

**This copy has been provided for information only. Cite only with author permission as:**

Beveridge, Dan, M. McKenzie, P. Vaughter, and T. Wright. "Sustainability in Canadian Post-Secondary Institutions: The Interrelationships among Sustainability Initiatives and Geographic and Institutional Characteristics." *International Journal of Sustainability in Higher Education*: In Press.

*Sustainability in Canadian Post-secondary Institutions: the Interrelationships among Sustainability  
Initiatives and Geographic and Institutional Characteristics*

Dan Beveridge

Sustainability Education Research Institute, University of Saskatchewan

Marcia McKenzie\*

Department of Educational Foundations, University of Saskatchewan

28 Campus Drive, Saskatoon, SK, Canada, S7N 0G4

[marcia.mckenzie@usask.ca](mailto:marcia.mckenzie@usask.ca)

Philip Vaughter,

Sustainability Education Research Institute, University of Saskatchewan

Tarah Wright

Environmental Science, Dalhousie University

\*Corresponding Author

Submitted 26-Mar-2014

Revised 2015-02-08

## **Abstract**

**Purpose** – This paper reports on a census of high-level sustainability initiatives at all accredited post-secondary institutions in Canada by documenting the institutions that have undertaken sustainability assessments, have signed one or more sustainability declarations, have sustainability offices or officers, or have sustainability policies. Our aim was to better understand the broad-scale patterns of commitments by post-secondary institutions to these sustainability initiatives by exploring the interrelationships among them, and with geographic and institutional characteristics.

**Design/methodology/approach** – We collected data on existing high-level sustainability initiatives at Canada's 220 accredited post-secondary institutions. We analysed patterns in the data using exploratory statistical techniques. We proposed a sustainability initiative score to help understand the diversity and patterns of sustainability initiative uptake.

**Findings** – Institutions located in larger communities, and in British Columbia and Québec, tended to have higher sustainability initiative scores. Institutions in Saskatchewan and the territories had the lowest sustainability initiative scores. We found that sustainability office(r)s, assessments, and policies co-occurred together disproportionately, potentially suggesting positive reinforcement mechanisms. On the other hand, having signed a declaration was generally weakly linked to other sustainability initiatives. Terminological preferences had shifted from “environment” and “sustainable development” to “sustainability”.

**Research limitations/implications** – The scope was limited to a discrete set of high-level sustainability initiatives appropriate for a nation-wide census, at a moment in time, and is therefore not exhaustive in subject or temporal extent. This broad-scale comparative analysis compels further study into the relationship between the sustainability policy environment and sustainability practices on the ground, as well as implications for how post-secondary institutions engage with sustainability. The patterns and interrelationships that we discover help to structure future critical and comparative in-depth analyses of sustainability policies and practices within post-secondary education.

**Originality/value** – Almost no extensive, comparative empirical studies of sustainability policy and practice in post-secondary institutions exist. We address this void by documenting and analysing high-level sustainability initiatives across all accredited post-secondary institutions in Canada.

## **Introduction**

Since the 1990s, there has been a steady rise in the number of empirical studies on sustainability policy and practice in post-secondary education (Wright & Pullen, 2007). However, there remains little comparative research across institutions, with much existing research taking the form of individual case studies (Corcoran, Walker, & Wals, 2004). As discussed in a recent literature review on this topic, the comparative empirical research that has been undertaken focuses specifically on comparing curricula, facility operations, or operations-focused audits (see Vaughter, Wright, McKenzie, & Lidstone, 2013). Given the narrowed scope and topical focus of existing research, there thus appears to be a need for more extensive comparative study.

This paper provides an analysis of data from year one of a pan-Canadian project which addresses this lack of comparative research on sustainability uptake in post-secondary education. In contrast to studies that focus on a particular domain of institutional policy and/or practice (such as teaching curricula or facility operations), the Sustainability and Education Policy Network (SEPN) is examining at both post-secondary and K-12 levels of formal education in Canada, the relationships between policy and practice across the five domains of i) general governance or institutional management, ii) curriculum, iii) facility operations, iv) research, and v) community outreach or engagement (AASHE, 2013). ‘Sustainability’ is operationally understood as encompassing the wide range of ways this term is taken up. However, given this study’s focus on Canadian environmental issues, we add the qualification that the uses of the term addressed in this research must include the consideration of environmental issues, and we also include analysis of policy and practice that may use terms other than sustainability to talk about environmental issues. The SEPN research team includes national and international organizational partners such as the Association for the Advancement of Sustainability in Higher Education, the Sierra Youth Coalition, the David Suzuki Foundation, Learning for a Sustainable Future, and the Canadian

Centre for Policy Alternatives<sup>1</sup>. Integrating across educational, environmental, and policy sectors, SEPN developed a six-year multi-stage research project, which includes document analysis, survey, and site analysis components. The project is informed by understandings of policy as including not only policy texts, but also the contexts of influence and practice (Bowes, Ball, & Gold, 1992), or in other words, the origins and enactments of policy in practice (Ball, Maguire, & Braun, 2012).

The post-secondary education component of year one of the SEPN project centered on the collection and analysis of data from all 220 accredited post-secondary institutions in Canada to document and better understand their high-level engagement with sustainability challenges, and the contextual factors associated with that engagement. More specifically, the analysis examines which high-level sustainability initiatives have been documented for accredited post-secondary institutions across Canada, including having undertaken a sustainability assessment (four different assessment types examined); having signed a national or international sustainability or environmental declaration (four different declarations examined); having a sustainability office or officer; and having a sustainability policy (with data analyzed including policy year and terminology used in policy title). The analysis explores relationships across these sustainability initiatives (for example, are those institutions that have signed a declaration more likely to have a sustainability office or officer?). We also examine relationships between these high-level sustainability initiatives, and geographic and institutional characteristics. This census and analysis of sustainability initiatives at post-secondary institutions will provide broad-scale insights into patterns of engagement with sustainability issues across Canada.

## **Research Design**

### **Data Collection**

#### **Study scope.**

---

<sup>1</sup> For more information on the network and its contributors, and interactive analysis and visualization of the research presented in this paper, see [www.sepn.ca](http://www.sepn.ca).

The sample for this research included all 220 accredited post-secondary institutions in Canada, based on data from the Association of Universities and Colleges of Canada (AUCC) and the Association of Canadian Community Colleges (ACCC) as of October 2012: 94 universities, 88 colleges (non-Cégep) and 38 Cégeps. In the Québec education system, Cégeps are general and vocational colleges that offer two or three year programs bridging secondary school and university. For each post-secondary institution, standardized information was compiled in a database on a range of factors related to their existing high-level sustainability initiatives if any, geographic characteristics, and other institutional characteristics. The data collection period extended from October 2012 to October 2013<sup>2</sup>. Data collection was limited to publicly available information.

### **Sustainability initiatives data collection.**

Data collected regarding sustainability initiatives included whether institutions had undertaken a sustainability assessment (Sustainability Tracking, Assessment & Rating System (STARS), Cégep Vert-Environnement Jeunesse, Campus Sustainability Assessment Framework (CSAF), or others); had signed a national or international sustainability or environmental declaration (Halifax Declaration, Talloires Declaration, Pan-Canadian Protocol, or the University and College Presidents' Climate Change Statement of Action for Canada); had a sustainability office or officer; and/or had a sustainability policy or plan (hereafter both referred to as 'sustainability policy,' with data collected including policy year and terminology used in policy title). We counted only policies that were institution-wide (as opposed to being restricted to one specific domain such as curriculum), and included both policies and plans). The inclusion of these sustainability initiatives was based on findings of common high-level, or institution-wide, initiatives commonly being taken to address sustainability (see Vaughter et al., 2013) for which

---

<sup>2</sup> The websites from which we collected data were dynamic, and many were updated before, during, and after the data collection period. We did not comprehensively capture this change. The single exception was the Talloires Declaration website which we updated shortly before press with an additional signatory.

data were sufficiently accessible for the purposes of a nation-wide census. To gather data on these sustainability initiative variables, the following procedures were followed.

*Institutional web searches:* The website of each institution was searched using its search engine for the terms: “sustain” OR “environment” OR “ecological” OR “green” OR “Aboriginal.” If the search did not return any results, variations of these terms were also entered into the website’s search engine. We used multiple terms in recognition that the terminology used to engage with sustainability issues depends on cultural context. French translations of these terms were used for French websites. Policy and sustainability sections of institutions’ websites were also comprehensively reviewed.

*Web searches:* The search terms and the term variations were also all entered into the Google search engine with each institution’s name (e.g., McGill University sustainability).

*External database searches:* The Association for the Advancement of Sustainability in Higher Education (AASHE) website lists institutions that have participated in their STARS assessment (AASHE, 2012). The Cégep Vert-Environnement Jeunesse website lists institutions participating in the Cégep Vert assessment (Environnement Jeunesse, 2012). The Sierra Youth Coalition (SYC), a SEPN research partner, provided information on institutions participating in the Campus Sustainability Assessment Framework (CSAF).

The Talloires Declaration (1990), Halifax Declaration (1991), Pan-Canadian Protocol for Sustainability (2007), and the University and College Presidents’ Climate Change Statement of Action for Canada (2008) were also examined to see which Canadian postsecondary education institutions were signatories.

*Personal communications:* Institutions’ websites, and AASHE’s and SYC’s websites yielded contradictory information in the case of four institutions. We contacted these four institutions by email and phone to determine whether they had sustainability policies.

### **Geographic characteristics data collection.**

To explore geographic patterns of sustainability initiative uptake, geographic data were collected including the location of institutions in terms of community size and province/territory. The population size of the community in which the institution was located was retrieved from Statistics Canada (Statistics Canada, 2012).

### **Institutional characteristics data collection.**

To explore the potential relationships between institutional characteristics and sustainability initiative uptake, additional data were collected on: institution type (university, non-Cégep college, or Cégep based on AUCC (AUCC, 2012) ACCC (ACCC, 2012), and Cégep (Fédération des CÉGEPs, 2012) listings; student population (as documented in institutions' annual plans for 2011-2012, including all full-time and part-time undergraduate and graduate students); whether an institution was public or private; the language of the institution (French or English, as indicated by the primary language of an institution's website); and whether the institution is Aboriginal (using the criteria of the Aboriginal Institutes Consortium, 2005).

## **Data Analysis and Visualizations**

### **Pairwise association.**

To measure the relationship between pairs of variables, we calculated pairwise measures of association. The database contains three types of variables: dichotomous (yes/no), nominal (e.g., province), and continuous or numeric (e.g., student population). Quantifying the strength of association between these different data types required three different measures: the mean square contingency coefficient ( $\Phi$ ), Cramér's V ( $\phi_c$ ), and the point biserial correlation ( $r_{pb}$ ). The three measures are conceptually or computationally related, but are appropriate for different data types.  $\Phi$ , or the mean square contingency coefficient, is a measure of association between two dichotomous variables. Cramér's V is an extension



of  $\Phi$  to nominal data.  $r_{pb}$  can quantify the strength of association between a binary and a continuous variable. We calculated the appropriate measure of association using the R statistical language (R Core Team, 2013) for all pairs of variables in the dataset. The values of all three measures of association were scaled between 0 and 1, where 0 indicates no relationship, and progressively larger values indicate stronger relationships. We considered values up to 0.09 to reflect a negligible relationship, 0.10-0.29 a weak relationship, 0.3 to 0.49 a moderate relationship, and 0.5 and higher a strong relationship. We realize other categorical labeling schemes are justifiable; we use these categories because they are consistent with our understanding, and in the hope that they help some readers through a relatively quantitative paper. We also included the association coefficient for those readers who wish to interpret the association coefficients themselves.

### **Spine plots.**

To visualize the relationship between two variables, we created spine plots. In spine plots, the widths of the bars correspond to the relative frequencies of the first variable. The heights of the bars correspond to the relative frequencies of the second variable in every level of the first variable. Spine plots allow simultaneous visualization of the relative frequencies of both variables. We created spine plots using `vcd` (Meyer, Zeileis, and Hornik 2013).

### **Conditional density plots.**

A probability distribution gives the probability of a variable taking on various values. We used conditional density plots to visualize how the conditional distribution of a categorical variable changed with a numeric variable.

### **Multidimensional statistics.**

Non-metric multidimensional scaling (NMDS) is a non-parametric ordination technique. Non-parametric means that the technique makes fewer assumptions about the normality of the data. Ordination techniques arrange and compress the variation in a dataset to allow easier visualization and interpretability. Similar variables or cases will be close to each other, and dissimilar variables or cases will be farther from each other. We performed NMDS on variables to visualize how they were interrelated.

### **Sustainability initiative score.**

To develop a high level understanding of the patterns of engagement with high-level sustainability initiatives across different institutions, we developed a sustainability initiative (SI) score. The SI score is currently based on the four categories of sustainability initiatives: assessment, declaration, office(r), and policy. An institution received one point for having a sustainability initiative in each category. An institution that had none would receive a score of zero. An institution that had all four would receive a score of four. The maximum score was four, so the institutions that had conducted more than one assessment (n=11), or signed more than one declaration (n=16) did not receive extra points. We then created groupings of sustainability initiative leaders (SI score = 4) and laggards (SI score = 0).

### **Results**

We used the methods described above in order to understand the relationships between sustainability initiatives, geographic characteristics, and institutional characteristics. The results were accurate using these methods of data collection during the period of data collection; however we recognize that institutions could have since changed the level of uptake of sustainability initiative or may have had initiatives in place at the time of data collection for which information was not found using the selected data collection methods. Tables 1 and 2 respectively tabulate the data by province and institution type. In

the sections that follow, we further analyze each high-level, or institution-wide, sustainability initiative in turn (i.e., sustainability assessment, declaration, office or officer, and policy). We examine the interrelationships between pairs of these sustainability initiatives, as well as between geographical and institutional characteristics; their association coefficients are shown in Table 3. Finally, we look for high level patterns, and present sustainability initiative (SI) scores which are shown in Table 4.

Table 1. Counts and percentages of institutions per province by sustainability initiative

		BC	AB	SK	MB	ON	QC	NB	NS	PE	NL	YT	NT	NU	CA
Assessment	Count	13	8	1	3	16	46	2	5	1	1	0	0	0	96
	Percent	48	33	7	33	27	78	29	38	33	25	0	0	0	44
Cégep vert	Count	0	0	0	0	0	34	0	0	0	0	0	0	0	34
	Percent	0	0	0	0	0	58	0	0	0	0	0	0	0	15
STARS	Count	6	4	1	1	5	2	0	2	0	0	0	0	0	21
	Percent	22	19	7	11	8	3	0	15	0	0	0	0	0	10
CSAF	Count	3	1	1	2	7	3	0	3	1	1	0	0	0	22
	Percent	11	5	7	22	12	5	0	23	33	25	0	0	0	10
Other assessment	Count	7	3	0	2	11	10	2	1	1	1	0	0	0	38
	Percent	26	14	0	22	19	17	29	8	33	25	0	0	0	17
Declaration	Count	19	14	5	4	31	18	4	8	1	1	0	0	0	105
	Percent	70	67	33	44	53	31	57	62	33	25	0	0	0	48
Halifax	Count	0	1	0	1	6	2	2	3	0	1	0	0	0	16
	Percent	0	5	0	11	10	3	29	23	0	25	0	0	0	7
Talloires	Count	8	3	1	3	11	5	1	6	0	0	0	0	0	38
	Percent	30	14	7	33	19	8	14	46	0	0	0	0	0	17
PCPS	Count	8	8	4	2	18	13	1	2	1	0	0	0	0	57
	Percent	30	38	27	22	31	22	14	15	33	0	0	0	0	26
UCPCCSAC	Count	11	7	1	2	4	1	0	1	0	0	0	0	0	27
	Percent	41	33	7	22	7	2	0	8	0	0	0	0	0	12
Office	Count	12	6	1	3	19	28	0	2	1	1	0	0	0	73
	Percent	44	29	7	33	32	47	0	15	33	25	0	0	0	33
Policy	Count	18	8	2	3	22	50	1	3	1	2	0	0	0	110
	Percent	67	38	13	33	37	85	14	23	33	50	0	0	0	50
SI score	Mean	2.3	1.7	0.6	1.4	1.5	2.4	1.0	1.5	1.3	1.3	0.0	0.0	0.0	1.8
	Standard deviation	1.6	1.5	1.1	1.9	1.3	1.1	0.8	1.4	1.5	1.9	NA	NA	NA	1.4
Leaders	Count	9	4	1	3	4	8	0	1	0	1	0	0	0	31
	Percent	30	19	7	33	7	14	0	8	0	25	0	0	0	14
Laggards	Count	6	5	9	5	17	6	2	4	1	2	1	1	1	60
	Percent	22	25	60	56	29	10	29	33	33	50	100	100	100	27
Institutions	Count	27	21	15	9	59	59	7	13	3	4	1	1	1	220

Note: Some institutions have signed more than one type of declaration: 105 institutions are signatories to at least one declaration studied here, 29 are signatories to at least two. Similarly, some institutions have conducted more than one type of assessment: 95 institutions have conducted 112 assessments, as 19 institutions have conducted two assessments.

Table 2. Counts and percentages of institutions per institution type by sustainability initiative

	Institution Type	Cégep	Non-Cégep College	University	Total
Assessment	Count	36	19	41	96
	Percent	95	22	44	44
Cégep vert	Count	31	3	0	34
	Percent	82	3	0	15
STARS	Count	0	5	16	21
	Percent	0	6	17	10
CSAF	Count	0	1	21	22
	Percent	0	1	22	10
Other assessment	Count	5	11	22	38
	Percent	13	13	23	17
Declaration	Count	13	46	46	105
	Percent	34	52	49	48
Halifax	Count	0	0	16	16
	Percent	0	0	17	7
Talloires	Count	1	4	33	38
	Percent	3	5	35	17
PCPS	Count	13	43	1	57
	Percent	34	49	1	26
UCPCCSAC	Count	0	6	21	27
	Percent	0	7	22	12
Office(r)	Count	18	19	36	73
	Percent	47	22	38	33
Policy	Count	35	27	48	110
	Percent	92	31	51	50
SI Score	Mean	2.0	1.7	1.7	1.8
	Standard deviation	1.4	1.4	1.5	1
Leaders	Count	6	8	17	31
	Percent	16	9	18	14
Laggards	Count	2	31	27	60
	Percent	5	35	29	27
Institutions	Count	38	88	94	220

## Sustainability Assessments

### Assessments in relation to other sustainability initiatives.

Of the 220 post-secondary institutions in Canada at the time of data collection, 96 (44%) had conducted sustainability assessments. Three types of assessments were most common: Cégep Vert (n=34

institutions), CSAF (n=22), and STARS (n=21); with 38 institutions having conducted a type of assessment other than these three. Nineteen institutions had conducted two assessments; except for Red River College, all were universities. Eight institutions had conducted both CSAF and STARS ( $\Phi=0.34$ ). Pairwise associations suggest a weak relationship between assessment and declaration ( $\Phi=0.19$ ). Of the 105 institutions that had signed a declaration, almost as many institutions had not conducted an assessment (n=50) as had (n=55). There was a moderate relationship between assessment and office ( $\Phi=0.42$ ), with 53 of the 96 (55%) institutions that had conducted an assessment having a sustainability office or officer; 105 institutions, or 84%, with no assessment did not have an office(r). However, there was a very strong relationship between policy and having conducted any type of assessment ( $\Phi=0.65$ ): of the 96 institutions that conducted assessments, 83 (86%) had sustainability policies; of the 124 institutions that had not conducted assessments, 97 (88%) did not have policies.

Of the 38 Cégeps in Canada, 28 (74%) had undertaken a Cégep Vert assessment. Three non-Cégep Colleges in Québec had also conducted Cégep Vert assessments. Cégep Vert was weakly related to all declaration types ( $0.06 \leq \Phi \leq 0.16$ ). Cégep Vert was closely associated with having a policy: all Cégep Vert institutions had a policy ( $\Phi=0.43$ ; 34/34), a higher frequency than all other assessment types.

Of the 220 institutions in Canada, 22 (10%) had conducted a CSAF assessment. CSAF was moderately related to Talloires ( $\Phi=0.37$ ) and weakly related to other declarations ( $0.16 \leq \Phi \leq 0.26$ ). CSAF was weakly related to having an office or officer ( $\Phi=0.25$ ), and having a policy ( $\Phi=0.15$ ).

Table 3. Association coefficients between pairs of variables.

	Assessment	Cégep vert	STARS	CSAF	Other Assessment	Declaration	Halifax	Talloires	PCPS	UCPCCSAC	Office	Policy	Province	Community Population	School Type	School Population	Language	Public	Aboriginal
Assessment	<b>1</b>	0.50	0.37	0.35	0.52	0.19	0.07	0.22	0.01	0.25	0.42	0.65	0.47	0.20	0.51	0.18	0.25	0.09	0.12
Cégep vert	0.50	<b>1</b>	0.14	0.14	0.20	0.13	0.12	0.16	0.06	0.16	0.15	0.43	0.71	0.09	0.84	0.08	0.57	0.04	0.06
Stars	0.37	0.14	<b>1</b>	0.34	0.15	0.33	0.27	0.48	0.10	0.41	0.27	0.33	0.21	0.06	0.19	0.07	0.18	0.04	0.04
CSAF	0.35	0.14	0.34	<b>1</b>	0.29	0.17	0.26	0.37	0.16	0.25	0.25	0.15	0.22	0.20	0.36	0.13	0.18	0.03	0.05
Other Assessment	0.52	0.20	0.15	0.29	<b>1</b>	0.09	0.06	0.11	0.02	0.16	0.21	0.22	0.19	0.07	0.14	0.12	0.07	0.07	0.06
Declaration	0.19	0.13	0.33	0.17	0.09	<b>1</b>	0.29	0.48	0.62	0.39	0.23	0.21	0.32	0.09	0.13	0.14	0.32	0.20	0.13
Halifax	0.07	0.12	0.27	0.26	0.06	0.29	<b>1</b>	0.38	0.17	0.11	0.17	0.18	0.28	0.16	0.32	0.01	0.10	0.07	0.04
Talloires	0.22	0.16	<b>0.48</b>	0.37	0.11	0.48	0.38	<b>1</b>	0.13	0.31	0.23	0.22	0.29	0.15	0.41	0.10	0.27	0.12	0.06
PCPS	0.01	0.06	0.10	0.16	0.02	0.62	0.17	0.13	<b>1</b>	0.10	0.02	0.03	0.18	-0.02	0.50	0.02	0.13	0.15	0.08
UCPCCSAC	0.25	0.16	0.41	0.25	0.16	0.39	0.11	0.31	0.10	<b>1</b>	0.20	0.26	0.43	0.11	0.28	0.10	0.21	0.04	0.05
Office	0.42	0.15	0.27	0.25	0.21	0.23	0.17	0.23	0.02	0.20	<b>1</b>	0.51	0.29	0.33	0.21	0.15	0.12	0.18	0.10
Policy	<b>0.65</b>	0.43	0.33	0.15	0.22	0.21	0.18	0.22	0.03	0.26	<b>0.51</b>	<b>1</b>	0.51	0.29	0.43	0.21	0.26	0.14	0.14
Province	<b>0.47</b>	<b>0.71</b>	0.21	0.22	0.19	0.32	0.28	0.29	0.18	0.43	0.29	<b>0.51</b>	<b>1</b>	0.11	0.57	0.01	0.59	0.29	0.54
Community Popn.	0.20	0.09	0.06	0.20	0.07	0.09	0.16	0.15	-0.02	0.11	0.33	0.29	0.11	<b>1</b>	0.14	0.11	0.05	-0.05	-0.10
School Type	<b>0.51</b>	<b>0.84</b>	0.19	0.36	0.14	0.13	0.32	0.41	<b>0.50</b>	0.28	0.21	0.43	<b>0.57</b>	0.14	<b>1</b>	-0.03	0.45	0.11	0.10
Student Popn.	0.18	0.08	0.07	0.13	0.12	0.14	0.01	0.10	0.02	0.10	0.15	0.2	0.01	0.11	-0.03	<b>1</b>	0.03	0.00	-0.05
Language	0.25	<b>0.57</b>	0.18	0.18	0.07	0.32	0.10	0.27	0.13	0.21	0.12	0.26	<b>0.59</b>	0.05	0.45	0.03	<b>1</b>	0.05	0.09
Public	0.09	0.04	0.04	0.03	0.07	0.20	0.07	0.12	0.15	0.04	0.18	0.14	0.29	-0.05	0.11	0.00	0.05	<b>1</b>	0.13
Aboriginal	0.12	0.06	0.04	0.05	0.06	0.13	0.04	0.06	0.08	0.05	0.10	0.14	<b>0.54</b>	-0.10	0.10	-0.05	0.09	0.13	<b>1</b>

Twenty-one (10%) institutions in Canada had conducted a STARS assessment. As of 2012, one had received a Gold rating (University of British Columbia), five had received Silver ratings, and 15 had received Bronze ratings. Having conducted a STARS assessment was weakly to moderately related to the four declarations:  $\phi_c=0.27$  for Halifax,  $\phi_c=0.48$  for Talloires,  $\phi_c=0.41$  for the Presidents' Climate Change Statement of Action, and  $\phi_c=0.10$  for the Pan-Canadian Protocol. There was a weak relationship between having conducted a STARS assessment and having an office or officer ( $\phi_c=0.27$ ), and a moderate relationship with having a policy ( $\phi_c=0.33$ ).

Thirty-eight (17%) institutions had conducted another type of assessment (e.g., one institution used the European assessment measure ISO 14000, several used institution wide assessments that students or faculty had created, more used different sustainability assessments created by independent auditors). This category of "other assessment" was negligibly to weakly related to declarations:  $0.02 \leq \Phi \leq 0.16$ . There was a weak relationship with office ( $\Phi=0.21$ ) and with policy ( $\Phi=0.22$ ).

### **Assessment in relation to geographic considerations.**

Geography helped to structure the patterns of assessment, with province being moderately related to conducting an assessment of any type ( $\phi_c=0.47$ ). There was a very strong relationship between Cégep Vert and province ( $\phi_c=0.71$ ), given that all the institutions having undertaken Cégep Vert were in Québec; the relationship was not higher because many institutions in Québec were not Cégep Vert institutions, and this was also reflected in the association coefficient. There was a weak relationship between CSAF and province ( $\phi_c=0.22$ ), between STARS and province ( $\phi_c=0.21$ ), and between other assessments and province ( $\phi_c=0.19$ ). Québec had the highest percentage of institutions that had conducted an assessment (78%), largely because of the success of the Cégep Vert program. British Columbia had the second highest percentage of institutions that had engaged in a sustainability assessment (48%), and also possessed the highest number of STARS assessed schools in any province in



Canada (n=6). Saskatchewan had the lowest percentage of institutions that conducted sustainability assessments of any province, with only 2 of 15 institutions having conducted any kind of sustainability assessment. There were no assessed institutions in Nunavut, Northwest Territories, or the Yukon.

The size of the community population was negligibly to weakly related to conducting any type of assessment ( $0.06 \leq r_{pb} \leq 0.20$ ).

### **Assessment in relation to institutional considerations.**

Institutional characteristics were examined in relation to assessment included school type, student population, language, public/private, and whether an institution was designated as Aboriginal.

An overall strong relationship was found between assessment and school type (university, non-Cégep colleges, and cégeps) ( $\phi_c=0.51$ ). In particular there was a very strong relationship between Cégep Vert and school type ( $\phi_c=0.84$ ), given that all but three of the 34 Cégep Vert schools were Cégeps. School type was moderately related to CSAF ( $\phi_c=0.36$ ), and weakly related to STARS ( $\phi_c=0.19$ ) and “other assessment” ( $\phi_c=0.14$ ).

Assessment was weakly or negligibly related to other institutional characteristics such as student population, primary language of the institution, public/private, and designation as an Aboriginal institution. Although the strong relationship between Cégep Vert and language was strong ( $\phi_c=0.57$ ), the relationship between language and having conducted an assessment of any type was weak ( $\phi_c=0.25$ ).

### **Sustainability Declarations**

#### **Declarations in relation to other sustainability initiatives.**

Of the 220 accredited post-secondary institutions in Canada, 105 (48%) had signed at least one international or national sustainability declaration. Having signed a declaration was weakly related to other sustainability initiatives ( $\Phi=0.19$  with assessment,  $\Phi=0.23$  with office or officers, and  $\Phi=0.21$  with

policy). Counting the association coefficients between the four individual declarations and each of the other sustainability initiatives (four assessment types, office(r), policy), most of the relationships were negligible (five coefficients), or weak (16 coefficients). Two exceptions were moderately related to Talloires: STARS ( $\Phi=0.48$ ) and CSAF ( $\Phi=0.37$ ). UCPCSAC was also moderately related to STARS ( $\Phi=0.41$ ).

Examining the data associated with individual sustainability declarations, 31 institutions had signed one of the two international declarations, with 16 (7%) signing the international Halifax Declaration, and 38 (17%) institutions signing the international Talloires Declaration. The Talloires and Halifax declarations were moderately related with each other ( $\Phi=0.38$ ), with 11 institutions signing both. Being a signatory to the Halifax Declaration was negligibly or weakly related to other sustainability initiatives. Being a signatory to the Talloires Declaration was moderately related to STARS and CSAF, as discussed above, and weakly related to all other sustainability initiatives.

Fifty seven institutions (34% of Cégeps and 49% of all non-Cégep Colleges) had signed the Pan-Canadian Protocol for Sustainability. Having signed this declaration was weakly or negligibly associated with other declaration types ( $0.05 \leq \Phi \leq 0.17$ ), with only five institutions having signed one other declaration type. The Pan-Canadian Protocol for Sustainability was negligibly related to other sustainability initiatives: to assessment ( $\Phi=0.00$ ), to office or officer ( $\Phi=0.02$ ), and to policy ( $\Phi=0.03$ ).

Thirty-eight institutions had signed the University and College Presidents' Climate Change Statement of Action for Canada (UCPCSAC). Four had also signed the Pan-Canadian Protocol. Three institutions had signed Talloires, Halifax, and the UCPCSAC (Dalhousie, McMaster, and the University of Manitoba). The UCPCSAC was weakly related to most other sustainability initiatives: with having conducted an assessment ( $\Phi=0.25$ ), with having an office or officer ( $\Phi=0.2$ ), and with having a policy ( $\Phi=0.26$ ).

### **Declarations in relation to geographic considerations.**

Geography played a small, but significant role in structuring the patterns of declarations across the country. Province was moderately associated with declaration ( $\phi_c=0.32$ ), but interesting patterns emerge when looking at individual declarations. The Talloires declaration was moderately related to province ( $\phi_c=0.32$ ) with a few provinces contributing most signatories. The percentage of institutions that signed the Talloires Declaration was highest in Nova Scotia with six signatories (46% of institutions in this province), Manitoba (one third of institutions), and British Columbia (eight of 27). Ontario also had a relatively rate of signatories (11 signatories, or 19% of institutions). The Talloires declaration was least popular in Saskatchewan (one signatory), Québec (five signatories), New Brunswick (one signatory), Prince Edward Island, Newfoundland, and the Territories (no signatories).

The Presidents' Climate Change Statement of Action (UCPCCSAC) was also moderately related to province ( $\phi_c=0.34$ ) with 18 of its 27 signatories in British Columbia or Alberta.

The Halifax Declaration was moderately associated with province ( $\phi_c=0.28$ ). The percentage of institutions that signed on to the Halifax Declaration was highest in Atlantic Canada, with New Brunswick (29% of institutions in this province), Newfoundland and Labrador (25%), and Nova Scotia (23%) possessing the highest percentages of signatory institutions – though none in Prince Edward Island.

The Pan-Canadian Protocol for Sustainability was weakly associated with province. Although, the percentage of institutions that have signed on to the Pan-Canadian Protocol was highest in Alberta (38%), with signatories in nine provinces, the PCPS had the widest, most even provincial representation of any declaration.

The population size of the communities institutions are located in was negligibly associated with having signed a declaration ( $r_{pb}=0.09$ ), and negligibly to weakly related to individual declarations ( $0.02 \leq r_{pb} \leq 0.16$ ).

### **Declarations in relation to institutional considerations.**

Other institutional characteristics examined in relation to declaration included school type, student population, language, public/private, and whether an institution was designated as Aboriginal.

Declaration and institution type were weakly related ( $\phi_c=0.13$ ). However, individual declarations had stronger relationships with institution type ( $\phi_c=0.32$  for Halifax,  $\phi_c=0.41$  for Talloires, and  $\phi_c=0.50$  for Pan-Canadian Protocol, although only  $\phi_c=0.28$  for UCPCCSAC). Almost all of the Talloires Declaration's signatories were universities, whereas signatories to the Pan-Canadian Protocol were mainly non-Cégep colleges. Of the 43 institutions that had signed one of the two international declarations (Talloires and Halifax), 38 were universities. Only 11 out of 34 Cégep Vert institutions had signed a declaration.

There were weak relationships between declaration and student population ( $r_{pb}=0.14$ ), private/public designation ( $\Phi=0.2$ ), and designation as an Aboriginal institution (0.13). There was a moderate relationship between declaration and language ( $\phi_c=0.32$ ) with primarily French speaking institutions less frequently signing declarations. Of 62 French speaking institutions, 14 (23%) were signatories, compared with 90 signatories (58%) among 156 English speaking institutions.

### **Sustainability Office or Officer**

#### **Office or officer in relation to other sustainability initiatives.**

Of the 220 accredited post-secondary institutions in Canada, 73 (33%) had a sustainability office or officer. Having an office(r) was moderately related to assessment ( $\Phi=0.42$ ), weakly related to declaration ( $\Phi=0.24$ ), and strongly related to policy ( $\Phi=0.51$ ).

Examining the relationship between office(r) and assessment in more detail, institutions without assessments were unlikely to have an office(r) [20 office(r)s among 124 institutions without assessments,

or 16%]. In contrast, institutions with an assessment were much more likely to have an office(r) (53 office(r)s among 95 institutions with assessments, or 56%). As outlined in the section on assessment, office(r) was weakly related with particular assessment types.

Office(r) was weakly associated with declaration ( $\Phi=0.23$ ), and as outlined in the declarations section, was negligibly to weakly associated with individual declarations ( $0.02 \leq \Phi \leq 0.20$ ).

Office(r) and policy were strongly related ( $\Phi=0.51$ ) as described in the policy subsection.

**Office or officer in relation to geographic considerations.**

Office(r) and province were moderately related ( $\phi_c=0.29$ ). Figure 1 shows the frequency of office(r)s by province. Québec and British Columbia most frequently had an office or officer (47% and 44% respectively; see Figure 2). Ontario also had a relatively high proportion of institutions with an office or officer (32%). Saskatchewan had a single institution (out of 15) that had a sustainability office or officer. New Brunswick had none (out of 7). None of the 3 institutions in the territories had an office or officer.

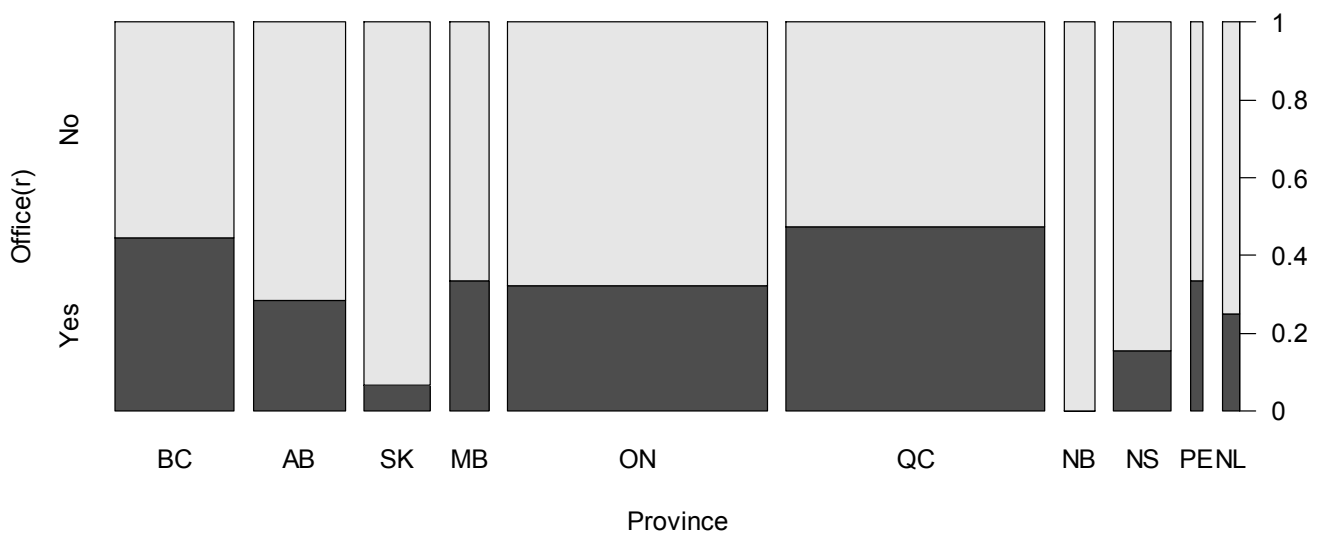


Figure 1. Spine plot of institutions with office(r)s by province. BC and QC institutions most frequently had

office(r)s, SK and NB least frequently.

Having a sustainability office or officer was moderately related to community population size ( $r_{pb}=0.33$ ). Institutions in larger communities more frequently had office(r)s. The correlation coefficient best measures the strength of linear relationships; it does not capture non-linear relationships as well. The trend was clearer when plotted visually (see Figure 2), where there are two bumps in the upward line. The first bump at 27 on the x-axis is partly due to both institutes in La Pocatière (population 4266) having an office(r); the second bump starting at 64 on the x-axis is partly due to a higher frequency of institutions with office(r)s in communities with populations around 100,000, e.g. Thunder Bay and Guelph. Both bumps are superimposed on an overall trend of higher frequencies of signatories in larger communities.

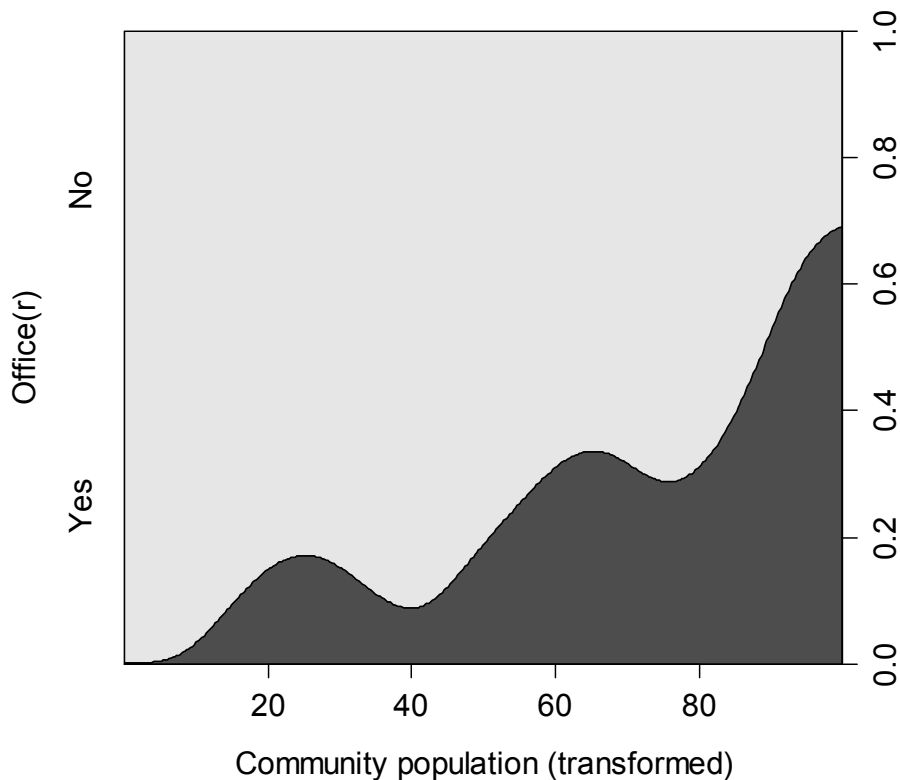


Figure 2. Frequency (conditional density) of sustainability office(r)s by community population. Institutions in larger communities much more frequently had office(r)s.

### **Office or officer in relation to institutional considerations.**

Having a sustainability office(r) was weakly related to student population, language, public/private, and whether an institution was designated as Aboriginal. There was a weak pattern with institutional type ( $\phi_c=0.21$ ): 47% of all Cégeps had a sustainability office(r); while 38% of universities and 22% of non-Cégep colleges had an office(r).

### **Sustainability Policies**

#### **Policy in relation to other sustainability initiatives.**

Of the 220 accredited post-secondary institutions in Canada, 110 (50%) had a sustainability policy. Having a sustainability policy was strongly related to assessment ( $\Phi=0.65$ ) and to office(r) ( $\Phi=0.51$ ). It was weakly related to signing a declaration ( $\Phi=0.21$ ).

Of the four types of assessments examined, policy had the strongest relationship with Cégep Vert ( $\Phi=0.51$ ), then weaker relationships with STARS ( $\phi_c=0.33$ ), with other assessments ( $\Phi=0.22$ ), and with CSAF ( $\Phi=0.15$ ).

Policy and declaration were weakly related, with individual declarations negligibly to weakly related ( $0.03 \leq \Phi \leq 0.26$ ).

There was a strong relationship between policy and office(r) ( $\Phi=0.51$ ): of the 73 institutions with officers, 63 (86%) also had policies; of the 110 institutions that did not have policies, 100 (91%) did not have office(r)s.

#### **Policy in relation to geographic considerations.**

Policy was strongly related to province ( $\phi_c=0.51$ ). The majority of institutions in both Québec and British Columbia had sustainability policies (85% and 67% respectively). While 22 Ontario institutions

had policies, this was a relatively small percentage of the total number of 59 institutions present within the province (37%). On the low end of the range of policy adoption, only 2 of 15 Saskatchewan institutions (13%), 1 of 7 New Brunswick institutions, and none of the 3 institutions in the territories had policies.

Policy was moderately related with community population size ( $r_{pb}=0.29$ ), with larger communities more frequently having policies.

### **Policy in relation to institutional considerations.**

Policy was moderately related to institution type ( $\phi_c=0.43$ ). Cégeps had policies much more frequently than universities or non-Cégep colleges: 92% of all Cégeps had policies compared to 51% of universities, and 31% of non-Cégep colleges.

Policy had a weak relationship with student population ( $r_{pb}=0.21$ ). Policy was weakly related to language ( $\phi_c=0.26$ ): 65 English language institutions, or 42%, had a policy, while 44 French language institutions, or 71%, had a policy. Policy was weakly related to whether an institution was designated as public/private, or as an Aboriginal institution.

### **Policy terminology.**

#### **Policy terminology in relation to other sustainability initiatives**

For the 110 post-secondary institutions in Canada with sustainability policies, we examined the terminology used in the titles of the policies in relation to the policy date, other sustainability initiatives, and geographic and institutional characteristics. Of the 110 sustainability policies in use, 49 used the term “green” or “environment”, 41 used “sustainability”, and 38 used “sustainable development” (24 titles used multiple terms). Terminology in policy titles was moderately related to the other major categories of sustainability initiatives: to assessment ( $\phi_c=0.30$ ), to declaration ( $\phi_c=0.30$ ), and to office(r)



( $\phi_c=0.34$ ).

In relation to assessment, Cégep Vert institutions most frequently used “environment” in combination with either “sustainability” or “sustainable development” (16/34 institutions or 47%), or “environment” alone (11/34 institutions or 32%). STARS institutions more frequently used “sustainability”: 16/21 institutions or 76% compared to only 28% of non-STARS institutions.

Institutions that had signed a declaration more frequently used the term “sustainability”: 32 institutions, or 52% of all institutions that had signed a declaration, used “sustainability”; 32, or 78% of all institutions with policies using “sustainability” had also signed a declaration. This trend was particularly marked for UCPCSAC ( $\phi_c=0.46$ ): 15/17 signatories, or 88%, used “sustainability”. 10/16 or 63% of Halifax signatories used “sustainability”. Signatories to the Pan-Canadian Protocol used terms more evenly.

Institutions with sustainability office(r)s more frequently used the term “sustainability”. Thirty, or 48%, of 63 institutions with office(r)s used “sustainability”, compared to 11, or 23%, of 47 institutions without office(r)s.

### **Policy terminology trends over time**

The dates associated with the policies in use at the 110 institutions during the period of data collection ranged from 1992 to 2013. The date of a policy was weakly related to its title terminology ( $r=0.29$ ), but this statistic does not capture more complex temporal patterns. Early policies predominantly used the terms “environment” and “sustainable development”, but their use substantially decreased in favour of “sustainability”. Increasingly used since 2005, “sustainability” had become the most preferred term between 2008 and 2013. Figure 3 shows frequencies of terms used in policy titles over time.

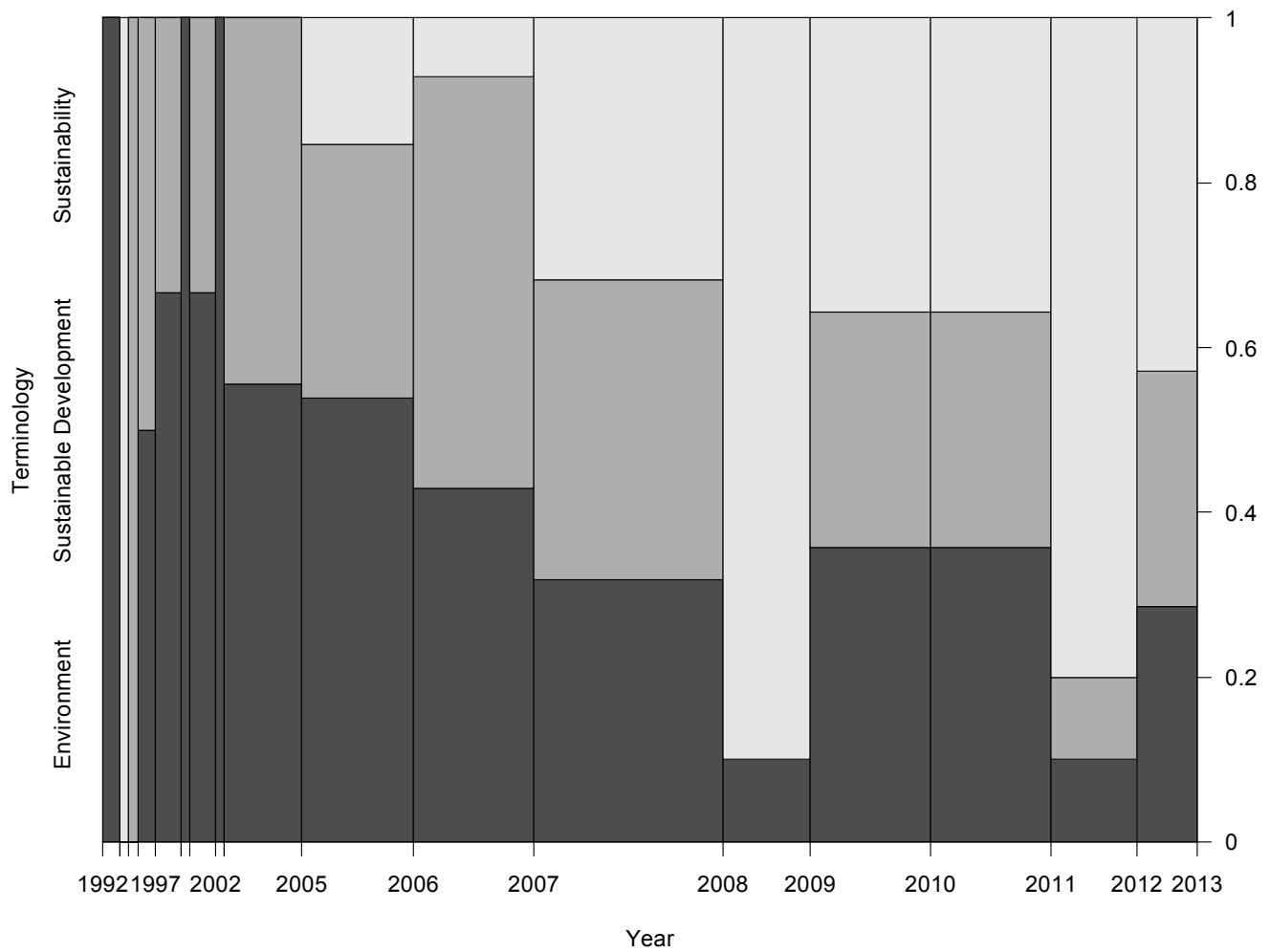


Figure 3. Spine plot of policy title terminology by year. The width of the bars in indicates the relative number of policies per year. The use of “environment” has decreased, while the use of “sustainability” has increased over time.

### Policy terminology and geographic considerations

Policy terminology was moderately related to province ( $\phi_c=0.36$ ). As Figure 4 shows, Québec policies were more likely to use “environment” or “sustainable development,” with very little use of the term “sustainability.” “Sustainability” was more commonly used in Ontario and Alberta policies, and exclusively used in Saskatchewan and Manitoba policies.

Terminology was also related to the population of the communities in which institutions were located. Policies of institutions in smaller communities more frequently used “environment,” or “environment” in combination with either “sustainability” or “sustainable development.” The use of “sustainability” increased with community population size.

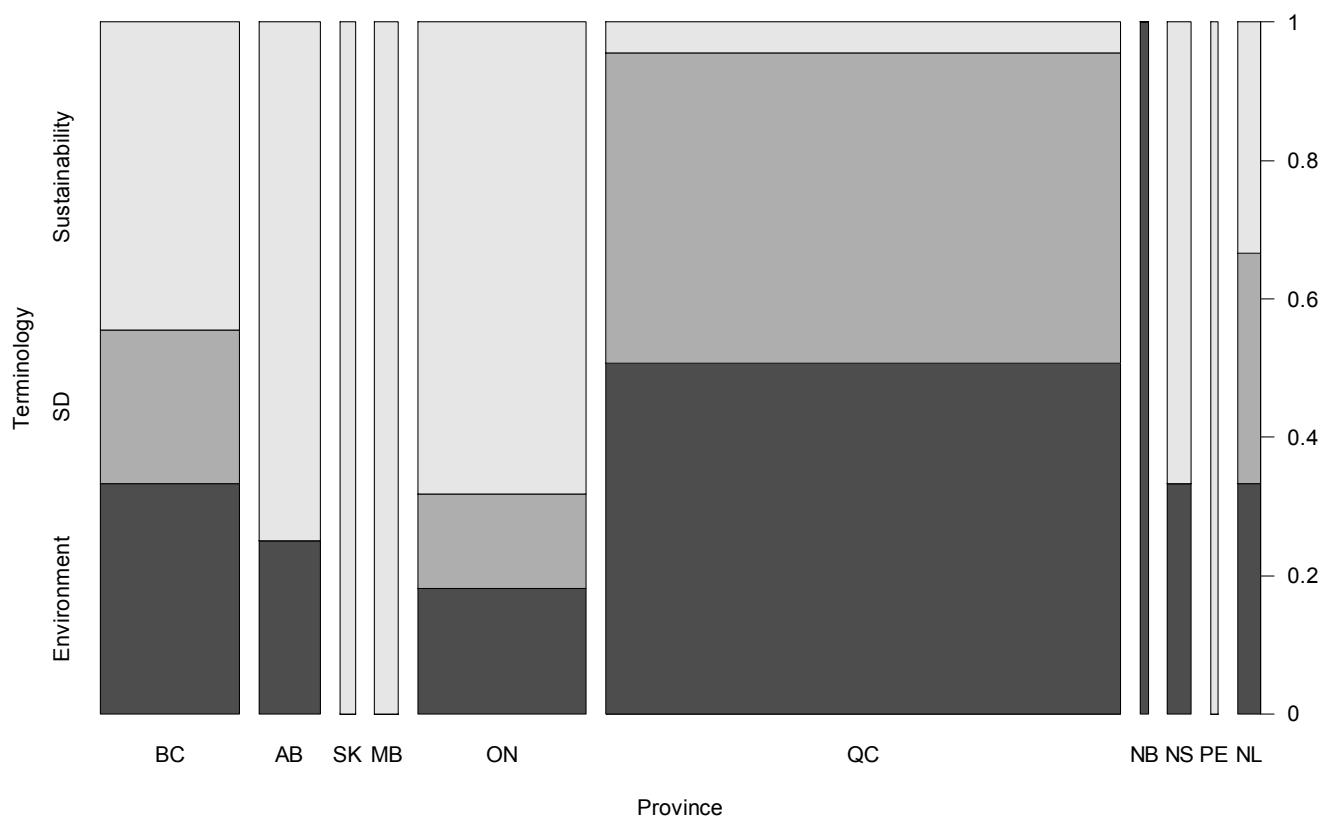


Figure 4. Spine plot of policy title terminology by province. The width of the bars indicates the relative number of policies per province. The Prairie provinces most frequently use “sustainability.” “Environment” is most frequently used in QC and NB.

### Policy terminology and institutional characteristics

Terminology was moderately related to institution type ( $\phi_c = 0.48$ ). Cégeps more frequently used “environment” alone (n=10, or 29%), or in combination with either “sustainability” or “sustainable

development” (n=18, or 51%). Non-Cégep colleges more frequently used “sustainability” (n=11, or 41%) and “environment” (n=7, or 26%). Universities more frequently used the terminology of “sustainability” in their policy titles (n=29, or 60%).

### **Multidimensional Visualization**

The preceding sections looked at relationships between two variables at a time. In this section, we look at the interrelationships between multiple variables simultaneously using non-metric multi-dimensional scaling. Figure 5 shows a plot of a two-dimensional non-metric multi-dimensional scaling. Some patterns emerge.

Policy, assessment, and office(r) clustered closely together: their proximity to each other in the plot indicates their statistical proximity; institutions with policies tended to share similarities with those that had conducted assessments or had office(r)s.

Cégep Vert, province, language, and institution type group together, a statistical representation of their intuitively close interrelations based on the Cégeps in Québec. Of this group, Cégep Vert was closest to the policy/assessment/office(r) cluster, which is consistent with our preceding analyses (e.g., 92% of Cégeps had a policy).

Other institutional characteristics i.e. public, aboriginal, and student population, were far from any sustainability initiatives.

The declarations were in the upper right quarter of the plot. Declaration was not close to the policy, assessment, office(r) cluster. However, individual declarations were close to individual assessments: Talloires and UCPCSAC were close to CSAF and STARS.

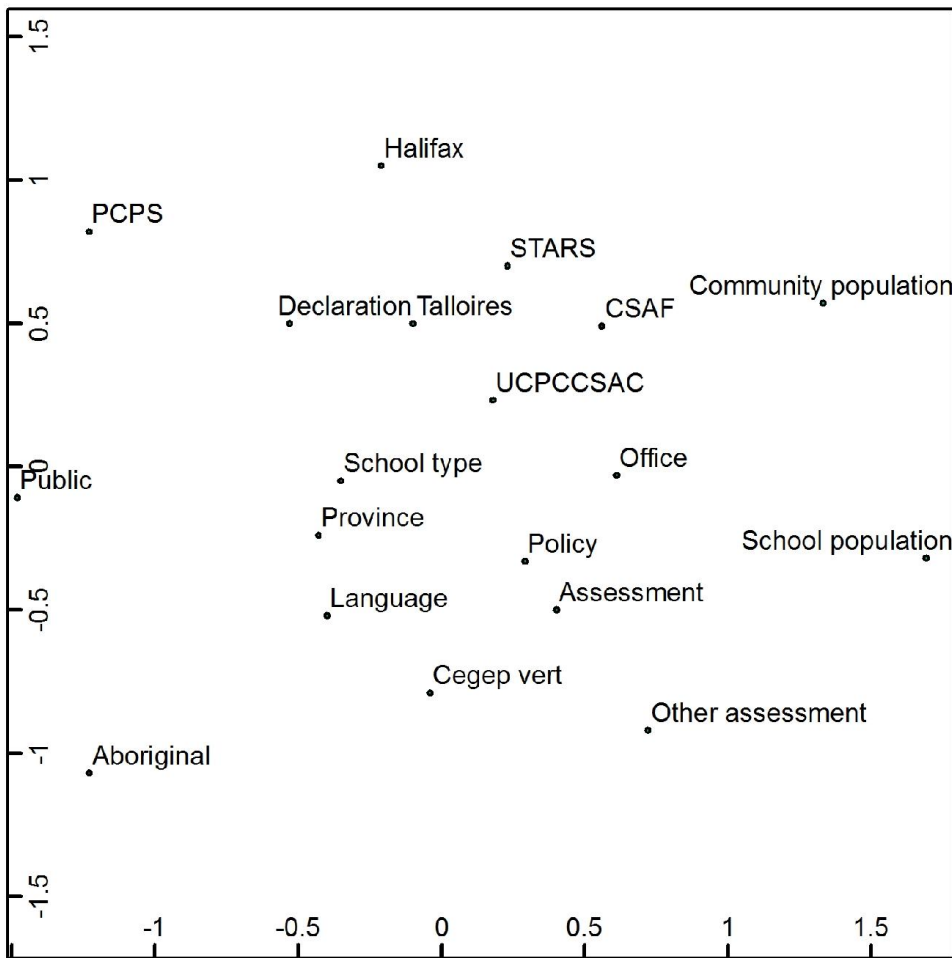


Figure 5. Plot of two dimensional NMDS. Variables that are located close together in the plot are more strongly related. Variables that are located farther apart are more weakly related. Assessment, office(r), and policy clustered together.

### **Considering assessment, officer, and policy together.**

Of the four sustainability initiatives, having conducted an assessment, having an office(r), and having a policy were statistically related to each other. Institutions with one of these three tended to share characteristics with institutions having undertaken another of the initiatives. Fifty-one institutions had undertaken all three sustainability initiatives.

These institutions were disproportionately in British Columbia (n=9) and Québec (n=24). They were also primarily in larger cities (n=33), although this relationship did not hold true in British

Columbia ( $r_{pb}=0.04$ ), where institutions in smaller communities frequently engaged with these sustainability initiatives. The geographic pattern was more striking when looking at both community population and province simultaneously. Of the 19 institutions in towns or cities with a population less than 150,000 that had engaged with these three sustainability initiatives, 15 were in British Columbia or Québec.

Engaging in these three sustainability initiatives was weakly related to declaration ( $\Phi=0.17$ ): 32/51 or 63% of the institutions that had undertaken all of assessment, office(r), and policy had signed declarations. Twenty-nine institutions without assessments, office(r)s, or policies had signed a sustainability declaration, comprising 28% of all 105 signatories. Twenty-one of these institutions were signatories to the Pan-Canadian Protocol, comprising 37% of its 57 signatories.

Of institutions that had neither an assessment, nor office(r), nor policy, institutions in Saskatchewan and New Brunswick were disproportionately represented: 13/15 SK and 5/7 NB institutions had no assessment, office(r), or policy (see Figure 6). None of the four Aboriginal institutions had an assessment, office(r), or policy.

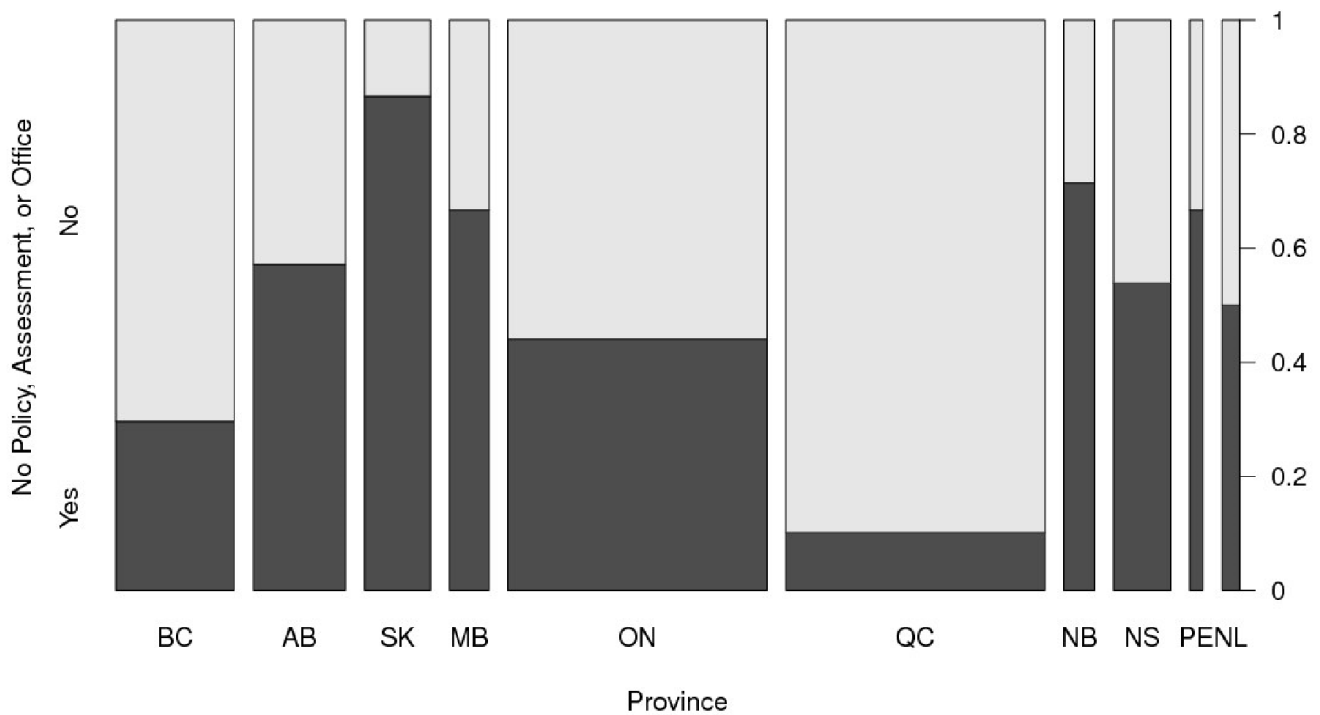


Figure 6. Spine plot of institutions without assessment, office(r), or policy by province. SK and NB institutions were most frequently in this group.

### **Sustainability initiative score.**

PSE institutions varied widely across the country, with the pattern significantly structured by geographic characteristics. SI scores are shown in Table 4. Thirty-two institutions received an SI score of four: we labeled these institutions as sustainability initiative leaders. Higher scoring institutions appear most frequently in British Columbia and Québec, with mean SI scores of  $\bar{x} = 2.3$  and  $\bar{x} = 2.4$  respectively. British Columbia and Québec had the highest number of leaders ( $n=9$  and  $n=8$  respectively). SI score was moderately related to community population size ( $r=0.32$ ), as shown in Figure 7. This relationship did not hold true in Québec, where mean SI scores in larger cities were only marginally higher than in smaller towns and cities (SI score=2.6 versus SI score=2.4 respectively).

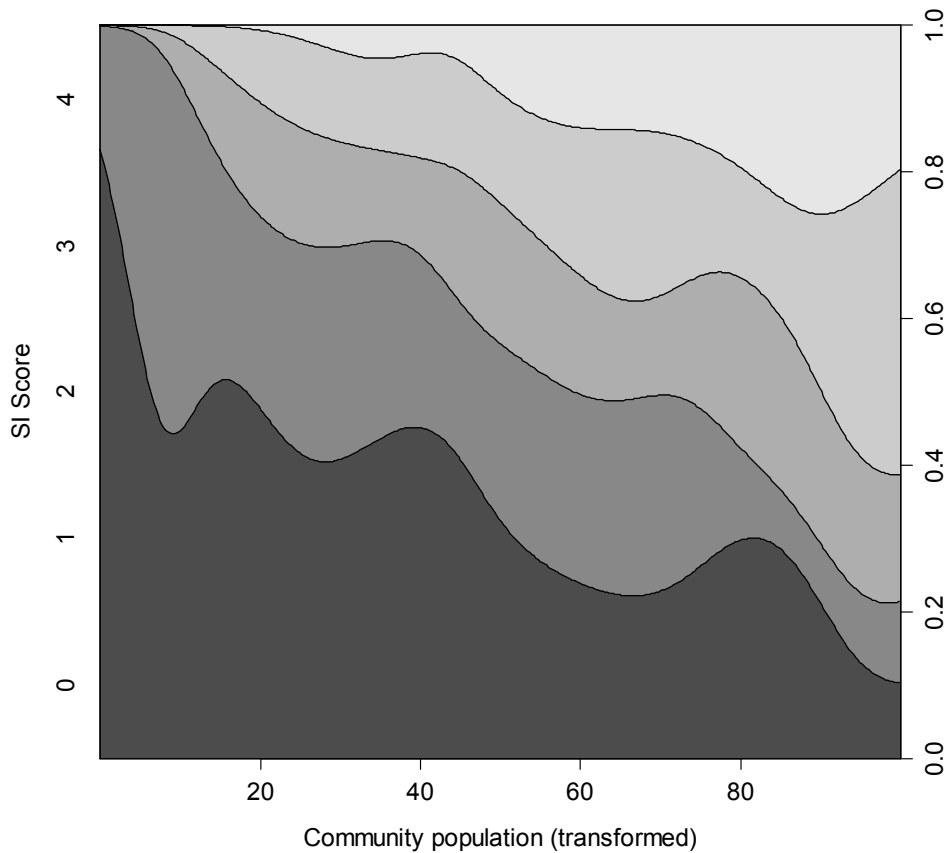


Figure 7. Frequency (conditional density) of SI score by community population size. The greater the community population, the higher the frequency of higher SI scores.

In contrast to the leaders, sixty institutions scored 0, with no assessment, declaration, office(r), or policy. This demonstrated to us a low level of uptake of high-level sustainability initiatives; we categorized them as sustainability initiative laggards. Figure 7 maps the institutional and provincial average SI scores. The territories had the lowest scores (all institutions with SI score=0). The pattern in Manitoba was polarized: of its nine institutions, five were laggards and three were leaders.



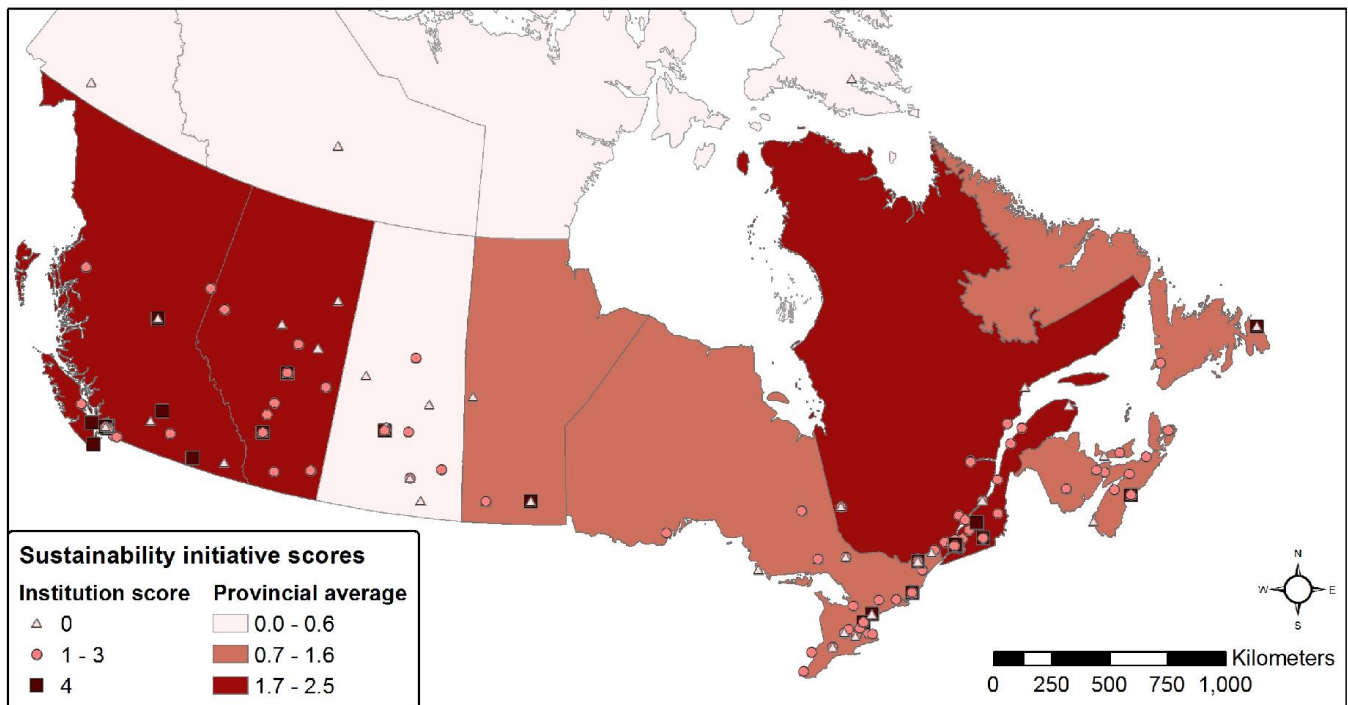


Figure 8. Institution and provincial average SI scores. Leaders have a score of 4, while laggards have a score of 0. Average SI scores are lowest in the territories and SK, and highest in QC and BC.

SI scores were also related to institutional type. Cégeps had the highest mean SI scores ( $\bar{x}=2.7$ ), followed by universities ( $\bar{x}=1.8$ ), and non-Cégep colleges ( $\bar{x}=1.3$ ). Positive SI scores for 160 accredited institutions are presented in Table 4.

## Discussion

The research results have a number of implications for post-secondary education institutions, as well as various other policy actors and institutions concerned with sustainability and education. One of our most striking findings was the strong linkages between the three sustainability initiatives of assessment, office(r), and policy. Of the three initiatives, having a sustainability policy was most popular (110/220 or 50% of institutions had policies), and having an office(r) was least popular (73/220 or 33%). Fifty-one institutions had undertaken all three sustainability initiatives. The strong relationships between these three sustainability initiatives (assessment, office(r), and policy) suggest these initiatives might be

mutually supporting, in that the uptake of one might create more favorable conditions for the uptake of others.

The generally weak relationships between signing a declaration and undertaking other high-level sustainability initiatives was another key finding. Educational institutions have been quite ready to sign declarations, with 105/220 institutions being signatories to at least one sustainability related declaration. The declarations that we examined had signing dates from 1990-2009, which means that institutions had in some cases two decades to pursue other high-level sustainability initiatives. However, institutions that signed declarations frequently had not engaged with other sustainability initiatives: one third of declaration signatories had no assessment, office(r), or policy; most declarations were weakly related to other sustainability initiatives. Declarations have different origins, purposes, and actors, and comparing across this diversity is challenging. Although the overall pattern was that declarations were weakly associated with other sustainability initiatives, there were three exceptions: the Talloires Declaration was moderately related to both CSAF and STARS, and UCPCSAC was also moderately related to STARS.

This suggests that institutions critically reflect on the purpose of each declaration, their intentions in signing it, and on how signing a declaration will integrate with other existing or planned sustainability initiatives. Policy actors developing and championing sustainability declarations might consider what measures could help signatories engage in other high-level sustainability initiatives after signing a declaration.

The sustainability initiative (SI) score helps to understand some of the diversity of institutional responses to sustainability challenges. We recognize that this weighting scheme, like all weighting schemes, is somewhat arbitrary. However, our approach is consistent with our understanding of the data, and helps to interpret the diverse stages of high-level institutional engagement with sustainability initiatives, and the spatial patterns across the country. Institutions in larger communities tended to have higher SI scores. In terms of provincial variation, Saskatchewan and the territories had the lowest

average scores. Québec and British Columbia had the highest average SI scores; this was not because of higher engagement with sustainability initiatives in larger cities, but because of relatively higher scores in smaller communities. There are perhaps unique factors in smaller communities in Québec and British Columbia that operate to promote sustainability initiative uptake. In the case of Québec institutions, the Cégep Vert program played a significant role. Among institution types, Cégeps had on average the highest sustainability initiative scores. This is potentially an example of the leadership role that provinces can play through the provincial level policy environment (i.e., the provincial Cégep Vert program influencing the uptake of sustainability initiatives at the institutional level).

Terminology used in policy titles had shifted over time. “Environment” and “sustainable development” had decreased in usage, while “sustainability” had emerged as the preferred term. We wonder whether these terminological preferences were reflective of any attitudinal or behavioural shifts.

We focused in this study on observing high-level dimensions of the policy environment that demonstrate institutional commitment and leadership, and for which data are sufficiently accessible for a nation-wide census. In particular, we examined a discrete set of high-level sustainability initiatives. Limitations of the research include that it was not within the scope of the study to individually contact each institution to determine any sustainability initiatives undertaken for which information may not be publicly accessible, and institutions may have undertaken high-level initiatives that were not posted on their websites. As a census, this research represents a moment in time, and does not capture the rapidly growing interest in sustainability initiatives, or their implementation after our data collection period.

In addition, the high-level institution-wide sustainability initiatives that we examined in this study represent only some of the ways in which post-secondary institutions are engaging with sustainability. Many institutions have active student sustainability groups, sustainability champions in specific units of institutions, or have implemented particular operational innovations. For example, sustainability issues inform Université St. Anne’s identity, but their efforts were not captured in our

methods. Thus, the high-level initiatives analyzed here are clearly not complete measures of the diversity of sustainability initiatives undertaken at any given institution.

As we move forward with our research on sustainability uptake in formal education in Canada, we will examine the relationships between the results reported in this paper and details of how institutions conceptualize and strategize about sustainability as articulated in the text of their sustainability policies (McKenzie, Bieler, & McNeil, in press; Vaughter, McKenzie, Lidstone, & Wright, in press). Also of interest is how the SI scores relate to sustainability practices evident within institutional contexts, and future research could examine the data reported in this paper, including the SI scores, in relationship to case studies of policy enactment from institutions across the country (Ball, Maguire, & Braun, 2012). In the trajectory of SEPN's research, the census data gathered for these 220 institutions has enabled subsampling for document content analysis (50 institutions selected), and will contribute to site selection for qualitative site analysis research (6 sites are planned). We will examine trends in sustainability policy and practice in relation to the sustainability initiative results reported here. Uptake of sustainability is on the rise among post-secondary institutions, and there is an important role for critical and comparative research on patterns of engagement with sustainability, in the terminologies being used, in the policy-related initiatives undertaken, and in on the ground practice.

## **Conclusion**

We conducted a census of high-level sustainability initiatives at all 220 accredited Canadian post-secondary institutions. We found that sustainability assessments, offices, and policies co-occurred together disproportionately, potentially suggesting positive reinforcement mechanisms. On the other hand, declarations were generally weakly associated with other sustainability initiatives. British Columbia and Québec had the highest average rates of adoption of sustainability initiatives, in part due to relatively higher engagement levels in their smaller communities. Saskatchewan and the Territories had the lowest rates. Terminology in policy titles shifted from “environment” and “sustainable

development” to “sustainability” over time. The analyses here focused on broad-scale patterns at a national scale; they will provide context, and frame subsequent document and site-level research on the relationships between policy and practice.

Table 4. Sustainability initiative (SI) scores.

<b>School</b>	<b>SI Score</b>
Camosun College	4
Capilano University	4
Cégep de Sherbrooke	4
Cégep de Victoriaville	4
Cégep Marie-Victorin	4
Collège Ahuntsic	4
Collège de Rosemont	4
Collège Édouard-Montpetit - Campus Longueuil	4
Concordia University	4
Dalhousie University	4
Durham College of Applied Arts and Technology	4
Humber College Institute of Technology and Advanced Learning	4
MacEwan University	4
McGill University	4
Memorial University of Newfoundland	4
Northern Alberta Institute of Technology	4
Queen's University	4
Red River College	4
Saint Mary's University	4
Selkirk College	4
Simon Fraser University	4
Thompson Rivers University	4
University of Alberta	4
University of British Columbia	4
University of Calgary	4
University of Manitoba	4
University of Northern British Columbia	4
University of Ottawa	4
University of Saskatchewan	4
University of Victoria	4
University of Winnipeg	4
Vancouver Island University	4
Bishop's University	3
Cégep André-Laurendeau	3
Cégep de Chicoutimi	3
Cégep de Jonquière	3
Cégep de La Pocatière	3
Cégep de l'Abitibi-Témiscamingue	3
Cégep de Matane	3
Cégep de Sainte-Foy	3
Cégep de Saint-Hyacinthe	3
Cégep de Saint-Laurent	3
Cégep de Trois-Rivières	3
Cégep du Vieux Montréal	3
Cégep Saint-Jean-sur-Richelieu	3
Champlain Regional College	3

Collège de Maisonneuve	3
Collège Montmorency	3
Collège Shawinigan	3
Confederation College of Applied Arts and Technology	3
Dawson College	3
École de Technologie Supérieure	3
École Polytechnique de Montréal	3
George Brown College of Applied Arts and Technology	3
Institut de technologie agroalimentaire, campus de La Pocatière	3
King's University College Edmonton	3
Kwantlen Polytechnic University	3
Lakehead University	3
Lambton College of Applied Arts and Technology	3
Lethbridge College	3
McMaster University	3
Okanagan College	3
Olds College	3
Royal Roads University	3
Ryerson University	3
Sheridan College Institute of Technology and Advanced Learning	3
Université de Montréal	3
Université du Québec à Montréal	3
University of Guelph	3
University of Prince Edward Island	3
University of the Fraser Valley	3
University of Toronto	3
University of Western Ontario	3
Vancouver Community College	3
Vanier College	3
Victoria University	3
York University	3
Acadia University	2
Algonquin College of Applied Arts and Technology	2
Athabasca University	2
Carleton University	2
Cégep Beauce-Appalaches	2
Cégep de Baie-Comeau	2
Cégep de Drummondville	2
Cégep de l'Outaouais	2
Cégep de Saint-Jérôme	2
Cégep John Abbott College	2
Cégep Limoilou	2
Cégep Régional de Lanaudière	2
Centennial College	2
Collège François-Xavier-Garneau	2
Collège Gérald-Godin	2
Collège Lafèche	2
Collège Lionel-Groulx	2
Collège Mérici	2
Dalhousie Agricultural Campus of Dalhousie University	2
Douglas College	2
Emily Carr University of Art and Design	2

Fanshawe College of Applied Arts and Technology	2
Heritage College	2
Langara College	2
Loyalist College of Applied Arts and Technology	2
Mohawk College of Applied Arts and Technology	2
Mount Allison University	2
Mount Royal University	2
Mount Saint Vincent University	2
Niagara College of Applied Arts and Technology	2
North Island College	2
Ontario College of Art and Design	2
St. Thomas University	2
Trent University	2
Université de Sherbrooke	2
Université du Québec à Trois-Rivières	2
Université Laval	2
Wilfrid Laurier University	2
Assiniboine Community College	1
Bow Valley College	1
Brock University	1
Cambrian College of Applied Arts and Technology	1
Cape Breton University	1
Carlton Trail Regional College	1
Collège Boréal	1
College of the North Atlantic (CNA)	1
Conestoga College Institute of Technology and Advanced Learning	1
École des Hautes Études Commerciales de Montréal	1
Fleming College	1
Georgian College of Applied Arts and Technology	1
Grande Prairie Regional College	1
Holland College	1
La Cité Collégiale	1
Lakeland College	1
Laurentian University	1
Medicine Hat College	1
New Brunswick Community College (NBCC)	1
Nipissing University	1
NorQuest College	1
Northern College of Applied Arts and Technology	1
Northern Lights College	1
Northlands College	1
Northwest Community College	1
Nova Scotia Community College (NSCC)	1
Parkland College	1
Red Deer College	1
Saskatchewan Institute of Applied Science and Technology	1
Seneca College of Applied Arts and Technology	1
St. Clair College of Applied Arts and Technology	1
St. Francis Xavier University	1
St. Lawrence College of Applied Arts and Technology	1
Trinity Western University	1
Université de Moncton	1



Université du Québec à Chicoutimi	1
Université du Québec à Rimouski	1
Université du Québec en Outaouais	1
University of Guelph, Kemptville Campus	1
University of King's College	1
University of Lethbridge	1
University of New Brunswick	1
University of Regina	1
University of Trinity College	1
University of Windsor	1
Algoma University	0
Aurora College	0
Brandon University	0
Brescia University College	0
Campion College	0
Canadian Coast Guard College	0
Canadian Mennonite University	0
Canadore College of Applied Arts and Technology	0
Cégep de la Gaspésie et des Îles	0
Cégep de Sept-Îles	0
Centre for Nursing Studies	0
Collège Acadie Î.-P.-É.	0
Collège communautaire du Nouveau-Brunswick (CCNB)	0
Collège Éducacentre	0
College of New Caledonia	0
College of the Rockies	0
Concordia University College of Alberta	0
Cumberland College	0
Dominican College of Philosophy and Theology	0
École Nationale d'Administration publique	0
First Nations University of Canada	0
Great Plains College	0
Huron University College	0
Institut national de la recherche scientifique	0
Justice Institute of British Columbia	0
Keyano College	0
King's University College London	0
Luther College	0
Marine Institute	0
Michener Institute for Applied Health Sciences	0
Native Education College	0
New Brunswick College of Craft and Design	0
Nicola Valley Institute of Technology	0
North West Regional College	0
Northern Lakes College	0
Nova Scotia College of Art and Design (NSCAD University)	0
Nunavut Arctic College	0
Portage College	0
Redeemer University College	0
Royal Military College	0
Saint Thomas More College	0
Saskatchewan Indian Institute of Technologies	0

Sault College of Applied Arts and Technology	0
Southeast Regional College	0
Southern Alberta Institute of Technology	0
St. Jerome's University	0
St. Paul University	0
Université de Guelph, Campus d'Alfred	0
Université de Saint-Boniface	0
Université du Québec (Télé Université)	0
Université du Québec en Abitibi-Témiscamingue	0
Université Sainte-Anne	0
University College of the North	0
University of Ontario Institute of Technology	0
University of St. Michael's College	0
University of Sudbury	0
University of Waterloo	0
University Sainte-Anne - Collège de l'Acadie	0
Winnipeg Technical College	0
Yukon College	0

## References

- Aboriginal Institutes' Consortium (2005). *Aboriginal Institutions of Higher Education: A Struggle for the Education of Aboriginal Students, Control of Indigenous Knowledge, and Recognition of Aboriginal Institutions*. Canadian Race Relations Foundation: Toronto, ON.
- Association of Canadian Community Colleges (ACCC). (n.d.). List of Members. In *Association of Canadian Community Colleges*. Retrieved October 15<sup>th</sup>, 2012, from <http://acc.ca/xp/index.php/en/members/memberinstitutions>.
- Association of Universities and Colleges of Canada (AUCC). (n.d.). Our Universities. In *Association of Universities and Colleges of Canada*. Retrieved October 15<sup>th</sup>, 2012, from <http://www.aucc.ca/canadian-universities/our-universities>.
- Association for the Advancement of Sustainability in Higher Education. (n.d.). STARS Participants and Reports. In *Association for the Advancement of Sustainability in Higher Education*. Retrieved November 30<sup>th</sup>, 2012, from <https://stars.aashe.org/institutions/participants-and-reports>.
- Ball, S. J., Maguire, M., & Braun, A. (2012). *How schools do policy: Policy enactments in secondary schools*. London: Routledge.

- Corcoran, P. B., Walker, K. E., & Wals, A. E. J. (2004). Case studies, make-your-case studies, and case stories: A critique of case-study methodology in sustainability in higher education. *Environmental Education Research*, 10, 7–21.
- Environnement Jeunesse. (n.d.). CÉGEPs et Collèges Certifiés. In *Cégep Vert du Québec*. Retrieved November 17<sup>th</sup>, 2012, from <http://enjeu.qc.ca/Cegeps-certifies.html>.
- McKenzie, M., Bieler, A., & McNeil, R. (in press). Education policy mobility: Reimagining sustainability in neoliberal times. *Environmental Education Research*.
- Meyer, D., Zeileis, A., & Hornik, K. (2013). vcd: Visualizing Categorical Data. R package version 1.3-1.
- R Core Team. (2013). R: A Language and Environment for Statistical Computing. R Foundation for Statistical Computing, Vienna. <http://www.R-project.org>.
- Statistics Canada. (2011). Population and Dwelling Counts, for Canada and Census Subdivisions (Municipalities). In *Statistics Canada*. Retrieved December 2<sup>nd</sup>, 2012, from <http://www12.statcan.gc.ca/census-recensement/2011/dp-pd/hltfst/pd-pl/Table-Tableau.cfm?LANG=Eng&T=301&S=3&O=D>
- Vaughter, P., McKenzie, M., Lidstone, L., & Wright, T. (in review). Campus sustainability governance in Canada: A content analysis of post-secondary institutions' sustainability policies. *International Journal of Sustainability in Higher Education*.
- Vaughter, P., Wright, T., McKenzie, M., & Lidstone, L. (2013). Greening the ivory tower: A review of research on sustainability in post-secondary education. *Sustainability*, 5, 2252-2271.
- Wright, T., & Pullen, S. (2007). Examining the literature: A bibliometric study of ESD journal articles in the education resources information center database. *Journal of Education for Sustainable Development*, 1, 77–90.

### **About the authors**

Dan Beveridge is a student in the School of Environment and Sustainability at the University of Saskatchewan.

Dr. Marcia McKenzie is an Associate Professor in the Department of Educational Foundations and Director of the Sustainability Education Research Institute at the University of Saskatchewan.

Dr. P. Vaughter: Philip Vaughter is a Postdoctoral Fellow working at the University of Saskatchewan. He studies sustainability policies with a particular focus on climate change, energy, and biodiversity. His current research examines discourses of sustainability in education policy in Canada and the tensions between alternative energy development and biodiversity policy in the Pacific.

Dr. Tarah Wright is Director of the Education for Sustainability Research Group and Professor in the Faculty of Science at Dalhousie University, Canada, where she has played a pivotal role in the successful creation of the Environmental Science Program and the innovative College of Sustainability. Tarah's research focuses on the emerging field of education for sustainable development and she has published numerous papers covering a wide range of issues in sustainability and higher education. Tarah and her family make their home in the city of Halifax, on the traditional lands of the Micmac people, in the Acadian Forest Bioregion, at the edge of the Atlantic Ocean.

### **Acknowledgements**

This publication draws on research from the Sustainability and Education Policy Network (SEPN), supported by a Partnership Grant from the Social Sciences and Humanities Research Council of Canada (Grant No 895-2011-1025). A full list of team members and organizational partners can be found at [www.sepn.ca](http://www.sepn.ca). Our thanks especially to Kathleen Aikens and Laurie Lidstone for their contributions to

the development of the methods and the collection of the data referred to in this paper, and to project manager Nicola Chopin.