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Article

A Tale of Two (or More) Sustainabilities: A Q Methodology Study of University Professors' Perspectives on Sustainable Universities

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Abstract: If change for sustainability in higher education is to be effective, change efforts must be sensitive to the institutional culture in which they will be applied. Therefore, gaining insight into how institutional stakeholders engage with the concept of sustainable universities is an important first step in understanding how to frame and communicate change. This study employed Q methodology to explore how a group of professors conceptualize sustainable universities. We developed a Q sample of 46 statements comprising common conceptions of sustainable universities and had 26 professors from Dalhousie University rank-order them over a quasi-normal distribution. Our analysis uncovered four statistically significant viewpoints amongst the participants: ranging from technocentric optimists who stress the importance of imbuing students with skills and values to more liberal arts minded faculty suspicious of the potential of sustainability to instrumentalize the university. An examination of how these viewpoints interact on a subjective level revealed a rotating series of alignments and antagonisms in relation to themes traditionally associated with sustainable universities and broader themes associated with the identity of the university in contemporary society. Finally, we conclude by discussing the potential implications that the nature of these alignments and antagonisms may hold for developing a culturally sensitive vision of a sustainable university.

Keywords: sustainability in higher education; education for sustainable development; Q method; pluralism; organizational change

1. Introduction

The Sustainability in Higher Education (SHE) literature is awash with statements to the effect that universities bear a profound moral obligation to promote ideals of sustainability by incorporating them throughout their institutional dimensions [1–4]. As one of the dominant producers of both social and intellectual capital in the Western world, institutions of higher education see many of our future political, cultural, and technological leaders pass through their turnstiles [5,6]. As such, it is difficult to imagine a more effective venue for the development and dissemination of a vision (or visions) of what it is to be a sustainable society, and what courses of action we should pursue to set us on a sustainable path.

In the years since the term "sustainable development" was first articulated by the Brundtland Commission [7], a host of organizations [8–10] have called on institutions of higher learning to take up the challenge of sustainable development in a meaningful way. Most notably, the United Nations declared 2005–2014 the Decade of Education for Sustainable Development, the framework for which outlined an important role for institutions of higher learning [10]. Universities have in many ways responded to this call. This is perhaps best evidenced by a proliferation of SHE declarations which outline sets of challenges and avenues for universities to engage in their pursuit of becoming "sustainable" institutions [11–13].

Nevertheless, as the Decade of Education for Sustainable Development draws to a close, questions of its ultimate relevance for tertiary education arise as universities have proved somewhat resistant to fully engaging with the concept of sustainability in an institutionally holistic fashion [14–17]. Universities have been much more successful at incorporating the principles of sustainability into their physical operations than they have been at incorporating them into their curricular, pedagogical, and management structures [14,18,19]. This is likely owing to the straightforward nature of implementing technical fixes to problems of inefficient use of resources and the concomitant economic benefits these present. By contrast, deep structural changes are far more challenging to accomplish in that they require profound deliberative efforts to have such a change effort reflect the various needs and desires of institutional stakeholders in a context of paramount academic freedom [14,20]. In higher education institutions, competing needs and desires complicate change efforts for sustainability since stakeholders often hold divergent, even conflicting conceptualizations of not only sustainability but of how to educate with sustainability in mind, and the role of the university with respect to sustainability in general [21,22].

Consequently, change efforts are often confounded by substantial institutional inertia. Like many institutions of similar breadth, universities have a long historical pedigree, perpetuated by being discursively reproduced in their contemporary context by both internal stakeholders and the societies in which they find themselves embedded [23,24]. As discrete, historical entities they possess the ability to mobilize their constituent parts [25,26] but are also the product of generations of institutional learning that create a sense of identity that can act as a significant barrier to change [17,27]. In addition,

universities have complex governance structures with no centralized organizing body responsible for implementing change initiatives [15]. In their interaction with the public sphere, they are sites of cultural production whose boundaries are increasingly permeable to external agents that seek to frame (often in terms favorable to themselves), and are themselves in part framed by the Institution [23] (p. 88) and [28]. Therefore, they are both socially constituted and constitutive. Now more than ever the university is a complex living system embedded in internal and external webs of significance. As a result, many contend that the university is undergoing a crisis of identity in the Western world.

The idea that Western universities are undergoing a transformation as a result of external pressures is widely accepted [23] (pp. 152–158), [29]. This transformation is often framed as the neoliberalization, or commoditization of higher education [23,30,31]. It has been argued that the pervasiveness of a neoliberal socio-economic discourse erodes the notion of the university as a public good. As a result, both education and research are instrumentalized to the detriment of critical thought and academic freedom [28,30,32]. This creates a tension at the university not only between its administrative elements and faculty, but also between faculty members as well [32,33]. The effects this may have on what is possible as a vision for a sustainable university and how it affects stakeholders' conceptualizations is yet unknown.

Although powerful external pressures work to frame the university, the culture of a university is not completely the product of external relations. Change within individual institutions is also a product of agency exerted by institutional actors. De la Harpe and Thomas [15] found that for institutional change efforts to bear fruit stakeholders need meaningful engagement and a clear vision of what change should look like. In addition, Kezar and Eckel [27] show that sensitivity to institutional culture is highly important in tailoring a vision and strategy for change to a particular institutional context. They define institutional culture as "deeply embedded patterns of organizational behavior and the shared values, assumptions and beliefs, or ideologies that members have about their organization and its work" [27]. Faculty, as the primary interface between students and the university, are a key constituency for sustainability at the university. Therefore, understanding the culture(s) of faculty at the university is exceedingly important for understanding how to frame change. Although Kezar and Eckel's definition of the term "culture" seems to imply a high degree of institutional determinism with respect to institutionally embedded agents, and may not take into account the effects that disciplines or economies of esteem [17] have on academics' identities, we feel this notion is still useful for conceptualizing distinct cultures within a university and how these may relate to external forces. Thus, we envision the potential for an important intersection where potentially diverse cultural forms emerging out of faculties' lived experiences within the university must necessarily interact with broader conceptions of the shifting identity of the university in a contemporary socio-economic context. In order to create a robust and contextually sensitive vision of sustainability at the university, we contend that engaging with both macro and micro level cultural influences is necessary. Given the importance of negotiating cultural barriers to change at the university, as well as "the diversity of opinion and lack of clarity about the roles of higher education players in sustainability" [34] (p. 3), it is essential to explore how university faculty interact with the concept of what it means to be a "sustainable university".

This study employed Q methodology to explore how a diverse cohort of faculty at Dalhousie University/King's College conceptualizes a sustainable university. The purpose was to explore: the

nature of tensions and agreements around what it is to be a sustainable university; how Q can be used to more effectively communicate a vision for change; and finally, what the nature of tensions at the university ultimately means for creating a vision for change. Q method has proved effective in other studies exploring the construction of sustainability discourses [35] and in the specific context of tertiary education both within environmental education [36] and Education for Sustainable Development (ESD) [34]. This study provides an interesting point of departure for unearthing heretofore functionally transparent institutional cultures at the university and how these cultures interact with the concept of "sustainable university".

2. Methods

Q method is a systematic means of studying subjectivity that employs both quantitative and qualitative methods [37]. Generally speaking, participants (P sample) are presented with a series of statements (Q sample) that they are instructed to rank-order over a quasi-normal distribution (Q sort) in response to a condition of instruction presented to them by the researcher [37,38]. Since a respondent's reaction to a statement can only be understood in its relationship to all other statements in the Q sort [39], the structures that these produce are meant to represent an individual's point of view given the condition of instruction. The data is then factor analyzed to determine where distinctive clusters of correlation exist. However, rather than looking for patterns across traits as with traditional factor analysis, participants are treated as variables, and we seek to empirically derive patterns from across the participant pool [37,40]. Out of the factor analysis emerges clusters of individuals rooted in a common configuration of viewpoints. The structure of, and divergence between, modal Q sorts for each cluster as well as open ended interview data collected from participants after the Q sort are used to contextualize and describe the viewpoints themselves as well as to explore the nature of tensions and consensuses that exist between divergent perspectives.

2.1. The P Sample

Dalhousie University is a comprehensive Canadian university with over 1000 full-time faculty members. The university's website was mined to create a candidate pool of faculty members. Academic faculty members were stratified according to their respective departments and one participant was chosen at random from each department. This yielded 26 participants (two participants loaded significantly on multiple factors and were excluded from final analysis leaving a final sample size of n = 24). All major academic Faculties were represented: Arts & Social Sciences n = 8; Science n = 7; Engineering n = 5; Management n = 2; Computer Sciences n = 1; and Architecture and Planning n = 1. Given that the purpose of Q method is to reveal and explicate viewpoints or discourses that are reproduced within a particular group, large and representative sample sizes are not necessary [41]. Indeed, as Watts and Stennor [41] argue, large numbers of participants can easily mute many of the nuances and complexities present in the data. Owing to the nature of the method, even one participant has the potential to produce a discourse that is substantively different from all others. Therefore, for the purpose of this study, we found it was more important to sample a breadth departments from across all faculties rather than seeking proportional representation.

2.2. The Q Sample

The methodology for this Q study followed both the approaches described by Watts and Stennor [41] and Van Exel and de Graaf [40], as well as the procedure employed by Sheppard and Furnari [34] to study a similar population. The Q study focused on understandings of the term "sustainable universities". An initial set of statements for the Q sample was gathered from a comprehensive literature review of Sustainability in Higher Education (SHE) articles conducted by Wright [42] seeking to identify common conceptions of sustainable universities. A second more informal review of the SHE literature was conducted to fill the space from the date of the initial literature review to present. This was achieved by entering the search term "sustainable university" into ISI Web of Science and ScienceDirect, and mining results for gaps in the original review. The reviews were combined to produce a list of 200 statements.

Since there is no standardized way of constructing a Q sample, we followed Brown [37] and Dryzdek amd Berrijikian [39], and constructed a "rough and ready" cell matrix in order to help infer a logical structure to the statement pool of 200. Such a matrix helps to ensure that our sample adequately represents the dimensions we have identified. The matrix was then populated with statements that fit into the established categories and then statements are randomly selected from the cells. By doing so, we attempted to limit the potential that a category of statements could be over-represented in the Q sample and thus potentially skew the result along those dimensions. This procedure provided us with 48 statements.

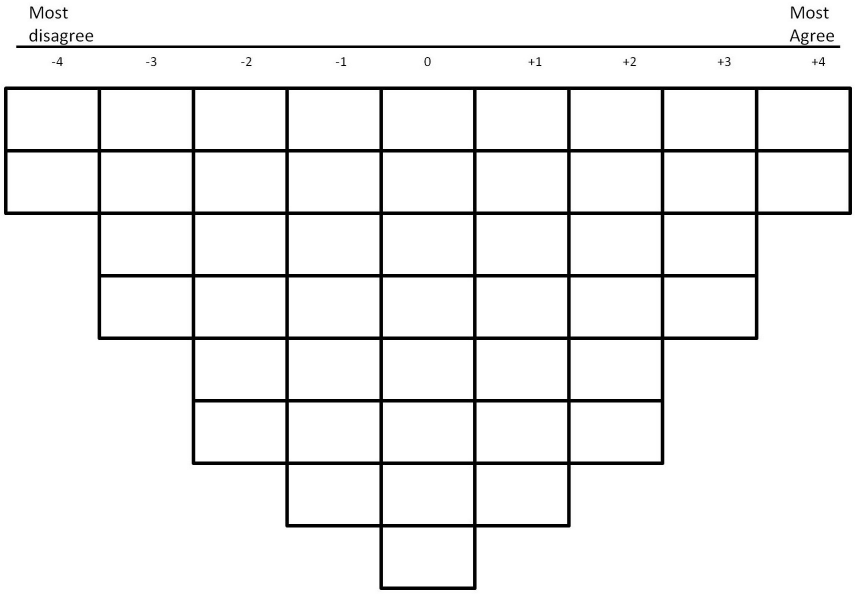
The Q sample was piloted on 12 faculty members (six of whom work in sustainability related fields). After the piloted Q sorts, the faculty members were informally interviewed about the nature of the Q sample; what they thought was missing and/or unclear. Statements that were unclear or viewed as redundant were eliminated and replaced with new statements generated from these interviews. The resultant Q sample was 46 statements.

2.3. The Q Sort

The Q sorting with the study population was completed during face-to-face interviews with individual participants who were randomly selected from different departments across faculties at Dalhousie University and the University of King's College (a college affiliated with, and on the main campus of Dalhousie University). Prior to, and after, the Q sort, participants were interviewed about their conceptualizations of sustainable universities [22]. Participants were then presented with the 46 statements (each printed on an 8 × 5 laminated card with a piece of Velcro on the back) and instructed to read them with the following guidance: "What do you feel are essential aspects to a sustainable university"? Participants were then asked to create three piles of statements: statements they agreed were essential; statements about which they were ambivalent; and statements they disagreed were essential. Participants were then instructed to rank-order statements on a nine-point scale (+ 4 to −4) distributed horizontally. The vertical distribution of the ranking grid-scale in the + 4 (most agree) position was two cells, up to eight cells in the 0 position, returning to two in the −4 (most disagree) position (Figure 1). These were arranged over a quasi-normal distribution, and placed on a 46 cell grid on a foam board. The choice to use the quasi-normal distribution was informed by Brown [37], McKeown

and Thomas [38], Van Exel [40], and Watts and Stennor [41] who found that the technique makes the sorting procedure less onerous for the participant and makes analysis and interpretation of the Q data significantly more manageable with little resultant loss in sensitivity. Once the Q sort was complete, participants were asked a series of open ended questions about the structure of their sort, why they afforded certain cards the position of most agree and others the position of most disagree, and what if any was the central idea they were trying to convey with the distribution they produced.

Figure 1. Quasi-normal distribution for Q sort.



2.4. Quantitative and Qualitative Q Analysis

Quantitative analysis of the Q sorts was performed using the dedicated Q analysis software program PQ method 2.20 [43]. Q method software programs such as this make quantitative analysis significantly easier and are commonly used in the analysis of Q data [37]. Data was centroid factor analyzed for seven factors. Analyzing for seven factors has little explicit rationale in the literature, it is simply described as the magic number of factors to look for [37,40]. Upon completing the factor analysis, the software calculates Eigenvalues (sum of the squared factor loading for that factor) and factors with an Eigenvalue of >1.00 were selected for factor rotation [44]. Finally, factors were rotated using Varimax rotation to maximize variance between groups. Factor analysis and rotation yielded four distinct and statistically significant factors on which participants loaded, representing four distinct viewpoints (note: only participant factor loadings greater than 0.38 ($p > 0.01$) were considered significant and carried forward to the interpretive stage as informed by Van Exel and de Graf [40]. Participants who loaded positively and significantly onto more than one factor were excluded from further consideration.

For each of the four viewpoints drawn from the analysis a modal Q sort was produced to represent a best-fit description for all the participants loading on a particular factor as well as outlining distinguishing statements that set that factor apart in a statistically significant manner ($p > 0.01$). In addition, the chosen software produced a series of factor arrays which illustrated agreement and disagreement across all statements between each of the factors. All of this simplified the task of

interpreting and defining the divergent viewpoints embedded in the factors. Nevertheless, this is only half the story.

Though parsimony is the goal building a narrative description to explain the factors, Dryzek and Berejikian note: "[they] are not constructed by merely cutting and pasting statements with extreme scores on each factor; for the narrative must also take into account how statements are placed relative to one another in each discourse…and the comparative placement of statements in different discourses" [39] (p. 52). In addition, to further contextualize perspectives, we conducted a thematic analysis of open ended interview questions [40] and [44] (pp. 200–201) concerning the Q sort as well as the participants' perspectives on sustainable universities.

3. Results

Each group discussed below represents a cluster of participants, all of whom loaded significantly on similar factors. The factor descriptions are based on the interpretation of the structure of modal Q sorts for each group, how statements are distributed in relation to each other within the modal sorts, and the similarities and differences between factors. In addition, interview data of respondents who loaded on the same factor were used to further elucidate the nature of each perspective. Numbers found in brackets refer to specific card numbers found in Table A1 in the Appendix in conjunction with the factor arrays which represent the position of statements in the groups modal Q sorts.

As Figure 2 illustrates, disciplines tend not to be over-represented on any of the four factors. This was surprising since, as noted above, disciplines often garner criticism for their role in organizational resistance to sustainability and as such we had expected more discursive alignment within faculties. We attempt to elucidate reasons for this below. In addition to our describing shared perspectives within participant clusters, we noted a number of clear points of potential tension and alignment between groups relating to groups of statements that centered on similar themes and thematically related responses to interview questions. Drawing out these points of potential tension and alignment between groups enabled us to uncover three broad themes that represent areas of tension and consensus. These we use as lenses through which to examine how relationships between groups shift given different visions of a sustainable university.

Figure 2. Distribution of faculties within the four distinct perspectives uncovered by the Q analysis.

Factors	Faculties: Arts and Social Sciences	Engineering	Management	Science	Computer Science	Architecture and Planning
Group 1	3	0	1	2	0	0
Group 2	2	3	0	3	0	1
Group 3	0	1	1	2	1	0
Group 4	3	1	0	0	0	0

3.1. Factor Description

Our Q analysis revealed four statistically significant groups that arise from the cohort of 26 professors (two participants loaded significantly on multiple factors and were excluded from analysis):

Group1: (n = 6 / 23%)

"Liberal Arts minded faculty sensitive to the socio-political dimensions of sustainability but skeptical of the instrumentality implied by "sustainable university."

First and foremost, Group 1 feels that sustainability is a contested concept that extends far beyond purely technical conceptualizations that they feel dominates the discussion. They tend to be more sensitive to the socio-political dimensions of sustainability. Essentially, they feel that universities in their current form are exceedingly well placed to grapple with the concept of sustainability through their traditional mores of free and open inquiry and how these relate to the institution's mission of education, research, and outreach. They are quite skeptical of the term "sustainable university" in part because of the political contestation around sustainability, but mainly because they can envision how such a transformation could potentially erode academic freedom and make an instrument out of education. Moreover, they display reticence to the notion that education should be "for" anything (unless of course it is for critical thinking and enhancing civil society by educating about the values of a democratic society—which they see as closely linked to each other and to sustainability). In the words of one respondent: "change for sustainability is not a revolution; it is an evolution" (Participant 27). They feel that it is essential that a sustainable university promotes a diversity of critical perspectives (Statements 13, 27, 39), (see Appendix A for list of statements in Q sample) that they engage with their local communities in a meaningful way (Statement 5), and that they seek to enhance civil society by helping to foster an engaged citizenry (Statement 4). If the university is to be a model then it must maintain itself as a site where the freedom exists to construct a plurality of diverse perspectives relating to various, even conflicting visions of sustainability. As one respondent contends: actively "fostering diversity helps to ensure that the institution resists becoming an elitist, self-selecting organization" (Participant 17), and guards against dogmatic adherence to disciplinary conceptions of sustainability. Finally, they feel that the intellectual footprint of the university is more important than the ecological footprint. As such, they do not find greening the campus initiatives to be exceedingly important, yet nor do they disagree with them (Statements 7, 19, 22, 28); they see the primary site of action of a sustainable university as the social realm, mobilizing knowledge in the form of education and research to the segments of society who need them.

Group 2 (n = 8 / 31%):

"Traditional liberal view of the university with a strong inclination towards greening campus but leery about incorporating sustainability into other institutional dimensions."

Group 2 conceptualizes a sustainable university in largely technical terms. To them, a sustainable university is a fiscally sound, technological leader who incorporates the latest research and technology into its infrastructure and thereby stands as a model for the rest of society of best sustainable practice. In this vein, a good deal of import is placed on the university reducing its ecological footprint and incorporating renewable and energy conservation measures into its physical plant with a view to

decreasing operating costs (Statements 19, 23, 36, 40). Though financial viability of the institution is important, Group 2 tends not to differentiate between "greening" efforts on the basis of cost recovery. They do not feel that the concept of sustainability is anything new; rather, as one participant states "[*sustainability has*] always been around, we just refer to as it sustainability now" (Respondent 6). To this Group a sustainable university is not about fundamentally changing the university but is about fine tuning the system already in place. Group 2 does not display interest in the socio-political dimensions of sustainability (Statements 4, 29) within the university and worry that as a political project a "sustainable university" is either a buzzword or worse, a political ideology that will erode academic freedom and critical thinking. Put another way, they feel the university should engage with the idea of sustainability without liquidating itself to it. Hence, they are weary of any form of explicit values based education and see this as inherently unsustainable: university education is undertaken in order to create a prepared mind; which they discuss as the central mission of the institution (Statements 9, 41). Furthermore, Group 2 shows ambivalence towards the idea of the university advocating on sustainability issues (Statement 45). They feel that the university can and should provide technical leadership and knowledge, as stated above, but is ill suited to acting with a specific goal in mind. Aside from a green campus, and technological leadership, they felt a sustainable university must also have a strong vision of economic sustainability. Therefore, in an era of diminishing funds the university should ensure that they do not run a budget deficit, while being sensitive to the fact that some short term loss is required to benefit from technical innovations in the future (Statements 16, 30).

Group 3: (n = 5 / 19%)

"Business savvy techno-optimists who see being a sustainable university as an opportunity to become global leaders and are strong sustainability advocates."

Broadly speaking, Group 3 feels that many questions currently exist as to the relevance of the university to contemporary society. They contend that making sustainability central to everything the university does is an excellent means of answering such questions. In fact, their Q sort suggests that they support the university actively advocating on these issues, and feel that it ought to be a strong model of sustainability (Statement 45). They feel that ESD should be central to the educational mission of the university (Statement 9). They concomitantly support training students in the skills they will need to be successful throughout their lives while imbuing them with the values of what it is to live in a sustainable society. Therefore, to Group 3, a sustainable university is by and large a technical issue centered on training students and developing new and innovating technologies which can be deployed throughout society at large as well as within the university's own infrastructure. In addition to viewing it as the institution's moral obligation, they feel that there is a strong business case for sustainability. With this in mind, they display a tendency to favor greening the campus initiatives that lead to clear cost saving outcomes, de-emphasizing those that do not (Statements 7, 19, 28). Moreover, they have a strong belief in partnerships, especially partnerships with industry. For Group 3, business and industry are the most powerful institutions of our time; engaging with them would be a highly effective means of promoting both sustainability and remaining socially relevant. Group 3 displays a high degree of receptivity to the needs of society insofar as sustainability is concerned, though they are more nationally and internationally focused than the other Groups (Statement 15). Part of this receptivity is sensitivity to the needs of the market with respect to curriculum and research. They feel that financial

viability is a key aspect to a sustainable university but hold a nuanced view of economic sustainability. They support running deficits and short term economic hardship if these are framed in terms of investments that will benefit the university in the medium to long term (Statements 16, 30). Finally, they do not find issues of accessibility, diversity, or educating for democratic citizenship to be very important to being a sustainable university relative to the more pragmatic initiatives alluded to above (Statement 4, 27). They prefer a much more practical and direct engagement with sustainability on the part of universities. In effect, they would use the university as the voice of sustainability in society (Statement 45).

Group 4: (n = 4 / 15%)

"Progressively minded faculty with a balanced vision of environmental and social sustainability who seek a more critical understanding of a sustainable university."

Group 4 believes that a sustainable university must strike a balance between big picture meta-questioning or even problematizing of the concept of sustainability while deploying and developing technologies to solve immediate problems as they arise (Statements 4, 7, 10, 19). With this in mind, they see a sustainable university as one that educates to create a prepared mind but is also a technological leader that models the principles of sustainability in its physical operations (Statements 4, 19, 40, 42). Thus, Group 4 conceptualizes balance in SHE as promoting sustainability both internally and externally. In creating a vision of sustainability at the university, the institution must at once sustain itself and its mission so it may excel in its provision of services to society. In addition, Group 4 feels that the university must also engage in a meaningful way with the socio-ecological dimensions articulated in broader societal notions of sustainability. While they feel that a sustainable university can and must strike this balance, they do however feel that the mission of the university is far too broad to be contained by the concept of sustainability. They resist anything that can be construed as instrumentalizing, especially education (Statements 8, 9), but do feel that promoting ecological literacy in all disciplines has merit. This is reinforced by either ambivalence or wariness with respect to the involvement of outside constituencies in academic matters which may erode academic freedom (Statements 34, 35, 37). Group 4 also clearly feel that sustainability is a contested concept and that one of the primary roles of the university is to foster a diversity of perspectives on the issue. Related to this is the importance of enhancing civil society through engaging with democratic values; where all of the respondents in this Group view a democratic society as a society conducive to change (Statement 4).

3.2. Dynamic Relationships of Tension and Consensus

We attempted to represent these relationships graphically using flowcharts where color of the connecting arrows implies the nature of the relationship (tension or consensus) and the weight of the connecting arrows implies the intensity (either mild, moderate, strong, or bipolar; where bipolar indicates that the cards relating to the theme discussed are at opposite or near opposite ends of the distribution of the two Groups being discussed).

The four groups that emerged out of the Varimax rotation represent distinct, but not necessarily opposing points of view. All Groups agreed that the pursuit of sustainability must not hinder the

institution's ability to meet their central imperatives; specifically, all groups framed the primary goal of education at the university vis-a-vis sustainability, to be fostering critical thinking in students. All groups were strongly opposed to policy related statements that were seen to limit academic freedom. Finally, though the importance of economic sustainability tended to vary between the Groups, broad agreement existed that the pursuit of greater enrolment as a means of maintaining economic viability was inherently unsustainable since it impedes the university's ability to deliver quality education.

The above analysis revealed that all participants had a serious concern about what they conceived as dangerous trends in higher education. These concerns were further developed and articulated in the answers to the open-ended interview questions [22]. Though participants' opinions on the effects of these trends speak to the same outcomes—specifically the erosion of academic freedom, a loss of excellence in education, and a perceived growing irrelevance of the university to society—the underlying causes that they identify differ between groups. Therefore, it is not only tension around the concept of sustainability and how best the university can model this which differentiates groups within this study, but substantive differences in their conceptualizations of the identity of the university in a rapidly changing world.

Further analysis of the Q-sorts revealed three broad themes where potential tensions are likely to exist between Groups that help to elucidate the nature of divergence between the groups:

(1) Ecological footprint and intellectual footprint;
(2) How to educate for sustainability;
(3) Reflective *versus* reflexive conceptualizations of the university

What is interesting is that tension and consensus between groups is dynamic and tends to shift as different thematic lenses are applied. The three change-related themes that emerged from the Q sorts are discussed below.

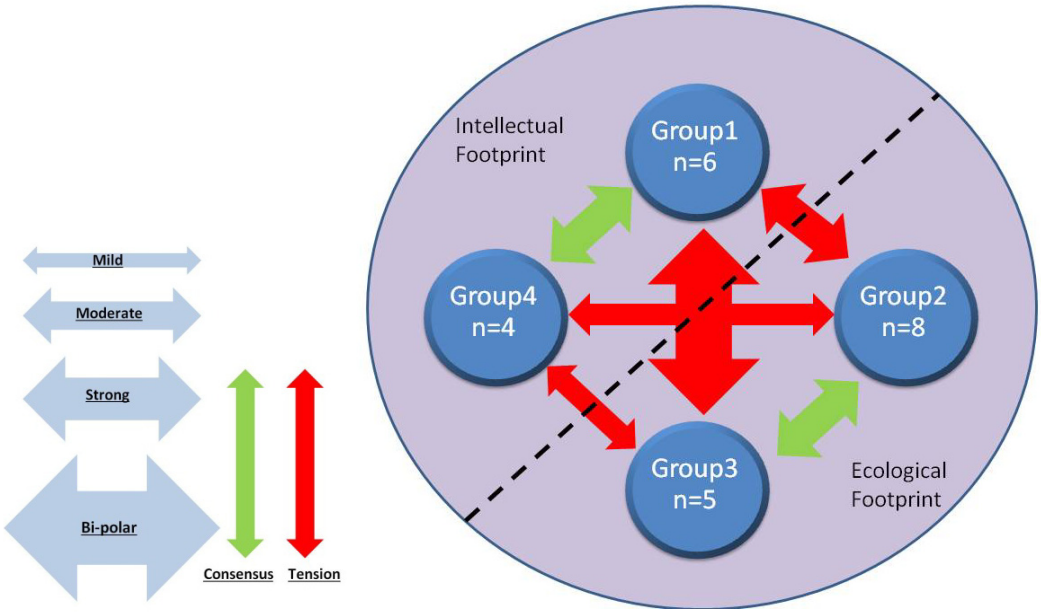
3.2.1. Ecological Footprint and Intellectual Footprint

This theme has a complex set of tension-consensus relationships. Initially, broad alignment exists between Groups 2, 3, and 4 around the importance of greening campus initiatives when set against the relative de-emphasis of such initiatives demonstrated by Group 1. It is important to note that while Group 1 does not align with the other groups in this category, they do not disagree with greening campuses. Analysis of their interview data shows that they are more or less ambivalent to these initiatives because in terms of promoting sustainability they feel that the university's role as a physical consumer of resources is far less important than its role in creating a politically engaged citizenry. It is around the importance of creating a politically engaged citizenry where Group 1 finds clear alignment with Group 4, illustrating that in fact only a partial tension exists with respect to this particular dichotomy between these two groups.

Within this set of statements we find moderate disagreement between Groups 1 and 4, and Group 2, and a nearly bi-polar disagreement with Group 3 (Figure 3). From the interview data, it becomes apparent that the primary difference lies in the perceived role of a democracy for the development of sustainability. Participants in both Groups 1 and 4 speak to democracy as the political system that is most amenable to facilitating change, Group 4 goes so far as to discuss it in terms of democratizing

administrative structures within the institution to be a sustainable university. Alternatively, participants in Group 2 do not broach the topic and Group 3 sees it as largely irrelevant to sustainability with one respondent from the group going so far as to state that the democracy and sustainability are sometimes mutually exclusive.

Figure 3. Tension and consensus between Groups in relation to the theme "Ecological *versus* Intellectual Footprint".



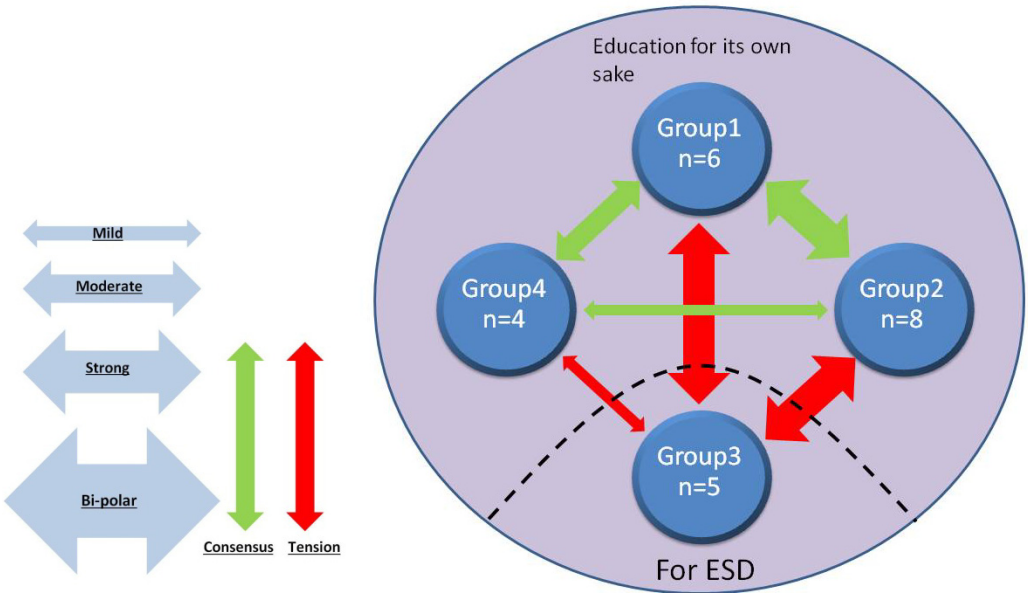
Regardless, the relationships that are a function of this dichotomy clearly draw alignment between Groups 1 and 4, and Groups 2 and 3, where a near bi-polar disagreement exists between Groups 1 and 3. Deemphasizing the importance of supporting a robust and democratic society may speak to both Groups 2 and 3 conceptualizing sustainability in largely techno-managerial terms set against Groups 1 and 4 being more sensitive to the social dimensions of sustainability, where in some instances they frame it in socially transformative terms. The partial tension that exists between Group 1 and 4 is likely a matter of Group 1 showing little interest in sustainability. An examination of their modal Q sort shows that the agreement end of the Group 1 distribution holds mainly statements with no explicit mention of sustainability, or point to reforms that could be beneficial and possible with or without consideration given to sustainability.

3.2.2. How to Educate for Sustainability

This theme presents a binary tension between the notion of ESD and education for its own sake (Figure 4). For this theme, Group 3 is in favor of ESD which is in tension with Groups 1, 2, and 4 who are all somewhat aligned in their support of the education for its own sake. Discussion during the subsequent interviews indicate that these three groups all feel that the educational mission of the university is far too broad to be reduced to the concept of sustainability. There is evidence to suggest that they would be more receptive to incorporating more sustainability related topics throughout university education in general, but that making it a central tenet would be too instrumentalizing in

nature and runs counter to the spirit of educating to create a prepared mind. Nevertheless, a gradation does exist between the liberal-arts minded Groups and it is not accurate to portray all Groups as promulgators of deep liberal sensibilities in education. Where, for instance, Group 4 displays strong resignation to the idea of university education being framed as professional training to give marketable skills to students, Group 1 seems somewhat ambivalent and Group 2 displays moderate amenability to this statement. In fact, Groups 1 and 2 begin to move into closer alignment with Group 3 on this particular statement though they are still presented as being in tension in Figure 4.

Figure 4. Tension and consensus between Groups in relation to the theme "how to educate for sustainability".



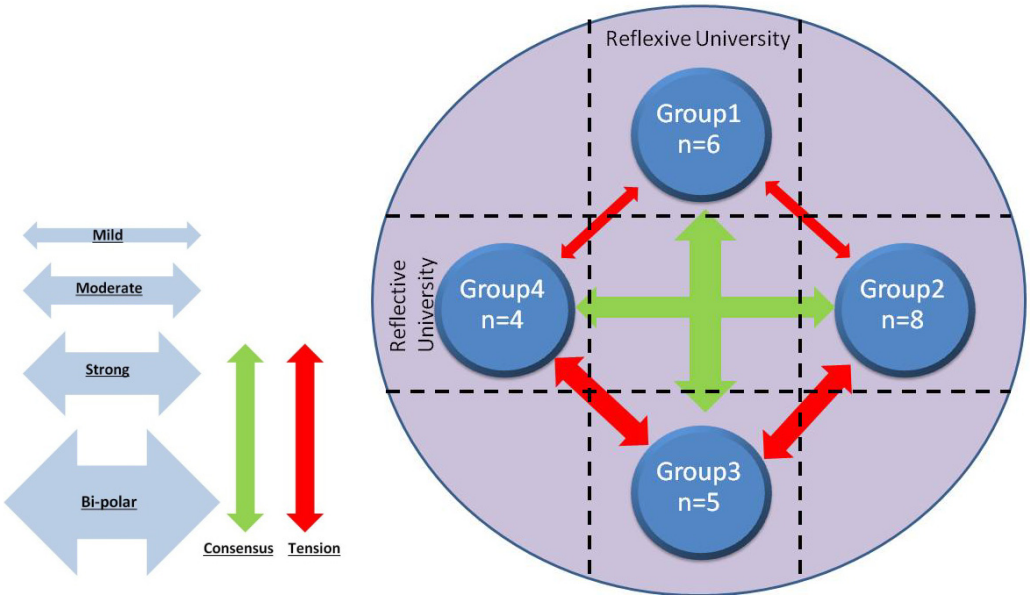
Nonetheless, Group 3 does differ significantly from the other groups in that they see ESD and educating to create a prepared mind as being synonymous. This is illustrated in their modal Q sort by the importance afforded to both the centrality of ESD and education that fosters critical thinking and is further supported by their interview data where they speak to the concept of sustainability as being essential to addressing emerging socio-ecological crises. In other words, if the future will require sustainability minded graduates then education for sustainability is educating to create a prepared mind. Interestingly, the fact that these tensions are represented as tensions relating to sustainability is likely an artifact of this study; the tensions that we describe likely relate to deeply held convictions as to the purpose of university education and the identity of the university in general.

3.2.3. Reflective *versus* Reflexive Visions of the University

Bi-polarity between Groups 1 and 3 dissolves in the face of consensus concerning statements that outline a more socially receptive and engaged role for a sustainable university (Figure 5). In fact, both groups find broad agreement on the importance of adopting an advocacy role in society; of culturing more cosmopolitan values, and of forging partnerships with industry and non-governmental organizations (interestingly, all groups equally de-emphasize creating partnerships with government). This is in contrast to Groups 2 and 4 whose modal Q sorts de-emphasize the importance of these as

central aims for a sustainable university and whose interview data fail to broach themes of outreach and permeability to the public sphere. Conversely, both Groups 1 and 3 speak to the importance of the university moving away from the antiquated notion of the "ivory tower" in order to ensure that knowledge generated within the institution is reflexively generated, and therefore more socially relevant. In returning to obvious tensions between Groups 1 and 3 outlined above, consensus here would likely break down around the sort of instrumentalism which Group 1 negatively associates with marketization in knowledge production, while Group 3 would frame it as problem solving and being receptive to the needs of society.

Figure 5. Tension consensus between groups in relation to the theme "Reflective *vs.* reflexive" conceptualizations of the university.



Tension between Groups 1 and 3, and Groups 2 and 4 with respect to this theme is a matter of degrees. De-emphasizing outreach could imply a more institutionally focused conceptualization of a sustainable university. This assertion is further supported by Groups 2 and 4 placing a good deal of importance on greening the campus initiatives and their mutual focus on education. Thus, a sustainable university in this view is an internal matter bounded largely by the confines of the institution. In contrast, the importance of institutional permeability suggested by the data for Groups 1 and 3 sketches a sustainable university as a site of knowledge mobilization where sustainability is positioned at the interstices of the institution and society. Perhaps at its simplest, this dichotomy is between a sustainable university as reflective, and of a sustainable university as reflexive, respectively.

4. Discussion

Our application of Q methodology helps to highlight the diversity of perspectives surrounding "sustainable universities" among faculty members at the university. Our findings show that while some tensions are specifically related to sustainability, others are the result of divergent normative beliefs concerning the nature of education and the role of the university in society. Moreover, we demonstrate that tensions are not static and well bounded; rather they are dynamic and shift with respect to the

particular dimension of sustainability being considered. We contend that if so much diversity and tension is present within a cohort of academics, the prospect of developing a university-wide consensus based vision of transformation for sustainability without engaging in a deeply collaborative process would be impossible. Research suggests that in loosely-coupled, pluralistic organizations such as universities, strategies for planned change that do not adequately reflect or make reference to the cultural realities in which they are being deployed generally tend to fail [45–48]. In this study, many of the normative/cultural tensions are rooted in values and beliefs that in many instances (e.g., values regarding forms of pedagogy, as we note below) are represented in the broader literature in the form of sound philosophical debate. Therefore, the challenge we see with respect to transformation for sustainability at the university is two-pronged. Firstly, given the cultural realities of change for sustainability highlighted by this study, practitioners and scholars seeking to organize change for sustainability must come to understand the cultures of their institutions and embed change strategies in those cultures. Secondly, where normative and cultural tensions relate to sound philosophical positions, such as questions of mission or pedagogy, collaborative approaches to visioning change need to be employed. The former may be resolved by finding novel ways of framing sustainability related change that has cultural resonance to help dissolve tensions regarding divergent conceptualizations of sustainability; the latter entails re-envisioning the way in which change for sustainability in higher education is being approached.

4.1. Framing Change Efforts for Sustainability

Visualizing where tensions and consensuses exist is a starting point for identifying context-specific alignments between groups on one level, which can be used to leverage tensions on others. The tension between ecological and intellectual footprints is a good example. We could potentially bring Group 1 into alignment with all other groups around the importance of greening the campus initiatives by framing these in terms of experiential learning; a concept to which Group 1 is amenable. Specifically, the SHE literature discusses campus sustainability as form of latent curriculum where students learn the value of sustainability through direct, everyday experience with its benefits [5,49]. This is cited as a contemporaneous benefit of campus sustainability initiatives aside from the direct economic and environmental benefits many greening initiatives tends to generate. Thus, understanding this particular tension for Group 1 allows practitioners to frame their greening operations in terms that foster alignment, reducing the ecological footprint of the university while expanding the intellectual footprint. Framing a vision for change like this is an effective way of developing a culturally sensitive communicative strategy.

Though Q is often plied as an exploratory tool, we feel that this study demonstrates how Q method could be useful to SHE practitioners. Properly communicating a vision for change is essential if one is to successfully promote organizational transformation [15], [50] (p. 21). Moreover, as Reid and Petocz [21] note, lack of a shared understanding and language for discussing sustainability is a barrier to university lecturers engaging with sustainability. Enlarging the scale and incorporating demographic information into a Q study could enable practitioners to *a priori* develop culturally sensitive communication strategies enabling them to circumvent, or at least anticipate, resistance. In addition, Q method could also prove useful for identifying and closing gaps between Groups' understandings of sustainable

universities. Nevertheless, as discussed above, some tensions are tied to sustainability only insofar as this study provided that context for their expression. Negotiating such non-sustainability related barriers no doubt presents a much more significant challenge to be overcome.

4.2. Institutionalizing Difference

Beyond tensions relating to divergent conceptualizations of sustainability, this study identified several areas of tension that would problematize creating a consensus driven vision for planned change. Owing to the "supra-institutional" nature of these tensions and their coverage in other studies [14,17,21,51], we feel confident in claiming that they are not solely the product of Dalhousie University's institutional culture and would likely find broad resonance elsewhere. For instance, in our study, resistance to ESD was often framed by participants in terms of a growing instrumentalism brought about by a neoliberal ideology that seeks to commoditize education and erode academic freedom. By contrast, proponents of ESD felt that the values based education and skills training implicit in this educational framework were a pragmatic necessity that aligned well with fostering critical thought. This echoes similar tensions identified during a Q study by Shephard and Furnari [34] with educators at a university in New Zealand. These substantive tensions find articulation in the broader literature as well, where it is argued on the one hand that the instrumentality implicit in the majority of ESD frameworks runs counter to the emancipatory and transformative forms of education required to promote deep premise reflection that leads to both action and behavioral change for sustainability [28,52–55]. Alternatively, proponents of ESD contend that it can be used as platform from which strong social critique and learning can occur [56,57], and that a central tenet of ESD is the culturing of critical thinkers through its focus on interdisciplinary and problem-based learning [5,19,58]. It is not the purpose of this paper to comment on the validity of either position. Rather, we advance this juxtaposition of theoretically sound positions to demonstrate the context from which tensions in our own study emerge, illustrating that beyond being values based they also reflect a high degree of critical deliberation on effective forms of education.

Though contention around the nature of ESD is but one example of a values-based tension uncovered by this study, we begin to see how this problematizes developing and communicating a vision for change insofar as "vision" (singularized) is traditionally conceptualized [15] and [50] (pp. 68–82). As Kezar and Eckel [27] note, organizational change is most difficult when values-based differences are involved. We offer that change will likely be further complicated when the foundations of values-based differences are philosophical positions supported by robust arguments on either side. Since organizational change for sustainability at the university necessarily entails a host of assumptions regarding the form and function of education, the role of research, and the nature of public service [5,59], developing a vision of sustainability as an organizing principle for change risks marginalizing important and divergent perspectives to the detriment of diversity. This is not to argue for "anything goes" pluralism, but rather than change, agents seek out and engage with dissenting points of view in a critical manner. Therefore, transformation to a sustainable university should occur prior to any one vision of sustainability and be about developing spaces where meaningful and critical collaboration can take place. Rather than seeking to resolve tensions, we should seek to institutionalize

them in such a way that enables, and facilitates communication between conflicting conceptualizations of sustainability and the role of the university with respect to it.

The vision of a sustainable university alluded to above has the potential of transforming obstacles to change into opportunities for deep social learning and collaboration. Diversity is an important part of the contemporary university. Therefore, there will no doubt always be a multiplicity of perspectives around a contentious issue like sustainability. "Institutionalizing" tensions implies creating a space that harnesses this diversity. Encouraging a pluralistic vision of "sustainabilities", rather than a singular vision of sustainability reflects the commitment to developing critical education for sustainability [19,58], without succumbing to the hubris inherent to many sustainability change initiatives attempting to manufacture organizational behaviours for a future that we cannot know [16]. Implicit to this is a process oriented commitment to change based on sense-making, dialogue, and collaboration in the design, implementation and outcome of an organizational transformation process in lieu of traditional, linearly structured, outwardly imposed, planned change strategies. Many have noted the success of such approaches to change in other loosely-coupled, pluralistic contexts for promoting the sort of organizational learning that leads to effective organizational change [45–48]. The challenge, however, is that the necessary steps of relationship building and developing culturally appropriate collaborative strategies generally need to take place over the long term and are so context specific as to be difficult to reduce to sets of rough and ready recommendations [46]. Regardless, such approaches are becoming more commonplace in business, although we have found little evidence of this being applied to the context of change in higher education.

Exploring how to effectively institutionalize such an approach, framing it as a project for a sustainable university, could potentially offer a way of resolving many of longstanding barriers to change for sustainability within the institution. In addition, this could be exceedingly helpful for embracing the diversity of perspectives required to cope with sustainability related socio-ecological problems while avoiding liquidating the university to a particular vision of sustainability. Exploring what possibilities exist for "retro-fitting" pre-existing institutional structures in such a way as that could create a place within the organization for sustainability related education, and inquiry could not only help in developing a more reflexive vision of sustainability for the university, but also is itself a fruitful line for future inquiry.

5. Conclusion

Q method has proven to be a useful tool for exploring how university stakeholders conceptualize a sustainable university. Moreover, it has helped in identifying specific sites of tension and consensus within the institution. To our knowledge, no study to date has attempted to apply this method in exploring university stakeholders' conceptualizations of what a sustainable university can and should look like. It is our hope that our study will be an insightful addition to the body of knowledge seeking to understand the nature of institutional resistance to change for sustainability, and to potentially elucidate avenues by which to negotiate these barriers that may be transferrable to other institutions of higher education.

Q method could be exceedingly helpful for practitioners and researchers seeking to uncover not only conceptual barriers to broad reform for sustainability but potential avenues to navigate these

barriers as well. In this study, in particular, we identified barriers which we argue occur outside of sustainability and relate to what are most likely deep-seeded normative beliefs about the nature of the university. Owing to inherent challenges with transforming normative beliefs [27] and the potential that such a course of action could undermine academic freedom at the university, we suggest trying to find ways of institutionalizing such conflicts where they can ideally be transformed from conflicts to opportunities for social learning.

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Author Contributions

Paul Sylvestre and Tarah Wright designed the research methods for this paper. All authors discussed the results and implications and commented on the manuscript at all stages. Paul Sylvestre conducted all data collection and analysis and wrote the majority of the manuscript under the supervision of Tarah Wright and Kate Sherren.

Conflicts of Interest

The authors declare no conflict of interest.

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Appendix A

Table A1. List of numerated statements used in the Q sample and Factor Arrays.

No.	Statements	Groups			
		1	**2**	**3**	**4**
1	Provides incentives for students to participate in environmentally friendly activities	0	−1	−2	−1
2	Values and gives due recognition to the important contribution of traditional, indigenous, and local knowledge systems for sustainability	1	−2	0	−2
3	Promotes knowledge transfers in innovative ways in order to speed up the process of bridging gaps and inequalities in knowledge	2	2	0	−1
4	Protects and enhances civil society by training young people in the values which form the basis of democratic citizenship	4	−1	−3	4

Table A1. *Cont.*

5	Engages in community outreach programs that benefit the local environment	2	1	0	0
6	Provides support for individuals who seek environmentally responsible careers	0	−1	−1	−2
7	Incorporates life cycle assessment (LCA) and sustainable growth, introduces input/output accounting, applied to production processes, products, services, and strategic planning	−3	0	2	2
8	Attempts to ensure that the university graduates students with marketable skill sets that will enable them to find gainful employment upon leaving the institution	−1	1	−1	−3
9	Makes education for sustainability central to its educational mission	−2	−3	3	−2
10	Encourages critical thinking about sustainability issues	4	4	4	3
11	Installs solar panels on campus buildings	−1	1	−1	0
12	Creates a written statement of their commitment to sustainability	0	−2	0	1
13	Attempts to maintain a high quality of education while faced with budget constraints by reducing the number of departments in order to better fund remaining departments	−3	0	−1	−2
14	Incorporates ecological principles into campus land-use policies as a means of improving biodiversity and ecosystems goods and services on campus	0	0	1	1
15	Works with national and international organizations to promote a worldwide university effort toward a sustainable future	3	1	3	−1
16	Ensures that sustainability does not impinge upon the financial viability of the institution	−3	−1	−3	0
17	Maintains that research done on campus must include a summary of potential environmental issues that may be faced during the course of the experiment	−2	−1	−1	−1
18	Encourages students to participate in various volunteer activities around the community	1	0	−2	−2
19	Strives to reduce its ecological footprint	1	4	1	3
20	Establishes environmentally responsible purchasing practices	−1	2	1	2
21	Establishes socially responsible purchasing practices	0	−2	0	2
22	Strives to be carbon neutral	−1	2	2	0
23	Seeks to increase enrollment	−2	−3	−4	−3
24	Performs sustainability audits on the surrounding community	−2	−3	−2	−3
25	Focuses on sustainable transportation for students, faculty, and staff, as well as alternative fuel or hybrid technology for campus fleets	−2	2	1	0
26	Reuses campus waste	1	2	1	1
27	Makes social equity/accessibility for all students a primary concern	2	1	−2	0
28	Uses renewable and safe energy that may lead to decreased operating costs	0	3	3	3
29	Actively fosters and promotes greater degrees of cultural and political diversity throughout all levels of the university	1	−1	−2	1
30	Ensures that the university does not run a budget deficit	−4	3	−4	1

Table A1. *Cont.*

31	Emphasizes sustainability through campus services (e.g., accessibility center, counseling services)	−1	−2	0	−1
32	University stakeholders have a common understanding of the term sustainable development	0	−2	0	2
33	Provides monetary reimbursement for individuals taking environmental courses	−2	−3	−3	−4
34	Creates partnerships with government working toward sustainability	2	2	2	0
35	Creates partnerships with industry working toward sustainability	2	0	3	−1
36	Actively promotes composting and recycling on campus	1	3	0	1
37	Creates partnerships with NGOs working toward sustainability	2	1	2	−1
38	Consults students on their opinion of sustainability	0	−1	−1	2
39	Promotes interdisciplinary networks of environmental experts at the local, national, regional, and international levels, with the aim of collaborating on common environmental projects in both research and education	3	1	1	1
40	Recognizes campus-wide green building guidelines and green building design for new and existing buildings	1	3	2	4
41	Incorporates environmental knowledge into all disciplines at all levels of study	−1	−2	2	−2
42	Promotes experiential learning through measures such as arranging opportunities for students to study sustainability issues in their surrounding community	3	0	1	2
43	Each department within the university must create their own written statement of their commitment to sustainability	−3	−4	−1	−3
44	Ensure that sources of income outside of tuition and government grants, therefore having a greater degree of self-reliance	−1	0	−2	2
45	The university adopts a more active advocacy type role within society concerning issues of sustainability	3	0	4	0
46	Establishes policies that allow for the granting of tenure to faculty based in their knowledge of and work in sustainability	−4	−4	−3	−4