

An empirical assessment of administration and planning activity and their impact on the realization of sustainability-related initiatives and programs in higher education

Elizabeth Semeraro and Neil M. Boyd
College of Management, Bucknell University, Lewisburg, Pennsylvania, USA

Assessment of
administration
and planning
activity

1311

Received 7 March 2016
Revised 19 December 2016
31 March 2017
17 April 2017
Accepted 24 April 2017

Abstract

Purpose – Administrators in higher-education settings routinely create planning documents that help steer the organization in mission-centric ways. In the area of sustainability planning, strategic plans, sustainability plans and climate action plans are the most common methods used. The purpose of this study is to evaluate if specific forms of planning predict sustainability outcomes.

Design/methodology/approach – This question was evaluated via an empirical archival study of the AASHE STARS database in relation to planning, administration and governance credits and criteria to determine if specific forms of planning were predictive of sustainability implementation outcomes in the categories of Education and Research, Operations, Diversity and Affordability, Human Resources, Investment, Public Engagement and Innovation.

Findings – Findings support the notion that climate action plans were most predictive of achieving sustainability outcomes, and strategic plans were best able to predict educational outcomes.

Practical implications – These findings have important implications for the design and execution of sustainability planning processes in higher-education institutions.

Originality/value – The academic literature contains relatively few empirical studies that demonstrate the capacity of planning on the realization of sustainability outcomes.

Keywords Strategic planning, Sustainability plans, AASHE STARS, Archival study, Climate action plans

Paper type Research paper

Introduction

A cultural and value shift has arrived in higher education, and institutions are seeking ways to adopt sustainable change and lead the movement into a sustainable future (Corcoran and Koshy, 2010; Cusick, 2008). Situated within a higher education context, Dunn and Hart-Steffes (2012) explain that sustainability “includes a holistic integration of social and economic equity along with an environmental focus”. This paper explores how social responsibility for a sustainable future might be quantified in the evaluation and efficacy of planning processes to predict sustainability outcomes within higher education contexts.

This project was funded by the Jamie Hendry Sustainability Studies Development Fund at Bucknell University.



International Journal of
Sustainability in Higher Education
Vol. 18 No. 7, 2017
pp. 1311-1330
© Emerald Publishing Limited
1467-6370
DOI 10.1108/IJSH-03-2016-0047

The United Nations Educational, Scientific and Cultural Organization (UNESCO) and the United Nations Environmental Programme (UNEP) first brought sustainability to the attention of higher education institutions in 1975. In recent times, industry entities such as the Association for the Advancement of Sustainability in Higher Education (AASHE), and the American College and University President's Climate Commitment (ACUPCC), formed to assist higher education institutions in their path to sustainability. In doing so, they particularly recognize the need for administrative tools in higher education institutions to consistently measure, report and compare sustainability progress within and across institutions in the USA and abroad (Cebrián *et al.*, 2013; Lidstone *et al.*, 2015; Fonseca *et al.*, 2011, Rauch and Newman, 2009a; Urbanski and Filho, 2015).

System-wide frameworks, a prominently recommended approach to sustainability, have typically originated from a singular environmental focus; however, this strategy recognizes the need for interdisciplinary action to achieve successful implementation (Littledyke *et al.*, 2013; Mcmillin and Dyball, 2009; Posner and Stuart, 2013). Orr (1994) calls for institutions that are living, breathing models of a wholly encompassing sustainable education: a kind of institutionalized education that moves beyond the bounds of the classroom to embrace a hands-on, restorative education model (Orr, 1994). Orr (1994) suggests that universities might be ranked on consumption metrics, operational metrics (such as facilities, purchasing and materials), ecological literacy in the curriculum, sustainable finances and investment decisions and alumni impact measures that focus on ecological footprints. Creighton (1998) describes universities that have made changes towards sustainability, although the focus on greening the educational system is fairly environmentally based. Creighton (1998) attempts to show university leadership what changes are needed and offers prescriptive steps to achieve them. Orr and Creighton are early champions for interdisciplinary action and top-down, system-wide change to achieve sustainability.

However, as Velazquez *et al.* (2005) propose in their work based out of Mexico, organizational structure is a consistent barrier to effective sustainability implementation and difficult to quantify for organizations such as the United Nations Decade of Education for Sustainable Development. As Bero *et al.* (2012) acknowledge, the problems of heterogeneity across universities in creating comprehensive frameworks that can be replicated successfully at other institutions is a problem. Thomashow (2014) promotes nine elements to achieve sustainability at a higher education campus in a case study of Unity College. However, research data in the literature has not progressed much beyond single case-study material (Clarke, 2006; Moore 2005; Hansen *et al.*, 2011), and this further adds to the difficulty of validated prescriptions of what administrators should do to advance a sustainability agenda in their institutions.

In higher education, sustainability-based changes have manifested in a myriad of institutional levels, from large culture shifts, to changes in the curriculum, to new programming ideas. Many universities have changed their curricula, such as adding new classes, faculty, academic specialties and educational programming, exploring research opportunities and challenging the traditional classroom model to include broader experiential learning contexts (Domask, 2007; Jerrams *et al.*, 2008; López, 2013; Savelyeva and McKenna, 2011). Higher education has also critically engaged with on-campus operations, such as introducing new building standards, renovating existing buildings to meet LEED metrics, introducing or improving recycling programs, critically examining environmental resource consumption in departments such as residential life and dining services and scrutinizing carbon dioxide production and consumption cycles (Berg, 2013; Brodie, 2012; Campbell, 2008; Kennedy, 2001; Payant, 2013; Rauch and Newman, 2009b;

Zain *et al.*, 2013). Actions specific to climate change strategy have emerged as well (Atherton and Giurco, 2011; Rauch and Newman, 2009b, Owen *et al.*, 2013).

Many administrative responses have been documented in the march towards sustainability, such as signing commitments like the ACUPCC, creating committees and new governance structures and policies, garnering greater attention in finances through capital budget requests and green revolving funds (Brown and Hamburger, 2012; Shriberg, 2002). Notably, while sustainability transitions have focused on top down and grassroots change strategies, some consideration has been placed on the potential of the faculty and staff to be change agents in the university setting in studies of Canadian and US universities (Brinkhurst *et al.*, 2011).

While the academic research in this area contains significant studies and observations regarding curriculum design and the interdisciplinary nature of sustainability, much less attention has been focused on the conditions, structures and processes that lead to effective system-wide change in higher education institutions. Therefore, many questions remain regarding how to effectively design organizational strategies that directly lead to effective system-wide sustainability-related change.

Strategy

In relation to strategy, the academic literature mostly contains descriptive studies of multi-stakeholder strategic planning processes and the development of new planning models. For example, Hansen *et al.* (2011) demonstrated how Macalester College engaged over 400 students, staff and faculty in sustainability strategic planning. The college used a highly participatory approach that generated a strategic sustainability plan with specific and measureable priorities. Their findings indicated that a series of factors are critical in a strategic planning cycle including constructive participation, multimodal communication methods, the importance of staff capacity, leveraging college resources and the importance of connections to senior college leaders. Similarly, Atherton and Giurco (2011) shared a strategy process at the University of Technology in Sydney (Australia) that involved staff/student consultation to inform the development of objectives, targets and actions for each strategy. Their work provided information on how to engage with staff and students to create a shared vision that would reflect on tangible objectives, targets and actions. Other descriptive work also shows how to implement multi-stakeholder strategy approaches in system-wide thinking about sustainability education and its integration with organizational sustainability goals (Moore, 2005). In addition, a couple of studies propose new models for strategic planning. Clark (2006) challenged a traditional strategy approach in relation to an environmental management system (EMS) cycle and offered a new model based on practical realities at Dalhousie University using Mintzberg's (1994, 1978) emergent strategy theory and Andrews' (1987) notion that planning and implementation are interrelated phases. In short, their findings supported the idea that EMS cycles do not occur in distinct phases and that strategy processes need to reflect a non-linear form of change. In addition, Adomssent *et al.* (2007) published a trans-disciplinary model that disseminates the "Lunenburg Approach", a system that establishes collaborations between sustainability activities within universities, higher education policy working groups and government administrators in Germany. Their work suggests that the creation of a trans-disciplinary model is critical if academic organizations are to realize significant advances in sustainable development.

Planning

Within the sphere of organizational strategy processes, planning is a core function that administrators can execute in relation to sustainability. Strategic plans, sustainability plans,

climate action plans and others are possible mechanisms by which leaders might try to organize and execute sustainable intervention. In a study of German corporations, [Schaltegger et al. \(2012\)](#) suggest that increased knowledge of sustainability management tools may promote greater application and dissemination of the tools and increase sustainable development as a result.

However, the academic literature in higher education contains relatively few empirical studies that demonstrate the capacity of planning on the realization of sustainability outcomes. Like the strategy literature, much of what exists is descriptive in nature. For example, [Cleaves et al. \(2009\)](#) describe the recent history of climate action planning at the University of New Hampshire (UNH). They articulated that successful climate action planning includes campus-wide stakeholder involvement, commitment to sustainability across the institution, careful planning and partnership development that directly link to the mission and identity of the University. In the case of UNH, they created a partnership with Clean Air-Cool Planet (CA-CP) to produce a greenhouse gas (GHG) inventory tool that was customized to their University. Similarly, [Owen et al. \(2013\)](#) outlined a unique six-step process for the inclusion of climate change adaptation goals and strategies in a University Climate Change Plan at Dalhousie University. Their planning process was designed to identify vulnerabilities and risks, and then, strategies based on risk levels associated with vulnerabilities were identified.

Beyond single descriptive case-study planning articles, only one study exists in the literature that attempted to evaluate planning across multiple institutions ([Swearingen, 2014](#)). This descriptive study assessed how sustainability plans are used in US institutions of higher education. Content analysis showed that campus sustainability plans are extremely diverse and that environmental issues are more prominent than social equity issues. Moreover, campus operations gained the most attention compared to academic or administrative issues, and most US campuses have taken an inclusive campus-wide approach to developing their sustainability plans.

The present research centers on the Association for the Advancement of Sustainability in Higher Education (AASHE) comprehensive planning tool, Sustainability Tracking, Assessment and Rating system (STARS). AASHE STARS attempts to quantify university attempts to move towards a sustainable ideal education model, exploring and researching frameworks that prioritize sustainability. In the literature, early research has shown a few key outcomes of the STARS metric system in higher education institutions. [Urbanski and Filho \(2015\)](#) find Doctorate and Master's degree granting institutions are proportionately the largest section of reporting institutions and that certain types of institutions have made greater progress in implementing sustainability-based changes than others. In the present study, the authors research two data sets in STARS: all reporting institutions, and private liberal arts institutions, exploring the ways that more recent STARS versions have expanded to fit an international framework. Notably, [Urbanski and Filho \(2015\)](#) find that STARS institutions struggled to receive high scores in areas related to climate change.

There are a number of comparable tracking tools within and outside of higher education within and beyond the USA. For example, the Global Reporting Initiative, United Nations (UN) Millennium Development Goals, UN Commission on Sustainable Development and the US Environmental Protection Agency Report on the Environment all have sustainability tracking metrics ([Clinton, 2011](#)). In urban planning, sustainable development is assessed through the Leadership in Energy and Environmental Design (LEED) certification, the Building Research Establishment Environmental Assessment Method (BREEAM), Environmental Sustainability Index (ESI), Dashboard of Sustainability (DS), Genuine Progress Indicator (GPI), Index of Sustainable Economic Welfare, City Development Index,

among many others (Berardi, 2013; Mori and Christodoulou, 2012). These indices chiefly arose out of specific needs to measure a singular aspect of sustainability in a certain social and political climate, although most have sought to achieve widespread adaptability beyond the initial scope of focus.

Many indexes, such as the European BREEAM, break down assessment criteria into categories, such as Climate and Energy, Resources, Place Shaping, Transport and Movement, Ecology and Biodiversity (Berardi, 2013). Further, Mori and Christodoulou (2012) find that while these indices all consider some aspects of social, environmental and economic factors, there is no one index that considers all of these factors as well as external impacts to fully encompass triple bottom line sustainability. Comparisons across the cultural and geopolitical borders make the ideal index difficult to uniformly assess and measure. Finally, within higher education in the USA, the Sustainable Endowments Institution College Sustainability Green Report Card existed until 2011, while the Princeton Review Green Campus rating continues to reside alongside AASHE STARS (Clinton, 2011). These sustainability assessment systems evaluate performance based on parameters that compare performance against standard benchmarks (Berardi, 2013).

Our review found that the academic literature on planning is sparse, and empirical data that investigate the efficacy of planning to predict the achievement of sustainability outcomes are non-existent. Therefore, the authors designed the current study to evaluate if *specific forms of planning predict sustainability outcomes*. This question was evaluated via an empirical archival study of the AASHE STARS database in relation to Planning, Administration and Engagement credits and criteria to determine if specific forms of planning were predictive of sustainability implementation outcomes in the categories of Education and Research, Operations, Diversity and Affordability, Human Resources, Investment, Public Engagement and Innovation.

Method

We began by attempting to determine an appropriate sample for the study by investigating the 662 institutions that had registered to use the AASHE's STARS reporting tool. Ultimately, we collected data from 304 universities that had completed and submitted a Version 1 report and received a rating and score. In addition, because we were interested in assessing private liberal-arts institutions, in addition to institutions in general, we determined that there are 180 Tier 1 liberal arts colleges and 58 Tier 2 liberal arts colleges (US News and World Reports). Of these colleges, 213 are private institutions and 48 institutions in this group participated in STARS reporting.

In the STARS reporting scheme, each school is scored and rated by submitting a report detailing sustainability-related initiatives in three main areas: Education and Research, Operations and Planning and Administration and Engagement (PAE). The average of the three major category scores, plus up to four points in innovation credits, determines each university's overall score and rating (Table I). Within each area, subcategories are measured and they comprise a series of credits. Each credit has specific criteria to meet to earn the full points of the credit. Each of the three categories is designed to be out of 100 points; however, some universities do not qualify for all credits. The sum of all the points earned in each category divided by the amount of qualifying points determines a category score.

Results

An initial analysis was conducted to understand basic STARS reporting data across institutions. Table II shows that the overall STARS score for all institutions was 51.54 ($S = 12.62$) and within private liberal arts schools the average overall score was 50.56

(S = 10.61). The STARS credits are broken down into three main categories: Education, Operations, Planning, Administration and Engagement. Within Education, credits are evaluated by the subcategories co-curricular education, curriculum and research. Operations subcategories include buildings, climate, dining services, energy, grounds, purchasing, transportation, waste and water. Planning, Administration and Engagement (PAE) subcategories will be discussed in depth in the following pages. Innovation credits are

1316

Table I.
AASHE STARS
rating level by
minimum score
required

Rating level	Minimum score required
Bronze	25
Silver	45
Gold	65
Platinum	85
STARS reporter	*Institutions that wish to use STARS and submit data publicly, but are not pursuing a rating

Source: AASHE STARS technical manual version 1.2 (2012)

Table II.
AASHE STARS
average scores and
standard deviation
by major category

Major category	Overall ^a		Private Liberal Arts ^b	
	Mean	SD	Mean	SD
<i>All institutions</i>	51.54	12.62	50.49	10.63
Education	52.03	17.39	50.09	19.04
Operations	38.10	11.08	39.05	11.05
PAE	56.87	13.53	56.55	9.76
Innovation	2.54	1.67	1.93	1.75
<i>Gold</i>	69.49	4.13	60.50	3.25
Education	73.41	9.65	76.20	13.56
Operations	49.72	6.41	46.60	3.32
PAE	73.20	6.77	70.71	5.52
Innovation	3.88	0.53	4.00	0.00
<i>Silver</i>	52.53	5.28	52.36	5.26
Education	52.56	10.98	51.18	13.32
Operations	39.10	7.77	42.56	8.62
PAE	57.71	8.71	57.20	7.01
Innovation	2.74	1.53	2.32	2.27
<i>Bronze</i>	35.11	4.76	36.82	3.61
Education	33.70	12.3	34.32	18.89
Operations	26.62	8.87	26.48	9.21
PAE	41.93	8.94	48.45	8.44
Innovation	1.03	1.39	0.60	0.52

Notes: Data collected here excludes colleges that reported using STARS 2.0. The most common version used in this sample is 1.2. Institutions that have completed more than one report were only counted by their most recent report. Scores are based on the percentage of points earned in each category, except Innovation, which is scored out of four points. PAE refers to the Planning, Administration and Engagement category. The sample is 284 participating institutions. For private liberal arts, the sample size is 39 participating institutions. ^aThis category includes all AASHE STARS members that have completed a report and received scores. ^bThe Private Liberal Arts column includes all private liberal arts institutions as classified by US News that have completed and submitted a STARS report

designed to award points for significant initiatives not covered by any currently existing STARS credits. Universities may earn up to four innovation credits, which increase the overall score by the amount of points earned.

Across the three main categories and innovation credits, private liberal arts schools generally scored similarly to all universities. One notable exception was for gold rated institutions, where private liberal arts schools scored 8.99 points less than the overall group. While the overall highest scoring category for all institutions and private liberal arts schools was PAE, it is important to note that for gold rated schools, the highest scoring category was Education. This suggests that the most common difference between gold or a lower rating is a strong commitment to sustainability outcomes within the various areas evaluated in the Education category.

Next, because our study focused on planning activity, the authors evaluated subcategory scores for institutions within the PAE category (Table III). The results of the coordinating and planning subcategory will be discussed in the following pages. Examples of possible credits within each category include: measuring campus diversity culture, staff professional development in sustainability, positive sustainability investments and inter-campus collaboration on sustainability. The results indicate a similarity in scores between all institutions and private liberal arts. Gold institutions generally have strong scores in

Planning, administration, and engagement subcategories	Overall		Private liberal arts	
	Mean	SD	Mean	SD
<i>All institutions PAE</i>	56.87	13.53	56.55	9.76
Coordination and planning	80.94	20.25	76.73	20.97
Diversity and affordability	85.08	21.04	82.50	19.21
Human resources	62.46	23.15	55.82	22.66
Investment	12.56	19.32	13.74	18.29
Public engagement	50.13	20.25	58.05	14.47
<i>Gold</i>	73.20	6.77	70.71	5.52
Coordination and planning	97.75	6.89	100	0
Diversity and affordability	95.54	9.02	88.00	16.44
Human resources	83.81	14.49	76.20	14.00
Investment	24.82	22.35	17.30	28.59
Public engagement	67.71	13.06	66.39	15.84
<i>Silver</i>	57.71	8.71	57.20	7.01
Coordination and planning	82.69	17.37	79.33	18.46
Diversity and affordability	87.58	16.36	80.22	20.55
Human resources	62.89	17.39	58.53	16.99
Investment	11.36	18.58	12.50	18.18
Public engagement	50.84	17.25	58.84	11.78
<i>Bronze</i>	35.11	4.76	36.82	3.61
Coordination and planning	63.69	20.10	57.57	17.65
Diversity and affordability	71.40	28.73	85.45	17.63
Human resources	44.35	24.56	38.84	28.21
Investment	5.24	12.71	9.43	16.93
Public engagement	34.49	18.76	52.09	18.59

Table III.
Planning,
administration and
engagement
subcategories means
and standard
deviations

Notes: Institutions that did not qualify for any credits within the subcategory received a 0/0, and were included in the mean and standard deviation calculations. For the Overall group, the size studied is 284 institutions. For private liberal arts, the sample size is 39 participating institutions

coordination and planning, diversity and affordability and human resources. The strength of the scores in these three categories appears to be the distinguishing factor between silver and gold rated institutions within PAE. The prominence of high scores for Gold institutions in these three categories suggest that organizations related to coordination and planning, diversity and affordability and human resources may be early leaders or have an ease of initiating sustainability outcomes. Further, it may suggest that common barriers to successful initiatives within investment and public engagement exist such that even high scoring institutions did not perform well in these areas. Overall, invest was the weakest subcategory evaluated in PAE.

Planning and sustainability outcomes

The primary research question for the present study was to test if specific forms of planning could predict sustainability implementation outcomes in different university areas represented by credits in the STARS report card. The Coordination and Planning subcategory measures sustainability coordination (the presence of a sustainability governing agent or body) and the presence of various forms of planning (strategic, physical campus, sustainability and/or climate action). Therefore, the authors were able to test if the presence of forms of planning (and a coordinating mechanism) were related to sustainability outcomes that were measured in the AASHE STARS system. Before those results are discussed, it is important to inform the readers about each of these Coordination and Planning credits.

According to the AASHE STARS Version 1.2 Technical Manual (2012), the sustainability coordination credit awards institutions with “active committees, offices, or coordinators” that focus on implementing triple bottom line sustainability across the entire institution. A majority of the institutions studied earned this credit. AASHE STARS regards the strategic plan as “the premier guiding document” for an institution and in this capacity effects change in institutional priorities, policies and budgeting. This plan must include sustainability as a high priority and two points are earned for each of the three core pillars discussed in the plan (environmental, social, economic). Next, the STARS technical manual describes the physical campus plan as the guiding document for the “development and maintenance” of the physical campus. It may be included as the foundation of the plan or a stated high goal or priority within the plan. Institutions can earn four points for this credit and partial credit is not awarded. The sustainability plan is a “roadmap for achieving sustainability” with “measurable goals with corresponding strategies and timeframes” that was formed through input from the campus community. Institutions can earn three credits for the inclusion of this plan, and partial credit is not available. Finally, according to the technical manual, the climate action plan credit awards universities who have “developed a formal strategy to reduce their greenhouse gas emissions”. Because there are multiple ways to reduce emissions, the climate action plan may help with university sustainability goals as well as emissions goals. With no partial credit, two points are available for this plan.

Within the AASHE Stars Version 1.2 measurement system, three of the planning methods (physical campus plans, sustainability plans and climate action plans) allow recipients to either receive credit or not (even though various point values are allocated). Because of the dichotomous nature of these factors, a series of independent *t*-tests were computed to compare if differences existed on sustainability outcomes for those institutions who implemented those types of plans compared to those who did not. Findings from the analysis are displayed in [Table IV](#).

The findings confirmed that all planning types tend to be associated with higher outcome scores, although it should be noted that climate action planning was most often

Planning and sustainability outcomes	Yes	No	T	p
<i>Physical campus plans</i>				
Education and research	53.94 (17.34)	43.18 (13.82)	-4.123	<0.001
Operations	39.29 (10.84)	32.67 (10.83)	-3.935	<0.001
Diversity and affordability	68.00 (40.48)	42.65 (41.32)	-4.023	<0.001
Human resources	87.37 (19.12)	74.68 (26.32)	-3.969	<0.001
Investment	64.63 (23.70)	54.07 (18.50)	-2.982	0.003
Public engagement	13.37 (19.93)	7.89 (15.60)	-1.840	0.067
Innovation	51.97 (19.26)	41.50 (21.89)	-3.418	<0.001
<i>Sustainability plans</i>				
Education and research	54.58 (16.99)	46.33 (17.02)	-3.762	<0.001
Operations	39.70 (10.83)	34.51 (10.85)	-3.712	<0.001
Diversity and affordability	67.70 (40.46)	54.02 (43.28)	-2.564	0.011
Human resources	87.59 (18.70)	79.44 (24.72)	-3.048	0.003
Investment	67.49 (20.90)	51.18 (24.07)	-5.768	<0.001
Public engagement	13.43 (19.89)	10.61 (17.92)	-1.132	0.258
Innovation	51.77 (20.05)	46.46 (20.33)	-2.044	0.042
<i>Climate action plans</i>				
Education and research	55.68 (16.90)	44.00 (15.77)	-5.485	<0.001
Operations	41.54 (9.54)	30.49 (10.47)	-8.731	<0.001
Diversity and affordability	73.45 (37.88)	41.48 (41.67)	-6.363	<0.001
Human resources	89.05 (16.40)	76.33 (26.83)	-4.894	<0.001
Investment	67.31 (20.83)	51.77 (24.48)	-5.488	<0.001
Public engagement	14.30 (20.37)	8.73 (16.22)	-2.263	0.024
Innovation	53.68 (19.74)	42.30 (19.24)	-4.522	<0.001

Table IV.
Types of planning
and sustainability
outcomes for all
AASHE stars
institutions

Notes: Physical Campus Plan Sample Size: Yes = 225, No = 51; Sustainability Plan Sample Size: Yes = 195, No = 87; Climate Action Plan Sample Size: Yes = 194, No = 88; Numbers in parentheses are standard deviations. Degrees of freedom for *t*-tests: Physical Campus Plan = 274, Sustainability Plan and Climate Action Plan = 280

indicative of higher scores across the outcome factors, while sustainability planning was the least able to produce significant differences on outcome variables. Consistent with earlier descriptive findings, various planning methods had the most difficulty in being linked to outcomes in the areas of investments, public engagement and innovation.

Next, **Table V** shows Pearson Correlations between Coordination and Planning factors and sustainability outcomes for all institutions. The findings showed that all of the forms of planning were correlated to the implementation of sustainability outcomes, and climate action plans demonstrated the strongest correlations across all implementation categories. Sustainability coordination did not correlate with any outcomes, but this was likely because all but two institutions in the entire sample earned the sustainability coordination credit. Interestingly, the climate action plan's strongest correlation was with the Operations category; however, on average Operations was the lowest scoring category of the three evaluated in the STARS report (**Table II**). Given that a climate action plan's focus most strongly affects Operations credit scores, the strong correlation appears appropriate. Most of outcomes evaluated demonstrated a correlation to all four of the plans, with the exception of diversity and affordability and investment. As found in **Table III**, Investment was one of the lowest scoring categories within PAe, so the absence of significant correlations is not surprising. Diversity and affordability did not have a correlation with a strategic plan. This may be explained by the relatively new importance of diversity and affordability as part of a

long-term sustainable institution and as such may not be reflected in a university’s strategic plan. Likewise, the significant correlation with the climate action plan may be born out of the era of ACUPCC commitments and an increasing awareness of sustainability’s three main pillars (people, planet, profit). This table is telling of current institutional priorities as they are represented in the various forms of higher education planning.

Next, the same analysis was conducted for private liberal arts institutions. **Table VI** shows results of independent *t*-testing that compared if differences existed on sustainability outcomes for those institutions that implemented various types of plans compared to those that did not. Similar to the analysis for all institutions, climate action plans were most often indicative of higher scores across the outcome factors. However, caution should be exercised when interpreting these analyses because of the low sample size in general, and specifically for institutions who did not report completing these plans.

Next, Pearson correlations were computed between Coordination and Planning factors and sustainability outcomes for all institutions. Similar to all institutions in **Table V**, climate action plans correlated with more outcomes compared to other forms of planning (**Table VII**).

While all institutions had a high prominence of significant correlations, there are noticeably less correlations for this category. This may be attributed to the smaller sample size or perhaps something disadvantaging private liberal arts institutions from successfully correlating these types of planning documents to outcomes. Further research is needed to investigate what the difference may be. In **Table V**, the climate action plan does have the most correlations, yet not as prominently a measure of successful outcomes for the private liberal arts. However, compared to the other three plans tested for this study (and available for credit on STARS), it is the most successful predictor of sustainable outcomes for this population.

Despite having less significant correlations, those that do appear are quite strong. Consistent with the data for all institutions, the strongest correlation was between a climate action plan and Operations. The climate action plan also correlated to outcomes in human resources and innovation. Another notable correlation is between the strategic plan and Education and Research. This is perhaps another instance of planning revealing institutional priorities. A strong emphasis on Education and Research within a higher education institution’s strategic plan is hardly surprising; this strong correlation suggests that early adapters of the sustainability movement may be located on the academic side of institutional planning.

Table V.
Correlations between coordination and planning factors and sustainability outcomes in all AASHE STARS institutions

Outcomes	Sustainability coordination	Strategic plan	Physical campus plan	Sustainability plan	Climate action plan
Education and research	0.110	<i>0.291*</i>	<i>0.237*</i>	<i>0.224*</i>	<i>0.316*</i>
Operations	0.025	<i>0.149</i>	<i>0.231*</i>	<i>0.218*</i>	<i>0.463*</i>
Diversity and affordability	-0.020	0.036	<i>0.233*</i>	<i>0.183*</i>	<i>0.284*</i>
Human resources	-0.005	<i>0.218*</i>	<i>0.177*</i>	<i>0.327*</i>	<i>0.313*</i>
Investment	0.049	0.116	0.100	0.065	<i>0.132</i>
Public engagement	0.022	<i>0.191*</i>	<i>0.202*</i>	<i>0.123</i>	<i>0.262*</i>
Innovation	-0.024	<i>0.149</i>	<i>0.229*</i>	<i>0.154*</i>	<i>0.355*</i>

Notes: Italic are sig. at 0.05 level. *are significant at 0.01 level. The sample size varies from 274-284, depending on each institution’s ability to qualify for a credit

Planning and sustainability outcomes	Yes	No	T	p	Assessment of administration and planning activity
1321					
<i>Physical campus plans</i>					
Education and research	49.83 (18.71)	47.17 (18.14)	-0.339	0.737	
Operations	38.07 (11.98)	42.18 (7.58)	0.859	0.396	
Diversity and affordability	50.00 (45.64)	28.57 (26.72)	-1.184	0.245	
Human resources	87.48 (19.40)	72.73 (20.46)	-1.419	0.165	
Investment	55.65 (23.94)	54.19 (13.13)	-0.112	0.991	
Public engagement	12.01 (17.13)	15.89 (23.33)	0.427	0.672	
Innovation	56.34 (13.84)	64.83 (13.55)	1.459	0.154	
<i>Sustainability plans</i>					
Education and research	53.05 (18.02)	46.09 (20.17)	-1.148	0.258	
Operations	41.31 (11.62)	35.99 (9.74)	-1.529	0.135	
Diversity and affordability	53.26 (44.15)	41.18 (43.25)	-0.863	0.393	
Human resources	86.64 (16.79)	78.61 (21.94)	-1.313	0.197	
Investment	60.52 (18.29)	46.77 (24.67)	-2.028	0.050	
Public engagement	13.25 (16.49)	15.10 (21.77)	0.307	0.771	
Innovation	58.59 (15.16)	58.37 (14.86)	-0.045	0.965	
<i>Climate action plans</i>					
Education and research	53.60 (16.37)	43.59 (22.40)	-1.619	0.114	
Operations	43.05 (8.11)	31.61 (12.19)	-3.556	<0.001	
Diversity and affordability	62.50 (43.16)	21.42 (30.79)	-3.147	0.003	
Human resources	82.94 (17.75)	83.77 (22.61)	-0.128	0.899	
Investment	59.95 (18.30)	44.89 (25.58)	-2.157	0.037	
Public engagement	14.60 (17.47)	12.98 (21.38)	-0.260	0.796	
Innovation	61.67 (12.45)	52.60 (17.46)	-1.906	0.064	

Notes: Physical Campus Plan Sample Size: Yes = 28, No = 7; Sustainability Plan Sample Size: Yes = 23, No = 17; Climate Action Plan Sample Size: Yes = 26, No = 14; Numbers in parentheses are standard deviations. Degrees of freedom for *t*-tests: Physical Campus Plan = 33, Sustainability Plan and Climate Action Plan = 38

Table VI. Types of planning and sustainability outcomes for AASHE stars private liberal arts institutions

Outcomes	Strategic plan	Physical campus plan	Sustainability plan	Climate action plan
Education and research	<i>0.435*</i>	0.049	0.206	0.246
Operations	0.028	-0.136	0.216	<i>0.530*</i>
Diversity and affordability	-0.280	0.250	0.193	-0.009
Human resources	0.115	0.029	0.300	<i>0.346</i>
Investment	0.092	-0.064	-0.074	0.057
Public engagement	-0.146	-0.252	0.015	0.293
Innovation	0.174	0.211	0.125	<i>0.470*</i>

Notes: Italic are significant at 0.05 level. *are significant at 0.01 level. The sample size varies from 34-39 institutions, depending on each reporting institution's ability to qualify for each of the credits (this N likely created some Type II errors for specific relationships, but overall the findings are able to demonstrate patterns of association between planning forms and outcomes). Sustainability coordination was not included because all institutions earned the credit

Table VII. Correlations between coordination and planning factors and sustainability outcomes in AASHE STARS private liberal arts institutions

Next, stepwise multiple-regression was computed to determine if coordination and planning factors were able to predict sustainability implementation outcomes (Table VIII). Although various forms of planning were able to predict outcomes, a climate action plan was consistently the best predictor of sustainability implementation. This is consistent with the Pearson correlations in Tables V and VII. In terms of human resources implementation, several forms of planning significantly predicted outcomes.

Climate action plans were able to best predict Operations outcomes and reaffirms the findings from Tables V and VII, but fairly robust r-squares were found for several sustainability outcomes. There is a clear and strong relationship between having a climate action plan and sustainability outcomes in Operations. Likely, this is because of the nature of how institutions reduce their carbon emissions footprint. This may demonstrate that institutions with a climate action plan are committed to sustainability values and have taken steps to become more sustainable in their operations. There may be a trend that early adopters of a climate action plan have had sustainability as an institutional priority for longer than those who did not adopt a climate action plan when the ACUPCC was first introduced and as such are showing greater sustainability outcomes in areas such as operations. It is telling that the climate action plan accounted for significant various on a number of outcomes. Only for human resources did a different plan account for a larger variance.

Actions	β	R	R^2	ΔR^2
<i>Education and research</i>				
Climate Action Plan	0.094*	0.313*	0.098*	0.098*
Strategic Plan	0.159*	0.407*	0.166*	0.068*
Physical Campus Plan	0.190*	0.447*	0.199*	0.034*
<i>Operations</i>				
Climate Action Plan	0.212*	0.463*	0.215*	0.215*
Physical Campus Plan	0.249*	0.505*	0.255*	0.040*
<i>Diversity and affordability</i>				
Climate Action Plan	0.086*	0.299*	0.089*	0.089*
Physical Campus Plan	0.130*	0.370*	0.137*	0.047*
<i>Human resources</i>				
Sustainability Plan	0.102	0.325	0.105	0.105
Climate Action Plan	0.156	0.403	0.162	0.057
Strategic Plan	0.171	0.424	0.180	0.017
Physical Campus Plan	0.180	0.438	0.192	0.012
<i>Public engagement</i>				
Climate Action Plan	0.072*	0.275*	0.076*	0.076*
Physical Campus Plan	0.104*	0.333*	0.111*	0.035*
Strategic Plan	0.121*	0.361*	0.130*	0.019*
<i>Innovation</i>				
Climate Action Plan	0.122*	0.354*	0.122*	0.122*
Physical Campus Plan	0.166*	0.415*	0.166*	0.044*

Table VIII.
Stepwise regression results between coordination and planning factors and sustainability actions in all STARS institutions

Notes: Bold are significant at 0.05 level. *are significant at 0.01 level. Investment did not have any significant predictors. The sample size varies from 274-284, depending on each institution's ability to qualify for a credit

Physical campus plans were also able to account for significant variance on a number of outcomes. Outcomes in Operations seem reasonable, as that is the credit area most commonly associated with the factors that go into a campus plan; however, this plan also accounted for variance in areas such as Education and Research and diversity and affordability. Institutions that earn the credit for including sustainability at a high level within their campus plan may rank sustainability as a high priority in other areas of the institution as well. Earning the credit for a physical campus plan may be a signal of high success in creating sustainability outcomes in a number of institutional areas, as demonstrated by its presence in predicting variance for all six of the outcomes tested.

Next, the same analysis was conducted for private liberal arts institutions (Table IX). None of the forms of planning were able to predict diversity and affordability, human resources, investment and public engagement outcomes. This may be accounted by the smaller sample size compared to all institutions, or there may be some other factor that limits private liberal arts institutions from scoring as well as the other group. Further research is needed to determine exactly what this difference may be. However, in agreement with findings for all institutions, climate action plans consistently predict outcomes in Operations. As the climate action plan is focused on reducing greenhouse gas emissions, the authors are not surprised at the consistent correlation with outcomes in Operations. Further research may investigate what particular subcategories and credits of Operations are causing this strong correlation. For the purposes of this paper, the significance of this consistent correlation lies in this particular planning document's ability to predict strong outcomes in the Operation credits.

As will be discussed further in the following pages, the authors postulate that early leaders of the sustainability movement come from an environmentally focused plan spurred by the implementation of the ACUPCC. Universities who adopted carbon emissions reduction plans may be early adopters of sustainability in Operations because of the multitude of ways to reduce emissions by greening practices. The early adoption of sustainable operations may prompt these same institutions to adopt a holistic approach to sustainability, as explained by climate action plan's correlation to a number of outcomes outside of Operations. Because in the private liberal arts group, the climate action plan fails to consistently predict outcomes beyond Operations, the authors suggest that there is something about this group that may be preventing them from achieving sustainability outcomes based on the planning documents available through AASHE STARS. Other future research may break down the institutional groups even further to understand if there is one type of institution that best predicts sustainability outcomes.

Actions	β	R	R^2	ΔR^2
<i>Education and research</i>				
Strategic Plan	0.145	0.414	0.172	0.172
<i>Operations</i>				
Climate Action Plan	0.287*	0.556*	0.310*	0.310*
<i>Innovation</i>				
Climate Action Plan	0.186	0.483	0.192	0.192

Notes: Italic are significant at 0.05 level. *are significant at 0.01 level. The sample size varies from 34-39 institutions, depending on each reporting institution's ability to qualify for each of the credits

Table IX.
Stepwise regression
results between
administration and
planning factors and
sustainability actions
in private liberal arts
STARS institutions

Discussion

The present study demonstrated that among all institutions studied, the highest scoring area in the AASHE STARS database was PAE. Coupled with the reality that many universities and colleges are moving to implement system-wide sustainability programs (Cleaves *et al.*, 2009; Owen *et al.*, 2013), this finding could mean that institutions are in the process of setting up the organizational infrastructure to tackle long-term implementation of campus sustainability. The high PAE scores that were reported show promising groundwork for future *tangible* outcomes in other substantive areas. The authors focused specifically on the coordination and planning subcategory because of this belief, supported by the extant literature in the various nascent planning systems implemented such as EMS (Bero *et al.*, 2012), the implementation of the ACUPCC commitment and reporting (SecondNature.Org) and calls for the creation of new committees and employee positions (Atherton and Giurco, 2011). Within the coordination and planning category, the credit opportunities address five prominent planning resources and strategies present in higher education settings. Institutional planning documents serve to guide administrative actions in the short- and long-term future, and they are essential to the success of the myriad interconnected systems that compose a single institution.

The primary motivation for the study was to understand if particular planning tools predicted sustainability outcomes in various strategic areas. Strategic planning credits proved to correlate most strongly with education-related sustainability outcomes. We believe that strategic planning documents serve the institution broadly and therefore education, research and curriculum are vital components of a thoughtful plan. These outcomes, given implementation under a comprehensive strategic plan, can be traced to the presence of sustainability coordinators and other actors within the university setting who champion their cause to key administrators (Farla *et al.*, 2012). A promising outcome was the discovery of the almost uniform credit achievement of a sustainability coordinator. Because a large majority of the institutions carried this credit, we were unable to find strong correlations with sustainability outcomes, but the universality of this credit suggests that many higher education institutions have taken steps to integrate sustainability into their administrative machinery.

If sustainability is integrated into the strategic plan for a university, then it can potentially envelop broader institutional goals without explicitly creating a need to adopt further planning methodologies (such as a separate climate action plan or sustainability plan). It is telling of the priorities in a strategic plan that the outcomes for this particular planning tool are educational, not operational or administrative (although some correlations existed for factors in operations and administration, they were not as compelling as the strong education correlation).

Interestingly, the credit for a sustainability plan yielded few significant correlations with any of the other measured categories. While strategic plans are institutional bedrocks and have been in place far longer than the sustainability movement, the importance of this credit's absence lies in institutional prioritization; sustainability doctrines have not yet attained real prominence within all institutions studied under STARS. The plan may highlight key sustainability initiatives of plans written into other documents, but the missing correlation to other credit areas belies its current usefulness to colleges and universities. Further research with updated STARS data should be conducted to determine whether or not the sustainability plan would prove to be as impactful as the climate action plan report as STARS collects data in new and different ways.

The most promising finding of the research was that climate action plans predicted implementation outcomes in a number of different STARS credit areas (education and

research, human resources, public engagement, diversity and affordability and innovation). Among all credit areas, it best predicted operations outcomes. While the research did find strong correlations between strategic plans and education, as well as between a physical campus plan and operations, the authors have found that in this study, the climate action plan is the best indicator of sustainable success at higher education institutions.

Given the relatively new status of the wider sustainability movement, it is not surprising that the grassroots of climate action plans are narrowly environmental-focused. The literature demonstrates that environmental planning has been at the forefront of earlier iterations of the sustainability movement (Viebahn, 2002; Zink, 2014), and the authors have shown that effective planning and ultimately implementation evolve from an environmental-focused strategy. The influence of environmental thinking appears in the fact that climate action plans correlated with many categories in the PAE group. Climate action plans also significantly correlated with human resources and investment outcomes, and this suggests that environmental-oriented sustainability planning has evolved into an ideology infused into each of the credits measured in the STARS report. Environmental plans modified to incorporate triple bottom line sustainability (i.e. environmental, social and economic) may be the best indicator of successful outcomes in the early stages of sustainable change in higher education institutions.

The American College and University Presidents Climate Commitment (ACUPCC), launched in 2007, focuses on the measure and reporting of GHG emissions alongside primarily environmental concerns (SecondNature.Org). The measures required to achieve the commitment are all credit earning opportunities in STARS. Given the background of environmentally based change initiatives, and the predominance of the ACUPCC in initiating climate change policy for higher education, the climate action plan has received the most guidance from external organizations to outline and implement for success. Organizational structure changes have occurred such that organizations and reporting mechanisms like AASHE STARS have gained relevance; however, significant changes are on the horizon. While sustainability formerly focused on environmental concerns, as it transforms holistically, the authors expect to see new sustainable outcomes in areas not traditionally associated with this concept such as human resources and finance.

The strong correlation to human resources was surprising in this study, particularly in contrast to the equally strong correlations with operations credits. While operations is concerned with the physical campus, based largely on environmentally focused changes, human resources is not an area typically associated with sustainable improvements. However, the credits for human resources may indicate that institutions are seeking individuals interested in sustainable intervention and are working to increase awareness within their communities. Credits that demonstrate this within the human resources category include staff professional development in sustainability, sustainability in new employee orientation and the employee sustainability educators program. It is worth noting that many private liberal arts institutions earned the largest valued credit for this category, sustainable compensation, which helped increase these institutions overall human resources score and ultimately influence the strength of the correlation.

American colleges and universities are beginning to adopt sustainability practices into both their daily operations and long-term strategic goals. While planning documents are context-specific to the university structure and governance bodies, there are three emerging ways to incorporate sustainability into the planning language. A pre-existing comprehensive strategic plan may be modified to include sustainability action steps. This would work to integrate sustainability into campus norms and values manifested in the document. Because climate action plans are historically associated with environmental

concerns, universities with present planning documents to meet the needs of the ACUPCC may consider modifying their strategies to integrate economic and social sustainability concerns into the document. Or a university without such a planning tool such as the climate action plan may consider taking steps to compile a report of all sustainability-focused plans moving forward. For example, it is possible that sustainability plans may become the more prominent document as social and economic sustainability becomes more on par with environmental issues. However, further research will be needed to determine what documents will be most beneficial to non-environmental-based sustainable change.

This research may be used at a strategic level to inform key university actors of the potential power of choosing to draft a particular type of institutional planning document. The authors have demonstrated that different types of plans yield positive sustainability correlations across a number of areas in higher education setting. That being said, this information is equally useful on organizational and interpersonal levels: divisions, departments, student and faculty-organized groups, and other campus communities may benefit from this study. This research has implications for a targeted strategic plan to effect positive outcomes in areas such as curriculum, which may in turn increase student awareness of social responsibility factors. Understanding the interrelated factors that contribute to, or negate, sustainability outcomes at a university have broader implications for universities and colleges educating their students holistically for their current and future roles as responsible citizens and professionals. In a world where social responsibility brings together the private company, public administration and civil society, students find themselves at a unique intersection of external forces with imposing expectations. Higher education settings model this interdependent relationship at a small scale. The present study indicates that a clear plan has the potential to effect positive changes across a number of university areas; in this way, a clear strategic plan models the importance of planning to responsible citizenship and social responsibility for students and the greater campus community. Furthermore, it highlights the continuous cycle of planning, with its need for communication, collaboration and cooperation within and across channels. Effective planning is not possible in a static state.

Special interest groups, hoping to create awareness or change related to sustainability issues, may point to this study as a way to demonstrate that outcomes in one university area may be predicted by implementing change in another. As noted earlier, [Hansen et al. \(2011\)](#) at Macalester College found that multiple factors were crucial in a planning cycle, such as multimodal communication methods and leveraging college resources. The present study serves to remind groups on campus that their actions, while singular in focus, often are buoyed through larger, intangible structural goals and policies. Having a clear plan that outlines tangible goals and action steps may ultimately lead to greater sustainable outcomes than independent groups lobbying through the same university systems for separate but related goals.

When this research was conducted, AASHE STARS version 2.0 was newly released. The 2.0 report changes the way credits are structured and scored, which may hold bearing on the data analysis outcomes of those newer reports. Future research may evaluate the changes between versions of AASHE STARS and critically examine the ways that credits are structured, valued and earned. It may also investigate the way that innovation credits and supplemental information are taken into account as part of the university's overall STARS rating. In addition, further research might explore testing for correlations between specific credits within operations and education, rather than testing planning and administration credits against these categories as a whole. This research may help elucidate further social and cultural changes in higher education settings that become reflected in the

institutionalized planning for sustainability. Ultimately, future research, as are the motivations behind the study undertaken presently, should continue to evaluate AASHE STARS' potential for measuring and effecting lasting change.

Conclusion

The present study was designed to evaluate if specific forms of planning predict sustainability outcomes. This question was evaluated via an empirical archival study of the AASHE STARS database in relation to Planning, Administration and Governance credits and criteria to determine if specific forms of planning were predictive of sustainability implementation outcomes in the categories of Education and Research, Operations, Diversity and Affordability, Human Resources, Investment, Public Engagement and Innovation. The findings support the notion that climate action plans were most predictive of achieving sustainability outcomes, and strategic plans were best able to predict educational outcomes. The study adds empirical data to the academic literature and sheds light on how administrators in higher-education settings might help steer the organization in mission-centric ways toward sustainable outcomes.

References

- Adomssent, M., Godemann, J. and Michelsen, G. (2007), "Transferability of approaches to sustainable development at universities as a challenge", *International Journal of Sustainability in Higher Education*, Vol. 8 No. 4, pp. 385-402.
- Andrews, K.R. (1987), *The Concept of Corporate Strategy*, 3rd Ed, Irwin, Homewood, IL.
- Atherton, A. and Giurco, D. (2011), "Campus sustainability: climate change, transport and paper reduction", *International Journal of Sustainability in Higher Education*, Vol. 12 No. 3, pp. 269-279.
- Bero, B.N., Doerry, E., Middleton, R. and Meinhardt, C. (2012), "Challenges in the development of environmental management systems on the modern university campus", *International Journal of Sustainability in Higher Education*, Vol. 13 No. 2, pp. 133-149.
- Berardi, U. (2013), "Sustainability assessment of urban communities through rating systems", *Environment, Development and Sustainability*, Vol. 15 No. 6, pp. 1573-1591.
- Brinkhurst, M., Rose, P., Maurice, G. and Ackerman, J.D. (2011), "Achieving campus sustainability: topdown, bottom-up, or neither?", *International Journal of Sustainability in Higher Education*, Vol. 12 No. 4, pp. 338-354.
- Brodie, M. (2012), "Building the sustainable library at Macquarie University", *Australian Academic and Research Libraries*, Vol. 43 No. 1, pp. 4-16.
- Brown, W.M. and Hamburger, M.W. (2012), "Organizing for sustainability", *New Directions for Student Services*, Vol. 2012, No. 137, pp. 83-96.
- Cebrián, G., Grace, M. and Humphris, D. (2013), "Organisational learning towards sustainability in higher education", *Sustainability Accounting, Management and Policy Journal*, Vol. 4 No. 3, pp. 285-306.
- Clarke, A. (2006), "The campus environmental management system cycle in practice: 15 years of environmental management, education and research at dalhousie university", *International Journal of Sustainability in Higher Education*, Vol. 7 No. 4, pp. 374-389.
- Cleaves, S.M., Pasinella, B., Andrews, J. and Wake, C. (2009), "Climate action planning at the university of new hampshire", *International Journal of Sustainability in Higher Education*, Vol. 10 No. 3, pp. 250-265.
- Clinton, C. (2011), "Transformation of a university climate action plan into a sustainability plan and creation of an implementation prioritization tool (Order No. 3490861)".

- Corcoran, P.B. and Koshy, K.C. (2010), "The Pacific way: sustainability in higher education in the South Pacific Island nations", *International Journal of Sustainability in Higher Education*, Vol. 11 No. 2, pp. 130-140.
- Creighton, S.H. (1998), *Greening the Ivory Tower: Improving the Environmental Track Record of Universities, Colleges, and Other Institutions*, The MIT Press, Cambridge, MA.
- Domask, J.J. (2007), "Achieving goals in higher education: an experiential approach to sustainability studies", *International Journal of Sustainability in Higher Education*, Vol. 8 No. 1, pp. 53-68.
- Dunn, M.S. and Hart-Steffes, J.S. (2012), "Sustainability as moral action", *New Directions for Student Services*, Vol. 2012 No. 139, pp. 73-82.
- Farla, J., Markard, J., Raven, R. and Coenen, L. (2012), "Sustainability transitions in the making: a closer look at actors, strategies and resources", *Technological Forecasting and Social*, Vol. 79 No. 6, pp. 991-998.
- Hansen, S.S., Bucki, J. and Lee, J. (2011), "Engaging the campus community through participatory sustainability strategic planning", *The Journal of Record*, Vol. 4 No. 2, pp. 75-79.
- Jerrams, S., Betts, T. and Carton, J. (2008), "Building sustainable academic research in a 'Teaching and Learning' intensive environment", *Industry and Higher Education*, Vol. 22 No. 3, pp. 189-194.
- López, O.S. (2013), "Creating a sustainable university and community through a common experience", *International Journal of Sustainability in Higher Education*, Vol. 14 No. 3, pp. 291-309.
- Mcmillin, J. and Dyball, R. (2009), "Developing a whole-of-university approach to educating for sustainability", *Journal of Education for Sustainable Development*, Vol. 3 No. 1, pp. 55-64.
- Mintzberg, H. (1978), "Patterns in strategy formation", *Management Science*, Vol. 24 No. 9, pp. 934-948.
- Mintzberg, H. (1994), *The Rise and Fall of Strategic Planning*, The Free Press, New York, NY.
- Mori, K. and Christodoulou, A. (2012), "Review of sustainability indices and indicators: towards a new city sustainability index (CSI)", *Environmental Impact Assessment Review*, Vol. 32 No. 1, pp. 94-106.
- Moore, J. (2005), "Seven recommendations for creating sustainability education at the university level: a guide for change agents", *International Journal of Sustainability in Higher Education*, Vol. 6 No. 4, pp. 326-339.
- Orr, D.W. (1994), *Earth in Mind: On Education, Environment, and the Human Prospect*, Island Press, Washington, DC.
- Owen, R., Fisher, E. and McKenzie, K. (2013), "Beyond reduction: Climate change adaptation planning for universities and colleges", *International Journal of Sustainability in Higher Education*, Vol. 14 No. 2, pp. 146-159.
- Payant, R.P. (2013), "Achieving and maintaining existing building sustainability certification at Georgetown University", Doctoral Dissertation, Northcentral University.
- Posner, S.M. and Stuart, R. (2013), "Understanding and advancing campus sustainability using a systems framework", *International Journal of Sustainability in Higher Education*, Vol. 14 No. 3, pp. 264-277.
- Rauch, J.N. and Newman, J. (2009a), "Defining sustainability metric targets in an institutional setting", *International Journal of Sustainability in Higher Education*, Vol. 10 No. 2, pp. 107-117.
- Rauch, J.N. and Newman, J. (2009b), "Institutionalizing a greenhouse gas emission reduction target at Yale", *International Journal of Sustainability in Higher Education*, Vol. 10 No. 4, pp. 390-400.
- Saveljeva, T. and McKenna, J.R. (2011), "Campus sustainability: emerging curricula models in higher education", *International Journal of Sustainability in Higher Education*, Vol. 12 No. 1, pp. 55-66.
- Schaltegger, S., Windolph, S.E. and Herzig, C. (2012), "A longitudinal analysis of the knowledge and application of sustainability management tools in large german companies", *Society and Economy*, Vol. 34 No. 4, pp. 549-579.
- Shriberg, M.P. (2002). "Sustainability in U.S. higher education: organizational factors influencing campus environmental performance and leadership", Dissertation, University of Michigan.

- Swearingen, S. (2014), "Campus sustainability plans in the united states: Where, what, and how to evaluate?", *International Journal of Sustainability in Higher Education*, Vol. 15 No. 2, pp. 228-241.
- Thomashow, M. (2014), *The Nine Elements of a Sustainable Campus*, The MIT Press, Cambridge, MA.
- Urbanski, M. and Filho, W.L. (2015), "Measuring sustainability at universities by means of the sustainability tracking, assessment and rating system (STARS): early findings from STARS data", *Environment, Development and Sustainability*, Vol. 17 No. 2, pp. 209-220, doi: <http://dx.doi.org/10.1007/s10668-014-9564-3>.
- Velazquez, L., Munguia, N. and Sanchez, M. (2005), "Deterring sustainability in higher education institutions: an appraisal of the factors which influence sustainability in higher education institutions", *International Journal of Sustainability in Higher Education*, Vol. 6 No. 4, pp. 383-391.
- Viebahn, P. (2002), "An environmental management model for universities: from environmental guidelines to staff involvement", *Journal of Cleaner Production*, Vol. 10 No. 1, pp. 3-12.
- Zain, S.M., Basri, N.E.A., Mahmood, N.A., Basri, H., Yaacob, M. and Ahmad, M. (2013), "Sustainable education and entrepreneurship triggers innovation culture in 3R", *Procedia – Social and Behavioral Sciences*, Vol. 102 No. 1, pp. 128-133.
- Zink, K.J. (2014), "Designing sustainable work systems: the need for a systems approach", *Applied Ergonomics*, Vol. 45 No. 1, pp. 126-132.

Further reading

- Baumgartner, R.J. and Ebner, D. (2010), "Corporate sustainability strategies: Sustainability profiles and maturity levels", *Sustainable Development*, Vol. 18 No. 2, pp. 76-89.
- Jeurissen, R. (2000), "Cannibals with forks: the triple bottom line of 21st century business", *Journal of Business Ethics*, Vol. 23 No. 2, pp. 229-231.
- Knieriem, A., Silverman, C., Eichen, S. and Moriarty, K. (2014), "Focus on corporate sustainability", *The Corporate Governance Advisor*, Vol. 22 No. 2, pp. 30-34.
- Kodama, A. (2011), "Sustainability in higher education", *Biocycle*, Vol. 52 No. 11, pp. 36-38.
- Krizek, K.J., Newport, D., White, J. and Townsend, A.R. (2012), "Higher education sustainability imperative: How to practically respond?", *International Journal of Sustainability in Higher Education*, Vol. 13 No. 1, pp. 19-33.
- Kurapatskie, B. and Darnall, N. (2013), "Which corporate sustainability activities are associated with greater financial payoffs?", *Business Strategy and the Environment*, Vol. 22 No. 1, pp. 49-61.
- McNamara, K.H. (2008). "Fostering Sustainability in Higher Education: A Mixed-Methods Study of Transformative Leadership and Change Strategies", Dissertation, Antioch University.
- Rusinko, C.A. (2010), "Integrating sustainability in higher education: a generic matrix", *International Journal of Sustainability in Higher Education*, Vol. 11 No. 3, pp. 250-259.
- Second Nature.Org (2016), "Who we are: Background", available at: <http://secondnature.org/who-we-are/background/>
- Yarime, M., Trencher, G., Mino, T., Scholz, R.W., Olsson, L., Ness, B., Frantzeskaki, N. and Rotmans, J. (2012), "Establishing sustainability science in higher education institutions: towards an integration of academic development, institutionalization, and collaborations with stakeholders", *Sustainability Science*, Vol. 7 No. 1, pp. 101-113.

About the authors

Elizabeth Semeraro is a recent graduate of Bucknell University. Elizabeth pursued dual academic interests in sustainable management practices and women's and gender studies. She conducted research on sustainability practices at higher education institutions through qualitative and quantitative methodology to understand common trends across institutions and uncover successful

planning methods for integration of sustainability at various institutional levels. Approaching the concept of sustainability holistically, Elizabeth spent her undergraduate career learning about the relationship between sociocultural values and measures of success in business institutions.

Dr. Neil M. Boyd is a Professor of Management in the School of Management at Bucknell University. His published work examines topics in human resource management, organization development and managing for sustainability, and his work has appeared in leading publication outlets in the fields of management, public management, and psychology. His latest research explores community experiences at work and how employees and organizations can benefit when a workplace is infused with a culture of community. This work coincides with Neil's interest in helping organizations to design effective organizational cultures that allow employees to thrive in the pursuit of exceptional organizational outcomes. He is a past Division Chair for the Public and Non-Profit Division of the Academy of Management, is the current Chair of the Organization Studies Interest Group in the Society for Community Action and Research (Division 27 of the American Psychological Association), and is on the editorial boards of seven academic journals. He holds a PhD in Public Administration and a Master's Degree in Business Administration from the Pennsylvania State University, a Master's Degree in Experimental Psychology (with a focus in Industrial/Organizational Psychology) from the University of Notre Dame and a Bachelor's degree in Psychology from Bloomsburg University. Neil M. Boyd is the corresponding author and can be contacted at: neil.boyd@bucknell.edu

For instructions on how to order reprints of this article, please visit our website:

www.emeraldgroupublishing.com/licensing/reprints.htm

Or contact us for further details: permissions@emeraldinsight.com

Reproduced with permission of copyright owner. Further reproduction prohibited without permission.