of Colorado, Boulder had 833 students in the Environmental Studies (ENVS) program as of fall 2018 and stayed steady in the number of students attending the major for the last five years (“CU Boulder fall enrollment” 2019). The ENVS program is almost 3% of the total university.

The ENVS program is a Bachelor of Arts in the college of arts and sciences at the University of Colorado, Boulder. It is an interdisciplinary program which provides education in a focus where students take charge and determine the extent of specific education students wish to receive in anything from geography, geology, biology, sustainable development, and much more (“Curriculum,” 2015). The Environmental Studies program has many requirements but can be simply broken down into three parts: General education requirements (determined by the college of arts and sciences), major requirements (ENVS specific classes), and electives (“Curriculum,” 2015). Within major requirements there is a specialization section which provides students an opportunity to learn about classes which fit their interests and post academic career studies, where some might choose to receive education in sustainability. There are 11 courses offered

with sustainability related topics in their description, which is a large amount, but only one lower division class (*ENVS Courses*, 2020).

At the university, Environmental Studies is the primary undergraduate major to provide education learning opportunities in sustainability (Newport, 2014; Wessman 2018). The Association for the Advancement of Sustainability in Higher Education (AASHE) provides a compilation of what major in every university is the main provider of sustainability education for the school (*STARS Technical Manual*, 2019). Each university reports their school performance in sustainability and sustainability education. CU Boulder's AASHE STARS report, called a snapshot, was written by Dave Newport, and Carol Wessman.

The STARS CU Boulder snapshot was filled out most recently in 2018 and 2014. The AASHE STARS snapshot states: Environmental Studies is an “interdisciplinary program, and utilizes existing courses given in various Arts and Sciences departments” (Newport, 2014; Wessman 2018). The ENVS program is designed to provide a broad, but rigorous education in environmental issues and problem solving, rather than a status quo and discipline-based training (Newport, 2014; Wessman 2018). The major uses curricula in both earth and natural sciences as well as from social sciences. (Newport, 2014; Wessman 2018). Wessman describes the purpose of the Environmental Studies Program as:

The purpose of the major is to train students in the cause, scale, and remediation strategies of the major environmental problems in the United States and the world. Students will acquire an awareness of the complexity of factors relating to human interaction with the environment. They will become acutely aware of the fact that environmental problems have both human and biophysical components, and gain knowledge of the general principles of human-environmental interaction, global habitability, environmental change, and sustainable human societies (2018).

This quote from the Environmental Studies department at CU covers the environmental pillar from the UN sustainable development goals. They have no mention of the social and economic pillars of sustainability in their description of the course. Although there might be some emphasis on them, as the description mentions sustainable human societies. This is not an explicit statement of environmental, social, and economic interactions that are a key part of sustainability. This requires further research on whether students are gaining sustainability education from the major. I will be asking ENVS students if they are receiving education in sustainability, and the quality of their learning opportunities.

The next section examines the interest around sustainability in one specific program, and if there is support from the larger undergraduate student body. The program is not a formally offered class through the university, but it is an educational opportunity for sustainability learning. This program, offered through the environmental center, shows the number of students, the diversity of majors, and their completion percentage for one sustainability learning course. There are minimal data points for sustainability education at the university, although there are problems with this data that I will touch on in the next section, it is data regarding student interest I have to work with.

CU Boulder Data Point

Examining one sustainability program in-depth is important to understand student interest in educational opportunities. I will be analyzing interest through quantitative data on number of students completing this course, and the variety of majors that attend this course. The course is called the Sustainability Buffs leadership program and provided by the Environmental Center. The program shows sustainability education interest research rather than sustainability generally

because it is a classroom setting where students hear from lecturers, and work through projects that mimic what would be taught in an academic for-credit course.

The Sustainability Leadership program or “Sustainability Buffs” is a vital point to provide learning to students as curricular opportunities are, as mentioned in the previous sections hard to find. There are unclear academic tracks at the university which are not easily accessible and examine this program as it is one sustainability educational opportunity available to be researched. There are gaps, as the course was not providing student’s academic credit and a large time commitment.

Sustainability Buffs is an extracurricular leadership program which specifically provides community based, hands on, and teamwork building leadership classes in sustainability. It is a program designed for any and all majors, where 43 students completed the program in the two semesters (Simmons, 2018). Students enrolled in this program came from different academic majors across campus, which indicates that there is need for further research in the interest of sustainability education at the university. I found it interesting how in a school with no curricular sustainability degree paths there are many students that attended a multi-week classroom session on sustainability.

Figure 1 describes the number of majors that attended the sustainability leadership program over the two semesters since its inception (Simmons, 2018). It shows 15 different majors that have attended the two semesters and is impressive in the diversity of majors that attended the course

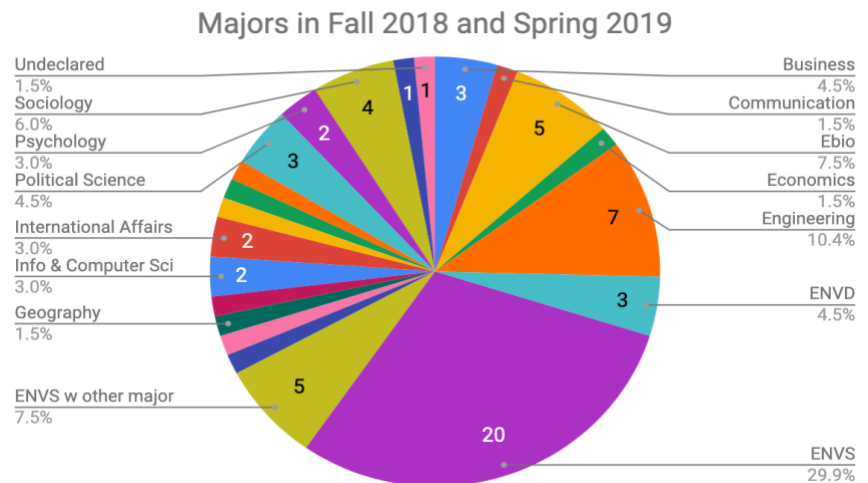


Figure 1 Sustainability Leadership Majors

Data indicates many different majors are interested in academic sustainability education, most of which are not the CU Boulder “Sustainability” major. I will use this thesis to add to the existing data on how many different majors are interested in sustainability education.

Figure 2 shows the completion percentage over the two semesters. There was a completion percentage of 64.2% over the course of two semesters (Simmons, 2018). The completion percentage is very high given there is no credit, or incentive other than the benefits of learning about sustainability. Students show they care about sustainability learning, and there is a need to further examine student

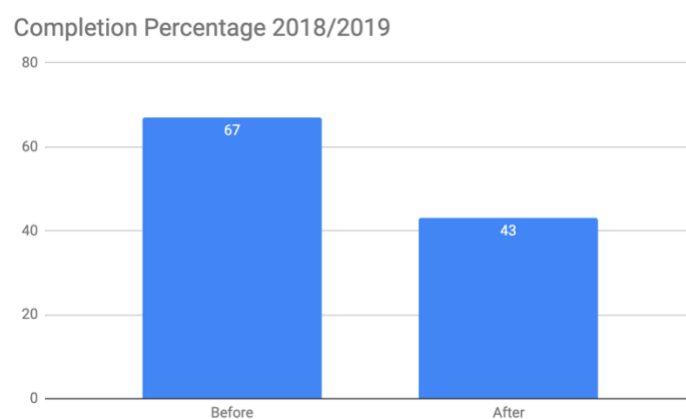


Figure 2 Sustainability Leadership Completion

interest in sustainability education programs. There are many possibilities for not completing the

program including: not affording the cost, an unexpected time conflict, or not realizing how much energy it takes for a night program, and having no curricular benefit to their degree path.

Sustainability Buffs indicates that students are interested in sustainability education programs at the university. Students from many different education pathways took this course on sustainability leadership, and many students completed the program with little to no incentives like there would be in a for-credit class. This suggests there is a need for more research in what level of education students would wish to receive, and if it would be popular among a wide student base. After showing one indicator of support for sustainability education, this research project focuses on student and educator support for many different levels of sustainability learning opportunities.

Methods

Research for this thesis uses surveys on 3 different sets of stakeholders in sustainability education from November 2018 to February 2020. These surveys from different respondents are indicators on the attitudes around sustainability education at CU Boulder. I surveyed 18 educators in sustainability. I called these respondents “educators” because they were not all tenured faculty at the university, although affiliated with CU Boulder. I then surveyed 100 non-ENVS students, and 55 ENVS students. I split student respondents into two groups as I wished to specifically analyze the “sustainability” major, as well as understanding the interests of a wider range of students. The goal of this research analyzes and understands sustainability education attitudes of both students and faculty regarding increasing learning opportunities as well as the existing opportunities at the university through answering research questions:

What do professors at CU Boulder regard as the benefits of sustainability education opportunities for students? What do educators believe are the roadblocks in implementing more

sustainability education? What are the opinions of educators as compared with students regarding the current opportunities for sustainability learning at the university? What level of education do students wish to receive in sustainability? Are ENVS students happy with their sustainability knowledge received from the Environmental Studies program at CU?

In order to answer the questions for research I studied survey respondents using a Qualtrics survey consisting of quantitative and qualitative questions. Survey questions and consent forms can be seen in the appendix. The Educator survey consisted of 8 questions. The non-ENVS student survey consisted of 11 questions. The ENVS survey consisted of 14 questions.

I gained respondents through email and in-person contacts. In order to contact educators, I supplemented a list of sustainability focused educators from my advisors with respondents from the environmental studies department using an email list provided on the ENVS web site. I contacted students through in-person contacts at the University Memorial Center and the Sustainability, Energy and Environment Community (SEEC) Building on east campus at CU Boulder. The ENVS department sent the ENVS student survey to their email list of all students in the program. I used candy as incentive for in-person contacts to complete the survey, who used my personal phone to answer questions. The results from these surveys is described next.

Findings

This section will discuss surveys among CU Boulder educators in the sustainability field, CU Boulder students not in the Environmental Studies major, and respondents from specifically the environmental studies undergraduate program. I will cover the information gathered from each survey question and the results broken down from each study samples. The findings include a diverse range of qualitative and quantitative questions for each survey respondent group.

Educators

I used the CU Boulder Environmental Studies web site to supplement advisor recommended sustainability educators. I call this set of respondent's educators in sustainability rather than faculty because they are not all tenured faculty at the university and there are some of those that teach education in sustainability outside of the university setting, although they work for the university. I surveyed 18 different educators in sustainability for this data set in December of 2019.

The first question asked respondents their job title at the university, and I created a word cloud based on responses. I received a wide range of responses from different levels of educators in sustainability that were affiliated with the University of Colorado, Boulder. Mainly consisting



of professors in some capacity at the university, although not all were professors. The responses included associate, assistant, and adjunct professors. There were also responses from lecturers at CU Boulder. This also included respondents identifying as professors and coordinators from the Masters of the Environment, which is the main graduate program that provides sustainability education.

The next question asked respondents about the academic and non-academic learning opportunities available at the university.

This section allowed the respondents to choose whether or not the school provided academic, non-academic, or neither. I added an “other” option that allowed respondents to provide other ways that the university implements

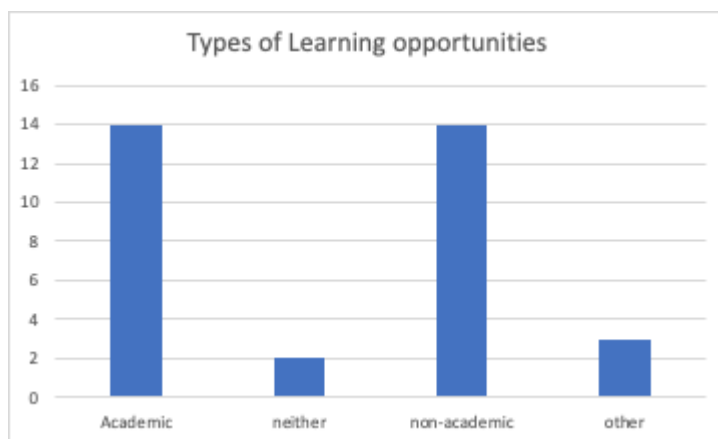


Figure 3 Educator assessment of sustainability opportunities

education in sustainability. This question showed 14 respondents stating that their university provides both academic and non-academic sustainability learning opportunities.

The third question in this survey asked educators to state three benefits to sustainability education. I asked the respondents to state three benefits to understand what current benefits for sustainability opportunities are for students, and to supplement background research on why education in sustainability is necessary for current undergraduate students. There were many themes involved in this question. There were four main themes I identified from this data. These themes included: student knowledge, benefits for the environment, job training, and student skills. The most widely stated theme included references to student’s knowledge. 67% of respondents stated that sustainability education would have a benefit to student’s overall

knowledge of world and societal problems, value changing, knowledge of greenwashing, and critical thinking. The next theme 61% of the educators identified mentions of environmental benefits, where students would help tackle climate change, environmental degradation, and overall benefits to the environment. This was mainly in relation to the climate crisis as educators thought that providing sustainability education to undergraduates would have a positive impact on our current and ongoing climate crisis. Fifty percent of respondents stated that sustainability education would have a positive benefit to skills and skill building of undergraduate students. These skills included: systems integration skills, leadership, problem solving skills, decision making, and empowerment of students. Forty-four percent of respondents identified job training and readiness in the response. This included mentions of sustainability skills being valuable for employers and preparing students for a 21st century job market where sustainability jobs will be at a premium.

The fourth question on this survey asked whether or not the respondents were supportive of expanding sustainable education opportunities at the university. The responses were very positive as there was not a single response stating no. All of the respondents answered yes or maybe to this question.

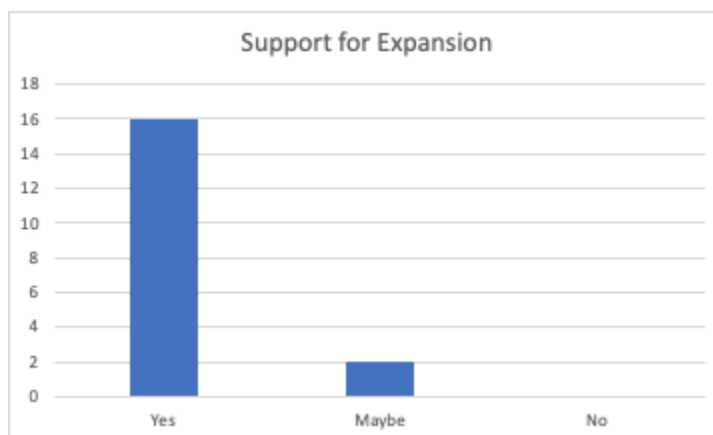


Figure 4 Educator support for expanding sustainability education

The fifth question in this survey asked respondents to identify ways to increase sustainability education at the university. The themes for this survey question included coursework, and faculty involvement. There were 61% of respondents that mentioned formal academic education in their response. This included expanding opportunities for students at many levels. There were mentions of including a general education class that would satisfy a requirement for all students that provided sustainability education. Educators also mentioned including a sustainability certificate, minor, major, and even a school of sustainability at the university. The second theme of this question included 28% of respondents mentioning increasing faculty involvement in sustainability education practices. This theme included educating faculty on sustainability topics who are not currently involved in sustainability education, and how they can integrate it into their courses. One interesting statement was including a faculty liaison that would work with the campus environmental center to “establish pathways to certificates, courses, and extracurricular sustainability education.”

The next question I asked in this survey asks respondents to identify challenges of sustainability learning implementation at the university level. There were two main themes of this question including faculty importance, and administrative leadership. Fifty percent of respondents identified leadership and administration. Respondents stated high level administration and leadership in the university. Others referred to program leadership including the business school and the Environmental Studies department. One respondent stated that the “administrative organization is at odds with the interdisciplinary and applied nature of the field.” A different respondent stated that “It seems what we lack the most is administrative leadership. Our Environmental Studies Program has no interest in housing an identified Sustainability

academic program. Students want this, our university needs a department or school to give it a home.”

The other theme from implementation challenges covered the importance of the faculty and staff influence on sustainability education. Half of respondents discussed faculty and staff in the challenges of implementing sustainability education. These respondents identified overwork, and under compensated. One respondent stated: “Faculty are overworked and (siloed) University culture of not appreciating assessment and adaptation.” A separate response stated: “faculty are not compensated for this work, as well as staff not allowed/supported to work with faculty at times (ex by co-teaching).”

The penultimate question asked whether the professors would have an interest in a curriculum that included applied sustainability projects that are designed to engage students in making a difference as part of course assignments. This question had not a single respondent say they did not support this curriculum. 94% of

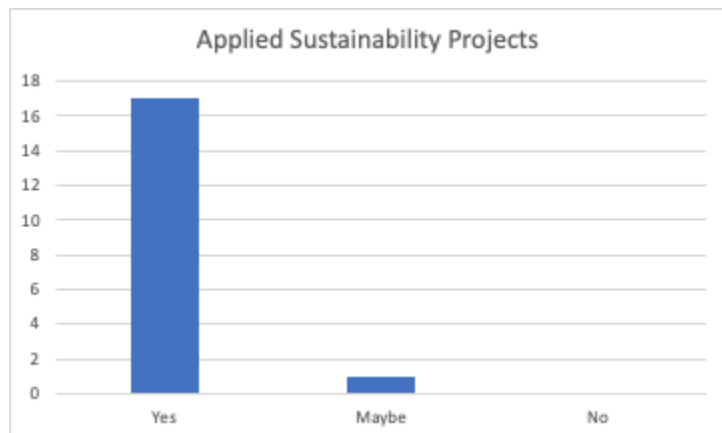


Figure 5 Educator support for applied project course

respondents stated they would be supportive in this kind of course. Only 6% of respondents stated they would maybe be interested in this kind of course.

The final question inquired for any additional comments from the educator respondents. There were seven respondents to this question. The first response to this question stated that “CU has the option to brand itself more strongly as the "environmental university," given strengths in earth and environmental sciences, history, culture, communication, and behavior. CU needs a

strong central hub to house all of these efforts, such as a School for the Environment and Sustainability.” The second respondent stated that “We used to do a teacher training for sustainability, Peak to Peak, that the provost paid for and a bunch of us led for about three summers a few years back.” The third discussed the importance of becoming a sustainability and climate hub could make the university an educational force of good. The fourth response stated that “In my view, CU Boulder is doing better than most in these areas. That said, the CU Boulder efforts still are not anywhere near commensurate with the scale of the needs of more engaged sustainability education.” The fifth respondent stated that they are implementing Community Engagement Projects in their courses and would love more support and collaboration on this. The sixth stated that they are “grateful we have so many experts on our campus.” The final response stated that: “We could be doing so much more at this University than we are.”

CU Boulder Students

I surveyed non-ENVS students to understand student's attitudes and interest for sustainability education. This included certain topics that were used to answer research questions stated in the methods and introduction. I used this data to help add to existing data for increasing sustainability opportunities. Examining interest and experiences in sustainability education for students not in the ENVS program is influential, as they are not experiencing sustainability learning opportunities at the same rate as Environmental Studies Majors. I surveyed 100 students between December 2019 and February 2020. Students stated support for attending sustainability learning opportunities, even though their majors are not sustainability focused. I have separate surveys from the ENVS and non-ENVS students. These are the results from the students that are not from the ENVS program.

I surveyed 100 students through email and in person surveys. I used this number due to the high value of statistical data extracted, as well as the ease in surveying a large number of students at the University of Colorado, Boulder. There were 53

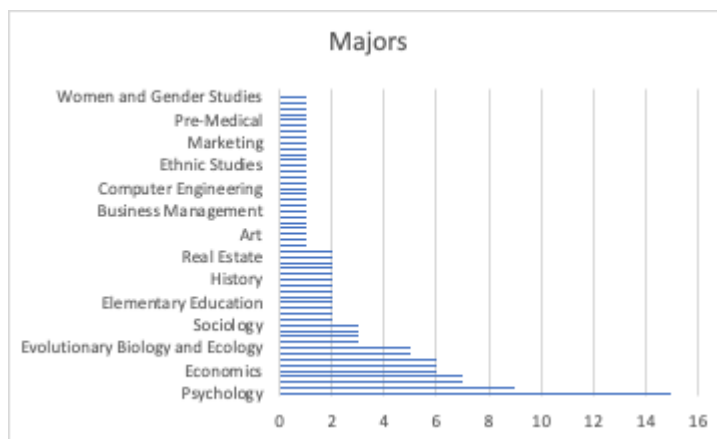


Figure 6 CU Student list of majors surveyed

unique majors in this survey. The highest number of respondents declared majors I surveyed were: 15 psychology majors, 9 integrative physiology majors, and 7 business majors.

The majors surveyed were: psychology, integrative physiology, business, international affairs, economics, geography, computer science, evolutionary biology and ecology, advertising, French, philosophy, sociology, accounting, biochemistry, electrical engineering, elementary education, film, finance, geology, history, journalism, neuroscience, political science, real estate,

technology arts and media, aerospace engineering, anthropology, art, art history, astrophysics, audio engineering, business management, chemical engineering, chemistry, Chinese, computer engineering, data science, English, environmental design, ethnic studies, Italian, Jewish studies, management, marketing, mechanical engineering, media production, pre-medical, speech language and hearing, statistics, strategic communication, women and gender studies.

Additional to the demographic question this survey asked students a “yes,” “no,” or “maybe” question whether they know about learning opportunities in sustainability at the university. I wanted to understand whether the respondents had seen any learning opportunities at the university, and most students have. Most of the students that were surveyed for this question answered yes, with 71% of respondents stated that they have seen learning opportunities for sustainability. The next most frequent answer was “maybe” with 19%. Only 10% of students stated they had never seen any opportunities for sustainability learning at the University of Colorado, Boulder.



Figure 7 CU Student knowledge of sustainability learning opportunities

The next question inquired whether the respondents have attended any form of sustainability education at the university. A majority of respondents have received education in sustainability. 51% of students reported that they had received sustainability education from CU Boulder. 19% of respondents answered maybe. 30% of survey respondents answered no to this question.

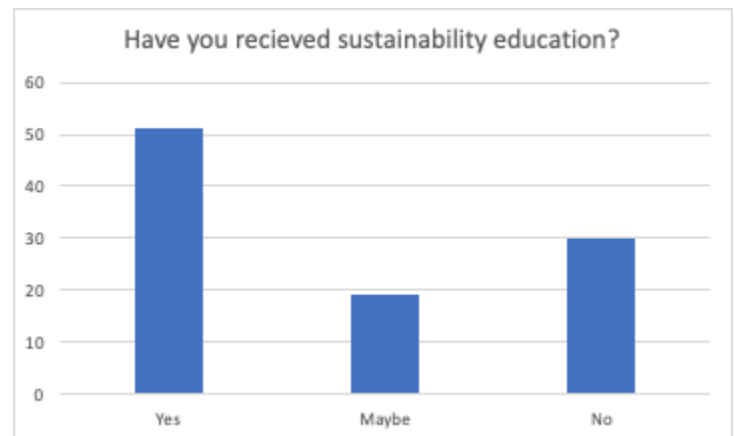


Figure 8 CU Students receiving sustainability education

The fourth question asked the students who had already attended education and learning opportunities in sustainability whether they were satisfied with their education or not. There were a large number of responses stating extreme satisfaction at 16%. The results from this question indicate that most of the respondents were either somewhat satisfied at 36%, or neither satisfied nor dissatisfied at 31%.

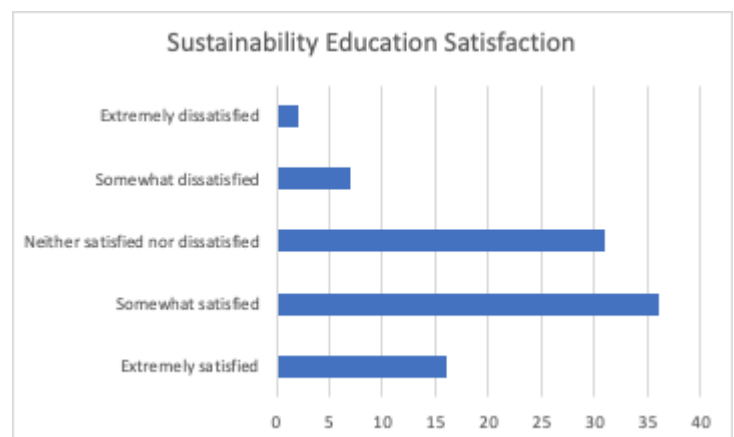


Figure 9 CU Students sustainability education satisfaction

The next question in this survey inquired on the ease of finding learning opportunities in sustainability. Not all students answered this question as there were students that did not know about learning opportunities at the university. Many had high quality education with 14.1% of respondents stated their learning at the university has been excellent. The most common

responses were “good” with 41.3% of responses, 35.8% responding “average,” and only 8.7% thought their sustainability education had been “poor.” There were no responses of “terrible.”

The sixth question in this survey asked whether students previous learning opportunities in sustainability had been high quality or not. Most of the students stated opportunities they had attended were high quality, with nearly 50% of students reporting high quality sustainability education. Thirty-nine percent of students stated that they

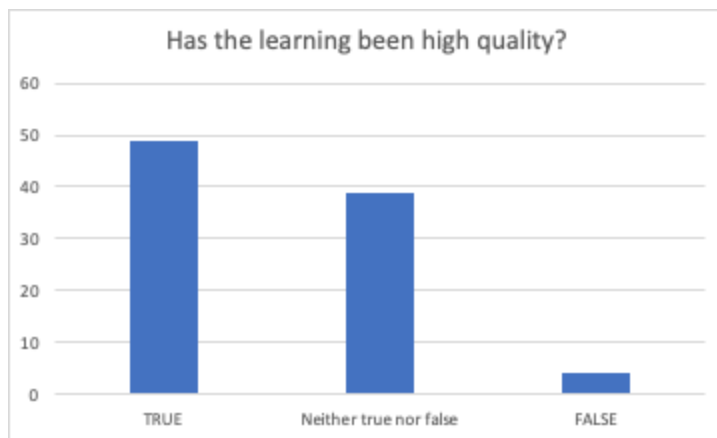


Figure 10 CU student quality of learning sustainability

thought the learning quality of their education was neither high or low quality. There was a small number of students that thought their education was not high quality at 4%.

The next question in this survey asked whether the student respondents would attend a class in sustainability learning. This question shows that students are very interested in attending classes in sustainability, even though all respondents were not in a major related to sustainability. A majority of those surveyed answered yes, with 64% of responses stating yes. Many students also answered “maybe” with 24% stating they might be interested in attending a

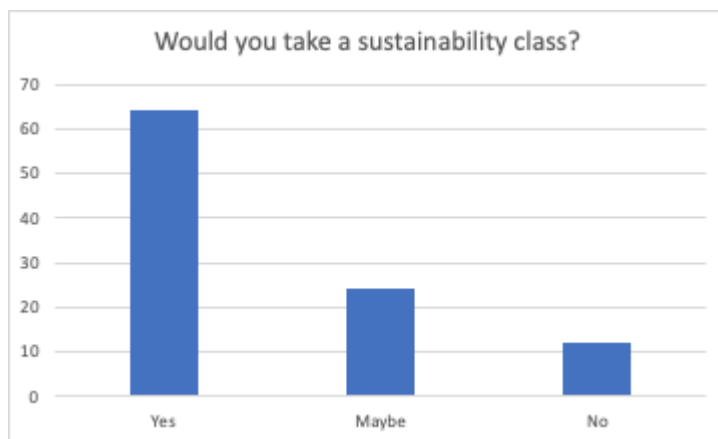


Figure 11 CU Students sustainability class interest

sustainability class. Very few replied “no” with only 12% of responses stating they would not take a class in sustainability.

The eighth question in this survey asked about the student's interest in being part of a sustainability major. Out of 100 survey takers, 23% of responses stated they would like to be part of a sustainability major. There were almost equal number of “maybe” and “no” respondents. 37% of stating they would perhaps be part of a sustainability major, and 38% of respondents stating they would not be part of a sustainability major. This is a very interesting data set as almost 25% of all respondents stated they would be in a sustainability major, although they are not.

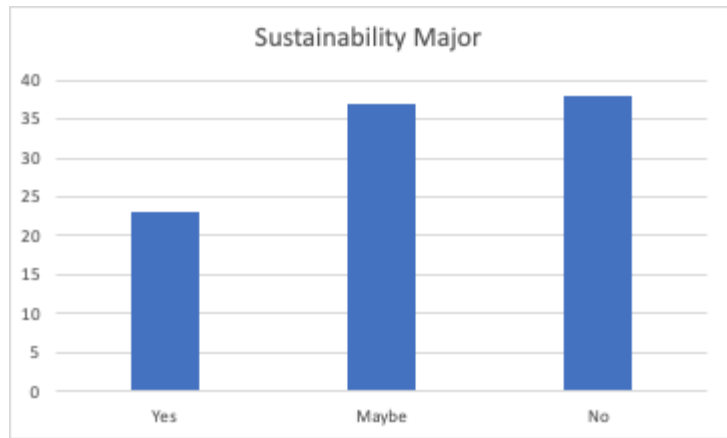


Figure 12 CU Student interest in sustainability major

The ninth question in this survey asked whether students would wish to be a part of a sustainability minor. Interestingly, 41% responded yes, 40% responded maybe, and only 18% stated they would not.

The next question asked respondents what specifically they had seen for opportunities in sustainability learning and education. I used a word cloud to help organize the 100 responses I received. This was an open-ended question that asked the respondents to name the learning opportunities that they have heard



about on campus. One main avenue for sustainability education has been the environmental center, where 24% respondents stated that was a form of sustainability education they have seen. Those who talked about the E-center mentioned their outreach programs, events, the recycling program, “EcoReps,” Applied Learning, and America recycles day. 21% of respondents stated classes including the business program, environmental classes, permaculture class, EBIO classes, and engineering.

The last question before asking for additional comments asked whether the students would take a class in sustainability that includes hands on project-based learning that makes a difference. This question showed

that many students at the university are interested in taking courses with projects that actually make a difference. 65% of respondents answered yes to the question, while 28% stated they would maybe take

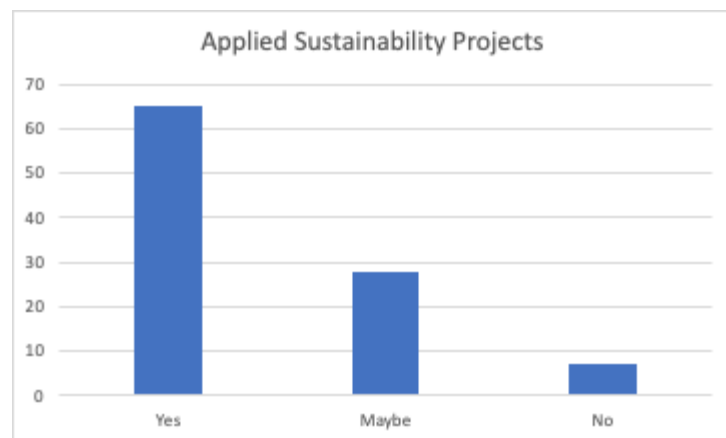


Figure 13 Applied sustainability projects

the class. The minority stated that they would not take the class with only 7% of respondents saying “no.”

Finally, I asked the survey respondents to provide any additional comments regarding sustainability education. I received many interesting answers although there were very few responses to this final question, with only four additional ideas on sustainability education. I got one answer stating that a sustainability program would be a great idea here at CU Boulder. One respondent stated that targeted sustainability education opportunities would be a great way to bring those less knowledgeable on sustainability practices into the field of sustainability. One

respondent stated that “I think even just changing the wording to problems like in the applied math department to be more sustainability focused would be great for showing students that a job in sustainability is an option.” Another respondent stated how “It would be cool to have a sustainability class, maybe there is one but if so I am not aware of it.”

Environmental Studies Students

After surveying a general student body about attitudes and interest in sustainability learning opportunities I examined specifically the Environmental Studies students. I surveyed 55 students in from December 2019 to February 2020. This survey sought to examine the differences between students in a major that focuses on sustainability, to those students in majors not focusing on sustainability.

The survey first asked ENVS students to provide a brief critique of their major, with goals on learning what students thought could be improved and added on to the major. There were many critiques that had nothing to do with improving the quality of coursework and excluded those answers. I was interested in understanding whether students in the Environmental Studies program would mention sustainability education unprompted. Thirty two percent of respondents mentioned coursework and classes. This included more ENVS focused classes and opportunities. One student stated they would like more class options with more specific topics, and many of the ENVS classes have an overlap on basic knowledge. A different respondent stated they wanted a wider range of environmental topics in course offerings. There was one respondent quizzical on the lack of urgency around the environmental crisis we are currently in as well as the lack of education about topics such as animal agriculture, that is the leading cause of climate change. One student mentioned project based environmental studies classes, and including hands on learning, and increased experiential learning.

Fourteen percent of respondents wanted improvement on routes and focuses for the ENVS major. One student wanted to make the major more justice oriented, another would increase the focus on water pollution as a crisis, another wished the major was more specific as the program requires too many broad topics. Many students mentioned focused and curricular degree path that would be on their diploma. Only one student say they would want a

sustainability focus added to the ENVS major. One student mentioned the past project that was the college of the environment, and how they would love to be part of a major that is specifically focused on environmental solutions and problem solving.

There were some outliers that pertained to sustainability education. One student took a broader approach to what they wanted changed about the major: “It needs to be more structured.” Three respondents mentioned advising and stated they would like more organized academic advisors. One student stated they were interested in the application of ENVS knowledge to community/personal challenges which would require community action and training. There was one powerful response: “would really appreciate if ENVS could incorporate more of a social lens and a lens inclusive of discussions surrounding justice and equity. I would also love if classes could be taught by more diverse experiences or through various pedagogies and knowledge sources.”

After learning about the students' critiques and concerns about the ENVS major, I wanted to understand the attitudes around the ENVS major. Out of 55 respondents to this survey, students generally reported satisfaction with their degree. 63.6% responded “yes,” they were satisfied, 29.1% answered maybe, while only 7.3% stated they were not satisfied with the program.

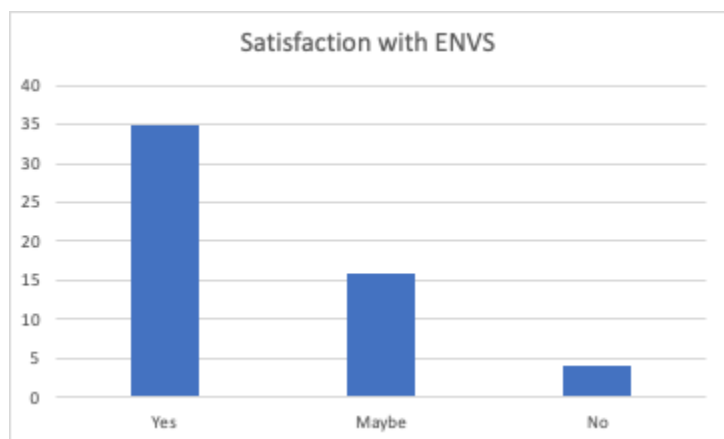


Figure 14 Satisfaction with ENVS

I then asked survey respondents whether they knew the difference between a specific sustainability major as compared with Environmental Studies. Most respondents reported they

did understand the difference with 45.5% of responses. There were 25.5% of responses reporting they “maybe” knew the difference between the two majors, while 29.1% responded they did not know the difference.

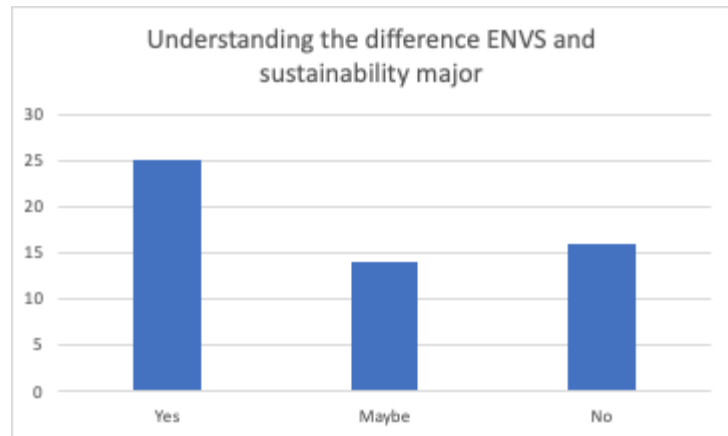


Figure 15 Knowledge between ENVs and a sustainability major

The fourth question in this survey of asked whether responded were interested in a sustainability focus or pathway for the major. Seventy-three percent of responses agreed they were interested in a sustainability focus for ENVs. Twenty-three percent of responses “maybe” were interested in a sustainability focus. Only 5% had no interest.

The next question asked was whether students knew about learning opportunities in sustainability at the university. This question inquired about formal, or informal learning opportunities, and whether ENVs students knew whether there were opportunities available. Response was generally positive, with 61% of those surveyed knowing about opportunities.

Twenty-six percent reported they “maybe” knew of opportunities for sustainability, only 13% did not know about sustainability learning opportunities

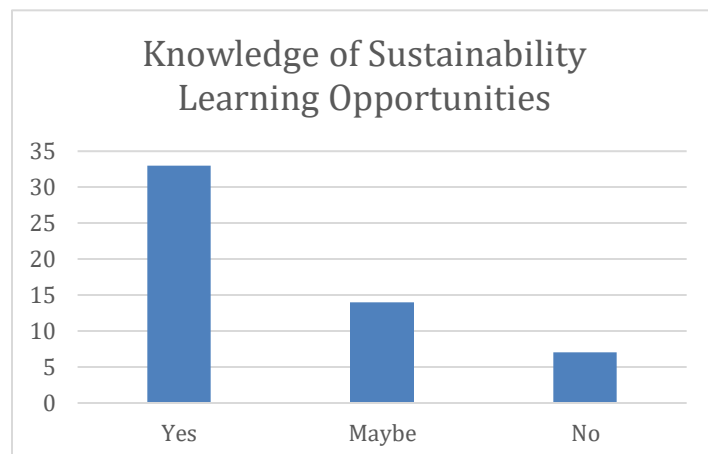


Figure 16 ENVs knowledge of sustainability learning opportunities

The sixth question for asked respondents to rank their satisfaction in sustainability learning at CU Boulder. Most students stated they were satisfied with the sustainability learning they had received. Thirty-nine percent of those surveyed responded that they were “satisfied” with the sustainability learning, while 33% responded they were “unsatisfied” with sustainability learning at the university. Twenty-eight percent responded that they did not know whether they were satisfied or not satisfied.

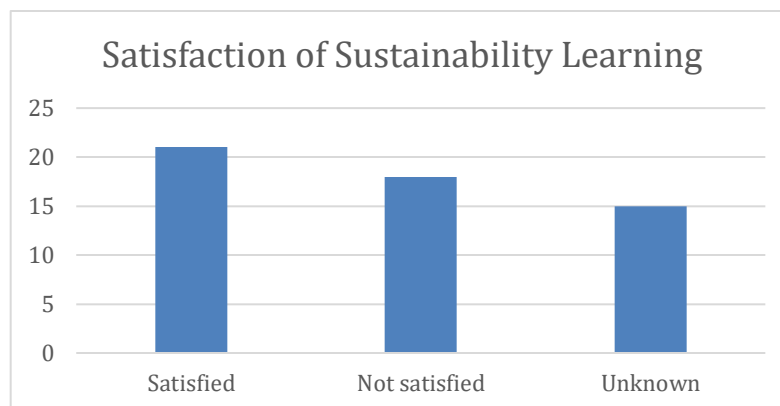


Figure 17 ENVS satisfaction of sustainability education

The next question inquired students to state the educational opportunities in sustainability they have seen at the university. The main avenue students had learned about sustainability in this survey at the university with 29.1% of respondents stated their sustainability learning has been through initiatives led by the Environmental Center. These programs included: recycling outreach programs, the applied learning program, eco-social justice, bike programs, sustainability skills workshops. The other main avenue students learned about sustainability was through class, with 29.1% also mentioned class or formal education. Respondents used examples including earth systems, ENVS classes, EBIO classes. Students also mentioned programs outside of class and the Environmental center including: Bioneers, the Environmental Board, PIPS,

Sustainable CU grant projects, CESR Impact Internship program, Eco-Social Solutions Conference, Sustainability CU, and others.

The next question asked whether students were interested in attending a class specifically including sustainability in the coursework and the name. The results were very positive as 84% stated they would take a class, 5%

would maybe attend, 4% would not take a class, and 7% already have taken a class on sustainability.

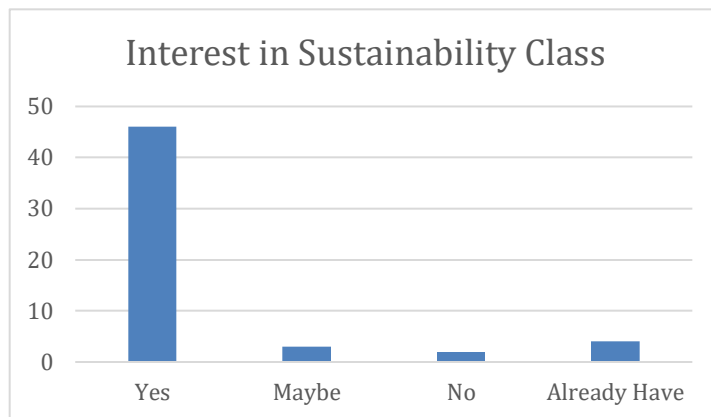


Figure 18 ENVS Sustainability Class Interest

The ninth question in this survey inquired whether the ENVS students would be a part of a major of sustainability should it be offered at the University of Colorado, Boulder. The results were generally positive, as 28 or 51% of respondents stated they would like to be in a sustainability major. Twenty-one or 38% of respondents stated they would perhaps be in a sustainability major. Only 11% would not be interested in taking part in a sustainability major at the university.

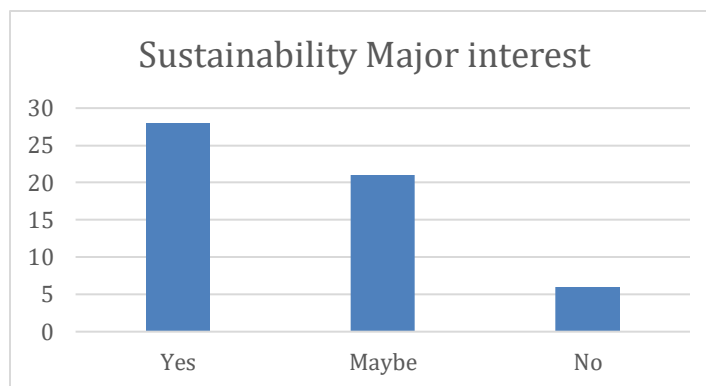


Figure 19 Sustainability Major Interest

The tenth question in this survey asked students to answer whether they would like to be in a sustainability minor program at the university. Seventy-one percent of students stated they would be in a sustainability minor,

where 20% of respondents stated they “maybe” would be in the minor, where 9% of students would not be in a minor of sustainability.

The next question asked whether sustainability education impacted the respondent’s decision in choosing to attend the university. Fifty-four percent of respondents stated that it did impact their decision, where 9% stated it perhaps impacted their decision, and 37% of respondents stated it did not impact their decision.

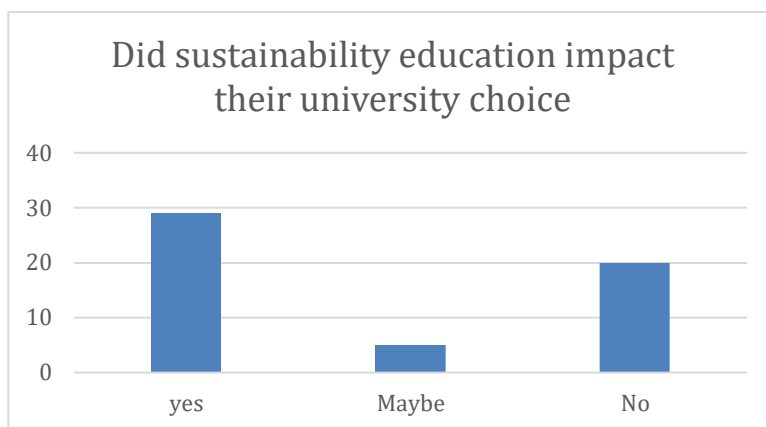


Figure 20 Sustainability and university choice

The last question I asked the students was whether they were interested in taking courses that included applied sustainability projects that made a difference as part of course assignments. This question had not a single respondent stating they would not wish to take a course. 50 students stated they would like to be in a course that did have these projects, which was 91% of responses. Nine percent or 5 students stated they would maybe take this course, and not a single respondent stated they would not wish to take the class.

I finally inquired about any additional comments. There were a few students that wondered why there was no sustainability undergraduate major at CU Boulder. One student stated it was bizarre that there were focuses on sustainability in the Masters of the Environment program here at CU. One student stated they loved the interdisciplinary part of ENVS as this study needs to think about problems and solutions from a variety of different viewpoints. One student was very excited about sustainability projects. Another stated that we need to narrow down sustainability from the broad topic that it is.

Discussion

Sustainability education is personally important due to my longstanding love for the environment, education, and creating change. I set out to perform meaningful research in a subject field where I have great passion. I have support for attending formal curriculum-based education on sustainability, and this research identifies whether other students had support also. I was unable to find data on student support at CU Boulder for attending various levels of sustainability education through background research. This project identifies in-depth data on students and educator's attitudes on sustainability education, and interest for learning opportunities in sustainability.

Sustainability education is an international goal as mentioned in the background and review of literature section where the United Nations and AASHE support implementation and research of curriculum-based education. Other universities provide strong opportunities for education in sustainability at different levels including classes, majors, and minors. CU Boulder has a gap in organized sustainability programs where other universities in the United States provide colleges and organized majors with sustainability focuses. Students need to be able to attend classes in higher education to gain the identified benefits in the background and results. CU Boulder has a goal to become a leader in modern challenges, and I suggest the university consider making sustainability a curricular program as there is strong support from students and educators in varying levels of learning opportunities, which I discuss further in the *Recommendations for further development* section.

The research questions as stated in the introduction of this report are: 1) What do professors at CU Boulder regard as the benefits of sustainability education opportunities for students? 2) What do educators believe are the roadblocks in implementing sustainability education? 3) What are the opinions of educators as compared with students regarding the

opportunities for sustainability learning at the university? 4) What level of education do students wish to receive in sustainability? 5) Are ENVS students happy with their sustainability knowledge received from the Environmental Studies program at CU?

Question 1 asks educators to explain benefits of sustainability education for undergraduate students. The benefits of sustainability education as told by the professors and teachers of sustainability at the University of Colorado, Boulder line up with background research on student benefits of learning opportunities. These stated benefits include short term and long-term sustainability literacy, and literacy can impact the planet and the environment in a beneficial way, which is a goal in CU's 30-year plan (*Flagship 2030*, 2014). These benefits fall in line with the goals of the Environmental Studies program, although are not completely covered. As many of the responses pointed out the need for a specific undergraduate program for students to gain skills and job marketability for a 21st century where sustainability skills are a premium. The interdisciplinary nature of Environmental Studies leads students to taking many different classes, most of which do not fall under the lines of sustainability education, and do not provide all of the benefits to students that a sustainability program would.

The second research question asks: What do educators believe are the challenges of implementation? Large numbers of faculty surveyed point out the need for leadership in sustainability that does not lead to lethargy in funding sustainability education projects. Faculty also stated out how sustainability education becomes a goal for ENVS and other sustainability-oriented faculty, which leads to overwork for undercompensating for their efforts. This implies the need for funding of faculty in sustainability education efforts, as well as a champion of sustainability within leadership. As mentioned in my background research there are ways to overcome these resistances.

The first part of question 3 asks: What is student's overall awareness of opportunities in sustainability learning? The results of this research show students have seen many opportunities for sustainability education, with 71% of non-ENVS students reporting knowledge of sustainability learning opportunities. Notably, Environmental studies students had a lower percentage of knowledge with only 61% of students saying that they have heard about sustainability learning opportunities. ENVS students might have a more nuanced view on sustainability learning where they would not put all of their classes that briefly touch on environmental topics into sustainability learning. ENVS students could have thought I was asking them to not include their classes into their responses, which could have lowered the statistics. Another possibility is the demographics of the ENVS survey could have more freshman which would be exposed to less opportunities for sustainability learning. It is unclear on why I received these results and more research is called on to understand these findings.

Only 21% of general CU Boulder student respondents stated they have experienced sustainability education through academic classes. Twenty-nine percent of Environmental Studies students stated learning about sustainability through academic class. This implies there are some sustainability topics in classes, although with almost 80% of non-ENVS students, and 70% of ENVS students not receiving sustainability education in class there are gaps in where students gain curricular learning opportunities. It is surprising only 29% of ENVS students stated class as a pathway for sustainability learning. As mentioned before CU Boulder states ENVS as their "sustainability" major. There are a few possibilities for this data, most of which could be attributed to ENVS not being a focused major in sustainability, although it is reported as such. Another reason could be that students do not attend the opportunities for sustainability learning

in their major. This implies sustainability educational opportunities could be greatly expanded at the university, as well as in the ENVS program.

Thirty-nine percent of ENVS students are satisfied with their sustainability learning opportunities, where 47% of the general student respondents are either somewhat satisfied or extremely satisfied with their sustainability learning. This is a surprisingly low satisfaction in sustainability education for Environmental Studies. There are a few possibilities, one of which could be expectations. Students in ENVS could expect to learn about sustainability and when classes do not, satisfaction could decrease. Another could be phrasing of survey question, as students that did not attend any sustainability education could have stated no satisfaction. A sustainability program at the university would go a long way in providing quality learning opportunities for students and increase satisfaction.

Continuing with this research question, 89% of educator respondents in this survey were supportive of increasing opportunities for sustainability education at the university. Educator respondents were almost unanimous in agreeing that CU Boulder provides academic and non-academic sustainability education to students. Students are in agreement that there are opportunities for sustainability learning, as stated above, yet the data shows less than 30% of students stating they know about educational opportunities from class. There are discrepancies in CU provision of sustainability education which could be attributed to outreach of curricular sustainability learning opportunities. This implies there are gaps in sustainability education which the university could fill through implementing highly publicized curricular learning opportunities in sustainability.

The fourth research question surveys students about what level of education wished to receive in sustainability. There was stated support by both ENVS and non-ENVS student

respondents for a range of formal sustainability education choices. The research question first understands if students would attend a single class on sustainability. Sixty-four percent of respondents not in the ENVIS program would take a class on sustainability. Support was even greater with 84% of ENVIS student's respondent's stating they wished to take a class on sustainability, and only 4% stating they would not want to take a course. Averaging the data for both student respondents. 71% of students surveyed who stated they would take a course on sustainability. This strong support from both ENVIS and students not in ENVIS suggest a class in sustainability would be very popular at the university, and further research in implementation is necessary.

Data regarding whether students are interested in attending a sustainability minor shows strong support. Surveying for interest in a sustainability minor is intriguing to examine as it is not as big of a commitment as a sustainability major, although it has large impact in providing sustainability knowledge and benefits to students. Forty-one percent of non-ENVIS students would be a part of a sustainability minor, which is a large number given that they are not in a sustainability related major. Seventy-one percent of students in the ENVIS department responded they would like to be in a sustainability minor at CU Boulder. For the total respondents of 155 students surveyed 51.6% of respondents stated they would like to be in a sustainability minor. This strong support from both ENVIS and non-ENVIS students suggests strong interest in attending a minor in sustainability, and there needs to be further research on a sustainability minor at the university.

Research question 4 then attempts to understand students support in a sustainability major at CU Boulder. Almost 25% of non-ENVIS students stated they would attend a sustainability major. The number is exceptionally high given students are not even in the universities so-called

“sustainability major.” Student interest in a sustainability major while currently in the Environmental Studies program is even larger. Fifty-one percent of ENVS respondents stated they would like to be in a sustainability major. This implies a sustainability major would be very attractive to both ENVS and non-ENVS students at the university and should be considered moving forward.

The fifth research question asks whether ENVS students are satisfied with sustainability knowledge received from CU. Environmental studies students at CU Boulder are not quite as satisfied with the learning opportunities of ENVS as out of 55 respondents only 39% stated that they were satisfied with the sustainability learning from ENVS. Respondents do report being satisfied with their major, as almost everyone surveyed stated they felt satisfied with the ENVS major. Only 4 out of the 55 respondents stated that they were unsatisfied with ENVS at CU Boulder with 63% stating they were satisfied. This could be attributed to the university’s renown ENVS program being very adept at providing education in environmental sciences, while not as strong in sustainability education. Students are satisfied with their major, although data suggests the program can be improved in sustainability education. Fifty-four percent of ENVS students stated that sustainability impacted their decision to attend the university. This is interesting because although the university is apparently not as strong at providing sustainability education, almost half of ENVS students chose to attend the university in some part due to sustainability.

Not just in relation to the research questions there were other interesting points to this study. I asked the students and educators whether they would like to be a part of a class that focuses on problem solving and applied projects and the support was almost entirely in favor. High favorability could be due to the framing of the question, along with students wanting to take classes that make a difference. Among educators at CU Boulder there was not a single

respondent who stated they would not be interested in taking that kind of class. Among the general student respondents there were only 7 out of 100 respondents stating they would not want to take the class. Among Environmental Studies students not a single student stated they would not be in that kind of course. Out of 155 students surveyed 95.5% of students would like to take a class that included applied projects that make a difference as part of course assignments. The results show a widespread interest in project-based sustainability courses. When asked whether students would attend a general sustainability course the results showed lower interest than asked whether students would attend a class with projects that made a difference. The framing of the question is intriguing as this question could invoke positive feedback from students, making it a popular course. Implementing a class with project-based learning that makes a difference would be very interesting to include in the Environmental Studies program as ENVS students have over 90% stating they would be in the class.

This data shows strong benefits in receiving sustainability education for students, and strong student support for implementation. Research also suggests the universities reported major in sustainability, the ENVS program, does not totally satisfy student sustainability learning interest and students want to be part of a specific major in sustainability. This implies that the university should consider further developing a program for undergraduate sustainability learning opportunities, and the next section considers recommendations for further development.

Recommendations for Further Development

I believe the next steps to take with this preliminary research is to expand the scope of research in student and educator interest in expanding sustainability opportunities. Applying this research on a school-wide level, with every student having the opportunity to express their level of interest in sustainability education would be extremely interesting. Should these figures

translate close to the level of this research when surveying a larger percentage, or the entire student body, there could be enough research to state that CU Boulder add sustainability education programs to the formal curriculum. These programs are necessary to compete with schools such as Arizona State University or Yale for CU Boulder to become a 21st century university.

Students show strong interest for increasing opportunities. I believe offering a general sustainability class would be very successful at the University of Colorado, Boulder. There was mentions of a sustainability class by educators in ways to increase opportunities, and a large percentage of ENVS and non-ENVS student respondents stating interest in attending a class on sustainability. A sustainability minor would also be very successful at the university if this reports numbers are similar with a larger sample. As 51.6% of the 155-participant survey are in support, a sustainability minor could be very popular. I would also recommend looking into adding a sustainability track to either the ENVS department, or a major within the College of Arts and Sciences. Should 25% of non-ENVS students still wish to be a part of a sustainability major, it should be very successful at the university. Bringing back the College of the Environmental project is one way to achieve these goals. Providing a course that included project-based sustainability education to make a difference is a recommendation as students have stated support.

Although this research shows strong support for sustainability learning opportunities, there were a few areas of weakness in this research. The next section covers these weaknesses that have arisen in the data.

Limitations

I did not ask for demographic data in these surveys, and this causes limitations in analysis. I am not able to extrapolate data from demographics as there was no opportunity for respondents to identify their age, what year they were in college, or any other data that might be helpful in analyzing this data. Another limitation for this survey, I surveyed an unknown number of students from the Environmental Center. There is no way to tell how many Environmental Center employees I surveyed, but when I was having a large amount of trouble gaining E-mail respondents to the surveys, I added both student surveys to the Environmental Center's weekly staff update in attempt to increase the sample size. I ended up changing IRB approval in order to have in-person contacts, and not be restricted to contacting students through E-mail.

One part of the survey that was missing was that I did not ask whether students would be interested in a sustainability certificate. Certificates are less intensive than a minor but still easily obtainable for a large number of students regardless of their major. I would be interested in identifying the number of students that would wish to have a sustainability certificate on their diploma. A final limitation: during in-person contacts I utilized candy as incentive for students to complete the survey, which suggests data skews towards those who enjoy candy.

Conclusion

Through research I found that the most important sustainability benefits for students include increasing knowledge, environmental influence, building practical skills, and job readiness. The challenges of implementing sustainability include working with administration as well as increasing faculty involvement and awareness. Opportunities for sustainability learning at the university consisted of education within classes, and the Environmental Center. There are large gaps where 70-80 percent of respondents did not receive sustainability education through

class. Educators have stated the university provides many opportunities for sustainability, which show a disconnect in outreach that could be solved through organized programs. Students both in the ENVS major and non-ENVS majors have interest in attending a sustainability class, minor, and major. Including a class with applied sustainability projects that make a difference is the most supported by students and could become a very popular class as over 90% of ENVS students stated interest. Environmental Studies students are somewhat satisfied in their major, although only 39% stated they had satisfaction in sustainability learning from the university. This research suggests sustainability education is important to students, and should be expanded upon at the university, while working through resistance. Major limitations for this study included the sample size as $n=173$ is small for researching the support of implementing classes, minors, and majors. I would like to provide these surveys to a much larger sample size to see if research holds true.

Sustainability education is important to many different groups including students, educators, CU Boulder, rival universities, and the United Nations. These groups are in favor of increasing learning opportunities in sustainability. As analysis shows widespread support for further development in sustainability education at CU Boulder. Currently there is not a specific program for undergraduate sustainability education. The University of Colorado, Boulder should consider the expansion of learning opportunities for undergraduate students. The study is a point for further research. I wished to provide helpful data to increase understanding of current student and educator support. Should CU Boulder not stay ahead of the curve in pursuit of becoming a 21st century school, there could be others that rival CU's objectives in becoming a flagship university.

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Appendix

Educator Questionnaire

1. What is your specific career title at your university?
 - a. Text box answer
2. Does your university provide academic or non-academic (co-curricular) learning opportunities for sustainability?
 - a. Academic
 - b. Non-academic
 - c. Neither
 - d. other
3. If yes: What are (in your opinion) three benefits for undergraduate students having exposure to academic sustainability education?
 - a. Text box
4. Are you supportive of expanding academic sustainability learning opportunities to undergraduate students?
 - a. Yes
 - b. Maybe
 - c. No
5. If yes: What would be one way to increase sustainability education in your university?
 - a. Text box
6. Are there challenges to implementing sustainability education at the university level? (ex: faculty interest, institutional interest, leadership, finances, etc.)
 - a. Text box answer
7. Would you have an interest in a curriculum that included applied sustainability projects that are designed to engage students in making a difference as part of course assignments?
 - a. Yes
 - b. maybe
 - c. no
8. Any other comments about sustainability education at your university?
 - a. Text box answer

Student Questionnaire

1. What are your majors and minors?
 - a. text box
2. Do you know if there are learning opportunities pertaining to sustainability at your university?
 - a. Yes
 - b. maybe
 - c. no
3. Have you received sustainability education from your university?
 - a. Yes
 - b. maybe
 - c. no
4. If yes: How satisfied are you with the learning opportunities at your university in sustainability?
 - a. 1-5
5. If yes #3: How easy has it been to find learning opportunities for sustainability?
 - a. 1-5
6. If offered would you take a sustainability class?
 - a. Yes
 - b. No
 - c. Already have
7. If offered would you be a part of a sustainability major?
 - a. Yes
 - b. No
 - c. Already have
8. Would you be a part of a sustainability minor?
 - a. Yes
 - b. No
 - c. Already have
9. What opportunities have you seen for learning about sustainability? (events, classes, etc.)
 - a. Open ended text box
10. Please rank your interest in taking courses that include applied sustainability projects that make a difference as part of course assignments.

- a. 1-5
- 11. Any other comments?
 - a. Text box

ENVS Questionnaire

1. If you could change one thing about ENVS what would it be?
 - a. Text box
2. Are you satisfied with ENVS at CU Boulder?
 - a. Yes
 - b. No
 - c. Unknown
3. Do you understand the difference between a sustainability major and ENVS?
 - a. Yes
 - b. maybe
 - c. No
4. Would you be interested in a sustainability focus for ENVS?
 - a. Yes
 - b. No
 - c. Unknown
5. Do you know if there are learning opportunities pertaining to sustainability at your university?
 - a. Yes
 - b. maybe
 - c. no
6. If yes: How satisfied are you with sustainability learning at your university?
 - a. 1-5
7. If yes on #3: What opportunities have you seen for learning about sustainability at CU?
(events, classes, etc.)
 - a. Open ended text box
8. Would you take a class about sustainability?
 - a. Yes
 - b. No
 - c. Already have
9. Would you be a part of a sustainability major?

- a. Yes
 - b. No
 - c. Maybe
10. Would you be a part of a sustainability minor?
- a. Yes
 - b. No
 - c. Maybe
11. Did learning about sustainability impact your decision in choosing your university?
- a. Yes
 - b. No
 - c. Unknown
12. Has sustainability impacted your decision in choosing your major?
- a. Yes
 - b. No
 - c. Unknown
13. Would you wish to take courses that include applied sustainability projects that make a difference as part of course assignments?
- a. Yes
 - b. Maybe
 - c. no
14. Any other comments?
- a. text

Consent Form

Title of research study: Sustainability curriculum at the University of Colorado, Boulder:

An analysis on benefits and enthusiasm of undergraduate sustainability education with

peer and exemplar university's students and educators. IRB Protocol Number: 19-0617

Investigator: Sol Shepherd Sponsor: Dale Miller

Purpose of the Study

The purpose of the study is to understand your feelings and views about sustainability education at your college.

We expect that you will be in this research study for five to ten minutes.

We expect about 30 people will be in this research study. We expect about 150 people in the entire study nationally.

Explanation of Procedures

This will be a short 5 to 10-minute online survey about your sustainability experience at your university. I will be using this information for my honors thesis regarding sustainability education at the university level.

Voluntary Participation and Withdrawal

Whether or not you take part in this research is your choice. You can leave the research at any time and it will not be held against you.

Confidentiality

Information obtained about you for this study will be kept confidential to the extent allowed by law. Research information that identifies you may be shared with the University of Colorado Boulder Institutional Review Board (IRB) and others who are responsible for ensuring compliance with laws and regulations related to research, including people on behalf of the Office for Human Research Protections. The information from this research may be published for scientific purposes; however, your identity will not be given out.

There are some things that you might tell us that we CANNOT promise to keep confidential, as we are required to report information like:

- Child abuse or neglect
- A crime you or others plan to commit
- Harm that may come to you or others

Payment for Participation

You will not be paid to be in this study.

Questions

If you have questions, concerns, or complaints, or think the research has hurt you, talk to the research team at (719) 239-8113

This research has been reviewed and approved by an IRB. You may talk to them at (303) 735-3702 or irbadmin@colorado.edu if:

- Your questions, concerns, or complaints are not being answered by the research team.
- You cannot reach the research team.
- You want to talk to someone besides the research team.
- You have questions about your rights as a research subject.
- You want to get information or provide input about this research.

Consent

If you would like to participate in this study, click the button below to begin the survey.

Remember, your participation is completely voluntary, and you're free to withdraw at any time.