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Stakeholder Perceptions of Campus Sustainability Efforts: Lessons from Vermont

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Abstract: Universities have begun to officially recognize advancing sustainability as an institutional goal. This paper reports on research on students' awareness, attitudes, and behaviors at the University of Vermont as a means of understanding cultural acceptance of sustainability. We report on the results of a survey administered by an applied research methods class working in partnership with the University's Office of Sustainability. Survey respondents report strong understanding of sustainability and believe it is important. They perceive the University's performance as strongest along environmental efforts and weakest along economic lines. Respondents were most likely to engage in sustainability behaviors, like waste and energy reduction, and least likely to attend campus events regarding sustainability. Responses to open-ended questions suggest skepticism of the University's commitment to sustainability, seeing it as more of a marketing effort, and express a desire for more concrete initiatives to foster sustainable behaviors and culture on campus. Our implications focus on ways to promote a more holistic and nuanced understanding of sustainability.

Keywords: higher education; campus; education; pillars

1. Introduction

As early as the 1972, and in response to the Stockholm Declaration on the Human Environment, universities began to officially recognize advancing sustainability as an institutional goal [1]. In 1990, the Talloires Declaration led to the first official inter-collegiate commitments to environmental sustainability, solidifying higher education's role in championing the idea [2]. Today, over 500 universities are signed onto this declaration, with many others unofficially following suit, each creating concrete, administrative-based goals to promote the concept on their campuses. With sustainability's growth has come a more complete understanding of the concept and universities moving away from strict environmentalism to now focus on improving the social, economic, and environmental contexts of their future communities [3]. Uncertainty arises with how effective these efforts are in influencing the awareness of and actions on behalf of sustainability among university populations [4,5]. In this research paper, we discuss the specific awareness, attitudes, and behavior of students and community members at the University of Vermont (UVM) in Burlington VT, with regard to the three pillars of sustainability: social, economic, and environmental. We then examine the role that university policy and culture may play.

The Office of Sustainability (OoS) at UVM is an organization that "supports grassroots efforts across campus and helps define and implement university-wide strategies for integrating sustainability on campus through programs, projects, and initiatives" [6]. The OoS supports the definition of the U.N. Brundtland Commission in 1987: "sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs" [6].

By recognizing the Brundltand definition, the OoS recognizes the three pillar approach and the value of balance in sustainability education and practice.

In Fall 2017, a UVM Applied Research Methods class partnered with the OoS to conduct a research project on campus sustainability. The purpose of this study was to assess the perceptions, beliefs, and behaviors of university students, faculty, and staff around practices of sustainability on the UVM campus. We utilize the focus on three dimensions of sustainability (environment, social, and economy) to evaluate successes and shortcomings that have come out of this work. This model is widely used: the three are systematically connected [7] and other higher education institutions, businesses, and countries use this model in their sustainability evaluations [1,8,9].

Scholars argue for a fourth dimension of sustainability—culture [10]. Much of the extant literature arises from sustainable development, particularly sustainable tourism [11–13]. Given potential similarities between tourism and higher education (e.g., marketed as a preferred destination, aiming for broader community benefits, location within a larger community), this literature may provide insights on creating cultural conditions for successful sustainability efforts and broader sustainable community development.

Di Castri's seminal work on this issue calls for understanding cultural sustainability in the face of a lack of unanimity on the definition of the concept, and the vast complexity across time, space and scale. In light of this, he calls for efforts to be specific to local conditions, flexible and precautionary so as to leave open opportunity for adaptation as conditions change [10,11,14,15].

Di Castri [15] cites cultural attachment as a "prime mover" (p. 330) of sustainable development. Adaptable changes are underpinned by respect for cultural pride, diversity and identity, which lead to community engagement and trust [10,11,15]. Sustainability efforts must respect both cultural norms and landmarks, like natural and built landscape features [11]. They must also integrate environmental, social, and economic concerns [13]. Numerous studies cite the need for community engagement and empowerment if sustainability efforts are to be successful [12,13]. Stakeholders are likely to hold a mix of shared and diverse values, so gaining perspectives of many stakeholders is vital to empowerment and success [12,15]. Stakeholders are constrained by a lack of information and understanding of initiatives; conversely, engagement and empowerment are achieved by forging networks and partnerships, and providing education, training and practical workforce skill transfer [11–13].

1.1. Overview of Campus Efforts and Assessment Tools

College campuses are a major source of economic activity and social capital and, thus, have immense potential to influence energy management and sustainability practices through their own operations, both internally and in their surrounding communities [16]. Furthermore, by immersing students in the campus sustainability culture and curriculum these institutions potentially have the power to create active and responsible citizens after their time at the university is complete, providing motivation, as well as knowledge and tools, to operationalize sustainability principles, particularly those around personal purchasing habits [17].

The United Nations has made it clear that it deems education for sustainable development an essential part of adapting to our changing world [18]. In the short run, sustainability education can "profoundly affect" and improve social sustainability through the creation of social capital [19]. This has cascading effects, allowing for a more long-term pursuit of environmental and economic sustainability in the future.

On the other hand, non-sustainability-related courses can have the deleterious effect of harming students' understanding of the complex concept. For example, introductory economics courses were found to disconnect students' conceptions of the economy and the environment, reinforce unrealistic and dangerous models of the world system, and undermine the effect of sustainability-related courses [20]. Ecological economists have critiqued this type of instruction for decades yet have seen little progress made in university economics education. The ambiguous nature of sustainability contributes to confusion for students, academics, and institutions at large [21]. This shortcoming may

be a result of complex ideas not being properly contextualized, messages appearing overly top-down, or a lack of face-to-face dispersal of information [22].

The way in which sustainability is taught in the United States reinforces Western dominance of academia and culture. Sustainability as it is understood by many in North America is void of non-dominant voices from the world, creating a concept that is not fitting for all contexts and not drawing on valuable inspiration from non-Western culture [23]. This understanding contributes to a surprisingly rigid construction of sustainability in practice that is less adaptable to specific contexts and less able to empower individual actors.

Campuses utilize toolkits to concretely measure the progress of their initiatives, taking the abstract concept and turning it into tangible objectives and actions. One example is the Campus Sustainability Assessment Framework, which provides a snapshot of a campuses' sustainability efforts, presented as a score out of ten [24]. This, and other tools, such as Sustainability Assessment Tools (SATs), follow a systems approach to sustainability by examining the concept in relation to education, research, operations, and community engagement [25]. This systems approach to sustainability is important as it suggests that every aspect of campus sustainability should be considered and evaluated, utilizing the entire campus community to foster long-term project success [26–29]. Assessment tools and their defined criteria also enable prospective students to easily access information on the sustainability of a university and allow it to be compared against others [30].

Despite their holistic nature these tools have, however, come under criticism from the scholarly community. If a systems approach is not put into effect when implementing an assessment tool, the campus community may tend to overlook important aspects of sustainability. Most universities tackle sustainability issues in a compartmentalized manner, focusing on classes and individual studies without linking theory to sustainable campus operations as a whole [31]. While many areas for growth and success have been identified, colleges and universities may still encounter barriers when working toward campus sustainability, such as a lack of student mobilization, lack of funding and grant awards, lack of time, and fear of stereotypes [32]. However, institutional support can help mitigate these issues and allow for the continuation of campus sustainability initiatives.

On the opposite side of this spectrum, comprehensive analysis tools, such as the Assessment Instrument of Sustainability in Higher Education, require considerable institutional investment with only few metrics as to which rating method is the most legitimate. Universities may be less willing to make the large investment due to the lack of clear convergence coming in the future of these tools [33]. The effectiveness of these toolkits is also undercut by redundancies, leading to a devaluation of certain criteria.

Another critique of these tools is the emphasis they place on environmental goals and actions over social or economic ones. Summers et al. [34] and Walsh [35] note that these two aspects of sustainability are severely under accounted for, but do not explain why this might be. Azapagic [36] found student understandings of sustainability were limited to visible examples of environmental issues, with a significant lack of emphasis on the social and economic aspects. When asked to define the concept, students overwhelmingly did not define sustainability in the context of economic or social issues, focusing almost entirely on the environment [21]. Denneen and Dretler [37] found that only eight of 27 of college campus sustainability plans made any mention of social or economic sustainability issues, like gender and race equity, or livable wages. The authors [37] hypothesize that it could be a result of economically unsustainable college tuition, suggesting an important omission on the part of the universities. Jucker [38] contends that sustainability, in actuality, is not as difficult to define as the dominant academic perspective suggests. Key components of sustainability can be tangibly identified, with actions falling under the categories of ecology, equity, empowerment, and economy. Placing the concept in succinct and real-world terms, as opposed to keeping it amorphous, will be beneficial in promoting understanding and further action on its behalf.

1.2. Past and Current Efforts at the University of Vermont

1.2.1. Ecological Sustainability

As a land grant university, the University of Vermont has a historic relationship to agriculture and the environment through federal funding of programs to conduct applied research and outreach. As Jacobsen et al. observed [39], land grant universities—including UVM—have emerged as leaders in sustainable agricultural practices through linking ecological, economic, and social foundations of agriculture. In addition to the ecological agriculture major which garnered UVM merits in the Jacobsen et al study, UVM lists 19 other environmentally-focused undergraduate majors of study within the College of Agriculture and Life Sciences and the Rubenstein School of Natural Resources. The University offers 25 (out of 50 total) environmentally-focused graduate programs—including a Green MBA program.

In 2006, UVM completed its first of its more than ten Leadership in Energy and Environmental Design (LEED) certified buildings, taking steps towards environmental sustainability through its built infrastructure [40]. The next year the university began transitioning its bus fleet away from diesel to natural gas and is now transitioning towards a fully electric fleet [41].

In addition, UVM has undertaken a series of efforts to create a culture shift within its community. After greatly expanding its recycling efforts in the early 2000s, UVM introduced composting to the campus in 2009, Reference [42] introduced reusable takeout food containers to students in 2011, Reference [43] and banned the sale of plastic water bottles in 2013 [44]. In 2015, the University introduced a sustainability course requirement for all undergraduates, with the goal of providing students with a knowledge of the three aspects of sustainability while developing skills for "rigorous and complex discussions about solutions" [6].

Through these ecological-based efforts, UVM has secured its reputation as a "green" school: In 2017, *The Princeton Review*, ranked UVM as the number four green university in the country [45]. These environmentally focused efforts along with the language used in which sustainable is interchangeable with "green" suggest that UVM's progress appears to be more heavily centered on environmental rather than social or economic goals.

1.2.2. Social Sustainability

UVM places social justice in high regard, as demonstrated by "Our Common Ground," the university's published set of core values: four of the six values are respect, integrity, justice, and openness [46]. In 2010 the Center for Rural Studies at UVM conducted a Campus Climate Survey (CCS), the first successful attempt to measure student perceptions of social inclusivity on campus. More than 4000 UVM affiliates were surveyed in order to understand the experience of students, faculty, and staff to inform the "development of diversity plans, policies, protocols and curriculum" in accordance with Our Common Ground. [46] This study reports that a large majority of respondents were satisfied with their experiences at UVM, but this is not true for all demographics. Faculty and staff of color or of lesbian/gay/bisexual/transgender identities were twice as likely to experience sexual harassment. Female students were twice as likely to experience sexual harassment than male students. Non-white students were twice as likely to experience discrimination than white students [47]. Through the work of UVM's Chief Diversity Officer, this survey resulted in the creation of a campus-wide diversity plan in 2016 and a multicultural professional development workshop for senior leaders [48].

Some other recent strides that the administration has made in the area of social justice include: extending gender-neutral bathrooms into major campus buildings, requiring all undergraduates to take two courses in diversity, flying a Black Lives Matter flag at the student center, openly supporting the Deferred Action for Childhood Arrivals (DACA), and meeting with a student-led activist group, NoNames for Justice. The University Administration, however, consistently labels these efforts

as strides towards social justice, diversity, inclusion, or multiculturalism rather than towards the university's social sustainability [49].

The undergraduate diversity course requirement ensures that all students take one course on race and racism in the US and one course on the diversity of human experience [50]. While these required courses contribute to social sustainability, they are not labeled or referred to as such. By having two sets of required courses for undergraduate students where the one labeled a "diversity requirement" imparts social sustainability and the other labeled a "sustainability requirement" imparts environmental sustainability, we can identify that UVM administrators are upholding the notion that sustainability *is* environmentalism and *is not* social justice.

Despite the aforementioned recent efforts made by the administration at UVM, there has been public backlash via organizing and demonstrations led by NoNames for Justice in early 2018 regarding the treatment of marginalized identity groups on campus [49]. The organization publicly states that UVM's commitments "do not reflect the lived realities of many students of color. A thoroughly accessible and academic classroom for all students is a long way from being in existence" [49]. NoNames for Justice's organizing was a result of anti-black bias incidents on campus invoking UVM's history of racism. Activists pushed back against the universities willingness to overlook past events such as the funding of the Vermont eugenics movement, celebrating a student-run blackface minstrel show until 1969, and the University's financial ties to South Africa's Apartheid prior to the 1990s [49,51]. It is important to note, however, that this widespread public outcry for social justice happened after the data collection in this report.

1.2.3. Economic Sustainability

Economic sustainability efforts may include using university financial resources to support sustainable community and economic development. Two prominent efforts around economic sustainability at UVM are the Real Food Challenge, a student-led initiative shifting food purchasing away from non-sustainable sources, and the Energy Revolving Fund, a dedication to invest $13 million of the university's endowment to clean energy [52]. UVM renewed their contract with the food service provider, Sodexo, in 2015. Sodexo is responsible for upholding the Real Food Challenge but saw backlash for poor treatment of workers during their contract renewal at that time [53].

Despite student-led demands in 2012 and 2017 for the board of trustees to divest the university's endowment from all fossil fuels, the board has not yet done so. In addition, as of the 2016–2017 school year, UVM remains as one of the top ten most expensive public universities in the country for out-of-state students [54]. Meanwhile, the teacher's union at UVM, United Academics, is pushing back against the university's aggressive funding strategy and budget cutting to Arts and Science programs [55]. These developments bring into question the University's commitment to economic sustainability.

1.2.4. Measuring Sustainability

UVM utilizes the Sustainability Tracking, Assessment and Rating System (STARS) measurement system created by the Association for the Advancement of Sustainability in Higher Education in 2010. STARS tracks and rates 811 universities under four categories: Academics, Engagement, Operations, and Planning and Operations, and each institution can receive a rating of Bronze (25% or above), Silver (45% or above), Gold (65% or above), or Platinum (85% or above) for each category. Each category is comprised of subcategories for which campuses are measured against. UVM submitted its first report in 2014 and again in March 2017. In 2017 UVM received a Gold rating overall (72%) with a breakup of 83% in Academics, 65% in Engagement, 57% in Operations, and 68% in Planning and Administration [56].

A study [57] conducted in 2009 at the University of Vermont measured students' views on importance of different sustainability focuses for the university. The results showed that overall, sustainability is important to the university community, but the level of importance varied

greatly among the different subsets of members (students, faculty, staff, and community members). "Undergraduates prioritized statements regarding ecologically designed buildings, local and organic food systems, and ample green space...graduate students, they were more likely to value courses with an emphasis on systems thinking and problem-based learning [57]." Other opinions among the faculty and the community members included focusing on a sustainable class curriculum (which has since been implemented) and keeping higher education more affordable. From this study, we can see that although the stakeholders of the UVM community have a positive view of sustainability, the community lacks a direction in which the groups can come together to pursue sustainability goals as a more effective unified body as opposed to several disparate groups.

1.3. Efforts at Other Universities

A 2015 Princeton Review survey noted that 60% of respondents consider the school's carbon footprint during the college search process [58]. Committing to sustainability can be seen as a positive and rewarding college characteristic that will draw in prospective students and add new sources of funding [58]. With this in mind, research found that once students are actually immersed in university life, they become more willing to participate in environmentally-focused clubs and more willing to act on behalf of the environment. Students, however, have been found to more willingly participate in "light green" sustainability-related activities that are highly visible and easily integrated into daily life, such as recycling and conserving water [17].

To meet this growing demand, universities across the country are rolling out different forms of sustainability education. Arizona State University created the first ever School of Sustainability in 2006, focusing much of the course work on a service-learning based approach to give students real world context to address complex systemic issues [59]. The aim is to give students the ability to create "sophisticated solutions" and to follow through with "extensive problem-solving processes".

At the University of California, Davis, students are asked to take the course "Introduction to Sustainable Design". During the semester long course, students were asked to create and use a personal Resource Consumption and Waste Audit. Students participate in a three-day audit in which they self-report their results. "Many call the audit 'life-changing' and add that everyone should do a similar audit if our society is to become more sustainable" [60]. The audit is a simple, cost effective way for students to become more aware of their own consumption and waste through traditional classroom-style learning. This program, and many others throughout the University of California network, were part of a three-decade approach towards improving sustainability, moving from environmentalism in facility operations towards a more encompassing network of sustainability [61].

A study performed at the University of Hartford tasked a group of student respondents to write their own definition of sustainability to see how closely student understandings aligned with the necessary key terms identified by previous research [21,62]. The collected definitions demonstrated a varied, but mostly incomplete understanding of sustainability which overly emphasized environmentalism. Definitions did not include mention of social or economic considerations and did not recognize world resources as finite. The definitions disconnected from the systems approach and were broad to the point of bordering meaninglessness [63]. This is potentially influenced by the way in which teachers and student-teachers of sustainability overly emphasize the environmental side of the concept [64].

1.4. Research Objectives

Our literature review suggests that many universities like UVM are putting sustainability at the forefront of their operations and outreach and using a variety of tools to measure progress along three dimensions (environmental, social, economic) of sustainability. However, as the literature [10–15] on the topic of cultural sustainability and its role in sustainable development suggests, successful initiatives must respect the values and norms of the university community. For sustainability efforts to gain success, the community must be informed and empowered;

its support and buy-in is essential. Initiatives must be seen as important and credible and integrate environmental, social and economic concerns. Strong initiatives have community members engaging in both individual and collective efforts supported by partnerships and networks. Finally, educational efforts should provide understanding of the nature and purpose of the efforts, but also how individuals and groups can operationalize this knowledge.

To that end, we posit the following indicators of cultural sustainability and likelihood of success.

- Support. Does the university community support the initiatives? What efforts are seen as important and effective?
- Integration of dimensions. Do efforts address and integrate environmental, social and economic concerns?
- Engagement. Are community members engaged in individual and collective sustainability behaviors?
- Informed and empowered. Are educational efforts teaching both conceptual and practical knowledge?

Our research objectives focus on how stakeholders perceive of and engage with sustainability on campus along these indicators. This study contributes to the literature by increasing understanding of the role cultural sustainability, particularly empowerment and engagement, can play in campus sustainability efforts. Results can be used to understand the cultural sustainability of the campus community and inform strategies for more effective efforts.

2. Materials and Methods

The research was conducted as part of a service-learning undergraduate social science research methods class at UVM. The class developed and administered an online, non-probability survey. The survey was developed in collaboration with OoS and was administered through UVM's online survey program, LimeSurvey (LimeSurvey GmbH, Hamburg, Germany). Topics included the importance of sustainability to respondents, UVM's performance across the three dimensions of sustainability (economic, environmental, and social), respondent's sustainable behaviors and, finally, the impact of UVM's sustainability education. A series of Likert-type scales were used to create ordinal variables measuring importance of initiatives, quality of performance, and frequency of behaviors. There were six multi-part questions using Likert scales with increasing order of responses (e.g., five-point scale of agreement with 1 = strongly disagree, 5 = strongly agree; five = point scale of importance (1 = irrelevant, 5 = extremely important; five-point scale of effectiveness 1 = very poor, 5 = excellent; four-point scale of frequency (hardly ever, less than half the time, more than half the time, almost always). There was one open-ended question ("Do you have any comments, suggestions, or questions about sustainability at UVM? If so, write below"). The survey concluded with demographic questions (college affiliation, class standing, residence (on- or off-campus), and gender.

Sampling was done in a variety of methods. Some students sent the survey link to friends and classmates; others brought a laptop or tablet device to public areas on campus like libraries, student centers, and dining areas. Given the convenience sampling method, no response rate can reasonably be reported. Class members collected 717 usable survey responses. A total of 635 (89%) of respondents identified their primary affiliation as undergraduate students and 19 (3%) as graduate students. The remainder were faculty (2) and staff (7) or did not list an affiliation (54, or 7% of the sample). UVM has 10,513 undergraduates and 1542 graduate students, so we surveyed about 6% of all undergraduates and 1% of graduate students [65].

Data collected from this survey were analyzed using Statistical Package for the Social Sciences. (IBM Corp. Armonk, NY, USA) Mean responses of ordinal variables were calculated. Cross-tabulation analyses of the aforementioned ordinal variables (importance, performance, behaviors) with demographics (college of affiliation and campus residence) were conducted; chi-squared tests were used to measure significant differences in cross tabulations.

As discussed above, respondents were asked the following open-ended question under the topic section of General Comments: "Do you have any comments, suggestions, or questions about

sustainability at UVM? If so, write below." The 151 responses were coded using qualitative thematic analysis by two independent coders to identify 10 open and three axial codes. These open and axial codes were included if both coders identified them. Key themes with supporting quotations are presented below in the Qualitative Results section. The number of responses for each theme were tracked by college of affiliation; their proportions were compared to percentages of college affiliation of the whole sample.

3. Results

3.1. Quantitative Results: Means and Bivariate Analysis

The first set of questions (Table 1) measured importance of sustainability to the university and its various stakeholders. Respondents were most likely to agree with the importance of sustainability to the university, followed by importance to themselves (more than students in general), and believe it is least important to employees. While they have a very good understanding of sustainability the university's sustainability reputation had little influence on their decision to attend.

Table 1. Importance and understanding of sustainability (five-point scale, 1 = strongly disagree to 5 = strongly agree).

Variable	Mean Response
Sustainability is important to UVM	4.21
Sustainability is important to UVM students	3.96
Sustainability is important to UVM employees	3.77
Sustainability is important to me	4.19
UVM's sustainability reputation influenced my decision to come here	2.97
I have a good understanding of sustainability as a concept	4.03
I am well aware sustainability efforts on campus	3.72

The next set of questions (Table 2) measured UVM's perceived performance of the three dimensions, or pillars, of sustainability (environmental, social, and economic) and the range of activities (academics, outreach, operations). Respondents rated performance on the environmental dimension highest, with social still being above the overall score. The economic pillar rated by far the lowest performance.

Table 2. Perception of university performance (five-point scale, 1 = very poor, 5 = excellent).

Variable	Mean Response
Sustainability overall–balance of social, economic and ecological pillars	3.58
Ecological pillar–natural resource use	3.74
Social pillar–well-being of people	3.65
Economic pillar–financial well-being and justice	3.06

Next, respondents compared importance of sustainability initiatives to how well the university executes them (Table 3). Operations was the most important initiative, followed by academics and engagement. Respondents rated academics as having the highest performance, followed by engagement. Policy ranked last in both importance and performance. In all cases, importance was ranked higher than performance.

Table 3. Importance and performance of university sustainability initiatives.

University Initiative	Importance (Five-Point Scale: 1 = Irrelevant, 5 = Extremely Important)	Performance (Five-Point Scale: 1 = very Poor, 5 = Excellent)
Academics: curriculum, research	4.03	3.75
Engagement: outreach materials, publications, community partnerships, staff and student ambassador programs	4.00	3.62
Operations: air, climate, buildings, energy, food, dining practices, grounds, purchasing standards, transportation options, waste, water	4.24	3.61
Policy: coordination, planning, diversity, affordability, investment, wellbeing	3.97	3.22

Finally, questions measured respondents' frequency of sustainable behaviors on a four-point scale (Table 4). Respondents most frequently conserved energy and reduced waste. The least frequent actions by far were reporting concerns and engaging in clubs or committees.

Table 4. Frequency of Sustainable Behaviors (four-point scale: 1 = hardly ever, 2 = less than half the time, 3 = more than half the time, 4 = almost always).

Variable	Mean Response
Energy conservation (turning off lights, reducing A/C and heat use, efficient electronics)	3.41
Waste reduction (reusable mugs/bottles/utensils/to-go containers, printing double-sided, avoiding excess packaging, buying used instead of new items)	3.30
Sustainable transportation habits (reducing driving, avoiding idling, taking the bus, carpooling)	3.02
Sustainable dietary choices (purchasing local/organic/humane/fair trade foods, eating fewer animal products)	2.84
Water conservation (taking shorter showers, turning off water not in use)	2.96
Reporting building or facility concerns (leaky faucet, drafty window, broken bike rack)	2.46
Engaging with sustainability (attending sustainability events or presentations, participating in sustainability-related clubs or committees)	2.32

Those students who took a sustainability class rated their agreement with meeting the intended outcomes on a five-point scale (strongly disagree to strongly agree). Students were most likely to agree with their ability to think critically about actions and outcomes, and were least likely to understand cultural complexities (Table 5).

Table 5. Ratings of intended outcomes of sustainability-intended classes (five-point scale).

Variable	Mean
I can explain and discuss sustainability in terms of its economic, ecological, social implications.	3.85
I can evaluate sustainability from my disciplinary perspective (my major).	3.75
I learned about the cultural complexities of sustainability.	3.64
I learned about sustainability on both a local and global scale.	3.86
I understand and can think critically about the relationship between my actions and a sustainable world.	4.09

Bivariate cross tabulation analysis (Table 6) suggests differences in attitudes, knowledge and behaviors around sustainability depending on respondent's school or college of affiliation. Virtually across the board, those in the School of Natural Resources have the highest mean scores, followed by College of Agriculture and Life Sciences. Those in business and engineering tend to score the lowest means. Only those variables found to have statistically significant differences by a chi-squared test are presented.

Table 6. Cross-tabulation results: Mean responses to selected variables by college of affiliation.

College	Sustainability Is Important to Me	UVM's Sustainability Reputation Influenced My Decision to Come Here	Importance of Sustainability in Academics	Importance of Sustainability in Engagement	Importance of Sustainability in Operations
Agriculture and Life Sciences	4.39	3.04	4.04	4.04	4.30
Arts and Sciences	4.13	2.92	4.09	4.05	4.30
Business	3.88	2.76	3.85	3.78	4.01
Education and Social Services	4.05	2.81	4.17	3.98	4.15
Engineering and Mathematical Sciences	4.30	2.85	3.73	4.00	4.28
Environment and Natural Resources	4.67	4.05	4.33	4.07	4.21
Graduate	4.60	1.75	4.50	4.25	5.00
Medicine	3.25	1.75	2.5	2.5	4.50
Nursing and Health Sciences	4.02	2.74	4.04	4.13	4.17
Chi-Square Statistic	87.308 ***	60.598 **	85.405 ***	69.361 ***	52.349 *
College	Frequency of Energy Conservation	Frequency of Waste Reduction	Frequency of sustainable dietary choices	Frequency of water conservation	Frequency of engaging with sustainability
Agriculture and Life Sciences	3.47	3.4	2.98	2.89	2.48
Arts and Sciences	3.44	3.28	2.94	3.03	2.35
Business	3.1	3.03	2.55	2.79	2.06
Education and Social Services	3.32	3.28	2.59	3.08	2.17
Engineering and Mathematical Sciences	3.49	3.38	2.68	3.10	2.30
Environment and Natural Resources	3.83	3.68	3.13	3.33	2.87
Graduate	3.2	3.75	3.00	3.5	2.33
Medicine	2.75	2.5	3.33	3.00	2.00
Nursing and Health Sciences	3.41	3.32	2.61	2.74	1.88
Chi-Square Statistic	64.005 ***	53.927 ***	40.322 *	43.246 *	41.579 *

Note: One, two, and three asterisks, (*, **, ***) denote significance at the 0.10. 0.05, and 0.01 levels, respectively.

On-campus student residents (mean response 3.24) conserve energy less frequently than off-camps (mean response = 3.56). This statistically significantly different at the 0.10 level as measured by a chi-squared test (chi-square statistic = 224.12).

3.2. Qualitative Results

From our analysis of the open-ended survey question, three major themes emerged. First, respondents expressed skepticism regarding the university's efforts. Second, they perceived inadequate attention to social and economic dimensions of sustainability. Third, students wished for greater support to make sustainable everyday life decisions easier. Details of these themes are below.

3.2.1. Student Skepticism

Out of the 151 open-ended comments that respondents made, 81 addressed student skepticism and concern that UVM is "greenwashing" the perception of campus rather than acting. Respondents brought up the university's overwhelming concern for its reputation, perceived sustainability initiative failures, unfulfilled sustainability commitments, and the university's current investment in fossil fuels.

Many respondents felt that UVM prioritizes sustainability because of the reputation that comes with the concept. In the words of one respondent "UVM markets itself as a sustainable college but I think it's less sustainable than it markets itself as." Several of the respondents felt that the university is more sustainable than other schools, but still fell short in key areas. Their skepticism comes from a perceived overemphasis of action that the university takes on admitted student tours and through marketing materials. As one respondent put it, "Sustainability at UVM seems to be more of a brand/buzzword rather than a practice or function of everyday life on campus".

3.2.2. Perceived Initiative Failures

There are three recurring sustainability initiatives that respondents often perceived as failed attempts. Respondents used these failures as justifications for why they did not seem to trust the administration's abilities to implement sustainability into practice in the future. Commonly referenced was the ban on plastic water bottles on campus. Respondents believed the ban did not go far enough in its action, banning only single-use water bottles while still allowing other drinks (soda, juice, etc.) coming in plastic bottles to be sold in campus stores. One respondent said, "Plastic soda bottles in vending machines, but no water in vending machines can encourage students to drink more sugary drinks." Others targeted the 2011 smoking ban as the cause of cigarette butt pollution across campus. In their eyes, these initiatives have failed to truly promote sustainable practice on campus, instead creating more litter with the smoking ban and unhealthy drink choices with the water bottle ban.

Another commonly referenced perceived failure in sustainability was the "Eco-Machine" (an artificial ecosystem designed to remediate effluent) located in the home of the university's school of environmental science [40]. Some respondents felt that in their eyes, the way the benefits of this machine are portrayed on campus tours and in promotional materials is exaggerated and at times untrue; according to some, the Eco-Machine is currently not in operation and does not treat the wastewater of the building it is housed within as respondents say tours suggest. Respondents were adamant in talking about how the Eco-Machine no longer works but is still actively promoted as a symbol of the sustainability of the university.

Respondents often referenced the university's investment of fossil fuels and the perceived secrecy of how UVM's endowment is being spent. Of the 81 responses mentioning student skepticism, 27 respondents explicitly mentioned divestment from fossil fuels as an issue of importance to them. In these responses, there was a high level of distrust for the administration because of this; as one student put it, "as long as we have any money to or from big oil and UVM, we're not being sustainable." Another respondent felt it was the universities duty to show students where their tuition money is going—"I have little understanding of what the university invests in and would prefer that to be not only easily accessed but should be advertised".

3.2.3. Dimension Imbalance

Out of the 151 open-ended comments that respondents made, 39 were regarding an imbalance in the way sustainability is discussed and put into action on campus. Overwhelmingly, students felt environmental sustainability overshadowed the equally important aspects of social and economic sustainability.

Eighteen respondents specifically mentioned lack of emphasis on social sustainability/social justice. None of the respondents that brought up this concept felt the university system had social and environmental sustainability in balance on campus and in the classroom. Respondents felt social sustainability is "often overlooked by both staff and students." This respondent went on to say, "It's easy to be conscientious about the environment, but harder when it comes to race, diversity, social equity, etc. The nature of these topics can often be harder to discuss and implement but are arguably more important." Other respondents were more critical in their assessment of lacking social sustainability, claiming the university purposely overlooks issues of racial justice and sexual assault on campus. Overall, respondents felt the university would be a better place if there were more diversity and more recognition of social sustainability from the administration.

Twenty-one respondents felt the university was failing to bring economic sustainability in balance. Most of the students addressed this imbalance through the inherently unsustainable cost of tuition at the UVM. The affordability issue for many respondents was critical; as one respondent put it, "It's hard to consider UVM "economically sustainable" as an out-of-state student with a tuition cost of $55,000." One respondent, who felt their sustainability course properly outlined economic sustainability, wished other students had the opportunity to understand sustainability in the way they had been taught it. This was the only respondent to respond that they were pleased with their education regarding the topic of economic sustainability.

Out of the 151 open-ended comments that respondents made, 63 responses emphasized having the sustainable choice be the easiest choice for students in their day-to day lives. We were able to categorize comments relating to the larger theme into relating to the following sub-categories: sustainable education, student engagement, and green infrastructure.

As previously mentioned, UVM students, as of the Fall of 2015 are required to take a course specifically relating to sustainability. Students can fulfill this requirement by completing one of 50 classes tagged with the Sustainability designation [50]. Within the surveyed sample, respondents had mixed feelings on the focus of the sustainability requirement. A total of 4/13 of respondents who brought up their sustainability education were grateful for the academic focus on sustainability; the other respondents felt that the current system does not focus adequately on sustainability. One respondent said "Why are sustainability requirement classes barely even about sustainability? There should be specific classes on sustainability." Some respondents felt that their education was not applied—some could only understand sustainability from an academic perspective or they wished that their courses were more connected to their university and local communities. As one respondent suggested, the university should, "teach or advertise to students what they can do on an individual level to help UVM be more sustainable," in order to put theory and concept into actual practice.

Ten student respondents felt that either there were not sufficient opportunities to engage with sustainability on campus in a meaningful way or that if these opportunities did exist, they were not publicized in an effective way. Out of this lack of engagement came a lack of student knowledge specifically of the status and success of campus sustainability initiatives. One respondent recognized their lack of knowledge, saying "these questions made me realize I don't know very much about UVM's sustainability practices." Another summed up the situation by saying:

> "UVM clearly has a lot invested in being sustainable but it seems to me like there is a lack of student knowledge on campus sustainability efforts and even less student involvement within those efforts. I just think with sustainability being so important here, there shouldn't be a disconnect with the students who play a large part in making UVM sustainable."

These respondents felt that the lack of engagement opportunity was to the detriment of both the individuals and the system as a whole. Three respondents specifically cited off-campus students as a demographic left out of the sustainability initiatives of the university.

One of the most visible sustainability initiatives on campus has been the push for more green infrastructure. This has taken the form of natural gas and electric buses, LEED-certified buildings, solar panels, widespread compost bins, and even a new bike share program. These pieces of infrastructure were referenced by 21 open-ended respondents. With regards to a new science, technology, engineering, and math (STEM) laboratory finished in 2017, one respondent said, "The University talks of sustainability, yet the STEM complex does not have a single solar panel or related technology." The lack of solar and other renewable energy sources was common among these respondents. Others questioned the tradeoff between new energy-efficient green building projects and the effects/costs of replacing/renovating older, less sustainable buildings.

Another critically important and ever-present aspect of student life on-campus is the process of waste sorting. Despite efforts to cut down on food waste, several respondents felt food and packaging waste were some of the least sustainable activities taking place on campus. To curb this, one respondent suggested more educational opportunities to learn about personal food waste in dining halls. One respondent asked for a fully-compostable food packaging system that can be discarded in locations throughout campus, not just where food is sold. That same respondent said the reusable packaging program, Eco-Ware, was not working well enough to offset other single-use packaging across campus. Respondents were split in their blame of systematic unsustainable food choices; some blamed the university, others blamed the food service provider Sodexo, but none of the respondents placed most of the blame on students themselves.

Some respondents brought up the harmful waste produced by the campus-wide smoking ban. Respondents demanded receptacles for cigarette butts on-campus despite the smoking ban, allowing smokers to dispose of butts as opposed to the current practice of littering. They felt the waste being disposed of improperly outweighed the positive aspects of the ban.

Green transportation options were also brought up frequently. Two respondents felt that the current bus system was flawed in usability and green energy usage. One respondent wished there were a greater incentive for carpooling on campus, potentially in the form of partnerships with local carpooling companies. Others wished for more bicycle infrastructure. As on respondent put it, "A possible way to make improve sustainability at UVM could be to increase student bike storage. This would encourage more students to use bikes as transport, lowering the college's carbon footprint." Some asked for a bike share program, which, since the collection of this survey data, has been implemented on campus.

There were a few notable differences in qualitative responses by college of affiliation. Higher percentages of Agriculture and Life Sciences, Arts and Sciences and Nursing students advocate for divestment from fossil fuels than their respective percentages in the sample. Education students disproportionately advocated for transparency. Agriculture and Life Sciences students were more likely to mention initiative failures; Arts and Sciences were more likely to mention waste disposal as an issue.

4. Discussion

The quantitative results found high perceived importance and awareness of sustainability on UVM campus. On the surface, respondents overall have favorable ratings of UVM initiatives including mandatory curriculum around sustainability. Comparing these results to the indicators of cultural sustainability and readiness developed above, community members are, overall, supportive, informed, and engaged in individual behaviors. Educational efforts are quite effective as well.

However, a deeper look suggests engagement and empowerment may be lacking, leading to dissatisfaction with many initiatives, especially commitment to social and economic sustainability. For example, respondents noted an imbalance of attention regarding the three sustainability

dimensions—which is in line with other studies, such as Summers et al. [34] and Walsh [34,35]. Participants believe UVM directs less of its efforts and messaging regarding sustainability to the social and economic foundations of sustainability in favor of environmental sustainability. This is supported by our survey responses which show that respondents perceived the university's performance of ecological sustainability to be higher than the other two dimensions and is reflected in our qualitative responses as well.

Our qualitative findings uncovered mistrust among respondents of the university's administration: They felt that other initiatives had failed, that sustainability is more of a facade than a bona fide way of operating, and felt that the university was investing the school's dollars in ways that did not reflect their values. While the racial justice rallies of 2018 were not directly tied to the what the university labels as sustainability efforts, they may reflect frustration regarding the administration's underperformance in fostering social sustainability. There seems to be a connecting link of the mistrust and a perception of a lack of transparency from the university's administration.

The 2011 Campus Climate Survey [47] on UVM's campus found that faculty, staff, and students of marginalized identities faced more discrimination than students with less marginalized identities. As shown above, many respondents felt that UVM ought to be doing more for social justice, echoing the findings of the CCS.

Denneen and Dretler [37] speculate that many of the university's rising tuition costs make them inherently economically unsustainable. Again, this is backed up by our findings in which survey respondents rated the university's performance of the economic dimension of sustainability lower than the university's performance regarding social or ecological pillars. Our open-ended respondents do not view the university as fostering economic sustainability largely due to its high tuition costs.

Our findings align with Pollock et al. [57]: respondents reported finding sustainability to be important. We saw this reflected in our qualitative data; however, we also saw that once students started at the university, they engaged with sustainability efforts rather infrequently and felt that they had a hard time accessing sustainable initiatives. Previous research [45] suggests a majority of students consider sustainability efforts when choosing what university to attend—our results found that respondents on average reported a 2.97 on a Likert scale of 1–5 when considering what school to attend, suggesting this was not an important factor for the polled respondents.

Finally, few community members engage in collective efforts involving groups or partnerships. Forming networks, organizations and partnerships is cited [12,13] as an important strategy for achieving community engagement and empowerment and if missing here, may provide insights as to why efforts are met with skepticism.

Based on these results, we pose a number of suggestions for UVM and higher education institutions in general to move towards both a more realistic portrayal of sustainability and more effective and realistic implementation of the concept.

First, UVM should better integrate the multiple dimensions of sustainability into its portrayal of the concept. It should avoid conflating sustainable with green and embrace a more holistic approach. Rebranding, realigning, and emphasizing social and economic justice initiatives as part of the bigger picture of sustainability will be crucial in promoting a greater and more nuanced understanding. In doing so, it will be crucial to link the three dimensions as inherently interconnected and equally important for the health of the global system. Education, publicity and outreach around campus sustainability efforts should emphasize multiple motivations and benefits (beyond environmental). It is also important to be transparent around both synergies (environmentally-friendly LEED-certified buildings may be more expensive to build but bring long term economic energy cost savings and create more comfortable and welcoming community-gathering spaces) and tradeoffs (paying living wages and divestment from fossil fuels may raise tuition costs and make education less affordable and accessible).

Second, classroom education on sustainability should not only foster conceptual understanding, but also practical steps to lead a more sustainable lifestyle. This includes demonstration

and explanation of what economic and social sustainability look like on a university campus and how a more nuanced view of sustainability will affect policies and the larger community. Creating common-space education materials on the ways in which university systems are interconnected to the social and economic happenings of their larger communities could augment this goal in an accessible and informal way. These practical tips can be reinforced by grassroots peer-to-peer education and social marketing from campus environmental and social justice groups.

Third, the University should promote student groups doing education and advocacy work around sustainability goals and more and better partnerships and networks of groups, as suggested by previous studies [12,13].

5. Conclusions

This study found that, overall, UVM community members believe sustainability is important and are generally aware of, and engaged in, activities. The strengths of this study are the unique perspectives of sustainability from the campus community that were recorded, which enabled us to draw many insights regarding the sustainability of the university. Though we view our research as beneficial to the campus community at the University of Vermont and similar higher education institutions, we are aware of areas for improvement. Potential weaknesses could include social desirability bias (responding more favorably to sustainability's importance or their own engagement than is true) or strategic responses (complaints about high tuition may be motivated by more than sustainability concerns).

Our study is limited in its ability to be applied to the entire university campus, since most respondents were undergraduate students, which leaves a large population of the campus community unrepresented. Second, our research was confined to the time period of one academic semester, which limited the depth of our research. Responses to the open-ended question likely reflect those with strong opinions, many of them negative and, therefore, strategic motivations.

Nonetheless, we believe that our research has the potential to be expanded upon and provide valuable information to similar universities. For the University of Vermont in particular, this research will be presented to the UVM OoS in hopes of providing them with information on how to improve existing initiatives. Future research could focus on ways to actively change the behavior of community members, research ways to best foster sustainable development, and utilize all stakeholders on campus to create legitimate change on the university scale.

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