ASSESSING SUSTAINABILITY ON CANADIAN UNIVERSITY CAMPUSES: DEVELOPMENT OF A CAMPUS SUSTAINABILITY ASSESSMENT FRAMEWORK

By

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ABSTRACT

Universities are the learning grounds for current and future leaders. They have the potential to offer innovative solutions to some of our greatest global challenges through their research activities. Universities have immense spending power, and shifts in university operations offer many opportunities to improve human and ecosystem wellbeing, locally and globally. The inspiration behind this project came from Canadian, and global, campus sustainability activists and their need to better advocate for, and act upon, campus sustainability objectives.

This project used a participatory action research approach to design a framework for assessing sustainability on Canadian university campuses. It represented the efforts of one graduate student, a team of fifteen co-researchers, and an ad-hoc advisory group. This team worked together to create a working definition of a "sustainable campus," and to define a set of research and action objectives to guide our work. A series of existing sustainability assessment methodologies, indicator selection criteria, and performance benchmarking tools from government, business, education and community organizations were reviewed. These were critically examined in light of the research and action objectives developed by our team. We built our own sustainability assessment methodology using these other tools as launching points. Our methodology included a set of over 175 indicators, short- and long-term performance benchmarks for each indicator, and an aggregation process leading to a campus sustainability index. This methodology went through three major reviews and revisions, where the co-research team and ad-hoc advisors were called upon to help refine and improve upon our methodology. Our resulting methodology was called the Campus Sustainability Assessment Framework (CSAF), and was the primary outcome of this research and action project. Many on-the-ground actions have already been inspired by this project including a national implementation program in Canada, a British Columbian regional implementation program, and a full-scale use of the CSAF at one Canadian university.

> "Education is not merely a matter of training the mind. Training makes for efficiency, but it does not bring about completeness. A mind that has merely been trained is the continuation of the past, and such a mind can never discover the new. That is why, to find out what is right education, we will have to inquire into the whole significance of living."
>
> Krishnamurti, 1996, p. 90

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Finally, I would like to dedicate this project to all current and future campus sustainability advocates who continue to devote themselves to this vitally important issue of incorporating sustainability into the operational, learning and teaching functions of our campuses. I hope that this thesis project provides you with a new tool that helps you to make a difference in the world.

"Be the change you wish to see in the world."
Mahatma Gandhi

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1. INTRODUCTION

> Education is not only learning from books, memorizing some facts, but also learning how to look, how to listen to what the books are saying, whether they are saying something true or false. All that is part of education. Education is not just to pass examinations, take a degree and a job, get married and settle down, but also to be able to listen to the birds, to see the sky, to see the extraordinary beauty of a tree, and the shape of the hills, and to fell with them, to be really, directly in touch with them. As you grow older, that sense of listening, seeing unfortunately disappears because you have worries, you want more money, a better car, more children or less children. You become jealous, ambitious, greedy, envious; so you lose the sense of the beauty of the earth. You know what is happening in the world. You must be studying current events. There are wars, revolts, nation divided against nation. In this country too there is division, separation, more and more people being born, poverty, squalor and complete callousness. Man does not care what happens to another so long as he is perfectly safe. And you are being educated to fit into all this. Do you know that world is mad, that all this is madness – this fighting, quarrelling, bullying, tearing at each other? And you will grow up to fit into this. Is this right, is this what education is meant for, that you should willingly or unwillingly fit into this mad structure called society?
>
> "Since you are young, fresh, innocent, can you look at all the beauty of the earth, have the quality of affection? And can you retain that? For if you do not, as you grow up, you will conform, because that is the easiest way to live. As you grow up, a few of you will revolt, but that revolt too will not answer the problem. Some of you will try to run away from society, but that running away will have no meaning. You have to change society, but not by killing people. Society is you and I. You and I create the society in which we live. So you have to change. You cannot fit into this monstrous society. So what are you going to do? (Krishnamurti, 1974, pp. 14-15).

This thesis is my response to Krishnamurti's question: what am I going to do? I have been involved in the environment and sustainability movements for several years, constantly overwhelmed by the feeling that we are only examining and concerning ourselves with the symptoms of much deeper and more fundamental issues. To me this is what education is really about: the fundamental level where the way in which we view our relationships with the world and other beings in it takes shape. This research is about, at its most base level, facilitating societal transformation through changing the way that higher education institutions learn and teach.

Universities need to be reconstructed as engaged social institutions that function as critical, reflective knowledge and capacity building centers for the next generation of engaged global citizens. Higher education institutions play a unique and important role in society. They are leaders, innovators, and problem-solvers. The current challenge of making progress towards

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sustainability poses a great opportunity for institutes of higher education to realize their role, and responsibility, as societal leader. Champions of campus sustainability are appearing on university and college campuses across Canada and around the world in response to this challenge. Some of them are well-known university presidents and respected academics. Others are students with environmental and social activist roots, and some are students with predilections towards business or engineering. Still others are plumbers, custodians, cooks, campus health service workers, unionists, or managers of physical plants.

The collaborative design and development of this Campus Sustainability Assessment Framework (CSAF) represents a major effort by many students, staff and faculty from Canadian (and some American) university campuses, as well as several government and non-government agencies. The research is grounded in applied and participatory action research and the research questions, approach, methodology, and final product reflect this grounding. It is framed by my belief that universities have a responsibility to their communities, to society, to their students, staff and faculty members, and to future generations (of all species) to find solutions to our current patterns of unsustainability. It is meant to provide a research framework and some boundaries for defining and assessing a "sustainable campus," while being constantly aware of the somewhat limited ability of models and indicators of sustainability to create a true representation of reality. It reflects my beliefs that sustainability is a process not a state, and that it is not likely to ever be reached. Thus the CSAF should be seen as a product created at a specific point in time on a continuum of research, work, redesign and action. Finally, this research reflects my belief that universities need to be leaders in forging new paths toward sustainability, and in finding new and innovative solutions to society's most challenging problems.

Section 1.1. details the motivation behind this thesis, section 1.2 describes some leading Campus Sustainability Assessment Frameworks, and section 1.3. describes the research and action objectives developed to guide our work. The brief chapter descriptions for the rest of the thesis can be found at the end of section 1.3.

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> "What is the good of learning if in the process of living we are destroying ourselves? …Systems, whether educational or political, are not changed mysteriously; they are transformed when there is a fundamental change in ourselves. The individual is of first importance, not the system; and as long as the individual does not understand the total process of himself, no system, whether of the left or of the right, can bring order and peace to the world."
>
> (Krishnamurti, 1996, p. 92)

1.1. Project Motivation

The development of the Campus Sustainability Assessment Framework (CSAF) as a tool to help actuate campus sustainability was motivated by several forces. The most important of these was the Canadian sustainable campus community's demand for such a framework. This community believed that the development of a common, nationally applicable CSAF was necessary to achieve many of the goals and objectives of sustainable campuses work in Canada and that none of the CSAF's currently in use or existence met their needs (these existing CSAF's are discussed in more detail in section 1.2). This community wanted a tool that would help them to:

- *Advocate for policy change in the university sector* by making the CSAF relevant and practicable to the decision-making processes on campus, and by providing information that is relevant to campus government and management structures, and provincial and federal education departments.
- *Compare sustainability performance across individual campuses using a common methodology and indicator set*. This would help campuses that are leading the way towards sustainability to understand how they compare to their colleagues. It would also inspire lagging campuses to take action. The CSAF would help campuses to assess a wide range of different sustainability issues, many of which are not always considered important when campuses work individually to design their assessment scope.
- *Build bridges of communication and understanding about campus sustainability amongst faculty, staff and students.* These communities tend to have very different realities, concerns, and languages. Building these bridges around sustainability issues requires a tool that is theoretically sound and practically grounded, transparently designed, useful, appropriate, and clear to all campus community users. Transparent design would help CSAF practitioners understand the strengths and weaknesses of the tool, how it is designed, and why it was designed as it is.

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- *Influence the government and media nationally and provincially to promote campus sustainability*. Campus sustainability advocates want and need a tool that can help them to raise the profile of these issues in the Canadian higher education sector.

A second major driving force in the development of the CSAF was the growing commitment of the higher education sector to sustainability issues. Over the last decade a series of national and international declarations on sustainability in education have been developed, and many campuses have committed themselves to implementing the declarations' objectives on their own campuses (Wright, 2002). These declarations include (but are not limited to) the Tbilisi Declaration, the Talloires Declaration, the Halifax Declaration, the CRE Copernicus Charter, and most recently the Ubuntu Declaration made at the World Summit on Sustainable Development in August 2002 (International Institute for Sustainable Development [IISD], 1991; University Leaders for a Sustainable Future [ULSF], 1994; Wright, 2002). Environment Canada (2002) also recently released their National Strategy on Environmental Education and Sustainability that aims to further the integration of environment and sustainability learning into both formal and non-formal educational systems. These declarations and strategies diverge slightly in language, but offer some common principles of campus sustainability including:

- moral obligation;
- sustainable physical operations;
- sustainability in research;
- public outreach;
- inter-university cooperation;
- partnerships with government, NGO's and industry;
- inter-disciplinary curriculum; and
- ecological literacy (Wright, 2002).

The third factor motivating the development of the CSAF was the large volume of divergent and uncoordinated campus sustainability activities currently underway on North American campuses. Many books and papers have been published on the topics of ecological literacy, the importance of addressing sustainability on campuses, environmental management on campuses, greening schools, and the responsibility of educational institutions to educate and train their students to be able to deal with environment and sustainability issues, and to be responsible citizens (Clugston, 1999; Clugston and Calder, 1999; Creighton, 1998; Eagan and Orr, 1992; Filho, 1999; Foster, 2001; Heinz Family Foundation, 1995; Keniry, 1995; Krishnamurti, 1996; National

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Round Table of the Environment and the Economy [NRTEE], 1992, 1995; Orr, 1992, 1994, 1999, 2002; Ospina and Osttveit, 2000; Page, 1989; Stapp, Wals and Stankorb, 1997; Thompson and van Bakel, 1995; Uhl and Anderson, 2000 and 2001;UNESCO, 1999; van Weenen, 2000; Whyte, 1999).

A major landmark in the history of the sustainable campuses assessment and action movement in North America was the publication of April Smith and the Student Environmental Action Centers' (SEAC) book, Campus Ecology (1993). This book was spawned from local action taken by a group of students on the University of California, Los Angeles campus, and marks one of the first major campus sustainability assessments in North America (Smith and SEAC, 1993). Many more individual campus assessment projects have been done over the last decade highlighting the diversity of scope, driving forces, scale, methodology and impact of campus environment and sustainability assessment initiatives (Barrett and Macander, 1995; Dahle and Neumayer, 2001; Doherty-Delorme and Shaker, 1999, 2000, 2001; Dowsett Johnson and Dwyer, 2002; Flint, 2001; McIntosh, Cacciola, Clermont and Keniry, 2002; Mount Allison University, 2000; National Wildlife Federation [NWF], 2002; Newport and Chesnes, 2001; Nixon and Glasser, 2002; Penn State Green Destiny Council, 2000; Royal Roads University, 2001; Second Nature, 2002; Sierra Youth Coalition, 2002; ULSF, 2002; University of British Columbia, 2002; University of Calgary Environmental Management Committee [EMC], 1999; UVic Sustainability Project, 2000; Venetoulis, 2001).

As a final motivating factor, Michael Shriberg (2002) recently published a paper that examined some of the most promising international examples of campus sustainability assessment techniques, and suggested that the movement would benefit from the development of cross-institutional assessment tools. He suggested some ways in which campus sustainability proponents would benefit from such a tool, including:

- identifying and benchmarking leaders and best practices;
- communicating common goals, experiences and methods; and
- providing a directional tool to measure progress toward the concept of a "sustainable campus" (Shriberg, 2002).

Shriberg (2002) also offered some suggestions of what an ideal campus sustainability assessment tool would be able to do, based on his research and analysis of eleven different

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tools already in limited use in North America and Europe. This "ideal tool" for cross-institutional sustainability assessments would:

- identify important issues;
- be calculable and comparable;
- move beyond eco-efficiency;
- measure processes and motivations; and
- stress comprehensibility (Shriberg, 2002).

He qualifies these characteristics by saying that this ideal tool would be quite difficult, or even impossible, to live up to in its entirety but that we have several tools currently in existence that offer great potential in meeting these criteria at least in part (Shriberg, 2002). A summary of the most promising and useful tools for the Canadian campus assessment context taken from Shriberg's analysis as well as some additional work done in preparing this thesis follows.

> "It is time, I believe, for an educational 'perestroika,' by which I mean a general rethinking of the process and substance of education at all levels, beginning with the admission that much of what has gone wrong with the world is the result of education that alienates us from life in the name of human domination, fragments instead of unifies, overemphasizes success and careers, separates feeling from intellect and the practical from the theoretical, and unleashes on the world minds ignorant of their own ignorance. As a result, an increasing percentage of the human intelligence must attempt to undo a large part of what mere intellectual cleverness has done carelessly and greedily."
>
> (Orr, 1994, p. 17)

1.2. Leading Campus Sustainability Assessment Frameworks

This research was motivated by a gap in current campus sustainability assessment frameworks in terms of their potential application to Canadian university campuses. It is important to understand and consider the work already done in the campus sustainability assessment field in order to learn from the experiences and perspectives of those who created and used the existing tools, and to improve upon their work in meeting the objectives of this research. This brief review will highlight gaps in tool form and function in order to justify the need for and relevance of this research project, and to fully describe how this research worked to fill these gaps.

Shriberg (2002) highlighted eleven different cross-institutional sustainability assessment tools in his paper. I will review only eight existing CSAF's in detail here, even though in preparing this

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thesis I reviewed many more others as referenced in part in section 1.1. These eight CSAF's were the most useful for our purposes given our research objectives, and the methodology selection criteria described in section 2.2.2. below. Three of the tools that I have selected for review are also in Shriberg's paper, and five are not. Our purposes for reviewing these tools differ slightly, perhaps explaining the difference in tools selected for review. Shriberg's review is more historical and descriptive whereas mine is focused on finding the most recent and leading edge elements of these tools for potential application in this research. Because the tools reviewed here are all quite new, they represent in part an evolution of campus sustainability assessments, as the experiences from reviewing and revising the other existing tools has been an integral part of their development.

One of the tools (Campus Sustainability Assessment Review Project) was actually done by undertaking a very large-scale literature review of campus sustainability assessments that have been done throughout North America (as well as a more limited review of global work) and finding the commonalities, highlights, and best practices from these to form a new tool.

1.2.1. Campus Sustainability Assessment Review Project

This project was initiated by Andrew Nixon and Dr. Harold Glasser at Western Michigan University (Nixon and Glasser, 2002). Andrew Nixon produced a research paper describing the process used in the CSARP to identify and define a set of preliminary campus sustainability assessment guidelines (Nixon, 2002). These guidelines are quite comprehensive and represent the best practices in campus sustainability assessment as found by reviewing over 225 different assessments from around the world, and identifying 55 high-quality assessments for more detailed review. This project closely parallel's the objectives of my research project, but followed a literature review methodology to determine elements of effective campus sustainability assessment. The project is ongoing, and the researchers hope to develop a series of assessment resources and tools applicable to most higher education campuses around the world after first piloting their guidelines at Western Michigan University.

The major strength of this research initiative is that it effectively reviews most of the existing campus sustainability assessments done in North America and Europe and culls out the best ideas from all of them to form a set of assessment guidelines. This research builds on a large history of campus sustainability assessment and works to take it to the next stage in its

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evolution. It is extensive, comprehensive, highly analytical, and very useful work. It covers most sustainability categories, and effectively addresses both people and ecosystem considerations.

A weakness of this work is that it has not been directly informed by either current thinking in terms of gaps in assessment tools and techniques, but simply draws from existing resources. It assumes, to a certain extent, that all sustainability issues have been addressed in at least one of the projects reviewed and may miss some key issues that no project has yet to identify and incorporate. A further weakness is that it has not yet been tested on the ground (although this is in their near-term plans), and it has not had substantial, interactive input from campus sustainability experts. The guidelines do not yet have many details associated with most assessment tools. For example, there are no performance benchmarks that can help guide us to understand what the "sustainable campus" means in terms of performance on a wide range of issues. There is no discussion of how performance will be described in terms of being useful for decision makers. This assessment tool is still in development, however, and has a great deal of potential to of a very high caliber.

1.2.2. Good Company's Sustainable Pathways Toolkit

This toolkit was produced by Good Company, a private sector business based in Oregon, USA, in the summer of 2002. Their objective was to produce a fairly simple and straightforward tool that they could market to potential university and college customers interested in sustainability assessment. The tool has 20 core indicators and 10 supplementary indicators, each with a performance benchmark attached (Good Company, 2002). This toolkit has been used for three small colleges in the USA with good success (Joshua Skov, *personal communication,* 2002).

One of the major strengths of this tool is that it is quite compact and focused, while still maintaining some depth of sustainability issues and coverage of both human and ecosystem dimensions. It is a tool of manageable size and is thus very marketable and useful for high-level decision-makers. It is one of the first campus sustainability assessment tools to attempt benchmark setting. This is done with moderate success even though the benchmarks have been somewhat arbitrarily set and longer-term more challenging benchmarks have not been included. With focus and simplicity comes a lack of detail, which (depending on the needs and objectives of the user) can also be seen as a weakness. There are many important campus sustainability issues that are not part of the toolkit, and as such it is only able to paint a very thin

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layer of understanding of a campuses sustainability impacts. This tool was developed primarily by Good Company, and has had very limited consultation of and involvement by a broader group of campus sustainability experts.

1.2.3. National Wildlife Federation's State of the Campus Environment

This project is unique in North America, and perhaps even in the world. It represents a major effort by the National Wildlife Federation (NWF), a USA-based non-profit organization that has been working on campus environment issues for several years. This organization designed an extensive questionnaire on campus environmental performance and set it to three high-level administrators at each of the 3,907 degree granting higher education institutions in the United States (McIntosh et al., 2002). Information was obtained from at least one of these administrators from 22% of the higher education institutions in the USA.

This project was very extensive, and quite strong in its methodology, engagement of campus leaders, and large sample size. It was performed by an external agency, and gives us a great deal of information about current performance of American higher education institutions on environmental issues. The survey design, review and revision, distribution, analysis of results, and conclusions drawn are all quite fully and transparently described in NWF's report.

This project has many weaknesses, perhaps identifiable because of the transparency in design of this process. The results hinge on survey responses given by high-level administrators only. It is questionable as to how much information they may have on detailed environmental issues, as well as how truthful they are in their reporting. The results are presented in aggregates of four geographical regions in the USA (and total national aggregates) rather than on an institutional or even state scale. This may bury interesting details through aggregation, and may also mean that information is not at a useful enough scale to inspire action. The survey questions are highly skewed towards environmental issues, with social issues not being effectively addressed. Results are presented as grade scores (A, B, etc.), but the method of turning indicator performance into a grade score and of aggregating indicators is not described. Because the organization that performed this assessment is external to the campus community, it is questionable as to how much action will be taken by campuses to improve their performance.

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1.2.4. University Leaders for a Sustainable Future's Sustainability Assessment Questionnaire

This tool takes the form of a questionnaire, with 22 questions requiring responses on a scale of 1 – 5, or open-ended paragraph answers (ULSF, 1999). It was developed by University Leaders for a Sustainable Future (ULSF), a non-profit association of signatories to the Talloires Declaration based in Washington DC, USA.

This tool clearly describes its use of the term sustainability through provision of definitions at the beginning of the Sustainability Assessment Questionnaire (SAQ). This is a definite strength, as it establishes the common ground or starting point from which participants can answer the questions. It is a fairly straightforward questionnaire, does not require intensive data collection or analysis or a great deal of time and covers a range of sustainability issues. Perhaps its greatest strength is that it facilitates dialogue, community and capacity building, and helps with the determination of common objectives for improvement.

The primary weakness of the tool is openly recognized by its creators; it is totally subjective, qualitative, and impressionistic. This limits the ability of the tool's results to be compared across campuses, or even to compare a single institutions' change in performance over time. The tool does miss many possible indicators of sustainability and is quite simplistic in scope, design, and structure.

1.2.5. Auditing Instrument for Sustainability in Higher Education

This tool was developed by the Dutch Committee on Sustainable Higher Education (CDHO) and Niko Roorda (2001). It has 20 issues that are assessed and loosely follows an environmental management system process of plan, do, check and act. The tool is used by bringing in a facilitator from the CDHO to run day-long small-group sessions with a range of campus stakeholders.

The tool is very interactive, and directly involves decision-makers and those affected by decisions in measuring performance. It is engaging and helps to build capacity and understanding of participants in campus sustainability issues. The assessment results are

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visually stimulating and useful for decision-makers. The tool requires workshop participants to describe desired future states of performance, and to define implementation plans on how to reach these future states. Thus it is firmly grounded in action and improvement.

The tool only work with small groups, and it is focused on assessing sustainability in terms of educational performance of individual departments only. It misses many campus sustainability issues in terms of operations, research, finance, governance, etc. It has a very limited, although important scope, and can only assess one academic department at a time. The results rely entirely on the subjective experiences of those participating in the workshop. This limits the ability to compare performance across campuses, and even across departments on the same campus. Thus to assess a whole campuses state of sustainability in terms of education issues only, would take a very long time and require a great deal of human resources. It currently requires the involvement of an expert facilitator, of which there are only currently three in the world, to run an effective workshop and assessment.

1.2.6. Penn State Indicators Report

This project is different from the others in this section in that is was done by an individual campus rather than designed to be cross-institutional. Many campus sustainability assessment projects regard this assessment quite highly and draw from it and that is why I have included it in my review. The Campus Sustainability Assessment Review Project rated Penn State's assessment as the best comprehensive (i.e. multi-category) sustainability assessment in all those that were reviewed (Nixon and Glasser, 2002). This assessment was done by the Penn State Green Destiny Council, of Pennsylvania State University in 2000 (Penn State Green Destiny Council, 2000). It covers 33 different indicators of campus sustainability issues and rates each one using a 4-point system.

This is one of the most comprehensive campus sustainability reports produced to date by a North American campus. It is well written, and represents work done by a diverse team of campus stakeholder groups. Each indicator discusses the relevance of the issues, what level of performance is given and why, best practices from other campuses, and short- and long-term recommendations for improvement at Penn State. The report is likely quite useful for decision-makers in setting priorities for action.

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This report is weak in its coverage of sustainability issues; many are missing from the assessment. The process of defining the indicators and deciding which ones would be a part of the assessment is not transparently described. The performance criteria for each indicator and its associated performance rating are also not transparent.

1.2.7. Maclean's Magazine Annual Guide to Canadian Universities

This assessment is produced annually by a Canadian weekly magazine as a special edition (Dowsett Johnson and Dwyer, 2002). They divide universities into three types and then assess each school according to six main categories, each with a subset of indicators. Each Canadian university is then ranked as compared to all of the other campuses in their "type". This is a very limited assessment of social issues and not a sustainability assessment tool in the same category as the others that have been reviewed. It was included in this review because of its importance and high regard in the university sector, and ability to generate public interest in university assessment issues.

The strength of this assessment is its widespread use, popularity, and recognition. Maclean's magazine is held in relatively high esteem, and this particular publication is well-known and reviewed in the Canadian university community. The data collection and analysis are quite rigorous, and the results have been very useful, or at least motivational, for university decision-makers.

The main weakness of this assessment in terms of sustainability issues is that it only addresses a limited number of social issues and is not a sustainability assessment per se, nor does it claim to be. It is meant to help prospective students in their university selection, and as such addresses issues like library holdings, reputation, grade point averages, faculty and finances. Many social equity issues are not addressed and environmental issues are not at all considered. The selection of indicators, designation of weightings, performance assessment criteria, data collection, and almost all other inner workings of the assessment are not transparently described or participatory.

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1.2.8. Canadian Center for Policy Alternatives Missing Pieces Reports I, II, and III

This report is published annually by the Canadian Center for Policy Alternatives (CCPA), a non-profit organization, in direct response to gaps in the annual Maclean's guide (Doherty-Delorme and Shaker, 1999; 2000; 2001). CCPA felt that the highly popular Maclean's guide did not include critical issues of post-secondary education quality, including equity, accessibility, affordability, opportunity, quality, and public accountability.

This report is strong as it has enjoyed substantial interest and support from the Canadian university and non-profit communities as an effective and important supplement to Maclean's work. It gets quite a bit of publicity, and is an effective advocacy tool. Data is taken primarily from Statistics Canada, thus adding a level of validity and soundness to CCPA's analyses.

There are many weaknesses of this report as well. It addresses a very limited range of social issues only, and still misses many important ecological concerns in terms of campus sustainability. Rankings are done at the provincial, rather than at the institutional level, thus making direct correlation with Macleans difficult. It also may not inspire individual campuses to take action as their own performance is buried in a provincial average. CCPA ranks provinces in a relative way without defining a performance objective, or a short- or long-term target. This is of limited use in determining how well or poorly campuses are doing absolutely in terms of sustainability. The development of the indicators and the assessment tool has been done by the editors alone, and the whole process is not very participatory or transparent in nature.

1.3. Research and Action Objectives

The four motivational drivers for this project discussed in section 1.1, and the gaps in current CSAF literature described in section 1.2 led to the development of the research and action objectives for this thesis. It must be noted that these objectives formed a starting point for this research, and that the objectives evolved over time through the participatory action research process (described further in Chapter 2). This project aimed to answer the following questions:

1. What is the definition of "sustainable campus" that universities are working towards?

2. What methodological structure should a Campus Sustainability Assessment Framework use? What criteria should be used to assess different methodological options in terms of their applicability to the campus setting? How should these criteria be determined?
3. What indicators should be used to assess campus sustainability? What criteria should be used to select these indicators?
4. How will performance benchmarks be set for the indicators? What will these performance benchmarks be?
5. How can a participatory action research approach be used to address all of the above research and action objectives?
6. What is required to bring the resulting Campus Sustainability Assessment Framework into the community to be acted upon?

The remainder of this thesis is designed to address these research and action objectives, and to describe how this project evolved and grew over the two years that it was in development. Chapter 2 addresses the methods used in the project, including both process and substance methods, as well as the convergence of the two. Chapter 3 describes the resulting Campus Sustainability Assessment Framework and its supporting outcomes. Chapter 4 discusses challenges and struggles faced along the way, and gives description of why certain decisions were made. Chapter 5 suggests opportunities for future research and action, and discusses some of the new initiatives that have already been spawned from this research. The final section provides a list of the references sourced in this project.

Appendix I is the Campus Sustainability Assessment Framework, and the primary result of this research. Appendix II is a series of excel spreadsheet calculators to help with assessing some of the indicator measures as well as to provide a template for useful campus sustainability data. Appendix III describes the indicators that were part of earlier drafts of the CSAF and then later omitted, and why they did not become part of the final CSAF. Appendix IV is another excel spreadsheet calculator designed to help with indicator management, and has the proposed aggregation calculations built in. Finally Appendix V is a short table that reviews the major sustainability assessment methodologies that were reviewed in creating the CSAF.

> "If you are thinking a year ahead, sow a seed. If you are thinking ten years ahead, plant a tree. If you are thinking a hundred years ahead, educate the people. "
>
> Chinese Poet, 500 B.C.

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2. METHODS

The methods chapter is divided into three sections: process, substance, and convergence. The process section (2.1.) addresses the participatory action research method used to engage campus sustainability experts in the design and development of the Campus Sustainability Assessment Framework (CSAF). Section 2.2. describes the method of researching, designing and developing the CSAF tool, and delves into the body of literature dealing with different sustainability assessment, indicator development, and benchmark setting methodologies. Section 2.3 describes the convergence of process and substance; how the iterative development process created the final CSAF described in Chapter 3.

2.1. Process: Participatory Action Research

A participatory action research (PAR) approach was used as the basic process methodology in this research. In order to use this methodology I had to determine what exactly participatory action research was, and how it would work for myself, my supervisors, and for co-research team members in this specific project. There were some challenges faced in defining PAR, and in developing a working model of using a PAR methodology in designing the CSAF.

Orlando Fals-Borda (1985, p. 18) describes PAR as "a philosophy of life as much as a method, sentiment as much as a conviction." Peter Reason (1994, p. 325) describes it as a "living process of coming to know rather than a formal academic method." Robin McTaggart (quoted in Reason and Bradbury, 2001) wrote that "the aim of participatory action research is to change practices, social structures, and social media which maintain irrationality, injustice, and unsatisfying forms of existence." Reason and Bradbury (2001, p. 1) further describe PAR as follows:

> There is no 'short answer' to the question 'What is action research?' But let us say as a working definition… that action research is a participatory, democratic process concerned with developing practical knowing in the pursuit of worthwhile human purposes, grounded in a participatory worldview which we believe is emerging at this historical moment. It seeks to bring together action and reflection, theory and practice, in participation with others, in the pursuit of practical solutions to issues of pressing concern to people, and more generally the flourishing of individual persons and their communities. Reason and Bradbury, 2001, p. 1

In reviewing the PAR literature, some descriptive principles of practice can be gleaned. PAR:

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- Is action by and for the people engaged in the research (Reason, 1994)
- Empowers people by revealing the ways in which the powerful monopolize the production and use of knowledge for their benefit (Reason, 1994)
- Is constructed through action and reflection on action by individuals and communities (Reason, 1994)
- Is radically plural, and always open (Lincoln and Denzin, 1994)
- Rejects the traditional subject-object relationship between the researcher and the 'researched' and instead asserts the ability of people to participate as equals in the creation of legitimate knowledge (Fals-Borda, 1985)
- Validates and verifies the resultant knowledge through a collective endeavour that is relative and internal to the collective (Friere, 1970)
- Challenges us to be more self-skeptical and to change our actions (Wadsworth, 1998)
- Is fundamentally about the right to speak (Hall, 1993)

The assessment methodology development literature also offers insight in designing our PAR process. Holland (1997) writes that the process of designing a sustainability assessment framework, and the people involved in that process, directly informs the scope and type of indicators chosen. Several additional authors give advice on the process of selecting indicators and designing an assessment and the literature outlines two general approaches proposed in this kind of process: top-down and bottom-up (Industry Canada, 1997; Hodge and Prescott-Allen, 1997; O'Riordan, 1998; Valentin and Spangenberg, 2000). A top-down approach begins with a group of "experts" (and support staff) publishing a report that defines both the framework and the indicator set. It is expected that decision-makers and communities then use this methodology, with minor modifications, to meet local conditions if necessary. This approach often results in a more homogeneous and scientifically valid set of indicators, although it likely lacks the inclusion of community priorities. A bottom-up approach is driven by a participatory process, and community opinion leaders, decision-makers, and other stakeholders define the indicators and assessment framework. The framework may then be finalized by a group of "experts." This kind of approach is more likely to create community buy-in, and to reflect community priorities. It may not cover all sustainability issues, however, due to particular community and stakeholder focus issues. Different initiatives are using different strategies for sustainability assessment techniques depending on their values, context, end-uses, and needs. A mixed top-down and bottom-up approach is also possible, and could be used to describe the

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process used in this project as the co-research team members were both the "experts" and the "community."

The co-research team used the perspectives and advice given by these authors as a launching point in our PAR driven development of the Campus Sustainability Assessment Framework. We did not feel confined to a particular process or specific outcome in our research, but were constantly conscious of the process that we followed, the decisions that were made, and who was involved in the decision-making process. The team worked to be self-reflective. Additionally, I constantly reflected upon my motivations, and whether or not the decisions that I was making were effectively representing the co-research team's needs and perspectives (more detail on team selection and roles can be found in sections 2.1.1 – 2.1.4 below). Some of the ways in which the PAR ethic was actualized in this project include:

- Engagement of a moderately diverse co-research team of experts and university community members who have a stake in the outcomes of the research, and/or whose work we hope to change as a result of the research
- Iterative process of problem definition, option analysis, creation, review, and recreation of our final product
- Commitment to action as a primary result of the research, with efforts being put into implementation of the research as it was being done
- Openness in communicating the challenges faced in our PAR process, and the areas in which we failed to be as participatory as possible
- Engagement of new co-researchers through the research to fill in the holes of inadequate information and under-representation of certain "groups." New members were also engaged as they emerged in order to facilitate expanded learning involved with the research, and to make an investment in the "next generation" of experts to follow-up on this research and action project.
- Use of external facilitation at key points in order to create a more equitable relationship between co-research team members and myself, the principal researcher.
- Use of a range of communication and media tools to meet the needs of different users.

Wadsworth (1998, p. 7) offers an anecdote that quite accurately portrays our use of PAR in this project:

> There is not participation followed by research and then hopefully action. Instead there are countless tiny cycles of participatory reflection on action, learning about action and then new informed action which is in turn the subject of further reflection.

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Fundamentally, I wanted this research to mirror the practice, processes, and results that I was trying to encourage on university campuses and PAR gave me an effective tool with which to do this. As Levin and Greenwood wrote (2001):

> …universities exhibit few of the characteristics of learning organizations. The irony of this situation should not be lost from view. The institutions that claim the position of the premier and most advanced knowledge producers in society frustrate learning and social change in most of their internal processes and in their articulation with the surrounding society.

From identifying and selecting the co-research team, through to learning about their experiences at the end of the project, I wanted to model new ways of learning, sharing ideas, and engaging people in creating their own knowledge and capacity. I wanted to demonstrate to the university community, both through our research process and through our research outcomes (the CSAF), new ways of learning, teaching, and behaving in a world working towards sustainability. I wanted to demonstrate that research does not have to follow a strict scientific method, be totally objective (if that is ever possible), or be completely theoretical in order to be valid. Instead it can be flexible, engaging, responsive to the needs of those who will use it, organic, practically useful, inspirational, and democratic.

This "process" section goes into further detail below about some of our participatory action research processes. This includes securing research sponsors (2.1.1.), defining project objectives and team roles (2.1.2.), the team selection process (2.1.3.), the project timeline (2.1.4.) and finally our methods of communication (2.1.5.).

> "Though there is a higher and wider significance to life, of what value is our education if we never discover it? We may be highly educated, but if we are without deep integration of thought and feeling, our lives are incomplete, contradictory, and torn with many fears; and as long as education does not cultivate an integrated outlook on life, it has very little significance."
>
> Krishnamurti, 1996, p. 89.

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This was not as interactive or versatile as Community Zero, but it met our communication needs sufficiently and was offered at no charge to users.

The most intense communication within our group was our in-person meeting held at Royal Roads University in Victoria, BC from July 18 – 21, 2002. Nine of the 15 members of the team were able to attend in person, either for all or part of the meeting. One of the absent team members participated in three conference calls scheduled during the meeting, and one other team member participated in one of the conference calls. This meeting was facilitated by Jane Worton, a person external to the process and hired to assist with the design and movement of the meeting. She was also responsible for collecting and reporting on feedback received from co-research team members after the meeting so as to maintain some confidentiality between myself and individual co-research team members. She was selected because of her facilitation expertise, as well as her significant knowledge and understanding of campus sustainability issues. After this meeting Jane became a full and active member of the co-research team, thus explaining why she is listed in section 1.1.2 above. This is indicative of an evolutionary and organic participatory action research process; the emergence and identification of new co-researchers during the process.

The co-research team had conference calling services made available to us through the generosity of Environment Canada. We used this communication tool very sporadically. Once in preparation for the co-research team meeting in Victoria, BC, three times during the meeting in order to connect absent co-research team members, and once for the major review of CSAF draft II in preparation for production of the final version.

Individual e-mail and phone conversations were also used periodically through the project, on an as needed basis as determined by either myself, or by individual co-research team members. Some direct mailing of materials was also done in order to supply members of the co-research team with reading materials in preparation for our in-person meeting. Analysis of the effectiveness of these communication strategies can be found in Chapter 4.

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> "No institutions in modern society are better able to catalyze the necessary transition (to a sustainable world) than schools, colleges and universities. They have access to the leaders of tomorrow and, through alumni, the leaders of today. They have buying and investment power. They are widely respected; consequently what they do matters to the wider public."
>
> David Orr

2.2. Substance

This section describes how we came to use the campus sustainability assessment methodology, indicators, aggregation, and benchmarking process that we describe in Chapter 3. There are many methodological options available for assessing sustainability. This is a rapidly growing field, and many international, national, provincial and local governments, businesses, non-profit agencies, community organizations, and other institutions are developing their own versions of sustainability assessment (Atkisson, 2002; Elkington, 1998; GRI, 2000, 2002; Grafé-Buckens and Beloe, 1998; Hillary, 2000; Hodge and Prescott-Allen, 1997; ICLEI, 2002; IISD, 2002; Maclaren, 1996; NRTEE, 1995, 2001; Redefining Progress, 2002a, 2002b; Schoffman and Tordini, 2000; UK DoE, 1996; UN CSD, 1996; Valentin and Spangenberg, 2000; Von Meyer, 2000) . Section 2.2.1. describes the working definition of a "sustainable campus" used to contextualize the CSAF. Section 2.2.2. describes what sustainability assessment methodologies were reviewed in order to design our Campus Sustainability Assessment Framework (CSAF). Section 2.2.3. describes the different indicator selection options available to us and the method that we used to select the CSAF indicators. Finally, section 2.2.4. discusses options available in performance benchmarking, and in aggregating indicator performance into an index.

2.2.1. Defining a "Sustainable Campus"

One of the first tasks of the co-research team was to define what exactly a "sustainable campus" is. The co-research team developed this working definition:

> A sustainable campus community acts upon its local and global responsibilities to protect and enhance the health and well being of humans and ecosystems. It actively engages the knowledge of the university community to address the ecological and social challenges that we face now and in the future.

All of the team members had previously worked with the concepts of environment, social justice, sustainable development and sustainability, but each member had their own personalized

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definition of what a "sustainable campus" meant to them. This co-development of a working definition was an important first step in defining what we were working towards in this project, and the broader movement as well. It also helped to ensure that the co-research team members were all starting from the same ideological understanding of campus sustainability in order to be able to move forward together. This definition should be seen as a working model, one that needs to be continually revised over time. This definition represents the collective effort of a small group of campus sustainability practitioners to define what it is that we hope this framework will help campuses to work towards.

2.2.2. Sustainability Assessment Methodologies

There are many sustainability assessment tools already in existence, all of which had something to offer the co-research team in our quest to build a Canadian campus-specific tool. Thus rather than starting from scratch, 13 of these tools were selected for a careful review and examination of their potential applicability to our purpose. The co-research team developed a set of 7 criteria that were used to assess each of the 13 methodologies on their performance on key issues of importance for us in our campus sustainability work. These 7 criteria resulted from a review of an already rich body of literature on this subject, combined with the expertise and needs of the co-research team (Bell and Morse, 1999; Canadian Comprehensive Auditing Foundation [CCAF], 1993; Canadian Institute of Chartered Accountants [CICA], 1994; Hodge, 2000; Organization for Economic Cooperation and Development [OECD], 1998). This set of "methodology assessment criteria" was:

1. *Balanced treatment of human and ecosystem dimensions of sustainability*. Human and ecosystem dimensions should be balanced and comprehensive in their coverage and be addressed in a holistic and integrated fashion. This degree of holism needs to be an integral part of the assessment tool's structure to ensure that skewed assessments cannot result.
2. *The tool must give useful results.* The output of the assessment methodology should be in a format that is useful for decision-making and taking action. This means that it should be easily communicable, consistent, allow for comparisons to be made, and show trends over time. Results should have the ability to catalyze change. The tool should assist decision-makers in developing goals and targets for action.
3. *The tool must address issues of equity*. Intergenerational, cultural, gender, class issues as well as access to resources and services issues should be addressed in an effective tool.

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4. *The design of the tool must be transparent*. The design of the tool should clearly describe the following in order for it to be understood, critiqued, and defended:
   a. How the indicators were chosen, and how they are organized and perhaps aggregated,
   b. Sources of data and honest reflection of data bias, information gaps, and other data source issues,
   c. Data collection methodologies used,
   d. What the criteria were for assessing the performance of each indicator and how it relates to making progress toward sustainability,
   e. Level/degree of rigor in the design of the tool and analysis of information,
   f. Any bias/values embedded in the design of the tool, and
   g. The definition of "sustainability" being used in the assessment as it describes the paradigm from which everything else is viewed and assessed.
5. *The tool must be accessible*. The design, use, and outputs of the tool should be user friendly, visually appealing, and clear. Application of the tool should be cost-effective so that users with different financial and human resource capacities can use it. The design of the tool should be accessible given the knowledge, capacity, and organizational style of the users.
6. *The tool must be adaptable.* The tool should be adaptable to and appropriate for the unique demands and needs of the users, and their unique context. The tool should be able to reflect different scales, cultures, and values of the group that is using it, and will vary slightly according to what they are trying to accomplish. The tool should be able to include different spatial and temporal scales as required by the nature of the campus environment.
7. *Participatory process in tool development and use.* The design of the tool should incorporate the perspectives and values of the communities that will use it. Those who will use or be affected by the use of the tool should be actively engaged in the application and use of the tool on-site.

Each of the 13 existing sustainability assessment tools was reviewed carefully according to these 7 criteria. These were reviewed separately from the campus specific sustainability assessment tools in order to widen our range of literature reviewed to some other leading edge tools from other sectors (the review of the campus specific tools can be found in Chapter 1). A summary of the review of these non-campus specific tools is available in Appendix V. Twelve of the tools are included in the summary table and include:

- Global Reporting Initiative (GRI, 2000, 2002)
- ISO 14 000 Series (Hillary, 2000; Schoffman and Tordini, 2000)

- OECD Guidelines on Multinationals (OECD, 2002)
- Triple Bottom Line (Elkington, 1998)
- The Natural Step (Chambers et al., 2000)
- Ecological Footprint (Chambers et al., 2000; Redefining Progress, 2002a)
- Compass of Sustainability (Atkisson, 2002)
- Local Agenda 21 (ICLEI, 2002)
- National Round Table on Environment and Economy (Center for the Study of Living Standards, 2001; NRTEE, 2001)
- UN Commission on Sustainable Development, Dashboard of Sustainability (IISD, 2002; UN CSD, 1996)
- Other UN Reports, including GEO, HDI (Industry Canada, 1997)
- Genuine Progress Index (Redefining Progress, 2002b)

The 13th tool to be reviewed was Wellbeing Assessment, by Robert Prescott-Allen (2001). This was the tool selected by the co-research team to use as a model for our assessment tool as it met the methodology assessment criteria most fully. Wellbeing Assessment (as described in the Wellbeing of Nations) features a hierarchically organized set of indicators rooted in the "egg of sustainability" where the ecosystem is the white of the egg, and the human system the yolk. It offers rigorous and transparent design, allows some manipulation by users, a method for aggregating indicators into an index, addresses equity, and treats human and ecosystem dimensions equally. Wellbeing Assessment thus became the starting point for the development of our Campus Sustainability Assessment Framework.

> "We cannot solve the problems that we have created with the same thinking that created them."
>
> Albert Einstein

2.2.3. Indicator Selection

An indicator of sustainability is defined as a package of data in order to simplify, quantify and communicate complex and detailed information for use by decision-makers, policy-shapers, and the public (Chambers et al., 2000; Rodenburg, 1995; van Delft, 1998). The co-research team had a large body of literature to draw from in determining how our indicators would be selected

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(Chambers et al., 2000; Grafé-Buckens and Beloe, 1998; Maclaren, 1996; OECD, 1998; O'Riordan, 1998; Prescott-Allen, 2001; Rodenburg, 1995; United Kingdom Department of Environment [UK DoE], 1996). We used this literature to develop our "indicator selection criteria", but not to determine the specific set of indicators that we would use. Our specific indicator set was developed using the experience, values, and expertise of the co-research team. The co-research team agreed that these criteria should be seen as describing the "ideal indicator", and that in reality all of our indicators would not likely meet all seven of the criteria. The set of criteria that the co-research team agreed to use in determining a "good indicator" was that it is:

1. *Based on accurate, available and accessible data of known quality*. Can high-quality data be found and accessed?
2. *Representative of the phenomena being measured.* Does the indicator actually represent the larger phenomenon that it is attempting to paint a picture about?
3. *Relevant to users, decision-makers, local and global sustainability challenges*. Does the indicator help decision-makers to take action? Does it clearly and succinctly describe a phenomenon? Does it make sense in terms of making progress towards local and global sustainability? Does it inspire action?
4. *Understandable to the university and broader communities*. Does the indicator clearly describe a particular phenomenon in a language that is accessible to the communities that will use the results?
5. *Geographically and temporally comparable.* Does this indicator take into account both short- and long-term time scale effects, and both local- and global geographic effects into account?
6. *Attached to a clear and ambitious goal.* Does the indicator let the user know which direction to head when aiming for improvement towards a more sustainable state?
7. *Reflective of the university's capacity to effect change.* Is the university able to take action on improving indicator performance without relying on other people to make decisions?

Once agreed upon by the co-research team, these criteria were used in conjunction with the indicator development process as discussed in section 2.3. to further define, review, cut and add indicators to the set.

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2.2.4. Benchmarking and Aggregation

Our starting point for setting benchmarks of performance came from Wellbeing Assessments' "barometer of sustainability" method (Prescott-Allen, 2001). This process had several useful insights to offer us in our work. The first was a set of tools and techniques to use when setting performance criteria, or benchmarks. These included:

- Estimated sustainable rates
- Estimated background rates
- An ecological or social threshold
- International (or national) standard
- International (or national) target
- Expert opinion
- Derivation from a related indicator
- The judgment of participants (Prescott-Allen, 2001).

Prescott-Allen (2001) then used these tools to develop a barometer of sustainability for each indicator used in Wellbeing of Nations. Each indicator had five bands of performance, where at least one level of performance was set through one/several of the above mechanisms, and the other bands were then set in relation to it. The five bands of performance were labeled bad, poor, medium, fair, and good.

Many of the benchmark setting tools available to other assessment methodologies like Wellbeing Assessment were not available to us in the campus sustainability movement. We do not have established national targets for sustainability on university campuses. We do not have regulations or guidelines governing performance. We do not have best practices in performance on these indicators available to us in a concise and accessible format. It also seemed a bit too ambitious to set five different levels of performance at this early stage in the campus sustainability movement. The co-research team decided that two performance levels would suffice: one shorter-term benchmark that could be shifted over time, and one long-term goal that represented the "sustainable state," recognizing that this is a moving target and not likely to ever be attained. The first three criteria from the above list (rates and thresholds) were used to set the long-term "sustainable state" goals, and we used the tools of "expert opinion" and "the judgment of participants" to set our short-term benchmarks.

After we had explored this general benchmark setting process we needed to find an indicator aggregation methodology. Aggregation is a method of bringing many individual indicator performance levels into a more cohesive and concise measure. Prescott-Allen's method of

These are then broken down into ten dimensions, numerous elements and sub-elements until the level of indicators is reached. A brief summary of the CSAF is offered in section 3.1.

The third piece is Appendix II, the CSAF calculators. This document is a series of Excel spreadsheets designed to help users with the calculations involved in some of the indicators. These calculators are referenced in the "measurement units" column of Appendix I for the relevant indicators. Appendix III is a listing of the indicators that were part of earlier drafts of the CSAF but were cut along the way for detailed reasons listed there. Appendix IV is an indicator management and aggregation tool also in an Excel spreadsheet format. It is meant to help practitioners manage the assessment of the indicators, and initiate a preliminary discussion on how to aggregate final performance into the campus sustainability index. The aggregation process proposed in Appendix IV is described in more detail in section 3.2. Appendix V is a critical summary of different sustainability assessment methodologies currently in existence, and describes their strengths and weaknesses in terms of our campus application as was discussed in section 2.2.2.

3.1. Overview of the CSAF

As described in section 2.2.2., this framework began as a slightly modified version of Robert Prescott-Allen's 'Wellbeing Assessment'[i] (2001). Through working with the CSAF, trying to shape and mold it to the university campus context, and through piloting it with over 130 different sustainable campus proponents, the CSAF has evolved substantially. It has become a true mélange of different sustainability assessment tools, and incorporates significant contributions from our own unique perspectives, ideas, and innovations. The co-research team has worked hard to bring all of these pieces into a coherent and cohesive whole.

Figure 1 represents our egg of sustainability, differing fundamentally from Wellbeing Assessment's version (Prescott-Allen, 2001). This schematic shows that the people subsystem lies within the eco-subsystem, representing its supportive function, and that each subsystem needs to be healthy in order for the whole system to be functional and healthy. Within each of the subsystems are five major categories, or "dimensions", representing the key campus sustainability issues identified by the co-research team. The ecosystem dimensions are air, water, land, materials, and energy. The people dimensions are knowledge, community, economy and wealth, governance, and health and wellbeing. This differs substantially from

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Prescott-Allen's (2001) set of 10 dimensions, thus essentially disqualifying our final product from being a true "Wellbeing Assessment," as that would require us to have kept the 10 dimensions the same as his. We have also illustrated our dimensions as being contained within the figure, rather than as external to it as is done in Wellbeing Assessment (Prescott-Allen, 2001). Each of these 10 dimensions is then further broken down in the framework into "elements" and "sub-elements" until the level of indicators is reached. This breakdown is shown in Figure 2. For the complete version of the CSAF, please review Appendix I.

Figure 1. The CSAF egg of sustainability, representing the highest level of organization in the hierarchy of the CSAF indicators.

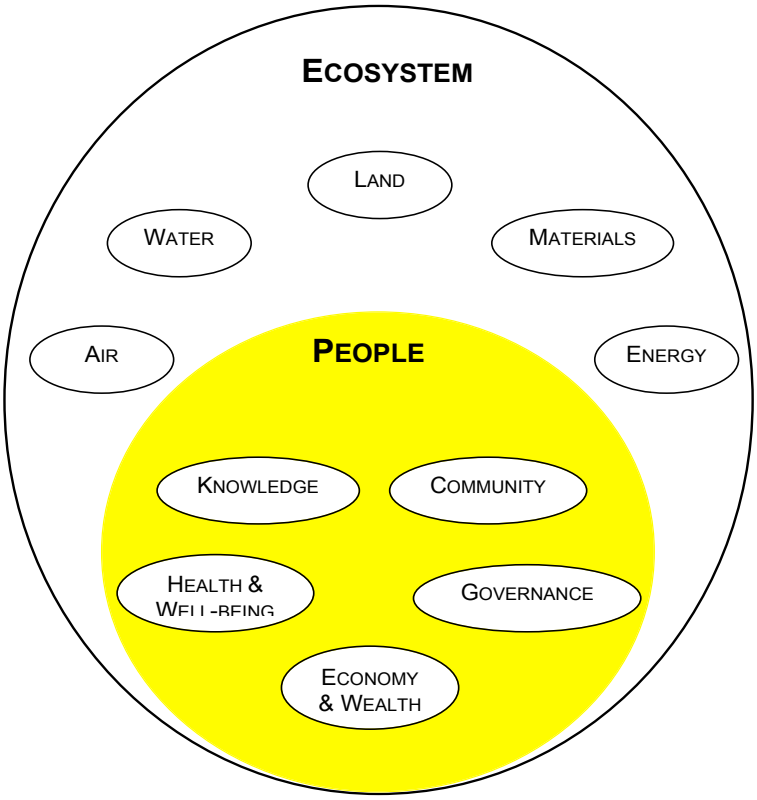

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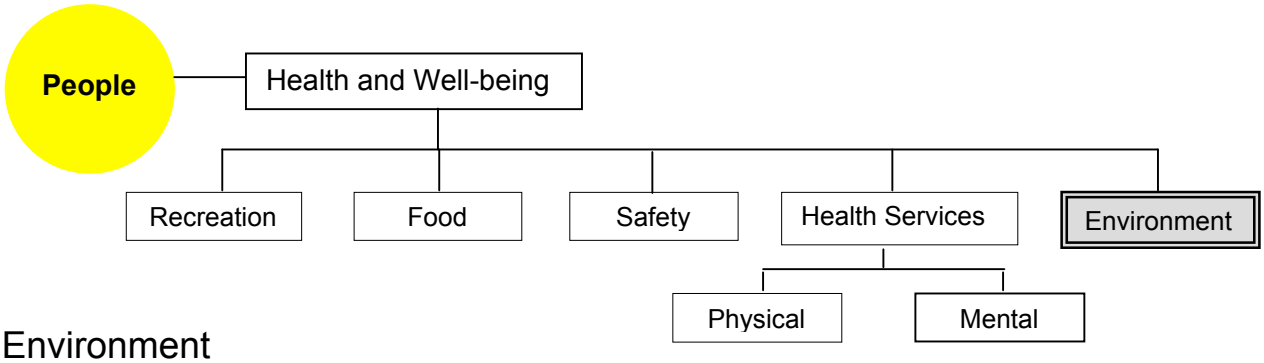
Figure 2. This figure is an excerpt from Appendix I, showing how the "people" subsystem is broken down into 5 dimensions, one of which is "Health and Well-being." This dimension is then divided into 5 elements. Each of these then has a set of indicators associated with it, and may also have further organizational levels before indicators are reached (as is the case with Health Services which is broken down further into 2 sub-elements). This figure shows how "Environment" is described in terms of its significance, and its indicators and benchmarks.



Environment

Issue: Although there is a whole series of environment indicators, these ones link environmental issues specifically with human well-being as a vital convergence in sustainability work on campus.

Indicators and Benchmarks:

NO.	INDICATOR	MEASUREMENT UNITS	SHORT-TERM BENCHMARK	LONG-TERM GOAL
HW-20	Square footage of greenspace (accessible to the CC – i.e. public) per CCM within one kilometer of campus.	Total square footage of greenspace within 1 km of campus (both on- and off-campus, that is accessible to the whole CC) divided by the total number of CCM's.		
HW-21	Percent of unoccupied classrooms and offices with noise levels of 35 decibals or less.	Number of unoccupied classrooms and offices with noise levels of 35 decibals or less, divided by the total number of classrooms; multiply by 100.	At least 50%	100%
HW-22	Difference between uplight levels on campus, and ambient uplight levels.	Subtract average uplight level above built campus space (in footcandles) from ambient uplight levels. Divide the difference by the built campus uplight levels; multiply by 100.	25% or less contribution of campus lighting to uplight levels.	Zero

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3.2. Indicator Aggregation

The CSAF contains over 170 different indicators organized into ten major categories, or "dimensions", as described in section 3.1. In order to make this extensive list more manageable for users, a proposed indicator aggregation process has been included in the outcomes of this project. This will eventually help to facilitate the translation of performance for each indicator into an aggregated campus sustainability index. Appendix IV is an Excel spreadsheet designed to help with the indicator management, and describes the proposed aggregation process. This initial aggregation method is quite simple, and should be viewed as a first, rough attempt at developing a campus sustainability index in order to stimulate dialogue on the subject. It was inspired by the Leadership in Energy and Environmental Design (LEED™) program, as was described in section 2.2.4. (USGBC, 2002).

Each indicator in the campus sustainability framework will be worth one point. The choice to weight each indicator equally at this stage was a conscious one, as I believe all of the indicators are equally important. It also aids in the simplicity of aggregation at this early state in CSAF development. This point is earned when the 'short-term benchmark' listed beside the indicator in the table is met. If the benchmark is not met, then a score of zero would be marked. Appendix IV is meant to be used to aid tracking and calculation of points. The 'long-term benchmarks' will not be factored into the tabulation at this point in the development of the framework, but should be used for target setting as the ultimate 'sustainable state' for that particular indicator.

Indicators that cannot be measured by a particular campus when the assessment is done, or indicators that are not relevant to the campus would be marked "n/a", and a narrative description of why that indicator was not assessed would be included in the campus sustainability assessment report. These indicators marked "n/a" will simply be omitted from the calculation – i.e. a campus will not be penalized if they have several indicators marked "n/a." However, a minimum of 60% of the indicators in each of the ten audit sections must be assessed in order to include that section in the final aggregation. If this 60% target isn't met, then the section will earn zero points in the final overall aggregation.

Once all of the indicators in a particular section are measured, and assuming that the 60% target is met, aggregation for that section can take place. All of the points would be summed, and then divided by the total number of indicators in that section. Indicators marked "n/a" will simply be

omitted from the total number of indicators. For example, if a section has a total of 20 indicators, but a particular campus can only measure 17 of them, the total number of points earned should be divided by 17 (not 20) to determine that section's score. This is a second level of weighting, and will affect the relative weighting of individual indicators. I believe that each section should be treated equally, and so made each section worth a total of one.

This section aggregation process will result in ten different section scores, with each one ranging between zero and one. The final aggregation will sum all ten sections, resulting in a performance score out of 10. This is the final aggregated score for the campus sustainability index.

The CSAF, as described in section 3.1, along with the aggregation process described in this section form the primary results of this research project. Aggregation of performance cannot be completed using the current version of the framework, as all of the short-term benchmarks have yet to be defined. We had hoped to be able to complete at least a first attempt at short-term benchmarking, but some indicators proved too difficult to benchmark as there was no tool available to us to set them. The aggregation process described, therefore, should be viewed as a tool to initiate further dialogue about the benefits and challenges of aggregation, the different options available, and what work needs to be done in order to make indicator aggregation into an index possible. The method proposed here leads easily to an "index," and would also easily flow into some kind of campus sustainability certification program if future research and dialogue deems that a desirable objective.

Other process and action oriented results that have arisen from this project are further described in the discussion section below.

> "This hour in history needs a dedicated circle of transformed non-conformists. The saving of our world from pending doom will come not from the action of a conforming majority, but the creative maladjustment of a dedicated minority."
>
> Martin Luther King Jr.

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4. DISCUSSION

This section discusses some of the detailed challenges and issues to consider in the use, analysis, and future revision of the Campus Sustainability Assessment Framework (CSAF). Section 4.1. describes why certain indicators were kept and others cut. Section 4.2. discusses some of the challenges and remaining issues associated with the benchmarking and aggregation processes used in the CSAF. Section 4.3. addresses how to strike a balance between comparability and flexibility in a sustainability assessment framework. Section 4.4. reviews the effectiveness and success of the participatory action research process in this project. Finally, section 4.5. celebrates the successes of this project and the CSAF, even in light of all the work yet to be done.

4.1. Making the Indicators Count

Throughout the development of the CSAF, indicators were created, focused, morphed, and cut. The co-research team did not use indicators developed by other projects in defining our own set. Instead we determined what the issues of importance to us were in terms of Canadian campus sustainability, and devised ways of measuring them in order to indicate a campus' performance. All of the indicators that were cut or drastically redefined through this process have been retained and listed in Appendix III. Most of these indicators were cut out of the framework for three reasons. Firstly, some indicators did not meet enough of the criteria for a "good indicator" (as described in section 2.2.3.) that the co-research team defined early on in our process. The most common criterion not met was that of having accurate, accessible, and available data of known quality. Many things that we wanted to measure were simply too difficult at this time. The second most common reason for cutting indicators was that we found a better way of measuring the same thing, thus more effectively meeting our selection criterion of measuring the phenomenon that we meant to. The third most common reason is that the indicator was found to be redundant or repetitive, and that including it would be double counting (at least in part) a certain phenomenon. We have kept these cut indicators as a potential resource for future users, and potentially for future versions of this framework.

It is also important to comment on the number of indicators. The first draft of the CSAF contained over 200 indicators. One of the primary goals of the second draft was to cut this by

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about half, as I felt that this number was too high and unmanageable. An edit of that scale did not occur for several reasons. First, the majority of co-research and ad-hoc advisory team members felt that all of the indicators included in the final version of the CSAF were important, and measured unique and vital characteristics of campus sustainability. Indicators are meant to give insight into a larger phenomenon by collecting information about a key aspect of that phenomenon. A prime example of this is using indicator species to measure the overall health and quality of a particular ecosystem or habitat. We believe that all of our indicators achieve this, and that reduced numbers would have compromised the quality of the framework. A second reason for keeping all of these indicators is that they appear to be manageable, and to work. Concordia University piloted the CSAF as it was being developed and managed to complete a full campus sustainability assessment from start-up and fundraising to the final report and recommendations in less than one year. This was an immense effort for the people involved, but they proved that it was possible thus satisfying the co-research team that the framework was of manageable size.

The third reason results from some of the comments made in another large-scale project, the Campus Sustainability Assessment Review Project (CSARP) undertaken at Western Michigan University by Andrew Nixon and Dr. Harold Glasser (2002). They found that many of the leading campus sustainability assessment efforts that cover a comprehensive range of subjects (i.e. they address a range of ecological and human elements) still do not have a great depth of measurement (Nixon and Glasser, 2002). The relatively small number of campuses that do perform comprehensive assessments still have only a few indicators or measures per category. This leaves one to question how fully the campus sustainability picture is being painted when depth of scope is not fully present in even the most comprehensive assessments. This finding encouraged me to keep the large number of indicators represented in the final CSAF in order to ensure that both breadth and depth of campus sustainability issues were included. Having a more robust and comprehensive CSAF now, in the early stages of its evolution, will aid future researchers in working on campus sustainability assessment.

4.2. Benchmarks and Aggregation

Section 4.1. discussed some of the challenges associated with defining indicators. This section discusses how the built-in biases of the current framework might accumulate in the application of the CSAF on a campus. It is also important to describe the benchmarks and aggregation

process used in the CSAF in order to facilitate an understanding of how built-in assumptions and biases might affect the assessment results.

A diverse literature was reviewed in my research in order to obtain information on possible benchmarks of performance for each of the indicators included in the framework. This resulted in perhaps the greatest challenge of this research, as we were not able to develop short- and long-term benchmarks for all of the indicators in the CSAF due to both the scope of this research and our current lack of knowledge and/or experience with this work. These difficulties with setting performance benchmarks included:

- Very few of the indicators used in the CSAF have any national targets or regulations that can help us with setting benchmarks. There are no common performance targets on sustainability issues set by university associations, trade unions, education ministries, or even non-profit agencies.
- The indicator set developed in this framework is a great deal more extensive in scope and depth than most campus sustainability assessments performed in North America to date. As a consequence, many of our indicators have not yet been assessed on campuses. This means that there has been no set of "best practices" in specific indicator performance to draw from in setting short-term benchmarks.
- A "sustainable state" for some of the indicators can be intuitively known, for example a target of "zero" for incidents of racism, rape, homophobia, and others is arguably "sustainable". Other indicators do not have such obvious "sustainable states," for example the level of financing for physical health care services. This leaves us struggling for a mechanism to set both short- and long-term benchmarks.
- "Good" performance on even the most understandable of indicators has not been discussed in the literature or by practitioners. Most assessments report on current performance, and then suggest recommendations for improvement that are often limited to program, policy, and operational process goals. Specific performance targets are rarely suggested, and there is no consensus on those targets that are given.
- Information collected in campus sustainability assessments is often inconsistent – different measurement units are used, and information is reported in a wide range of ways. This makes setting benchmarks for those indicators that have been used before difficult.

The next step in using the framework is to aggregate indicator performance based on the short-term benchmarks as described in section 3.2. There are many different ways to aggregate

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indicator performance, especially in terms of weighting. Indicators could be given unequal weightings if they were deemed more or less important in terms of campus sustainability. They can also be weighted equally, as we have done, representing the value of all issues being equally important. Even then our proposed aggregation process does make some indicators more or less important than others at the next level of aggregation, where each of the ten sections is given a score based on the total number of indicators in the section. We have also decided that a minimum of 60% of the indicators must be assessed in order for a section to be counted. This number could be different, and will likely change as campuses build their capacity to assess a wider range of sustainability issues.

The challenges with this framework are aggregated deeply; from indicator selection, to benchmark setting, to aggregating performance scores into an index. It is critical that users and viewers of the CSAF understand the inherent biases and challenges are embedded in the framework. Every effort of this kind has difficulties and weaknesses and its own set of embedded values. I believe that the mark of a "good" framework is one that openly recognizes and describes its values and bias, and its known weaknesses so that all those who use and view it can understand the inner workings. Very few sustainability assessment frameworks reviewed in this research were transparent with their design bias making interpretation and use of their tools very difficult. I have attempted to design this framework with the utmost of transparency in design, and to allow and encourage practitioners to fully describe their processes of data collection, sample design, analysis, and narration of results, in alignment with participatory action research principles. I urge all those who use this framework in the future to clearly communicate your own challenges and biases involved in your assessments.

The current version of the CSAF, and the challenges listed here, can only be improved through using, testing, and refining the assessment framework. As more and more campuses begin to assess their state of sustainability, publish reports, and compare performance to one another, we will be better positioned to improve upon this CSAF.

> "Consider this: all the ants on the planet, taken together, have a biomass greater than that of humans. Ants have been incredibly industrious for millions of years. Yet their productiveness nourishes plants, animals, and soil. Human industry has been in full swing for little over a century, yet it has brought about a decline in almost every ecosystem on the planet. Nature doesn't have a design problem. People do."
>
> McDonough & Braungart, 2002, p. 16

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4.3. Balancing Flexibility and Comparability

University campuses are very diverse. They range greatly in terms of size, age, programs offered, and sense of community. Some are situated in very extreme climates while others enjoy milder temperatures. Campuses can be rural, suburban, urban, or somewhere in between and they can be a dominant, or a relatively minor force in the community in which they reside. And this says nothing of the diversity of colleges and high schools that have also expressed an interest in using this framework. All of these issues, and more, make the development of a Campus Sustainability Assessment Framework that is useful for all Canadian campuses a great challenge. The CSAF needs to be flexible enough to reflect the range of sustainability issues facing Canadian campuses, yet be rigid enough to allow for comparisons in performance to be made between these campuses. The CSAF must to be able to reflect both the uniqueness of individual campuses and the commonalities between all Canadian campuses.

The CSAF was designed with the intention to balance our goals of flexibility and comparability. But as Calvin (of Calvin and Hobbes) says “a good compromise leaves everyone involved mad.” It is likely that all campuses using the CSAF will have difficulties with making all sections fit their circumstances. The pilot study at Concordia University has certainly shown this to be so. In assessing Concordia’s challenges, we constantly had to ask ourselves if the challenge was rooted in the design of the CSAF, a data collection and/or availability issue, or if it was an indication of poor performance on a particular issue at the university. We have tried to balance the number of indicators that urban campuses will likely perform poorly on (e.g. on campus nature protection) with those that suburban and rural campuses might do poorly on (e.g. CO2 emissions due to commuting practices). We have also attempted to eliminate indicators that unfairly bias a particular type of campus, with the aim of making all indicators represent important sustainability issues and goals for all campuses. Just because a rural campus performs poorly on driving habits and their associated impacts does not mean that it is okay for a rural campus to have exceptionally high transportation impacts. Although this situation adds complications for the rural campus, it does not mean that progress towards sustainability on that issue could not be made. That is what the CSAF hopes to encourage.

The CSAF is meant to be a starting point in researching campus sustainability issues. If a campus chooses, it can add additional indicators that describe particular sustainability issues of importance or relevance to them as long as the current and comparable format is maintained

and completed as described by this thesis. Campuses are also free to add in a descriptive narrative that follows the layout of the framework to more fully describe issues in specific sections. The indicators use a very wide brush to paint a picture of indoor air protection, intensity of energy use, or campus community and cohesion. Each campus is encouraged to fill in the details of this picture through a more descriptive narrative. It is hoped that these elements of flexibility enhance the overall framework, and make it useful and possible for most campuses to work within its confines. I feel that the rewards of comparability, and of building a national sustainable campuses movement, are worth the challenges associated with working within the structural confines of the CSAF.

> "Once you understand the destruction taking place, unless you do something to change it, even if you never intended to cause such destruction, you become involved in a strategy of tragedy. You can continue to be engaged in that strategy of tragedy, or you can design and implement a *strategy of change.*"
>
> McDonough & Braungart, 2002, p. 44

4.4. Reflections on the PAR Process

It was a challenge to juggle the ideal participatory action research (PAR) driven process that I wanted to follow, and the reality of the time and financial resources available to us. It is important to recognize the challenges and limitations faced in this project in order to facilitate greater understanding of how the whole process worked, and I will highlight some of these below.

A research project is multifaceted, and different players in the project need to have their own requirements met in individually specific ways, and based on their own timeframes. I had to balance many different requirements in this project, including my own thesis requirements, my course work requirements, the needs of my academic supervisor and professional sponsors, the individual needs of each co-research team member, and the ever growing demands for the results of this project. I had to consider and work with the student school year schedules, the work schedules for other co-research team members, the sustainability assessment happening at Concordia University throughout this whole project, the needs of the Sierra Youth Coalition

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and their work to find funding to implement the CSAF, and my own struggles to balance school, work, volunteer, and family commitments. This lead to my taking of what might be seen as "shortcuts" in the eyes of PAR purists (if there is such a thing). Rather than truly defining research objectives together with the co-research team, I had to research and propose these in advance in order to meet the thesis requirements for my program. In order to make sure that the co-research team's one chance at an in-person meeting was as smooth and efficient as possible, I had to prepare some proposals for us to use in beginning our work rather than allowing the co-research team to do this together. A full collaborative process to identify and define issues, goals, objectives and strategies was not realized in this project. Instead we did the best that we could with the time and financial resources available to us.

My original plan for testing, reviewing and revising the CSAF involved a visit to each of the participating campuses to conduct interviews with key campus community members, see how/if the CSAF could be implemented and what challenges might be faced, and work with each of the co-research team members in their own communities. I also wanted to host a second in-person meeting in order to review the final CSAF draft to produce the completed version. Both of these activities required time and financial resources that were not available, and we had to find substitutes for these in-person interactions through virtual means.

I think that the team suffered somewhat from a sense of disconnection to their colleagues, myself, and this project at times. This is a difficult barrier to overcome when working by distance. The one in-person meeting that we were able to have in Victoria went very well, and I think that this is a minimum requirement for any project involving team members who are geographically separated in order to create community, and build a comfortable and collaborative environment. Those team members who were not present at the in-person meeting did not, in general, engage as fully in the project as the others did. In direct communications with them, they felt somewhat disconnected from the project, and did not feel that they knew enough about what was happening to make an effective contribution. Some team members also virtually "disappeared" at some point during the project, and didn't participate in community group or conference calling activities. There were exceptions to these generalizations, of course, but there was a definite trend to be seen.

It was very difficult to find the balance between asking too much and too little of the co-research team members. I tried not to isolate them by having long periods of silence, but I also attempted

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not to inundate them with too much information or requests for input. Interactions were generally limited to key points in the development of the CSAF. Team members were asked for substantial comments at the initial development, and at the review/revision stages of each draft of the CSAF, and were also asked periodically for assistance with difficult sections. This worked for some people, but not for others, and several members of the team disconnected at some point in the process and offered little opportunity for dialogue and collaboration.

It is also important to recognize how this PAR process worked. Although we faced many challenges, the co-research team offered invaluable assistance and expertise to me in the development of the CSAF. The project would not be as extensive as it currently is, and I would have no idea as to the potential applicability and usefulness of the CSAF for practitioners if it were not for the co-research team. The implementation work that has happened already through the work of co-research team members is very exciting, and there is a very real chance that the CSAF will be implemented on many Canadian university and college campuses. I also found that bringing in the ad-hoc team of advisors helped to fill some gaps left in the co-research team process. These people were asked for specific advice and input, and offered a great deal of insight into improving the CSAF. I would not have used any other method to develop the CSAF and to complete my thesis requirements, even though we faced many hurdles along the way. I think that a PAR approach for this kind of project, which is meant to help transform the way that universities function, requires the active engagement of those who are doing the transformational work. Given that, I want to include some comments from the co-research team members at both the conclusion of our in-person meeting, as well as at the conclusion of the project. These comments have not been attributed to individual co-research team members in order to protect their privacy.

Mid-term comments on the future application of the CSAF outcomes on team members' respective campuses:

- "Feel the information will definitely help out in sustainability projects on my own campus"
- "Information from the weekend and greater work of the co-research team has a direct relation to work I am doing on campus"
- "One of the fundamental problems with the policy and auditing process is the lack of coherent and collective vision of what sustainability even is, a definition is needed"
- "It gives me a kick start and a place to start working from"

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Mid-term comments on the PAR process:

- "Easy to communicate ideas quickly"
- "Fosters a strong national network"
- "Found it personally motivating"
- "Appreciated the way issues were discussed with the whole group"
- "We covered a lot of ground in a short amount of time"

End of project comments on the application of CSAF outcomes on their campus:

- "The CSAF has been significant for me personally in the way it has brought the principle, fundamental areas of sustainability together in a cohesive and straightforward framework. I am absolutely certain that having this solid theoretical framework has been a key reason behind the success of the Sustainable Concordia project: it serves as a solid, well-constructed tool around which to frame the short-term goals of the project."
- "The framework will be useful for our campus in terms of understanding what CAN be done on campus. I don't foresee the university using it in longer term planning until sustainability becomes more mainstream in university culture."
- "The CSAF has given me many ideas to think about, and possibly research ideas to pursue in the future."
- "This needs to be brought to experts in the field with the intent of getting input. While this is a Canadian tool, I think quite a bit can be learned from international experts. Pilot tests on at least 3 other campuses should be conducted in order to get out some of the glitches."
- "I see the next stage of development as being through trial and error – seeing how other universities have fared with the framework and the improvements that need to be made."
- "I can't wait to get some friendly competition going where we compare apples to apples!"
- "I think SYC's Sustainable Campuses project will play an integral role in the next steps of the CSAF, and hopefully will help train other students to use this tool, and begin documenting such efforts. I think this stage of documentation is extremely important, and some sort of clearing house should be established where schools can enter this information."
- "I think that by virtue of the model containing built in dynamic mechanisms (i.e. it can change according to feedback after use), that it will evolve – and constantly evolve – to be as broadly useful as it is intended."
- "It is an amazing tool in that it attempts to counter the fragmentation of science, thus presenting a whole picture."

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- "I would have preferred to work with a manageable number of indicators (practical for implementation), starting with the environment and then proceeding to the social."
- "The CSAF has definitely opened my mind to the difficulties of a sustainability assessment in terms of the difficulty of measuring the social side and benchmarking it."
- "It is a large document. A sustainable assessment framework, whether it is yours or a number of others, it is useful to check to make sure we are covering everything in every area for long term planning. Day to day use will be limited to what is easy data to obtain and taking the time to get the information to begin the database."
- "I think the framework has to be simplified greatly if it is to be useful to campuses generally."
- "I feel it's important that the use of the CSAF is promoted as part of a process to make a campus more sustainable. Nothing is going to change by just doing the assessment. For change to happen there needs to be cross sectoral engagement at the university and a group of people who are committed to building relationships and creating a sustainable process."

End of project comments of the PAR process:

- "I was particularly pleased to have had involvement from faculty, staff, students, as well as from different perspectives in sustainability measurement (i.e. environment management to a more full sustainable model including human measures) even though this caused conflict, and I think resulted in lessened involvement from some members of the team."
- "I think there is great value in collaboration and having the opportunity to work with colleagues from across Canada was inspiring but the problem I have with the process is that the outcome is almost entirely dependant on the team dynamics. I think student comments are useful in certain ways but they cannot be given the same weight in some areas of concern as administrators who have extensive experience in the area."
- "I don't have a lot of experience with electronic collaboration, so I was a bit hesitant to engage the group on-line. Plus I already spend a lot of time on e-mail, the last thing I often want to do is read more material on-line."
- "We probably could have predicted that conflict would occur, and within the process I don't feel we ended up spending enough time resolving it. I think this is a tension that will be present on many campuses, mine included, when we begin to circulate the CSAF more formally, and it would have been good to have worked through those issues in a tighter, potentially less politically charged atmosphere."
- "I think the initial face to face meeting we had last July was very helpful for the project, and found the process to be successful. However I have found since that initial meeting, the

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momentum of the group dwindled, partly do to the fact that we were spread across the country. I myself found that I was participating less and less, and for this I am apologetic. The main reason I can state why this happened, was the fact that over the summer and early fall I was extremely busy, and found I did not have a lot of extra time. "

- "My main suggestion if this was to be done again, and of course if money was not an issue, would be to have the group meet at least one other time face to face (the late fall I think would have been a good time to assess and reflect properly). "
- "I have definitely found the process useful- many minds make a better brew. Although having a co-research team in the same location might help because there could be better and more direct engagement- distance is difficult- there is not the same human to human accountability. Also a statement of commitment at the beginning outlining what people committed to might help (digging in the social marketing soil)."
- "Participatory Action Research SHOULD be participatory, and it seems that with everyone's busy lives, the project would sometimes take the back bench to other priorities (myself included)."
- "I appreciated varied options for communication, and being given deadlines for feedback."
- "The information you sent was often overwhelming. Had the information been condensed in a fashion that would take a short time to read, I think I probably could have participated more; however, I just found that the volume of information was not digestible in the time that I had."
- "It is difficult to find time in a busy day to give thoughtful input to a non-urgent process."

4.5. Celebrating Our Successes

It is easy to describe in detail all of the weaknesses and remaining challenges of a project like this one, especially when there is still so much room for further work and improvement. It is important however, to take time to celebrate the successes and achievements of this project to date, as there have been many. I am very proud and excited to have been a part of this project, and to convene and collaborate with such an amazing group of people whom are all working to promote sustainability on their campuses. That we have been able to work together to develop a common definition for campus sustainability, and develop this framework for measuring our progress towards this goal is a great achievement. This is the first time in Canada that a group of students, staff, faculty, NGO's and government representatives had been brought together to work on a common campus sustainability project, and to share ideas and experiences. We have also engaged with experts from the United States sustainable campuses movement, a

collaborative exercise that I hope will continue into the future. I think that this has been a rich and valuable exercise for all those involved. I know that it has been for me.

This research represents many firsts in this movement. We have initiated dialogue on developing a nationally standardized framework for assessing campus sustainability. We have begun to discuss what "good" performance on over 175 different campus sustainability issues might be. We have defined the "sustainable campus" both through our working definition, and through the wide range of issues that we have chosen to include in this framework. I think that this is the first time that human and ecological systems have been given equal consideration in a campus sustainability assessment tool. We have begun discussing the possibility of having a "sustainable campus" certification process in place to aid us in transforming the way that universities perform their functions. We have worked to bring the broader sustainability assessment world into the campus context, something that was lacking in previous ad-hoc campus assessment activities.

These successes can contribute to the academic development of the campus sustainability assessment literature. This research has built upon existing campus sustainability assessment tools using the guidance of experience and non-campus specific assessment frameworks to build something new. It is a broad and deep tool that attempts to get a very thorough understanding of campus sustainability. I think that it represents a significant evolution in the campus sustainability movement, in particular in the following areas:

- Making a first attempt to concisely define the "sustainable campus" and its characteristics.
- Using sustainability indicators to define a very large range of campus sustainability issues in terms of both scope and depth.
- Making a first attempt at developing performance benchmarks of campus sustainability for over 160 indicators at both short- and long-term time scales.
- Making a first attempt to develop an indicator aggregation process that can lead the movement potentially towards a campus sustainability index and perhaps a certification framework.
- Using a participatory action research approach to model a new way of moving towards sustainable campuses in our collaborative co-research team process.
- Working with students, faculty, staff, government, business, and non-profit advocacy organizations in both Canada and the United States in a positive, collaborative, and action-oriented way towards a common goal.

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We have created motivation and momentum behind the Canadian campus sustainability movement through this research and action project. More attention and financing are now being directed to campus sustainability work in Canada partially due to this project. A more diverse and active sustainable campuses community is growing in Canada; we are expanding into the faculty and administrative communities, into the college and high school sectors, into government and new non-profit agencies, and into regions and communities that were not previously involved in this work. Finally, and most specific to the CSAF, we have created a plan of action to improve and implement the framework, to train people how to use it, and to generally further build momentum around making our campuses models of sustainability. These are some of the more intangible, but arguably most important results of this research and action project.

"The world is not ruined by the wickedness of the wicked but by the weakness of the good."

Napolean

5. FUTURE RESEARCH AND ACTION

This research and action project was a long time coming; the need for a campus sustainability assessment tool to further the work of the Canadian sustainable campuses movement had been discussed by people in this movement for over a year before work finally began on it. In researching, writing, and watching the results of this work begin to be put in to action I have realized, amongst other things, how far we still have to go.

In reviewing Appendix I, the primary Campus Sustainability Assessment Framework (CSAF) tool, many savvy readers will quickly pick up on interesting conclusions and assumptions that were made in the design and development of the project. Many of the remaining challenges and areas for future work are alluded to in Chapter 4, and recommendations regarding specific indicators are embedded in the “discussion” sections that follow each grouping of indicators in Appendix I. Some general themes emerge from these “discussions,” the first being benchmark setting. The description of long-term goals was somewhat less challenging, as this section was

only meant to describe the “ideal sustainable state” for each specific indicator. Most of these long-term goals are not likely to ever be reached, but they provide the user with important information about where they should be aiming in their campus sustainability efforts. The nature of some of the indicators made setting long-term goals difficult, as there was no perfect, absolute, or obvious sustainable level of performance associated with them. Most of the indicators that fall into this category have not had long-term goals described in the framework. Further research into the long-term goals for these indicators must be done to complete this part of the CSAF.

Establishing short-term benchmarks proved to be one of the greatest challenges of this project. The co-research team, even through this difficulty, chose to stick to our goal of setting these benchmarks. It was deemed a vitally important and necessary step forward in the campus sustainability movement and we did not want to abandon it simply because it was too challenging. The co-research team fully recognized this setting of short-term benchmarks as a necessary subject for future research in order to strengthen and legitimize the CSAF. We hope that this will happen through active use of the framework, centralized collection of results from each user, and then another round of action research to review and revise the benchmarks proposed in this version of the CSAF.

Another area requiring more work is that of language and definition of terms. There is a real need to more carefully and rigorously define many of the other terms used in this, and many other campus sustainability assessment initiatives. Some examples of these terms are “healthy,” “local,” “sustainability focused research and teaching,” “sustainability literacy” and other important terms. Clearly defining ambiguous terms is important for assuring that the CSAF is being used and interpreted in the same way by all those who are applying it on their campuses. Ambiguity in language will also open this current version of the CSAF up to criticism by the sustainable campuses movement, particularly the academic segment of the movement. I challenge those who are particularly concerned with language to begin working to clarify these ambiguities through further collaborative research and action.

This leads into yet another area for future research and action, that of active application and use of the framework by Canadian (and perhaps international) campuses. This framework benefited greatly by the information gathered through Concordia University, the first campus to fully implement the CSAF in their campus sustainability audit (Garcia-Lemarca and Guerin, in press).

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It is only through testing this version of the CSAF that we will learn which indicators do or do not work, what is missing and needs to be added, how the aggregation process works, and what benchmarks to set. Any campus with the capacity to use this CSAF to assess your university's sustainability performance should aim to do so, and report back to the Sierra Youth Coalition and the co-research team on your experience. The Sierra Youth Coalition, the co-research team, and other advocacy groups should continue to actively seek out financial support to help encourage and facilitate the application of the CSAF on Canadian campuses. A stronger, more active and effective communication and information sharing network is needed to share individual campus experiences with the broader community in order for comparative studies in performance, and sharing of best practices to occur.

This version of the CSAF has come with several tools, designed to ease application of the framework. Another such tool is necessary in order to complete this set. A workbook or toolkit describing in detail how to assess your campus on each of the indicators should be developed. This could be in the form of an interactive website with dynamic calculators and other helpful elements built in. This will both ease application of the framework, and make the assessment process more streamlined and clear. It will also ensure that campuses are all collecting and analyzing information in the same way. This will facilitate inter-campus comparison of results, and will allow outside agencies to prepare annual reports on the "State of Campus Sustainability". Thus a toolkit describing recommended campus assessment practices should be developed and used in partnership with the CSAF, and made accessible to the Canadian sustainable campuses community. I would also encourage an outside agency, like the Sierra Youth Coalition, to begin building their capacity to research, write and publish an annual State of Campus Sustainability report. This will aid the work of activists nationally by raising the profile of campus sustainability issues, and by highlighting best practices so as to encourage all campuses to improve performance.

The idea of publishing a State of Campus Sustainability report ties into one of the long running ideas of the SYC sustainable campuses network, namely that of working with Macleans magazine to publish a "sustainability" indicator in their annual guide to Canadian universities. There is still much debate and discussion amongst campus sustainability advocates as to whether or not this is something that we want to pursue, and a decision will require further discussion on this issue. Publication of an external, independent report using indicators selected from the framework by the sustainable campuses community should also be discussed.

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This would allow us to maintain the integrity of the measurements to ensure that they adequately represent sustainability while still launching a report of manageable size to coincide with Macleans.

One further recommendation for future research and action is to examine the potential for a "Sustainable Campus" certification program, based on the CSAF. Other international issues have benefited greatly through certification programs, including green buildings, and forest and marine stewardship (Forest Stewardship Council [FSC], 2003; USGBC, 2002). This version of the CSAF was developed with such future certification in mind, and I have thus left room for the framework to easily evolve into a certification program in the future if the sustainable campuses community deems (through further research) this to be an interesting and exciting prospect.

As a final thought, I would like to place this thesis into its broader context. Understanding and reporting on the performance of a campus, or any organization for that matter, on key sustainability issues is an important step in making change happen. But it is only one step. This assessment tool is only as good as the action and change that it inspires, and must be followed by priority setting, action planning, feasibility studies, financial planning, measuring and monitoring performance over time, and reforming the policy and management structures of the university. I encourage all future users to ensure that this action and change to promote progress towards sustainability remains central to assessment efforts. Studying and understanding our problems is only one small part of transforming society towards sustainability. Make sure that you go all the way.

> "Education is, above all, and ever has been, the process of learning how to think honestly and straight; to distinguish between the true and the false; to appreciate quality and beauty wherever it may be found; and to be able to participate and to desire to participate with intelligence and tolerance in that most important of all forms of free enterprise - the exchange of ideas on every subject under the sun with a minimum of every restriction, personal, social and political.
>
> In a word, education means- and I think this is the best definition of it that I have ever discovered- the creation of finer human hungers.
>
> So the educated person will place the desire to put muscle into missiles or men below the desire to put dignity and decency into words or images. He will put the search for the good life in peace and freedom above every other search."
>
> Lester B Pearson

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