

INDIGENOUS KNOWLEDGES AND SUSTAINABILITY
IN POST-SECONDARY EDUCATION

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Canada

By

Yvonne Nadine Vizina

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Canada
OR

Dean
College of Graduate and Postdoctoral
Studies
University of Saskatchewan
107 Administration Place
Saskatoon, Saskatchewan S7N 5A2
Canada

Abstract

The overall purpose of this study is to begin identifying relationships between sustainability and Indigenous knowledges in post-secondary education. Sustainability discourse indicates a need to reconsider our approaches to social, economic, and environmental issues because without deep transformation, global human survival is in jeopardy. At the same time, post-secondary education institutions in Canada are Indigenizing their settings but lack discussion on sustainability and Indigenization as related concepts. For this study, interviews and surveys were conducted with faculty and administrators working in Indigenous PSE programs in ten post-secondary education institutions across Canada to gain insight into: Indigenous philosophical principles concerning the environment and sustainability; how sustainability is linked to curriculum, research, facility operations, institutional governance, and community outreach; how sustainability is practiced, and what policies drive those practices. The five key findings that emerged from the study are: 1) Indigenous worldviews are based in a belief of the sacred, which orients Indigenous knowledges and responsibilities for sustaining life on Earth; 2) Sustainability is expressed as a function of tradition linking Indigenous identity with culture, language, and environmental health; 3) Entrenching Indigenous knowledges throughout institutions is to sustain cultural identity; 4) National and international standards supporting Indigenous self-determination are primary drivers for the inclusion of Indigenous knowledges and advance the underlying principle of sustainability; and 5) Indigenous holistic learning includes social, economic, and environmental aspects of sustainability. These findings indicate that supporting Indigenous cultural identity through integration of Indigenous knowledges can expand the basis of sustainability practices and programs in post-secondary education, but there is a need to increase dialogue about the interconnectedness of sustainability and Indigenous knowledges based on a rights-based approach to Indigenous education consistent with national and international standards.

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Dedication

To Isaiah, I hope when you grow up you will have a beautiful life. There is no person more important to me than you. This work was anchored in my belief that you deserve to live in a world that has clean air, fresh water, healthy land, and continues to be full of all the amazing plants and animals that share the Earth with us.

Table of Contents

Permission To Use.....	i
Abstract.....	ii
Acknowledgements	iii
Dedication	iv
Table of Contents	v
List of Tables	x
List of Figures.....	x
CHAPTER ONE	1
INTRODUCTION TO THE STUDY	1
Background and Conceptual Underpinnings.....	3
Researcher Positionality	7
The Sustainability and Education Policy Network.....	12
Statement of the Problem.....	12
Purpose of the Study.....	14
Research Questions.....	14
Significance of the Study	15
Definition of Key Terms.....	16
Summary.....	17
CHAPTER TWO	19
REVIEW OF RELATED LITERATURE	19
Sustainability	20
Sustainability history.....	20
Sustainability and Indigenous communities.....	25
Community-based conservation.....	30
Indigenous Knowledges.....	35
Indigenous peoples and knowledge systems.....	35
Traditional livelihoods, land use, and languages.....	37
Environmental decision-making.....	42
Post-Secondary Education	44
Indigenous education.....	44

Contemporary careers.....	47
Sustainability in education.....	48
Practice – policy gaps.....	52
Summary.....	55
CHAPTER THREE	56
RESEARCH DESIGN AND METHODOLOGY	56
Methodology	56
Study Design.....	61
Settings and Participants.....	61
Data Collection and Analysis	65
Interviews.....	66
Survey.....	69
Synthesis.	71
Ethics.....	71
Summary.....	71
CHAPTER FOUR.....	72
RESEARCH FINDINGS.....	72
Finding 1: Indigenous worldviews are based in spiritual beliefs, which orient Indigenous knowledges and responsibilities for sustaining life on Earth.....	73
Connection and renewal.....	73
Intergenerational foundations.	74
Transmission of worldviews.....	74
Finding 2: Sustainability is expressed as a function of tradition linking Indigenous identity with culture, language, and environmental health	76
Indigenous knowledge, land, and language.....	76
Active skill building.	77
Respect for local knowledges.	78
Traditional sustenance.	79
Finding 3: Entrenching Indigenous knowledges in curriculum, research, facility operations, institutional governance, and community outreach is to sustain cultural identity	79

Curriculum.....	80
Research.....	81
Facility operations.....	83
Institutional governance.....	84
Community outreach.....	86
Survey results.....	88
Finding 4: National and international standards supporting Indigenous self-determination are important drivers for including Indigenous knowledges in PSE institutions and advancing the underlying principle of sustainability.....	90
Indigenous rights.....	90
Pedagogy.....	91
Engagement.....	92
Awareness.....	94
Regional sustainability.....	94
Conservation and environmental decision-making.....	95
Finding 5: Indigenous holistic learning includes social, economic, and environmental aspects of sustainability.....	99
Social considerations.....	99
Economic considerations.....	101
Environmental considerations.....	101
Sustainability networking.....	102
Summary.....	105
CHAPTER FIVE.....	107
DISCUSSION, CONCLUSIONS, AND IMPLICATIONS.....	107
Discussion Category 1: Indigenous Cultural Identity.....	107
Principle of spiritual beliefs.....	108
Principle of holistic thinking.....	109
Principle of language.....	109
Principle of sustainability.....	110
Principle of learning from nature.....	110
Principle of respect and responsibility.....	111

Principle of willing participation.....	111
Contextualizing the principles.	112
Summary.....	113
Discussion Category 2: Integrating Indigenous Knowledges for Sustainability.....	113
Curriculum.....	113
Research.....	115
Facility operations.....	118
Governance.....	119
Community outreach.....	120
Sustainability survey.....	121
Summary.....	121
Discussion Category 3: Expanding Sustainability Practices and Policies	122
Sustainability and Indigenous knowledges.....	122
Conservation and environmental decision-making.	125
Sustainability networking.	129
Summary.....	132
Conclusions.....	132
Finding 1: Indigenous worldviews are based in spiritual beliefs, which orient Indigenous knowledges and responsibilities for sustaining life on Earth.....	134
Finding 2: Sustainability is expressed as a function of tradition, linking Indigenous identity with culture, language, and environmental health.	134
Finding 3: Entrenching Indigenous knowledges in institutional governance, curriculum, facility operations, research, and community outreach is to sustain cultural identity.....	135
Finding 4: National and international standards supporting Indigenous self- determination are primary drivers for including Indigenous knowledges in PSE institutions and advancing the underlying principle of sustainability.....	135
Finding 5: Indigenous holistic learning includes social, economic, and environmental aspects of sustainability.....	136
Implications	137
Future research.....	139

Limitations of the Study	139
Final Remarks	140
References	142
Appendices	163
Appendix A Target Institutions	164
Appendix B Telephone Script	169
Appendix C Letter of Invitation	173
Appendix D Research Guide.....	176
Appendix E Participant Consent Form	183
Appendix F Transcript Release Form.....	189
Appendix G Data Codes	190

List of Tables

3-1 Participant Characteristics	65
4-1 Survey Findings by Theme.....	89

List of Figures

3-1 Approach for inclusion of PSE institutions	64
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CHAPTER ONE

INTRODUCTION TO THE STUDY

Sustainability has become a defining goal of our lifetime. In 2015, countries comprising the United Nations put forward the *2030 Sustainable Development Goals* (UN, 2017a) to help guide world thinking about social, economic, and environmental issues because of the recognition that without deep transformation, global human survival is in jeopardy. At the same time, post-secondary education (PSE) institutions in Canada have been working to Indigenize their settings, but sustainability and Indigenization are not often discussed as related concepts. Consequently, there is very little research into how Indigenous knowledges might contribute to the transformative thinking so critical in 21st century. To begin identifying the relationship between sustainability and Indigenous knowledges, I explore how ten faculty and administrators working in Indigenous PSE programs of seven universities and three colleges understand the concept, practices, and policies of sustainability in relation to the Indigenous knowledges in their setting. If similarities exist between the purpose and goals of environmental sustainability and Indigenous knowledges, then post-secondary education institutions can become important sites across Canada where Indigenization is recognized as consistent with the social, economic, and environmental pillars of sustainability.

This research study began with my interest in understanding more about the complex relationships between the concepts of sustainability and Indigenous knowledges as they relate to our natural environment. Over time, I came to realize this question was so much bigger than I imagined. Using a combination of Indigenous, critical, and emancipatory theories, I focus on participants' descriptions of how Indigenous knowledges are related to sustainability, some of the ways Indigenous knowledges might be better integrated into PSE institutions, and the potential for increased knowledge exchange and mobilization about sustainability and Indigenous knowledges. It is my hope that in illustrating how these terms are understood and applied in PSE practice and policy, their use will be strengthened through a closer association of the concepts.

For this research, I defined Indigenous PSE places of learning as post-secondary institutions or programs that primarily serve First Nations, Métis, and Inuit learners. In addition, I also required that the institution grant degrees, diplomas, or certificates and be recognized by a provincial or territorial government. Alternatively, the institution may be affiliated, or in a

partnership, with a degree, diploma, or certificate granting institution recognized by a province or territory (AANDC, 2015). This definition was useful in clarifying which Indigenous peoples were under discussion (those defined in Canada by the *Constitution Act, 1982*), identifying what was meant by post-secondary education places of learning, and in acknowledging partnerships that exist between Indigenous peoples and PSE institutions that deliver educational programming to Indigenous learners. Throughout the document, references to Indigenous PSE places of learning, PSE institutions, and PSE programs will appear as appropriate in referring specifically to Indigenous PSE or PSE in general.

In this research, I review related literature, describe five major findings in response to three research questions, discuss the meaning of the findings, and provide recommendations as a response to the implications of the research. No other comparable study exists to provide these insights, leaving a significant gap in research evidence about how Indigenizing PSE institutions may be linked to sustainability thinking and action. This study may benefit PSE faculties seeking to adapt curriculum and pedagogy to increase Indigenous knowledges and sustainability content, administrators in policy development processes related to Indigenization and sustainability, and Indigenous communities who have called for greater understanding of Indigenous knowledges within PSE institutions.

In Chapter One, introductory information on the background of the study is provided, as well as the conceptual underpinnings. A personal statement follows this on my own positionality as a researcher and an individual, including why positionality is considered by many to be an important practice of transparency and accountability. Next, I provide some information about the Sustainability and Education Policy Network (SEPN) and its connections to my research. Then, I describe the research problem and the purpose of the study. I provide an overview of the research questions and instruments used in the study. Finally, I conclude the chapter with a discussion on the significance of the study, a definition of key terms, and a summary of the chapter.

Chapter Two provides a review of related literature on: sustainability; community-based conservation; traditional livelihoods, land use, and languages; contemporary careers; environmental decision-making; sustainability education; practice and policy gaps; Indigenous education; and sustainability and Indigenous communities.

Chapter Three describes the research design and methodology, including: the problem

and purpose of the study, the research questions and thesis statement, the study design, the methodology, the settings and participants, data collection and instrumentation, data analysis including coding and themes, and ethical considerations.

Chapter Four describes the five research findings that emerged from the analysis of participant interviews and surveys.

Chapter Five includes a discussion of the findings, conclusions, and implications. The discussion of findings is contained within three discussion categories that align with the research questions. A series of five conclusions are then drawn based on the findings and discussion. This is followed by conclusions, which provide the basis for a discussion of the implications of the research and recommendations for PSE institutions and future research. The chapter concludes by indicating limitations of the study and final remarks by the researcher.

There are several appendices included at the end of the study, which provide additional details about: target institutions, the telephone script used in the research, the letter of invitation to participants, the research guide, participant consent form, transcript release form, and the ethics certificate.

This research suggests that the purpose of including Indigenous knowledges in PSE institutions is to strengthen Indigenous learners. Spiritual beliefs, holistic thinking, Indigenous languages, sustainability, learning from nature, respect and responsibility, and willing participation are some of the principles of Indigenous knowledges that are part of forming cultural identity. Integrating Indigenous knowledges throughout PSE institutions to strengthen Indigenous cultural identity also has the potential to advance sustainability processes and policies because of the underlying similarities in protecting the natural world and encouraging transformative thinking. The thesis concludes that taking a rights-based approach to Indigenous education and involving Indigenous communities can lead to expansion of sustainability practices and policies but there must be much more dialogue about approaches and benefits among institutional leaders, those working in Indigenous programming, and those working in sustainability programming.

Background and Conceptual Underpinnings

The topic of whether Indigenous knowledges and sustainability are interrelated concepts is a relatively new area of study. Both Indigenous knowledges and sustainability have been studied separately within various disciplines such as education and environmental studies respectively.

Indigenous scholars in education have described the nature and application of Indigenous knowledges in curriculum and pedagogy as a means of overcoming the historic exclusion of Indigenous cultural identity resulting from the establishment of colonial education systems (Battiste, 2013; 2002; Battiste & Henderson, 2009; Cajete, 2008;1994; Cote-Meek, 2014; Kovach, 2009; Littlebear, 2009; 2000; Smith, 2012). Current environmental crises have exposed the need to look beyond Eurocentric science and technology to knowledge systems that have sustainability at their core, such as Indigenous knowledges (Aikenhead & Michell, 2011). Inclusion of Indigenous knowledges in land-based education programs, science curriculum development, and other related activities have done so because of the recognition of the importance of holistic thought and the value of Indigenous philosophical wisdom (Borrows, 2016; Datta, 2018; Eco Canada, 2018; Lowan-Trudeau, 2015; Michell, Vizina, Augustus, & Sawyer, 2008). However, the linkages specifically to sustainability, representing broad social, economic, and environmental dimensions is less understood. Sustainability studies have gained momentum over the past few decades as more attention is paid to planetary conditions of climate, natural disasters, and environmental degradation (Adams, 2004; Dyer, 2009; Hendry, 2014). In both cases, Indigenous knowledges and sustainability are based on the need for a healthy planet.

The disruptions to Indigenous peoples' traditional learning processes have negatively affected the development of the personal cultural identity of individuals and diminished Indigenous communities' intergenerational transmission of knowledge about land, water, climate, and energy systems of their traditional territories. The United Nations Education, Scientific and Cultural Organization (UNESCO) acknowledged:

Indigenous people have a broad knowledge of how to live sustainably. However, formal education systems have disrupted the practical everyday life aspects of indigenous knowledge and ways of learning, replacing them with abstract knowledge and academic ways of learning. Today, there is a grave risk that much indigenous knowledge is being lost and, along with it, valuable knowledge about ways of living sustainably. (Fien, 2010, p. para 2)

The practice and transmission of practical and philosophical aspects of Indigenous knowledges must become an integral part of both formal and informal education processes if it is to be retained within Indigenous individuals' lives and community practices. This means inclusion of

Indigenous knowledges within a holistic framework connecting childhood learning, formal education systems, and community settings.

In 2007, First Nations, Métis, and Inuit reference groups contributed their insights to the development of Holistic Lifelong Learning Models depicting what they saw as essential themes in their respective traditional cultural education processes (AERC & FNAHEC, 2007d). The Métis Holistic Lifelong Learning Model, for example, characterizes learning as an intricate interplay of personal development and contribution to their surrounding world guided by the processes of nature and spiritual beliefs in the “sacred act of living a good life” (AERC & FNAHEC, 2007c, p. 1). First Nations people indicated their belief that “the purpose of learning is to honour and protect the earth and ensure the long term sustainability of life” (AERC & FNAHEC, 2007a, p. 2). Lifelong learning for Inuit is grounded in the cultural values and beliefs articulated in Inuit Qaujimajatuqangit (IQ) that links family and community members with their ancestors (AERC & FNAHEC, 2007b). These theoretical models provide a useful framework for actualizing the Indigenous knowledges in particular locales and educational settings.

Within the K-12 education sector, significant accomplishments for inclusion of Indigenous knowledges have already been achieved in many provinces and territories. Policies support improved curriculum with rationale and evidence that inclusion of Indigenous knowledges in education not only addresses the needs of Indigenous learners in achieving success but also benefits all learners. For example, in Saskatchewan, the Science 10 Curriculum states:

Today, societal and environmental needs and issues often drive research agendas. As technological solutions have emerged from previous research, many of the new technologies have given rise to complex social and environmental issues, which are increasingly becoming part of the political agenda. The potential of science, technology and Indigenous knowledge to inform and empower decision making by individuals, communities and society is central to scientific literacy in a democratic society.

(Saskatchewan Ministry of Education, 2015, p. 13)

Acknowledging these broad issues described by the Saskatchewan Ministry of Education in school curriculum enables educational authorities to build on the strengths of science and Indigenous knowledges. The successful inclusion of Indigenous knowledges within primary and secondary education might also demonstrate that these perspectives are not fanciful activities for children but are relevant in Canadian PSE institutions for adult learners.

PSE institutions are an important part of Indigenous learning within the cycles of a holistic framework. Many Indigenous PSE programs and institutions emerged because Indigenous communities recognized that the needs of Indigenous learners were not being met within mainstream institutions. For example, across Canada, Indigenous teacher education programs have produced hundreds of graduates that now work as professionals in school systems, where their training helps support Indigenous learners' success. In recent years, PSE institutions have been developing opportunities across disciplines for understanding and integrating Indigenous knowledges into their systems because it reflects a response to evidence put forward by studies such as the Truth and Reconciliation Commission of Canada (TRC) and the Royal Commission on Aboriginal Peoples (RCAP), among others (RCAP, 1996; TRC, 2015). PSE institutions influence society through the knowledge, skills, and actions of the graduates they produce. The introduction of Indigenous knowledges within education can benefit all learners, whether they are Indigenous or not, by exposing them to the value of holistic thinking and how the relationships among issues affect each of us.

The definition and understanding of sustainability has also grown and evolved over time. Even though Thomas Malthus theorized the connection between human consumption and environmental limits in the 18th century, it wasn't until the 20th century and afterward that sustainability was recognized globally as an intergenerational responsibility with deeply connected social, economic, and environmental elements (Sachs, 2015; WCED, 1987; World Summit on Sustainable Development, 2002). In my research, as with global sustainability developments, there is an underlying focus on environmental sustainability because of its key role in supporting human activity.

Sustainability studies in PSE have increased over the past few decades, spurred on by a host of environmental issues that are all associated with social, economic, and environmental demands. Some of these major issues include: climate change and energy supplies; degradation of global biological diversity; accelerated loss of species to extinction; threats to fresh water security; terrestrial, aquatic, and atmospheric pollution; and increased human population. These, and other sustainability challenges, have been taken up both independently and through collaborations. For example, the new field of sustainability sciences looks at high-level problems and complex interplays among elements that are contributing factors (Kates, 2011; Kates, Parris, & Leiserowitz, 2012). Other experts have articulated the relationship between

Indigenous knowledges and science as a way of broadening our views and usage of the environment (Berkes, 2012; Cajete, 2008; Deloria Jr., 1997; Michell, 2006). Their work has contributed to our increased understanding that sustaining life on Earth means educational institutions cannot isolate themselves from new ways of identifying, examining, and addressing the parts and the whole of environmental challenges.

The past *Millennium Development Goals* and the current *2030 Sustainable Development Goals* (UN, 2017a) are an important step forward by the international community in new orientations to social, economic, and environmental development. If more effective intergenerational processes can be found in establishing common goals, recognizing failures, building on successes, and encouraging engagement of all sectors of society, including Indigenous peoples, there is a greater chance of better decision-making by human societies for the viability of this planet.

Researcher Positionality

Researcher positionality has been identified as an important aspect of understanding the relationship of the researcher to the research topic, since it reveals background information about some of the values and biases held by researchers in the subjective process of constructing knowledge (da Costa, Hall, & Spear, 2016). This subjective process includes recognizing the ability of people to be experts on their own worldviews and experience, including experiences related to the construction and influence of gender, race, class, and nationhood (Hill Collins, 1998; Steinhauer, 2002). Qualitative researchers often include positionality statements in their research when working with socially constructed knowledge claims because, “Researchers recognize that their own background shapes their interpretation, and they ‘position themselves’ in the research to acknowledge how their interpretation flows from their own personal, cultural, and historical experiences” (Creswell, 2003, pp. 8-9). Expression of positionality in research is also a way of being transparent.

Waas, Verbruggen, and Wright (2010) identify transparency as a feature of research wherein the researcher is clear about such things as, “their stance, attitude, vision, position, methodology, realization and results of their research” (p. 634). The idea of positionality has roots in both academic research and Indigenous traditions. In Indigenous traditions, relationship building among individuals and groups is an effort to find common interests and mutual benefits that may lead to closer relations or collaborations. Unfortunately, Indigenous communities have

often been the subjects of research that has not served their best interests and subsequently have come to exercise great caution in participating in studies that do not show a clear benefit to their communities. Recognition of problematic research processes led to the creation of a set of principles in 1998 by Indigenous health researchers that established a foundation for First Nations' to have Ownership, Control, Access, and Possession (OCAP®) of their own data (FNIGC, 2018). While OCAP® was created to protect First Nations' data, its principles are also valuable for use in other Indigenous communities in Canada. Transparency is a desired outcome of academic and Indigenous ethical protocols.

National and international research ethics processes have helped protect Indigenous communities with more rigorous ethical standards developed in recent years (CIHR, NSERC, & SSHRC, 2014; UN, 2004). Indigenous communities have their own local protocols of relationship building often based on personal interaction. In the process of building the relationship between individuals who are seeking and giving knowledge, for example, personal information is exchanged that helps assure honesty, integrity, and good-will form the basis of the relationship.

In my research, the process of relationship building was initiated at the beginning of the study and will carry on after the study is concluded. Some information was exchanged over the course of several conversations between the participants and myself; however, I am including some additional information here that further explains my positionality within the research. It is, perhaps, one of the most difficult parts of writing because it commits a static view of personal views and characteristics that, in reality, continue to evolve through time.

I came to do this research after spending several years working on national and international environmental issues with Indigenous communities. As an Indigenous person, I was exposed to many of the challenges Indigenous groups contend with in trying to assert positive influences on environmental policy, legislation, and practices. Indigenous communities and organizations often have few people working on environmental issues because of a lack of capacity. In addition, there is very little research published about current environmental issues¹

¹ According to Brook and McLachlan (2008), although there are some case studies the demonstrate successful integration of multiple knowledge systems, a study published in Biodiversity Conservation indicated that over a period of 25 years, from 1980 to 2004, references

that include Indigenous voices (Brook & McLachlan, 2008), and although there are environmental projects being carried out by Indigenous communities across Canada, these are often not broadly shared or known outside of the involved communities or funding agencies. Over the past few decades, I have remained committed to working on environment and sustainability issues, largely because of the traditional teachings I have learned from honoured and respected Indigenous Elders, cultural knowledge holders, and other like-minded people.

I am a member of the Métis Nation, but I have worked collaboratively with other Indigenous peoples in Canada and around the world. Although we each have unique cultural histories and experiences, we are also similar in our shared compassion for the natural world. As more Indigenous people migrate to urban settings, I believe there is even more impetus to create opportunities for young people to interact on a daily basis with nature. In a conversation with a friend visiting from Africa, I mentioned my belief that in Canada most people need to be wealthy to live outside the city in a natural setting. He was surprised and said it was not like that in his country. There, a person is usually very poor if they live outside the city.

Growing up in the bush country of north central Saskatchewan shaped my life and appreciation for the environment. As a child, my world was a sparsely populated place, surrounded by boreal forest, with lakes and streams that provided an ample supply of fish. Berries and hazelnuts grew wild all around, and home was a village of about 50 people where everyone knew each other. In the early days, our tiny house had no electricity, running water, or furnace for heat. I suppose we were poor but it did not seem that way. Most of our food came from the moose, elk, and deer my father hunted and my mother was a skilled gardener so there was always plenty of food. Even as kids, we helped with planting, weeding, and harvesting the vegetables. We picked berries and helped our parents with cleaning and processing the wild meat.

As children, we were seldom inside the house, in any season. I do not remember ever

to local ecological knowledge has increased but still only constituted less than 0.01% of all papers, or 421 out of 7.5 million papers in 360 environmental, conservation, and ecology journals. A further analysis showed 172 of the articles focused primarily on ecological knowledge, used only research voice, rarely referenced spiritual knowledge or provided quotations, and the majority failed to recognize contributions by participants.

worrying about drowning, being eaten by a bear or wolf, or getting lost in the bush, nor do I remember anyone else warning about such things. Perhaps we had learned to be alert and careful over time from being outside so much. My love of nature was formed during these years and I cannot say it was one thing over another, but during the formative years of my childhood spent playing in the quiet of nature, some part it imprinted onto me. As an adult now, I recognize the value of growing up outside an urban setting.

Having now lived in the city for much of my life, I reflect on the importance of those early years in developing an appreciation for the natural world at home and around the world. I have lived in other parts of Canada and the world, learning some of the social, economic, and environmental norms of those places that have contributed to shaping who I am. Visiting other places opens your eyes to the reality of the beauty and the dangers of our world. Most of all, I found a new appreciation for home, the familiar, and the shared values of community.

I acquired a B.Ed. through the Saskatchewan Urban Native Teacher Education Program (SUNTEP) in Prince Albert, SK, gaining professional training in combination with cultural knowledge shared by Elders, students, and traditional practitioners from a variety of Indigenous nations. For myself, as a Métis person, this was a very powerful experience. Through participation in school and community activities, I learned to understand, honour, and practice many traditional First Nations philosophies and ceremonies passed down through generations, while gaining a better understanding of what it meant to be Métis. I carried a dual specialization in Native Studies² and Biology because they seemed equally important to me.

After teaching for a time, I worked within the Métis Nation on environmental policy and intergovernmental relations, which introduced me to Indigenous rights and how these rights influence the lives of Indigenous peoples. I have worked nationally for the Métis Nation on environmental policy and with other Indigenous peoples on issues such as the conservation of biological diversity, species at risk, water, climate change, chemical pollutants, and energy issues. I have also worked for the Aboriginal Healing Foundation, a predecessor of the TRC, on issues related to Indigenous peoples' experiences with residential schools in Canada.

Questions about the interconnected issues of the environment, education, and Indigenous

² Most Native Studies programs are now called Indigenous Studies, as accepted terminology has changed over time.

peoples seemed to keep coming up everywhere in my life. I returned to the University of Saskatchewan to study and completed a Master of Education degree with a thesis on *Métis Traditional Environmental Knowledge and Science Education* (Vizina, 2010) and worked with a number of other people on a major research project on *Learning Indigenous Science from Place* (Michell, Vizina, Augustus, & Sawyer, 2008) so that we could positively influence revisions to science curriculum in Saskatchewan. Now, through a Doctor of Philosophy degree, I am working to advance research on sustainability and Indigenous knowledges in post-secondary education. These experiences illustrate some of what I see as important in protecting the natural world for future generations. I do not claim to have all the answers, but I believe humanity has sufficient knowledge to make better life choices that will slow environmental damage.

Along with the many positive experiences I have had working within Indigenous communities, I acknowledge that in some, forging and maintaining good relationships is often neglected, traditions are sacrificed for economics, and conservation of the environment is frequently last on the list of urgent concerns. Some have said this is a result of the effects of colonization or the need to deal with the social and economic realities of living today. I maintain that relinquishing foundational teachings is even more destructive because it severs the link between the past and the future. I wonder what an Indigenous future would look like when one's own values, traditions, and languages no longer exist and the natural environment has been destroyed. Indigenous peoples, including myself, do need to be part of the economic system in Canada, but upholding traditional values means placing the health of the environment as a first consideration in the choices we make. It is for this reason that I am resolute in my belief that PSE institutions must play a larger role in connecting Indigenous knowledges to sustainability.

Indigenous rights, in my view, are an important means of reconnecting cultural traditions with contemporary lives of Indigenous peoples because they originate with spiritual beliefs and responsibilities. In reflecting on my own positionality, I recognize that I have had benefited from growing up in a region of healthy boreal forest, lakes, and landscapes. The natural world wants to be resilient, to sustain life. It is constantly changing to balance its own life-giving conditions. Indigenous peoples also want to be resilient and thrive in their territories by being part of social and economic systems. The process of honouring traditional values, as opposed to capitalist values, should mean advancing Indigenous rights to support collective and environmental benefit rather than individual power and wealth.

My view of the world has been shaped by traditional teachings generously shared by Elders Danny Musqua, Vicki Wilson, Wes Fineday, the late Rita Parenteau, Richard Dubois, Mike Maurice, and many others who share common values. None of these Elders have shied away from difficult issues, but all of them have taught with love and kindness, encouraged learning and respect for cultural traditions. I hope to carry on this legacy.

The Sustainability and Education Policy Network

The Sustainability and Education Policy Network (SEPN) project based at the University of Saskatchewan is an international network of researchers and organizations working to advance sustainability in education policy and practice. The network emerged in response to the urgency of responding to global environmental issues and recognition of the need to coordinate and increase research on sustainability policies and practices in education. SEPN team members are examining policies, practices, and innovations that are most promising for enabling educational change for a more sustainable future. The network develops locally responsive, research-based analyses of sustainability in education policy and practice nationally and internationally (SEPN, 2017).

SEPN's multi-stakeholder approach was designed to mobilize diverse communities, institutions, and networks to carry out research most likely to influence positive change. Part of that mobilization includes examination of the relationship between Indigenous PSE institutional policies and sustainability education to better understand how Indigenous philosophical principles of environmental stewardship and interconnectedness are related to education (Sustainability Education Research Institute, 2014).

My research was developed in an effort to contribute to SEPN's overall goal of examining and enabling the evolution of policy and practice in education in relation to Canadian environmental issues (SEPN, 2014b).

Statement of the Problem

In Canada, there is a paucity of research in the fields of environment and sustainability coming from Indigenous PSE places of learning. More of such research could potentially benefit Indigenous communities and other policy decision-makers in a variety of sectors. Indigenous peoples are often the subjects of research, especially in regard to traditional knowledges, leading to a recognition of the need to decolonize research by having Indigenous peoples determine and lead their own research agendas based in their own worldviews (Battiste & Henderson, 2000;

Kovach, 2009; Smith, 2012).

Decolonized research has been achieved, to some extent, in education in Canada through a systemic process that began as a result of the near annihilation of Indigenous cultures and languages through the federal policies that created residential schools, which were designed to assimilate Indigenous peoples into mainstream society (Legacy of Hope Foundation, 2012). The failure of federal assimilation policies and the subsequent journey of recovery is an important parallel to how we have also failed to connect Indigenous traditional knowledge systems with sustainability and environmental decision-making in a manner that has Indigenous peoples in a central role.

The restoration of Indigenous cultures and languages is reliant on a healthy environment. In turn, Indigenous peoples' traditional knowledge and value systems can contribute to maintaining environmental health. Indigenous knowledge and theory developed in education can be adapted to address Indigenous peoples' roles in environment and sustainability and augment the field. The connections between PSE institutions, Indigenous communities, and environmental issues can be better understood by looking at how Indigenous peoples have been responding to environmental development across Canada.

Indigenous peoples have been involved in a variety of activities related to the environment and sustainability as evidenced by, for example, reports in public media (CBC News, 2015; Pfeffer, 2013); reports by Indigenous, and other, governance authorities (Assembly of First Nations, 2011; CIER, 2009); and rulings from Canadian legal processes (Supreme Court of Canada, 1990; 2004; 2014). However, while some ad hoc information can be found about Indigenous community activities in relation to sustainability, little is known about the role Indigenous PSE places of learning in Canada might play in furthering sustainability. For example, how they might support community-based conservation projects, or contribute to sub-national, national, and international decision-making processes by Indigenous peoples on environmental issues. I give these as examples because of the gap in scholarly literature on linkages between Indigenous PSE places of learning and policy decision-making on environment and sustainability issues at provincial, territorial, national, and international levels of government, even though these policy-making authorities rely on academic research to make decisions that affect Indigenous lives.

The gap in literature reflects an absence of scholarly perspectives of First Nations, Métis,

and Inuit on sustainability initiatives, such as how sustainability is related to Indigenous knowledges; and the role of Indigenous faculty members in contributing research to sustainability studies, curriculum development, and community-based projects. Subsequently, there is also a gap in literature on how Indigenous PSE places of learning might support each other to build capacity and increase proactive participation in sustainability matters locally and beyond.

Purpose of the Study

The purpose of my research is to begin identifying the relationship between sustainability and Indigenous knowledges by exploring how faculty and administrators working in Indigenous PSE programs understand the concept, practices, and policies of sustainability in relation to Indigenous knowledges in their setting. If similarities exist between the purpose and goals of sustainability and Indigenous knowledges, then post-secondary education institutions can become important sites across Canada where Indigenization is recognized as consistent with the social, economic, and environmental pillars of sustainability.

Research Questions

The overarching research question for this study is: How do Indigenous PSE places of learning address environmental sustainability? The question was phrased this way to convey that the research has an environmental focus, as opposed to other interpretations of sustainability that might be found in, for example, economic or social development. In consideration of the overarching question, participants were asked a series of interview questions (see Appendix D) that were analyzed in relation to the following:

- In the territory you work, what Aboriginal philosophical principles concern the environment and interconnectedness in relation to sustainability in PSE?
- In your PSE place of learning, how are curriculum, research, facility operations, institutional governance processes, and community outreach linked to sustainability through practice and policy?
- In your PSE place of learning, how is sustainability practiced, and what policies drive these practices?

The overarching and secondary research questions facilitate analysis of a broad range of participants' responses for: interpreting sustainability through Indigenous perspectives, identifying how these interpretations manifest in specific areas of PSE, and including new

insights that might emerge from traditional Indigenous worldviews or other advice that is not typically associated with mainstream discourse on sustainability.

Significance of the Study

This research study is significant because little is known about the relationship between sustainability and Indigenous knowledges in PSE institutions. Identification of similarities in the purpose and goals of environmental sustainability and Indigenous knowledges would contribute to PSE institutions becoming important sites across Canada where Indigenization is recognized as consistent with the social, economic, and environmental pillars of sustainability.

Many Indigenous people are choosing careers that require post-secondary education. There are approximately 1.4 million Indigenous people in Canada with 46.2% under the age of 25 (Statistics Canada, 2011a, p. 16). Many of these Indigenous people are actively engaged in environmental issues in keeping with their cultural beliefs and values. Since academic institutions reflect and refine priorities of the society where they operate (Calder & Clugston, 2003) it is important to understand the relationship between Indigenous worldviews and sustainability issues, including how they are being taken up in those institutions.

In education literature, academics have identified the absence of Indigenous worldviews about the environment in education and point out a need for their integration (Kapyrka & Dockstator, 2012; Kulnieks, Longboat, & Young, 2012; McKeon, 2012; Tuck, McKenzie, & McCoy, 2014). Canada's 2010 report on education for sustainable development (ESD) indicators includes a rationale and some examples of ESD from within provincial jurisdictions at the K-12 and PSE levels (Council of Ministers of Education, Canada, 2010). The report appears to lack a framework that would facilitate consistency in longitudinal reporting that would seem to be critical in monitoring sustainability issues and responding to the invisibility of Indigenous worldviews within ESD. The absence of Indigenous peoples' perspectives in approaches to addressing sustainability issues, including in education, is a grave concern.

The results of this research will advance scholarly knowledge on how sustainability is understood in relation to Indigenous knowledges in PSE settings. Academic institutions will benefit from the results that can help extend efforts to Indigenize academic programming by including Indigenous perspectives in environment and sustainability education. This research may also contribute to teachers and learners in Indigenous PSE places of learning increasing their participation in environmental and sustainability activities of concern to Indigenous peoples

that focus on, for example, customary sustainable use of biological diversity, culturally relevant community-based conservation, and environmental decision-making processes.

The research also has implications beyond academia. As Kovach (2009) argues, “Policy and programming grow out of research, and while the influence of research and its methodologies is not always visible in the policy cycle, research is where it starts. Research creates policy and policy generates programs” (p. 13). Following this argument, my research will potentially benefit Indigenous communities, academics, and others concerned with inclusion of Indigenous perspectives in global sustainability efforts.

Indigenous communities will also benefit as PSE institutions increase awareness of the linkages between Indigenous knowledges and sustainability and initiate new actions that support mutual goals. Calder and Clugston (2003) argue that institutions of higher education will play crucial roles in contributing to societal success or failure in adopting new strategies that address the rising global population, issues of equity, and environmental sustainability. My research will contribute Indigenous perspectives to the body of literature on sustainability that can be used by PSE institutions and Indigenous communities to initiate new partnerships both inside and outside of PSE institutions.

Definition of Key Terms

Some of the key terms used throughout this study include:

Aboriginal peoples. This term refers to First Nations, Inuit, and Métis peoples in Canada as recognized in Section 35(2) of the *Constitution Act, 1982*, which says, “In this Act, “aboriginal peoples of Canada” includes the Indian, Inuit and Métis peoples of Canada” (Government of Canada, 2013).

Higher Education (HE). The term ‘higher education’ is often used in academic literature, but in Canada education beyond high school (secondary school), usually in colleges or universities, is referred to as ‘post-secondary education.’

Indigenizing. In education, this term usually refers to the integration of Indigenous knowledges in existing education processes (Goulet & Goulet, 2014, pp. 10-11).

Indigenous peoples. While there is no universally accepted definition of Indigenous peoples, the term is used throughout the world to refer to groups who: self-identify as Indigenous peoples; have historical continuity with pre-colonial and/or pre-settler societies; have a strong link to territories and surrounding natural resources; have distinct social, economic or political systems;

have a distinct language, culture and beliefs; form non-dominant groups of society; resolve to maintain and reproduce their ancestral environments and systems as distinctive peoples and communities (UNPFII, n.d.).

Indigenous knowledges. This term refers to the understandings, skills, and philosophies developed by societies with long histories of interaction with their natural surroundings. Indigenous knowledges inform Indigenous peoples' decision-making about fundamental aspects of day-to-day life. Indigenous knowledges encompass language, systems of classification, resource use practices, social interactions, ritual and spirituality (UNESCO, 2017). Indigenous knowledge and Indigenous knowledges are often used interchangeably but use of the plural form highlights that knowledge systems differ among Indigenous peoples.

Indigenous PSE places of learning. This term refers to post-secondary education programs and institutions established to primarily serve First Nations, Métis, and Inuit learners. These places of learning are recognized by a provincial or territorial government and grant degrees, diplomas, or certificates. Alternatively, the institution may be affiliated, or in a partnership, with a degree, diploma, or certificate granting institution recognized by a province or territory (AANDC, 2015).

Post-secondary education (PSE). In Canada, there are three types of post-secondary education institutions: universities, colleges, and institutes. Institutions passing government approval can grant: degrees, diplomas, certificates, or other qualifications. (Government of Canada, 2017b)

Sustainability or sustainable development. These terms are often used interchangeably across literature and definitions vary. One of the most common definitions is: "Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (WCED, 1987, Ch 2 para 1). Sustainable development is also considered to have three components that include "economic development, social development and environmental protection — as interdependent and mutually reinforcing pillars" (World Summit on Sustainable Development, 2002, p. 2).

United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP). An internationally accepted document containing 46 articles expressing Indigenous peoples' beliefs about their rights and freedoms (UNPFII, 2008).

Summary

In summary, sustainability has become a global concern that is shaping how societies plan for the future, including in Canada where PSE institutions are taking up sustainability

issues. At the same time, many PSE institutions are advancing efforts to Indigenize their policies and practices by including Indigenous knowledges as a result of the history of colonization and oppression of Indigenous peoples. Yet, there is very little research that explores the relationship between sustainability and Indigenous knowledges, even though they appear to share many of the same goals. In my research, I explore how Indigenous PSE places of learning address environmental sustainability by asking how participants understand sustainability in relation to Indigenous knowledges, how this is understood and acted on within their setting, and what might be possible for the future based on those observations. The outcomes of this research will potentially benefit Indigenous communities and PSE institutions in advancing the discussion on the similarities of Indigenous knowledges and sustainability. It may also lead to greater collaboration on environmental practices and policies of mutual interest to Indigenous communities and PSE institutions.

In the following chapter, a review of related literature is provided that examines related existing research on sustainability, Indigenous knowledges, and post-secondary education.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

As introduced in Chapter One, the relationship between sustainability and Indigenous knowledges is not well understood because there has been little research on the subject. This study explores how Indigenous PSE places of learning address environmental sustainability by examining Indigenous philosophical principles concerning the environment, the linkages between Indigenous knowledges and sustainability in PSE institutions, and the ways these are practiced and supported in PSE settings.

Chapter Two provides an overview of literature drawn from a variety of sources to provide background information relevant to the research. The literature is discussed under three main categories: 1) sustainability, 2) Indigenous knowledges, and 3) post-secondary education. These main categories also include sub-topics focused on existing literature about Indigenous and non-Indigenous perspectives of these issues.

The first category, of sustainability, contains three sub-topics on: sustainability history, sustainability and Indigenous communities, and community-based conservation. I provide a general description of sustainability to highlight various ways the term has been understood and used over time. Next, I give an overview of why sustainability is important to Indigenous communities and what is meant by community-based conservation.

The second category, of Indigenous knowledges, contains three sub-topics on: Indigenous peoples and knowledge systems; traditional livelihoods, land use, and languages; and environmental decision-making. In this category, I describe what the literature says about Indigenous knowledges, including how they are reflected in traditional livelihoods, land use, and languages, and their use as indicators of biodiversity health. Environmental decision-making processes are discussed next as they relate to Indigenous peoples' knowledges and self-determination.

The third category, of PSE, contains four sub-topics on: Indigenous education, contemporary careers, sustainability in education, and practice-policy gaps. The category begins with an overview of literature on Indigenous education in Canada, illustrating how it is related to sustainability and Indigenous communities. I then include information about contemporary careers, Indigenous learners studying in the sciences, and how these relate to issues of sustainability and Indigenous knowledges in PSE. These are followed by an overview of

sustainability education as an important feature of modern education, along with issues of gaps between practices and policies in PSE institutions.

The literature review is structured in this way to illustrate that even though concepts related to sustainability have developed independently over the past several decades, they have many parallels to the ancient ancestral knowledges of Indigenous peoples, with implications for PSE institutions. Despite the differing modalities of learning, languages, and terminology, there are many common elements and goals revealed by the literature about how Indigenous and non-Indigenous people describe sustainability and what they desire for the future of education. I have reported on the literature in a way that compares, contrasts, and analyzes what the authors have said.

Sustainability

The following three sub-topics provide an overview of the history of sustainability, the importance of sustainability to Indigenous communities, and the role of community-based conservation in advancing sustainability goals.

Sustainability history. Public attention to the sustainability of life on Earth has increased over the past few decades but warnings by scientists show we have not achieved the deep systemic changes needed in human thinking and behaviour. In November 2017, over 15,000 scientists, representing 184 countries, issued a warning to humanity about our ongoing inability to adequately address conditions causing severe global environmental damages. The scientists agreed that we have failed to make adequate progress on a broad spectrum of environmental issues identified in a previous warning 25 years earlier in 1992³. In fact, greenhouse gas emissions from burning fossil fuels, deforestation, and agricultural production have continued to rise, leading to potentially catastrophic climate change. In one of their most dire warnings, Ripple et al. (2017) said, “[W]e have unleashed a mass extinction event, the sixth in roughly 540 million years, wherein many current life forms could be annihilated or at least

³ In 1992, the Union of Concerned Scientists and 1700 independent scientists warned humanity was approaching the limits of the biosphere and urgently needed to address ozone depletion, freshwater availability, marine life depletion, ocean dead zones, forest loss, biodiversity destruction, climate change, and continued human population growth (Ripple et al., 2017).

committed to extinction by the end of this century (p. 1026)”. The seriousness of these and other environmental issues points to the need for humanity to transform the way it views and interacts with the environment. The mass extinction is not projected; it is already underway. Despite widespread knowledge of environmental problems, human behaviours have been slow to change.

Moving away from current status quo behaviours to sustainable lifestyles will require a foundational shift in how we create and apply knowledge, the types of meaningful actions taken by society, belief in our potential for a successful outcome, and accountability. Understanding more about what sustainability is, and perhaps conversely what it is not, may lead to a holistic approach that can create the type of systemic changes we need. Some sustainability experts have indicated that viewing sustainability from holistic or Indigenous perspectives may lead to a better understanding of environmental problems and application of our collective knowledge for improved sustainability decision-making (Sachs, 2015; Sterling et al., 2017; Waas, Verbruggen, & Wright, 2010). Defining sustainability in a way that is easily understood and acted on can be challenging.

Sustainability is a broad concept with varying definitions, often interchangeably described as sustainable development (Kates, Parris, & Leiserowitz, 2012; McGregor, 2004; Vaughter, Wright, & Herbert, 2015). Mebratu (1998) recognized that interpretation and application of the terms were often used to assert political influence by national, international, or corporate organizations rather than contribute to a synthesis capturing the essence of the concept and contribute to the development of a theory of sustainability and sustainable development (Mebratu, 1998). Since there continues to be no consensus on what sustainability or sustainable development means, there are many definitions (Kates, Parris, & Leiserowitz, 2012; McGregor, 2004). Many academics use the term sustainability in their discourse, while the term sustainable development tends to be used more broadly in international discourse (UN, 2017a; Vaughter, Wright, & Herbert, 2015). These definitions have evolved over time.

Historical antecedents to the concept and concerns of sustainability were included in early studies on environmental, economic, and human population limits. Thomas Malthus put forward an environmental limits theory in 1798, in which he predicted limits to economic growth and food security because of resource scarcity caused by the growing human population and a limited amount of good agricultural land (Mebratu, 1998; Sachs, 2015). This prediction has proven true with economic growth accelerating over the last two centuries. As other early

examples, in 1962, Rachel Carson published *Silent Spring* on the effects of environmental toxins, and in 1968, Paul Ehrlich published *The Population Bomb* on similar connections among human population, resource exploitation, and the environment (IISD, 2012). Earth systems now support over 7 billion people and projections estimate a likely increase to between 9 and 12 billion by 2100, making sustainability the urgent issue of our time (Patrick et al., 2014; Sachs, 2015).

Since the time of Malthus, attention to environmental degradation, development, and economics has grown and branched into a variety of ideological streams, such as eco-theology, eco-feminism, and eco-socialism, each with particular points of view, histories, and recommendations for action. Academic disciplines concerned with environmental economics, deep ecology, and social ecology, among others, have also taken shape contributing to the development of over 67 sectoral sustainability assessment tools relevant in, for example, innovation, technology, human development, market economies, ecosystems, products, cities and other geographic areas, and energy (Kumar Singh, Murty, Gupta, & Dikshit, 2012; Mebratu, 1998).

The variety of approaches to sustainability has resulted in multiple definitions and applications depending on when and how the terms are used. Past definitions of sustainability have focused specifically on the resilience of ecological processes and functions (McGregor, 2004, p. 73). The evolution to sustainable development emerged in 1980 with the International Union for Conservation of Nature and Natural Resources (IUCN) *World Conservation Strategy*, which defined the two terms this way:

Development is defined here as: the modification of the biosphere and the application of human, financial, living and non-living resources to satisfy human needs and improve the quality of human life. For development to be sustainable it must take account of social and ecological factors, as well as economic ones; of the living and non-living resource base; and of the long term as well as the short term advantages and disadvantages of alternative actions. (IUCN, 1980, p. 18)

As one of the largest environmental networks in the world, IUCN represents great diversity with hundreds of organizations and thousands of experts from governments, non-governmental organizations, scientists, businesses, local communities, Indigenous groups, faith-based groups, and others working on conservation issues around the world (IUCN, 2018). As such, the broad agreement on the creation of an expanded definition was important in advancing approaches to

sustainability that included consideration of temporal, as well as social, economic, and ecological factors.

One of the most well known definitions of sustainable development came in 1987 from the Bruntland Commission, in *Our Common Future*, which said: “Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs” (WCED, 1987, Ch 2 para 1). The Bruntland Commission also acknowledged that sustainable development is limited by technology, social organization around environmental resources, and the biosphere’s response to human activities (Kates, Parris, & Leiserowitz, 2012). The synthesis of factors concerning sustainability continued to develop and be taken up worldwide.

The 1992 United Nations Conference on Environment and Development, also known as the Rio Earth Summit, resulted in the adoption of Agenda 21, a global partnership plan for implementation of sustainable development (UN, 1992; UN, n.d.a). Agenda 21 set out guidance in four categories: Social and Economic Dimensions (including, for example, international cooperation, combating poverty, changing consumption patterns), Conservation and Management of Resources for Development (including, for example, protection and management of the atmosphere, land, seas and inland waters, and hazardous wastes), Strengthening the Roles of Major Groups (including, for example, youth, women, farmers), and the Means of Implementation (including, for example, financial mechanism, technology transfer, international legal instruments, and information for decision-making) (UN, 1992).

The Rio Earth Summit was followed by the 2002 World Summit on Sustainable Development, often called Rio +10, which focused on mainstreaming sustainable development through a plan for implementation that described “the three components of sustainable development — economic development, social development and environmental protection — as interdependent and mutually reinforcing pillars” (World Summit on Sustainable Development, 2002, p. 2). Ten years later, the 2012 Rio +20 Conference was marked by mass public protests because of poor progress on sustainability commitments by global leaders. The conference did result in the outcome document *The Future We Want* (Rio +20, 2012) that included agreement to establish a new set of international sustainability goals. The conference also established a High-level Political Forum on Sustainable Development to monitor international progress on the new goals (UN, n.d.a).

Sustainability has continued to be addressed at the highest levels of global social organization in order to understand it better and determine appropriate actions. At a macro level, Sachs (2015) said sustainable development should reflect “a normative outlook on the world” (p. 3) with “a set of *goals* to which the world should aspire” (p. 3). The global approach needed to actualize such goals would need to ensure widespread economic progress, alleviate extreme poverty, develop social trust through policy that strengthens communities, protect the environment from human-induced degradation, and achieve good governance (p. 3). The complexity of sustainability indicates that challenges and solutions must also be viewed holistically (Sachs, 2015, p. 3; Waas, Verbruggen, & Wright, 2010). All sectors of society need to be actively engaged in advancing sustainability and undertaking and communicating research that can inform decision-making is vitally important.

In 2015, 193 member states of the United Nations unanimously adopted the *2030 Sustainable Development Goals*, demonstrating their commitment to a sustainable future. UN members recognize “ending poverty must go hand-in-hand with strategies that build economic growth and addresses a range of social needs including education, health, social protection, and job opportunities, while tackling climate change and environmental protection” (UN, n.d.b). To advance the *2030 Sustainable Development Goals*, governments, businesses, and civil society were called on to work toward the 17 goals identified as most critical globally (UN, 2017a).

The 17 Sustainable Development Goals include: 1) No Poverty; 2) Zero Hunger; 3) Good Health and Well-Being; 4) Quality Education; 5) Gender Equality; 6) Clean Water and Sanitation; 7) Affordable and Clean Energy; 8) Decent Work and Economic Growth; 9) Industry, Innovation and Infrastructure; 10) Reduced Inequalities; 11) Sustainable Cities and Communities; 12) Responsible Consumption and Production; 13) Climate Action; 14) Life Below Water; 15) Life on Land; 16) Peace, Justice and Strong Institutions; and 17) Partnerships for the Goals (UN, 2017a). These goals are voluntary, but since the Government of Canada agreed to support them, provincial and territorial governments, businesses, civil society, and institutions such as universities, colleges, and institutes have a role in contributing to the national and global sustainability efforts.

Scholars today tend to use the term sustainability as a concept that encompasses both sustainability and sustainable development (Vaughter, Wright, & Herbert, 2015). Sachs (2015) argues that universities are vital in preparing a skilled workforce and training teachers, who can

in turn, train students on innovative technologies for sustainability. He highlights that research and development, for example, are a “web of institutions, involving universities, national laboratories, and high-tech businesses” (Sachs, 2015, p. 272).

In response to urgent social, economic, and environmental issues, sustainability science has emerged as an important new method of working collaboratively to solve sustainability challenges. Sustainability science takes a broad approach, being driven by high level questions and problem solving rather than through basic or applied disciplinary research. Kates (2011) describes sustainability science as “a different kind of science that is primarily use-inspired, as are agricultural and health sciences, with significant fundamental and applied knowledge components, and commitment to moving such knowledge into societal action” (Kates, 2011, p. 19450). This type of problem solving is primarily concerned with: ensuring the sustainability of Earth’s life support systems, meeting the needs of global human populations, and reducing poverty and hunger. Natural and social sciences play important roles in sustainability science by exploring properties of complex, adaptive human-environment systems (Bettencourt & Kaur, 2011; Clark, 2007; Kates, 2011). Even so, sustainability science has not yet reconciled its relationship to Indigenous knowledges (Johnson, Howitt, Cajete, Berkes, Pualani Louis, & Kliskey, 2016).

A search of scholarly literature yielded very few results inclusive of Indigenous perspectives specifically about sustainability and there is quite a gap in the literature connecting sustainability and Indigenous knowledges in PSE institutions. For example, Loomis (2000) has written about Indigenous approaches to holistic, self-determined sustainable development in New Zealand. In Canada, Beckford, Jacobs, Williams, and Nahdee (2010) have written about Walpole Island First Nation peoples’ perspectives of environmental wisdom, stewardship, and sustainability. Additionally, much of the existing literature on Indigenous peoples and Indigenous knowledges in education and in natural resource management embodies sustainability concepts; however, because it may not explicitly refer to sustainability, is not often recognized for that purpose.

Sustainability and Indigenous communities. Creation stories of many Indigenous cultures convey that humans are the least important life form, being created last and being most dependent (Rice, 2005, p. 14). Human dependence is reflected in the importance Indigenous peoples have traditionally placed on the environment. This wisdom exists because Indigenous

cultures and languages emerged over millennia from their knowledge, understanding, and relationships with the natural world (Battiste, 2002; Cajete, 1994; Deloria Jr., 1997). Embedded within Indigenous cultures and languages are the traditional laws intended to guide thought and behaviour. Traditional protocols, principles of culture, languages, spiritual belief systems, kinship, and relationships with non-human life forms demonstrate Indigenous peoples' understanding of their reliance on the natural world (Michell, 2006; Relland, 1998; Tester & Irniq, 2008). Maintaining cultural traditions in a contemporary world has brought new challenges for Indigenous peoples that often stem from living in a colonized society where they are no longer the majority population in their traditional territories.

Indigenous approaches to addressing environmental issues in Canada often take a human rights approach, specifically an Indigenous rights approach, encompassing holistic views of cultures and traditions (Henderson, 2008; Kawagley & Barnhardt, 1998; Wilson, 2009). In Canadian law, First Nations, Métis and Inuit are recognized as Aboriginal peoples holding treaty rights and/or Aboriginal rights (Government of Canada, 2013). While colonial law plays an important role, cultural belief systems continue to form the centre of Indigenous traditional law. First Nations, for example, believe their rights and responsibilities concerning the natural world extend from an unbreakable covenant with the Creator (Henderson, 2008; Wilson, 2009). Legal and spiritual dynamics play important roles in understanding why Indigenous peoples vigorously engage in environmental issues and seek to ensure their cultures and languages are perpetuated in education systems in Canada.

Indigenous peoples' traditions are often based on ancestral teachings about relationships with non-human ancestors or relations within the natural world. As such, Indigenous peoples believe maintaining life support systems are essential not only for humans but also for all living things and subsequently, try to honour these teachings in contemporary life. Interpreting environmental issues through Indigenous worldviews, whether First Nations, Métis, Inuit, or otherwise, requires thinking beyond mechanistic scientific methods and theories, social theories, and colonial legal processes to consider relationships among human and non-human elements of nature.

It is only in recent years, rights of the natural world are beginning to be recognized in law in parts of the world. For example, in March 2017, New Zealand granted the Whanganui River (Te Awa Tupua) legal status as a living entity as an ancestor of the Māori with the same rights,

duties, and liabilities as a legal person. It was reported, “The new status of the river means if someone abused or harmed it the law now sees no differentiation between harming the tribe or harming the river because they are one and the same” (Roy, 2017, para 6). Other countries, including Ecuador and Bolivia, had already passed laws affording protection to nature through designation of rights as well as obligations of the state (Biggs, Goldtooth, & Lake, 2017, p. 7). These advances in law have come as a result of long-term advocacy by Indigenous peoples in their commitment to the importance and value of traditional belief systems.

Indigenous peoples’ traditions link environmental issues to their foundational cultural belief systems, including affective and spiritual aspects, as well as the physical and intellectual aspects. That is, ethical protocols, value systems, and beliefs of Indigenous peoples are as important as specific actions and knowledge necessary for co-existence with the rest of Creation. Reductionist questions about global concerns of climate change, severe weather, land degradation, pollution, and loss of biodiversity are, to Indigenous peoples, questions of systemic dysfunctionality concerning the behaviour of human beings. According to Elder Danny Musqua, the departure of individuals from living in accordance with traditional laws results creates chaos and sickness, which can only be remedied by healing individual behaviour (Relland, 1998).

The colonial view of nature is often dramatically different from Indigenous worldviews because it is rooted in the “science of empire” (Adams, 2004, p. 25). The empirical system of resource exploitation is intended to build colonial wealth and power and negate Indigenous worldviews of a living sentient environment understood within personal relationships maintained by traditional practices (Adams, 2004, pp. 22-35; Deloria Jr., 1997, p. 40; 2006, p. xviii). Conversely, the protection and enactment of Indigenous rights is an effort to protect the natural world for the benefit of all its occupants.

Indigenous communities perpetuate Indigenous knowledges to sustain their traditional territories and address social, economic, and environmental concerns in their lives. Non-Indigenous researchers and other often believe traditional knowledge is only the physical knowledge held by local resource users. More accurately, Kimmerer (2002) states that Indigenous ontologies and epistemologies are built on multiple domains of knowledge that are intertwined. She explains that this knowledge comes from the mind, body, emotion, and spirit. Other researchers have also indicated Indigenous knowledges are cumulative as complex systems of philosophies and practices of life. Nadasdy (2003) states, in the Yukon, Indigenous

peoples have said that traditional knowledge is not really knowledge at all but a way of life. Métis in northern Saskatchewan have conveyed similar sentiments (Vizina, 2010). Indigenous actualization of sustainability might be thought of as the strengthening of traditional cultural practices and values. The following are two examples of contemporary application and adaptation of Indigenous traditions to contemporary life in relation to sustainability.

The Kluane people in the Yukon believe that hunting does not simply mean the killing of animals. Instead, hunting represents an “entire constellation of values, beliefs, practices, and social relations that surround and give meaning to Kluane people’s subsistence strategies and their relationship to animals” (Nadasdy, 2003, p. 66). Sharing meat among community members, gender roles, knowledge of cyclical interactions, labour, material contributions, and child-rearing all comprise part of building social relations and reinforcing Kluane identity through hunting. Kluane also “see individual animals as intelligent non-human persons to be respected” (p. 111) who can teach humans if the terms of their existence are honoured. Individual animals and communities of animals think, feel, and are not simply objects of study, but contribute within the human-animal relationship. Scientists who “wrest knowledge from them by force” (p. 110) through radio-collaring, aerial surveys, and other unnatural forms of study are considered by the Kluane to be committing the highest forms of disrespectful behaviour since these are methods that would never be used on people. Although this case describes Kluane beliefs, it can be extrapolated to understand basic traditional values of most other Indigenous cultures in Canada.

Traditional belief systems are not artifacts of the past. These belief systems continue to comprise the foundation of Indigenous peoples’ worldviews and influence decision-making in everyday life, including social, economic, and environmental aspects of sustainability. The Gitksan-Wet’suwet’en in British Columbia have described their vision of a sustainable economy as part of the path to healing social and spiritual disease of their people. The formation and management of a local economic development organization was based on Gitksan-Wet’suwet’en self-government of Hereditary House Groups (RCAP, 1996a). Traditional knowledge continues to guide community behaviour and goals as well as establishes the norms of behaviour for individuals.

Values inherent in Indigenous worldviews also extend benefits beyond Indigenous communities because they contribute to expanding our understanding of the concepts of

sustainability through linguistic expression. For example, Goulet and Goulet (2014) explain the Cree term *Pimatsiwin* means ‘life’ or ‘the state of aliveness,’ whereas *Pimachihisowin* is the self-determined action of individuals, groups, and nations in a quest for life, livelihood, and survival. *Pimachihisowin* contains a strong element of conscious, or intentional, action that is not limited to people but includes all forms of action by other entities (pp. 59-60). The authors explain this will to be alive through their cultural perspective:

The Nehinuw life force system is an inter-active, dynamic process of causal forces that are the source and foundation of life and all non-living creations and emanations. This life force dynamic exists in beings and entities such as people, animals, plants, the sun, spirit beings such as the thunderbird, and also in the creations and processes of entities and beings, whether cultural or natural. (p. 60)

Goulet and Goulet (2014) convey traditional Nehinuw beliefs in English so that they can provide a unique insight about life forces and a reminder that different cultures and languages carry different knowledge and perspectives. This is linked to another significant term, *weechihitowin*, translates as helping or supporting each other through interactive collaboration and cooperation (p. 61). Translating Indigenous languages is never exact and often involves extensive explanations to capture the essence of a term.

Indigenous communities communicate knowledge about sustainability through their cultural knowledge systems and languages. Indigenous knowledge systems reflect complex adaptive ways of life that are holistic, have philosophical and applied components, and serve to ensure the health and vitality of people, as well as Earth’s systems (Cajete, 1994; Campbell & Vainio-Mattila, 2003; Crowshoe, 2005; Michell, Vizina, Augustus, & Sawyer, 2008; Relland, 1998; Rice, 2005). Eurocentric education in Canada has historically sought to eliminate traditional Indigenous knowledge because it did not reflect the ideology of colonial authorities (Hendry, 2014; York, 1990). Through federal assimilation policies, often carried out with brutal vigour, efforts to eliminate Indigenous cultures and languages resulted in extensive losses. Cree, Ojibwe, Inuktitut, and Dene languages remain relatively healthy but other Indigenous languages are in decline, endangered, or already extinct (Cook & Flynn, 2008). Often, the English language cannot accurately reflect components of Indigenous knowledge systems because of differences in linguistic structure and meaning. This is discussed further in the section on Indigenous knowledges. These differences are relevant to how sustainability is understood in

English and Indigenous languages and cultures.

Community-based conservation. Indigenous traditional knowledges and languages are premised in worldviews that differ from secular processes in motive, understanding, and interpretation of how we are to behave and interact with our environment. There are many convergences in the desire to achieve common goals, but if the divergences are not understood and addressed, Indigenous communities are the ones left to suffer the consequences of lost knowledges, disrupted social systems, and the staggering task of rebuilding functional cultural communities. This has been well documented in research on the destructive processes colonization has had on Indigenous peoples (Anaya, 2014; Legacy of Hope Foundation, 2012; RCAP, 1996b). Because of the name, community-based conservation sounds like it should be similar to customary sustainable use of the environment by Indigenous peoples. However, in many cases, community-based conservation is a label that often may not reflect community traditions of sustainable living.

There are two primary discourses describing community-based conservation: 1) those that focus on common-pool natural resource management and explore projects with environmental governance practices that have evolved at the community level to manage resources sustainably; and 2) those that refer to situations where resource management agencies promote projects in communities that are not based on local residents' own norms and institutions (Balint, 2006). In the first case, customary sustainable use of biodiversity is based on culture-based systems of self-governance in, for example, zoning, selective harvesting, rotational or shifting cultivation, and migratory grazing to ensure biodiversity and communities thrive. Through traditional knowledge and constant monitoring, Indigenous communities determine the intensity and frequency of use based on factors such as species' reproductive cycles, population abundance, and seasonal weather patterns (Natural Justice: Lawyers for Communities and the Environment, n.d.). In the second case, non-local systems are implemented that do not take into consideration long-term knowledge and experiences of local residents.

Divergences between community and other proponents of community-based conservation are often described in academic literature as involving tensions between spiritually based environmental values and economic values (Bengston, 2004; Devin & Doberstein, 2004). That is, tensions emerging from viewing the environment as the engine of the national economy where everything can be inventoried and has a financial value, or as a living feminine entity

where traditional Indigenous laws orient relationships and interactions to ensure her well-being as well as that of people. Indigenous peoples consider the regenerative capacities of landscapes and particular places of their territories as linked to their own physical, spiritual and emotional well-being, such as with the Cheam⁴ people's perspectives of forest and riparian vegetation as sites of refugia for spiritual practices (Lewis & Sheppard, 2005). In contrast, scientists often see traditional knowledge only as a source of low-cost qualitative information covering a broad range of environmental indicators or products (Dowsley, 2009; Shanley & Stockdale, 2008). The use of Indigenous knowledges to advance some conservation practices can result in detrimental outcomes for Indigenous peoples once it is beyond the control of their communities.

Involvement of Indigenous communities in conservation planning or development is recognized in international and national standards of research and decision-making. Two important standards were developed under the UN Convention on Biological Diversity in consultation with Indigenous peoples from around the world. These standards provide important guidance on the involvement of Indigenous peoples in conservation activities.

The first standard, is entitled *Akwe:kon Guidelines for the Conduct of Cultural, Environmental and Social Impact Assessments Regarding Developments Proposed to Take Place on, or which are Likely to Impact on, Sacred Sites and on Lands and Waters Traditionally Occupied or Used by Indigenous and Local Communities* (UN, 2004). Although the guidelines are considered to be voluntary for UN member states, the document provides key information about what Indigenous peoples believe need to be taken into account in any development that affects them.

The second important guide is *The Tkarihwaïé:ri Code of Ethical Conduct on Respect for the Cultural and Intellectual Heritage of Indigenous and Local Communities Relevant for the Conservation and Sustainable Use of Biological Diversity*, which is applicable in the complex interfaces of sustainability involving Indigenous communities (UN, 2011). The effectiveness of these, and other similar instruments, will be dependent on the extent of their use and normalization within institutions and processes addressing sustainability. In addition to the standards mentioned above, the UN General Assembly adopted a rights-based declaration supporting Indigenous peoples.

⁴ Pronounced Chee-am. The Cheam People live west of Vancouver in the Fraser Valley of BC.

The *UN Declaration on the Rights of Indigenous Peoples* (UNDRIP) contains 46 articles expressing what Indigenous peoples around the world see as their rights and freedoms (UNPFII, 2008). Most UN member states agreed in 2007 to adopt this document that was developed through Indigenous peoples' efforts over many years. Some western countries, including Canada, the USA, New Zealand, and Australia initially voted against adopting the Declaration, but in subsequent years, the four dissenting members changed their positions. Canada officially endorsed UNDRIP in 2010, provided a national mandate for implementation in 2015, and removed its status as an objector with the United Nations in 2016 (Fontaine, 2016; Government of Canada, 2017c). Despite past resistance, Canada is now making some progress on the implementation of UNDRIP and the views of Indigenous peoples about a range of issues affecting social, economic, and environmental aspects of their lives and territories.

Balint (2006) argues that conservation programmers cannot circumvent international development issues of rights, capacity, governance and revenue generation in project planning and implementation. These four variables are critical to success determination in community-based conservation projects. In the theory-praxis debate, Campbell & Vainio-Mattila (2003) argue that conservation cannot be separated from the context of people's lives and their interaction with species and ecosystems. Community experience "is central to the explanations and visions of conservation as well as the choice of appropriate conservation strategies" (p. 423). Developing strategies inclusive of Indigenous and human rights requires development of expertise.

There are over 25 international instruments that connect Indigenous rights with conservation standards. Some of these include: the *Universal Declaration on Human Rights*; the *International Covenant on Civil and Political Rights*; the *Convention on Biological Diversity*; and the *Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters* (Jonas, Makagon, & Roe, 2014, p. 12). In some regions of the world, conservation-related conflicts have escalated to human rights abuses. Jonas, Makagon, and Roe (2014) have identified these abuses as:

Denial of free, prior and informed consent; lack of engagement with indigenous institutions; eviction; unjust resettlement; destruction of property and livelihoods; denial of access and use of natural resources; intimidation and physical harm; and exploitative employment. (p. 10)

Non-Indigenous authorities developed the international instruments listed by Jonas, Makagon, and Roe (2014), but there are other instruments developed by Indigenous peoples.

One such instrument is the *Alta Outcome Document*, which was developed and put forward by Indigenous delegates at the 2013 UN World Conference on Indigenous Peoples (UN, 2013a). The document was created prior to the 2030 Agenda on Sustainable Development and expressed four key themes that Indigenous peoples deemed crucial for discussion in pending future international forums. The major themes identified in the *Alta Outcome Document* included: 1) Indigenous Peoples' lands, territories, resources, oceans and waters; 2) UN system action for the implementation of the rights of Indigenous Peoples; 3) Implementation of the Rights of Indigenous Peoples; and 4) Indigenous Peoples' priorities for Development with free, prior and informed consent (p.3-8). In the preamble of the document, the authors conveyed this opening statement:

As the original and distinct Peoples and Nations of our territories we abide by natural laws and have our own laws, spirituality and world views. We have our own governance structures, knowledge systems, values and the love, respect and lifeways, which form the basis of our identity as Indigenous Peoples and our relationship with the natural world.
(UN, 2013a, p. 1)

Indigenous peoples face the challenge of expressing collective views of hundreds of Indigenous communities in a way that reflects the way they think about the environment, but also so that it is understood and useful in more bureaucratic processes.

Understanding human and Indigenous rights is often difficult, often because the language and form of its expression is complicated. Joffe (2010) describes the necessity of education in protecting, respecting, and fulfilling Indigenous peoples' human rights:

Many scholars, lawyers, legislators, and government officials are also in need of human rights education. Increased comprehension of the relationship of international human rights law to Canada domestic law is needed. (Joffe, 2010, p. 75)

Strategies for facilitating equitable discussions about diverse knowledge systems have emerged over the past few years and are growing in application in scholarly contexts.

In addition to national and international standards for consulting Indigenous peoples, the strategy of ethical space for collaborative research, for example, provides guidance on respecting unique knowledges and goals of Indigenous peoples and other researchers (Ermine, Sinclair, &

Jeffery, 2004; Hampton, 1995). Using strategies that bring forward philosophical frameworks for Indigenous knowledge and theory can serve as a decolonizing process for Eurocentric education and research, while at the same time facilitating collaboration that can contextualize non-Indigenous theory and praxis (Battiste & Henderson, 2000; Smith, 2012; Wilson, 2008). Development of collaborative frameworks that involve Indigenous communities may be unique but must still draw on established human and Indigenous rights standards.

The term *sui generis* is often used to describe a concept that is unique. In examining application of the term to Indigenous land rights, Borrows and Rotman (1997) have described the doctrine of *sui generis* as “a balance between common law and Aboriginal conceptions, acting as an aid to the development of the common law in a manner which accommodates cultural differences and unique Aboriginal legal rights” (p. 9). It can be thought of as a bridge between different systems, which “brings together separate systems and principles which have a mutually beneficial, interactive, and practical co-existence” (p.37). Working in partnership, however, does not mean Indigenous communities relinquish control of their cultural knowledges.

Indigenous communities want to ensure that Indigenous knowledges remain the property, and under the governance, of Indigenous peoples. Respecting their authority over Indigenous knowledges is critical in the success of community development projects, such as conservation and sustainability projects. Employing strategies to ensure Indigenous perspectives are not marginalized does not mean that conservation or sustainability projects will proceed. Deeper measures of consent need to be provided by Indigenous communities to ensure moral and legal standards are met.

Free, prior, and informed consent (FPIC) is an important concept in any proposed environmental changes within Indigenous territories. FPIC is “an international human rights standard that derives from the collective rights of indigenous peoples to self-determination and to their lands, territories and other properties” (FAO, 2014, p. 4). FPIC is a means of protection of a spectrum of Indigenous peoples’ rights, such as the right to culture, identity, self-governance, lands and territories, found within other international human rights agreements. FPIC ensures the ability of Indigenous peoples “to give or withhold their consent prior to the approval by government, industry or other outside party of any project that may affect the lands, territories and resources that they customarily own, occupy or otherwise use” (p. 4). FPIC is a means by which Indigenous peoples can protect themselves and their territories from use they deem

detrimental to their way of life or facilitate new partnerships.

Indigenous Knowledges

This section provides an overview of Indigenous peoples and their knowledge systems; how traditional livelihoods, land use, and languages are an integral part of Indigenous knowledges; and the role of Indigenous peoples in environmental decision-making. Each of these sub-topics provides further detail about Indigenous peoples' connections to sustainability, including moral and legal obligations for their inclusion in environmental processes in Canada.

Indigenous peoples and knowledge systems. The previous sections outlined some considerations of human and Indigenous rights, including the need for specialized training because it is complex. A similar situation exists with understanding Indigenous knowledges. These knowledges are complex and unique to Indigenous communities. It is important to first understand something about the people whose knowledge is under discussion.

There are an estimated 390,000,000 to 430,000,000 Indigenous people comprising culturally distinct communities in some 90 countries of the world (FAO, 2018). Each group has its own worldview and approach to sustainability. Although Indigenous peoples make up less than 5 percent of the world's population, they are often among the poorest (UNESCO, 2017). It has been reported that traditional Indigenous territories cover less than a quarter of Earth's land but hold approximately 80% of its remaining biodiversity (Sobrevila, 2008, p. xii). Indigenous peoples' cultural traditions are directly linked to their traditional territories and maintaining the health of the natural world ensures their traditions can continue. Indigenous perspectives of sustainability are influenced by the geographical locations, histories, experiences, and worldviews of each culture group and are reflected in the cultures and languages of these communities.

There is no universally accepted definition of Indigenous peoples, but they have been described by international organizations as having the following attributes: they are associated with geographically distinct ancestral territories; they self-identify and are recognized by others, such as state authorities, as a collective; they are descended from cultural groups present in that area before colonization, modern states, or borders were created; they have experienced subjugation, marginalization, dispossession, exclusion or discrimination; and they perpetuate cultural distinctiveness associated with language, social organization, religion and spiritual values, livelihoods, laws, and institutions that are separate from the mainstream or dominant

society or culture (FAO, 2018; ILO, 2017; WHO, 2018). Worldwide, there are thousands of Indigenous groups, each with their own ancestral name, which often differ from commonly used names derived from external sources. Indigenous peoples claim the right of self-determination but sometimes come together as a collective to advocate for common goals.

With respect to Indigenous knowledges, it is generally agreed that there is no one universal definition. Indigenous scholars Battiste and Henderson (2000) have identified three primary problems with attempting to define Indigenous knowledge. They explain that first, Indigenous peoples do not carry similar concepts of ‘culture’ in keeping with Eurocentric concepts of ‘culture’; second, Indigenous knowledge is not a uniform concept among all Indigenous peoples, it is diverse and exists in varying layers and often those who possess it cannot categorize it into Eurocentric categories because the knowledge does not exist in this manner; and third, that the knowledge held by individuals, clans, bands or communities cannot easily be separated from the user as it is part of their existence and normal usage (p. 36). Despite these challenges, it is useful to examine some of the ways Indigenous knowledges have been described.

Indigenous peoples in Canada, First Nations, Métis, and Inuit, described their understandings of what constituted a cultural education in their respective Holistic Lifelong Learning Models (AERC & FNAHEC, 2007d). These models, described in Chapter One of this study, use a combination of text and images to illustrate the important elements that connect individuals to their families, communities, and broader society through cultural knowledge. In the First Nations model, for example, it says that, “The purpose of learning is to honour and protect the earth and ensure the long[-]term sustainability of life” (AERC & FNAHEC, 2007a, p. 2). The Métis model indicates that learning is a sacred act that is made up of, “learning experienced in the physical world and acquired by “doing,” and a distinct form of knowledge – sacred laws governing relationships within the community and the world at large – that comes from the Creator (AERC & FNAHEC, 2007c, p. 2). The Inuit model describes cultural learning processes that bring community members to a deeper awareness of Inuit culture, people and sila⁵. With successful learning, each member is able to contribute newly acquired skills and knowledge back to the community in support of the physical, economic, social, and environmental well-

⁵ sila, in the Inuktitut language, refers generally to the Arctic environment (ITK, 2016)

being of the community (AERC & FNAHEC, 2007b).

In every facet of life, Indigenous peoples have cultural knowledges that stem from their ancestral traditions. For example:

Local and indigenous knowledge refers to the understandings, skills and philosophies developed by societies with long histories of interaction with their natural surroundings. For rural and indigenous peoples, local knowledge informs decision-making about fundamental aspects of day-to-day life. This knowledge is integral to a cultural complex that also encompasses language, systems of classification, resource use practices, social interactions, ritual and spirituality. (UNESCO, 2017)

UNESCO's description of Indigenous knowledges includes cognitive, affective, and psychomotor elements recognized in contemporary education processes, but it also illustrates the role of spirituality as a vital part of Indigenous knowledge.

A variety of terms, such as traditional ecological knowledge, Indigenous knowledge, or traditional knowledge have been used as placeholder names that encompass:

[T]he sophisticated arrays of information, understandings and interpretations that guide human societies around the globe in their innumerable interactions with the natural milieu: in agriculture and animal husbandry; hunting, fishing and gathering; struggles against disease and injury; naming and explanation of natural phenomena; and strategies to cope with fluctuating environments. (Nakashima, Prott, & Bridgewater, 2000)

Particular cultural beliefs and practices vary among Indigenous communities around the world but the heart of Indigenous traditions value ancestral teachings that provide insight into the importance of protecting the natural world.

Traditional livelihoods, land use, and languages. Traditional livelihoods, land use and tenure, and Indigenous language use are three indicators used globally to assist in determining the status of traditional knowledges of Indigenous peoples. These three indicators have been accepted under the UN Convention on Biological Diversity as important to understanding the health of Earth's biological systems and Indigenous communities (UN, 2013b). These indicators are used to monitor biodiversity in relation to the extent to which Indigenous traditions are still practiced, how traditions have changed, and how land is governed. Yet, formal training to perpetuate traditional livelihoods, knowledge of land use and tenure, and use of Indigenous languages are not widely found globally, including within Canada, even though environmental

health has been demonstrated in research to be linked with the vitality of Indigenous traditional practices. Some PSE institutions are moving to integrate courses on Indigenous knowledges and languages (First Nations University of Canada, n.d.; GDI, 2015; Nunavut Arctic College, 2015), but these are largely designed to support the achievement of other professions such as health care, education, and social work. There appears to be a gap between the international processes of measuring the status of traditional knowledges and national investment in capacity development that will facilitate continued traditional Indigenous practices.

According to Berkes (2012) most traditional land tenure systems have disappeared in North America, with a few exceptions. The James Bay Cree continue to designate communal property into familial hunting territories and abide by traditional governance of those lands. In each area, a senior hunter assumes a leadership role and enforces compliance according to customary law and social sanctions. In a review of an 18-year data set, Berkes (2012) found that even though the eastern James Bay population nearly doubled and the number of people involved in traditional harvesting declined, the number of active hunters and the resource base remained stable.

In the Pacific Northwest, Berkes (2012) also reports it is the Nishga who designate how fishing, hunting, and gathering territories are used. His research shows, in the Nass River area of northern BC, from the watershed level to specific salmon fishing sites, traditional governance of kinship-based houses representing groups and individual leaders are recognized. The author indicates traditional land use and land tenure are not simply an allocation of resources for use by particular people. Although serving that function, traditional land use and tenure is a complex system expressing social, cultural, and environmental values.

The need for more robust evaluation metrics has led to an international movement by Indigenous peoples to collaborate on the development of indicators, including how they might be used to provide information on the status of traditional knowledge globally (Stockholm Resilience Centre, 2015; Tebtebba Foundation, 2008). Without evaluation metrics, it is more difficult to plan responsive programming that links training and employment with Indigenous knowledges, livelihoods, and land uses. If society undervalues Indigenous traditions, opportunities will not be created to ensure the intergenerational transmission of Indigenous cultures and languages. Potential Indigenous contributions to a healthy environment and employment inclusive of traditions will be lost. The current deficiency in formal training

opportunities for traditional occupations, knowledges, and languages might be improved with data from indicators. Specific or aggregate data is often shared around the world and the use of multiple languages to discuss environmental issues, including sustainability, is illustrated during most national and international forums on these subjects.

Indigenous languages are one of the key indicators used internationally for measuring the extent to which Indigenous peoples and biodiversity are thriving. Internationally, it has been reported:

Over the past few decades, it has become clear that biodiversity and cultural diversity (including linguistic diversity) are inextricably interrelated and interdependent, and that the permanence or loss of diversity in one realm closely tracks the permanence or loss of diversity in the other realm. Furthermore, language and traditional environmental knowledge are intimately linked. Therefore, tracking the state of linguistic diversity over time provides evidence of changes in the state of "traditional knowledge, innovations and practices of indigenous and local communities relevant for the conservation and sustainable use of biodiversity, and their customary use of biological resources". (UNEP-WCMC, 2013, para 1).

Preservation of Indigenous languages is dependent on fluency, which requires they are used and understood. Indigenous languages bring forward holistic worldviews that emphasize the importance of cultural histories, traditions, and relationships.

Language is foundational to how worldviews are understood and expressed. The differences between Indigenous and non-Indigenous languages can be profound. Indigenous languages are often described as being verb-based rather than noun-based (such as French and English), with subjects described as processes rather than things that cannot be understood outside of their relationship to other parts of life (Berkes, 2012; Henderson, 2002; Little Bear, 2000; Peat, 2005; Spak, 2005). For example, Peat's (2005) work on the understanding of Blackfoot Physics and Henderson's (2008) work on Indigenous Diplomacy give detailed insight into how worldviews are conveyed within the construct of language (Henderson, 2008; Peat, 2005). Stonechild (2016) relates a message from Cree Elders about interconnectedness:

The overriding doctrine governing all relations is *wâhkôhtowin* (mending the physical separation), which affirms that everything is a unity under and within the Creator, a state symbolized by the circle of life. *Miyo-wicêhtowin* is the principle of "having good

relations” among humans, who were to conduct themselves in such a way as to achieve harmonious life. Medicine persons and the community engaged in ceremony for reconciliation and to heal divisions. This enabled the nation to nurture, care for, and protect all its citizens. (p. 88)

In Indigenous worldviews, the natural world, law, spirituality, and relationships are often not separated but integral parts of each concept expressed within a particular language.

Wâhkôhtowin, for example, encapsulates unification, traditional law, spiritual belief, and relationships all within one word.

Sustainability and sustainable development are English language terms that are also process terms heavily reliant on context to understand their meaning. Having arisen from global ideology, these terms are not locked into singular definitions but are interpreted as needed for sectoral or disciplinary understanding. Creating a universal definition of sustainability may not be possible but understanding their historical evolution from having an ecological foci to including social, economic, and environmental dimensions moves closer to the holistic perspective needed to keep the Earth habitable and ensure human survival.

Comparative analysis of the language and cultural frame used to describe sustainability in education from public PSE, Indigenous PSE, and Indigenous cultural perspectives is a gap area within the scholarly literature. The term sustainability originates from outside Indigenous languages and brings with it other non-Indigenous concepts of unoccupied and uncivilized lands (*Terra nullius* and *Terra sacer*⁶) that have informed applications of environmental education and settler notions of sustainability (Tuck, McKenzie, & McCoy, 2014, p. 5). Non-Indigenous languages used to define and describe sustainability may not accurately reflect what is culturally appropriate or desirable to Indigenous peoples. However, even misaligned concepts can provide important reference points for discussion, building relationships among groups, and exploring integration of traditional knowledge systems into sustainability initiatives. Inclusion of Indigenous languages in education is connected to diverse worldviews on sustainability and the retention of cultural identity.

⁶ Characterized by Paperson (2014) in Tuck, McKenzie, & McCoy (2014) as the colonial fiction of empty land (*terra nullius*) that justified the doctrine of colonial discovery because the land was both sacred and accursed, making it ripe for settlement through gentrification (*terra sacer*).

For Indigenous peoples, the decolonization of contemporary education is necessary to engage Indigenous learners with cultural traditions, including languages, and facilitate successful educational outcomes. Fluency in Indigenous languages is reliant on continual use that builds over time. Peat (2005) describes Indigenous languages as maps to an expanded reality that help individuals navigate their understanding of matter, energy, power, and spirit. He says the average non-Indigenous person uses approximately 1500 words in normal daily communication. The Yakut of Siberia use about 4,000 words and their shamans use approximately 12,000 words, which is comparable to Indigenous peoples in North America (pp. 292-293). Past research has highlighted the importance of linking Indigenous peoples' past, present, and future in education:

Equipping successive generations with the skills to participate in a global economy is a major goal of Aboriginal people and their educators, but it is only part of the story.

Aboriginal people are determined to sustain their cultures and identities, and they see education as a major means of preparing their children to perceive the world through Aboriginal eyes and live in it as Aboriginal human beings. Aboriginal education therefore must be rooted in Aboriginal cultures and community realities. It must reinforce Aboriginal identity, instill traditional values, and affirm the validity of Aboriginal knowledge and ways of learning. (RCAP, 1996b, para 7)

Reinforcing cultural identity is an incremental process that is relevant in all forms of education. Too often it is limited to primary school, creating gaps in the learning process for young adults and those in PSE institutions. The process of decolonization involves reclaiming and privileging cultural values that strengthen Indigenous communities (Battiste, 2002; Hampton, 1995; Kovach, 2009). The process of actualizing decolonization in practice and communication can be uncomfortable as it creates tension within existing systems and norms.

Using humour to teach is a traditional Indigenous form of education that is not seen frequently in PSE but is a useful tool for understanding how Indigenous peoples often view education that does not reflect their cultures, languages, and belief systems. Peter Cole (2012) plays with story and language in relating a conversation between Coyote and Raven about Indigenous environmental education. Using English words without grammatical rules, the author pulls the reader out of a comfortable literacy, forcing full attention to concepts such as languages, technologies, educational practices, theories, politics, and economics being discussed by these mythical beings. Musing about the origin of the word *curriculum*, Raven and Coyote

note that although the settlers have told them the word is derived from *currere*, they believe it is more likely to have been derived from the word “*curare*: a Carib word referring to an organic metabolic toxin causing neuro-paralysis” (p. 21). Even without the use of humour, divergent methods of conveying information to decolonize educational processes is becoming more accepted in PSE education.

In 2015, Patrick Stewart, a Nisga’a architect studying at the University of British Columbia completed a PhD on Nisga’a architecture. His completed work contained no commas, periods, semi-colons, or other English language conventions of grammar and punctuation (Hutchinson, 2015). The first draft was written using the Nisga’a language but was required to be translated into English much to the chagrin of the Indigenous author. In omitting any punctuation, Stewart was demonstrating colonial resistance by privileging Indigenous knowledge and language while challenging accepted academic language norms (Hutchinson, 2015; Stewart, 2015). Although this is an unusual example, the sentiment that Indigenous people want to express themselves in their mother tongue is an important consideration.

Most academic literature written about Indigenous peoples and traditional knowledges, with some exceptions, conveys an understanding of the importance of language as a reflection of cultural knowledge and history. In Canadian public education, policies are in place to support Indigenous language retention in education at regional, provincial, and territorial levels (Crown in Right of the Governments of Alberta, British Columbia, Manitoba, Yukon Territory, Northwest Territories and Saskatchewan, 2000). The role of Indigenous languages is also an integral part of my own research because these languages are linked to spiritual beliefs comprising Indigenous ontology and epistemology, which is being studied here, and is expected to emerge in participant responses.

Environmental decision-making. Indigenous involvement in environmental decision-making in Canada is required by law and stems from Aboriginal and treaty rights. First Nations, Inuit, and Métis are the Aboriginal peoples recognized as the original inhabitants occupying the land before Canada became a country. Section 91(24) of the *Constitution Act, 1867* allocates federal jurisdiction over “Indians, and Lands reserved for the Indians” (Barsh & Youngblood Henderson, 2003, p. 50). Inuit have been included since 1939 and Métis and non-Status Indians as of January 8, 2013 (Rae, 2013). Section 35 of the *Constitution Act, 1982* recognizes and affirms existing Aboriginal and treaty rights (Government of Canada, 2013). The test developed

for interpretation of Section 35 and what constitutes an Aboriginal right is grounded in the honour of the Crown, must allow for growth and development of rights through changing times, must favour Aboriginal peoples in cases of doubt or ambiguity, and must be respectful of the existence of Aboriginal peoples habitation of the land before European colonization (Wilson, 2009). The *Sparrow* and *Van der Peet* cases lay out conditions for infringement of rights with the majority of burden placed on the federal government (Barsh & Youngblood Henderson, 2003; Wilson, 2009).

Although recognition of Aboriginal and treaty rights exists in Canadian law, invoking the legal system to enact these rights is adversarial, slow, and costly for all parties. In 2012, the federal government spent approximately \$110 million on litigation, with an associated liability of approximately \$4 billion for comprehensive land claims (Taddese, 2013). Annual expenditures of this magnitude to combat Aboriginal rights would seem to infer that Canada is reluctant to honour its commitments to Indigenous peoples. In an extensive study of Canadian environmental law, Wilson (2009) concluded that while First Nations are frequently denied rights because of conservation processes, they are not allowed to hold others to account for the same purpose. The recent restructuring of federal government departments, described in the next section on Post-Secondary Education, are intended to advance Indigenous self-government and self-determination, alleviate litigation, and make greater progress on matters of importance to Indigenous communities. Success nationally may eventually provide an opportunity to increase Indigenous involvement in international issues concerning the environment.

Canada has multiple obligations to include Indigenous peoples in programs of work under international treaties. Without the voluntary compliance of states to abide by international obligations, global systems become dysfunctional. One form of dysfunction is power imbalances. Power has been defined as “the ability to enforce a certain kind of ideology, a certain way of seeing and understanding the world” (Spak, 2005, p. 235). Protection of Indigenous knowledges is an effort to avoid total dominance of people’s consciousness, beliefs and behaviours by non-Indigenous ideology (Tester & Irniq, 2008). Facilitating Indigenous peoples’ participation in environmental decision-making processes is necessary to overcome historic marginalization.

Effective decision-making, agenda setting, and political argument are crucial to counter hegemonic dominance. Information is a source of power that can be used to mislead, distort

communication, or misinform. By anticipating that misinformation is an expected norm, a variety of strategies can be employed to assist affected citizens in being well-informed and subsequently fostering democratic planning processes (Forester, 1989; Howlett & Ramesh, 1995). Communities cannot provide informed consent in decision-making if distorted information, whether deliberate or accidental, is not challenged and clarified (Forester, 1989). Increasing Indigenous communities' involvement in environmental decision-making processes based on their own authority, knowledge, and experiences will rely on a positive nexus of interaction between governments and Indigenous communities. These interactions can be supported by improved PSE training for professions and occupations related to the environment for Indigenous people, which facilitate inclusion of their worldviews.

Post-Secondary Education

This section provides an overview of the history of Indigenous education in Canada, the relationships linking contemporary careers with Indigenous learners and sustainability, sustainability in education, and gaps in sustainability practices and policies of Canadian PSE institutions.

Indigenous education. Canada's record on Indigenous education carries the scars of state-sanctioned residential schools that used concealed terror and torture on a national scale, to intimidate Indigenous children and their families for generations. Friesen and Friesen (2002) state, "Personal stories related by former inmates of the system emphasize the inhumane conditions of these assimilation-oriented institutions, including child labor, personal humiliation, language loss, poor sanitation and health conditions, and sexual abuse" (p. 99). Federal assimilation policies meant parents had little choice in sending their children to this "entirely different cultural milieu, replete with such alien features as corporal punishment, strict discipline, hard work, loneliness, and, worst of all, confinement" (p. 100). Over the past several decades, Canadian society has begun to learn the truth of this "national crime" (Milloy, 1999) through the testimony of residential school survivors. Detailed research by scholars and experts has provided the evidence that has been instrumental in exposing what happened in these schools, the federal policies that supported them, and remedies for justice. While Indigenous education is changing, research reveals that not enough progress has been made.

Throughout the world, many Indigenous peoples suffered similar abuses in state controlled education systems. The report *State of the World's Indigenous Peoples: Education*

(UNPFII, 2017) indicated that equality and self-determination are two intertwined principles that underpin Indigenous peoples' rights in education. The report also identified five key issues found to be common around the world, including: the non-recognition of Indigenous knowledge and learning systems, the use of education as a vehicle for assimilation, the marginalization of Indigenous peoples in formal education, efforts to work toward education that strengthens Indigenous rights, and progress in taking a rights-based approach to Indigenous education (pp. 3-6). This UN report describes Indigenous peoples' experiences within their traditional territories or homelands. It is not a commentary about Indigenous people who have immigrated to new countries or continents, such as North America.

The distinction of traditional territories is important because it raises the issue of multiculturalism in Canada and in Canadian public education systems. St. Denis (2011) points out, "multiculturalism is a form of colonialism and works to distract from the recognition and redress of Indigenous rights" (p. 308). Within public education systems across Canada, robust learning about Indigenous history, rights, and sovereignty is eroded when education is defended as a "neutral multicultural space" (p.306) because it serves as justification to reduce or erase First Nations, Métis, and Inuit educational initiatives.

In her work, St. Denis (2011) highlights major shortcomings of multiculturalism identified by scholars in that it: increases social divide by increasing competition among culture groups; does not create a context for combating social inequalities; focuses on decorative aspects of culture such as singing, dancing, and food; and lacks processes to address conflicting claims among individuals, groups, and the centralized state (p.308). Educational philosopher Paulo Friere (1985) argued,

No pedagogy which is truly liberating can remain distant from the oppressed by treating them as unfortunates and by presenting for their emulation models from among the oppressors. The oppressed must be their own example in the struggle for their redemption. (p. 39)

Multiculturalism, as practice, policy, and legislation in Canadian society, acts as a shield preventing deeper discussions about historic and on-going colonialism and the effects that continue to be experienced by Indigenous peoples in Canada.

PSE institutions are working to increase awareness and engagement of issues concerning Indigenous peoples through national and local policy. In Canada, First Nations, Inuit, and Métis

are increasingly young and urban, often wanting to retain links to their root communities while seeking careers requiring post-secondary education (EnviroNics Institute, 2010). As such, PSE institutions have been actively developing policies that attract and retain Indigenous learners such as *Principles on Indigenous Education* (Universities Canada, 2015) and the *Indigenous Education Protocol* (CICan, 2013) in response to decades of calls by First Nations, Inuit, and Métis peoples to address inequities in educational processes.

The legacy of destruction left by residential schools and inability of colonial education processes to meet the needs of Indigenous learners has led Indigenous peoples to develop their own programs in primary, secondary, and post-secondary education. Over the past few decades, ample research and policy has supported these actions, including the 1972 policy paper *Indian Control of Indian Education*, the 1996 *Royal Commission on Aboriginal Peoples*, the 2007 *UN Declaration on the Rights of Indigenous Peoples* (UNDRIP), and the 2015 Truth and Reconciliation Commission of Canada's 94 *Calls to Action*, among others (National Indian Brotherhood, 1972; RCAP, 1996; TRC, 2015; UNPFII, 2008). Holistic Lifelong Learning Models were developed by Indigenous reference groups to help illustrate the complexities of their holistic worldviews and represent what First Nations, Métis, and Inuit see respectively as essential components of education (AERC & FNAHEC, 2007d). These efforts express the will of Indigenous peoples across Canada to overcome historic trauma, experience success in education, and reconnect to their cultural traditions.

The press to Indigenize PSE institutions in Canada has been on-going for several years, but it has been gaining momentum. Indigenizing means different things in different settings but generally includes increasing Indigenous content in programming, as well as the number of Indigenous faculty members and students. Rainey Gaywish, a Cree-Anishinaabe scholar and 3rd Degree Midewiwin at Shingwauk Kinooamaage Gamig and Algoma University argued that, "Indigenization must mean that Indigenous Peoples have the right to education that prepares the youth for life in a manner that is not at the expense of their language, culture, history, identity, safety, rights or future" (CAUT, 2016, para 9). For PSE institutions, decolonizing education to move away from colonial paradigms will not be easy. Dr. Marie Battiste (2013) explains why this challenge is so acute:

Every university discipline, and its various discourses, has a political and institutional stake in Eurocentric diffusionism and knowledge. Yet, every university has been

structured to see the world through the lens of Eurocentrism, which opposes Indigenous perspectives and epistemes. The faculties of contemporary universities encourage their students to be the gatekeepers of Eurocentric disciplinary knowledge in the name of universal truth. Yet, Eurocentric knowledge is no more than a Western philosophy invested in history and identity to serve a particular interest. When it approaches Indigenous issues or peoples, its research methodology is contaminated with multiple forms of cognitive imperialism. (p. 186)

In spite of these significant barriers, Battiste (2013) also believes in the possibilities of educational transformation and the role of teachers, students, and institutions to make choices that counteract neo-colonialism and domination in favour of decolonization and liberation (p. 175). Creating educational contexts that support Indigenous learning in the reality of their daily lives means overcoming institutional barriers and finding new pathways forward that affirms Indigenous cultural identity in a contemporary world.

Contemporary careers. Given the near absence of formal training available in Indigenous traditions, it is useful to examine what occupations related to environmental health are available and what occupations Indigenous individuals are choosing. In 2012, Eco Canada published an overview of public opportunities in Canada's green economy. In their study, jobs dealing with environmental protection, natural resource management, and environmental sustainability rose from an estimated 70,000 jobs in 1990 to over 1.5 million in 2010. In 2012, they found that 38% of green economy jobs are in environmental protection, 21% in resource conservation, 11% in renewable and green energy, 10% in green services, 8% in sustainability planning and urban design, 5% in eco-tourism, 4% in energy efficiency and green building, and 3% in other unspecified fields (Eco Canada, 2012). There are no data indicating how many Indigenous individuals are employed in green economy jobs. The paucity of Indigenous scholars within fields such as environmental and sustainability studies are an indication that a critical view of systemic processes is needed to provide insight into this phenomenon (Cajete, 2008). In Canadian PSE institutions, there are few Indigenous scholars studying in the sciences, which may be a further indication of the need to reconcile western paradigms and Indigenous worldviews.

Top employers for Indigenous individuals are within health and social assistance industries, trade, construction, and manufacturing (Statistics Canada, 2011b). According to the

Government of Canada, there are an estimated 32,000 Indigenous individuals working in energy, mining, and forestry jobs across Canada making “natural resource sectors a leading private sector employer of Aboriginal people” (Government of Canada, n.d.). Employment in natural resource extraction industries provides valuable income for Indigenous families that may not otherwise be available in employment more in keeping with traditional cultural values. Development that lacks integration of social, economic, and environmental factors often forces Indigenous individuals to choose the means of their survival, outside the consideration of future generations.

An estimated 400,000 Indigenous youth will be entering the work force in the next ten years (Government of Canada, 2015) and each year, Canada reshapes funding allocations for Indigenous peoples in the federal budget. Institutional programs are also designed based on provincial or territorial funding and projected employment opportunities, indicating the need for stabilized long-term funding if the inclusion of sustainability programming is to be an important component of training programs leading Indigenous learners to occupations within a greener economy in Canada.

In 2017, the federal government announced a new relationship with Indigenous peoples in Canada based on “the recognition of rights, respect, co-operation, and partnership” (Government of Canada, 2017a, para 1). In that announcement, the government indicated closing the socio-economic gap and addressing systemic challenges faced by Indigenous communities led to a number of proposals for improvement in education services and changes to the interfaces with Indigenous organizations. Based on recommendations from the RCAP, the federal government has restructured its department of Indigenous and Northern Affairs (INAC) into two departments: the Department of Crown-Indigenous Relations and Northern Affairs, and the Department of Indigenous Services. These departments are intended to advance reconciliation efforts by developing in consultation with Indigenous peoples to accelerate progress toward self-government and self-determination (Government of Canada, 2017a). The effect of this restructuring on resources and choices for Indigenous learners in PSE institutions is not yet known. Evidence linking Indigenous education and sustainability education may support future planning in PSE policies and practices.

Sustainability in education. The UN Decade on Education for Sustainable Development (ESD), 2005-2014, ignited new attention across the globe but the precise meaning of ESD continues to be debated worldwide (Wals, 2009). UNESCO believes ESD should allow

every individual to gain the knowledge, skills, attitudes, and values needed to shape a sustainable future (UNESCO, 2017). UNESCO describes some of the processes and content that defines ESD this way:

Education for Sustainable Development means including key sustainable development issues into teaching and learning; for example, climate change, disaster risk reduction, biodiversity, poverty reduction, and sustainable consumption. It also requires participatory teaching and learning methods that motivate and empower learners to change their behaviour and take action for sustainable development. Education for Sustainable Development consequently promotes competencies like critical thinking, imagining future scenarios and making decisions in a collaborative way. (UNESCO, 2017).

It should be noted that UNESCO does not mention formal education or schools in their description of ESD; instead, they put forward an educational approach that connects all people with teaching and learning about the global sustainability problems outside their everyday life or sphere of existing knowledge. Even so, Sachs (2015) points out that universities are critical in helping society identify and solve sustainability problems with locally tailored solutions. Networks of universities have been growing and building capacity to address sustainability challenges.

The Global Universities Partnership on Environment and Sustainability (GUPES) was launched in 2012 by the UN Environment Programme (UNEP) as a way of engaging with universities to promote and integrate environment and sustainability into teaching, research, community engagement and management of universities as well as to enhance student engagement and participation in universities and beyond (Pradhan & Mariam, 2014). During the Decade of Education for Sustainable Development (2005-2014), UNEP had already been working on “initiatives focused on integrating sustainable development into higher education which includes the transformation and development of green campuses, mainstreaming of environmental sustainability across curriculum, training of policymakers utilizing universities as hubs and enhanced engagement with communities and student bodies” (p. 172). There are now over 400 universities affiliated with GUPES from Africa, Asia and the Pacific, Europe, Latin America and the Caribbean, West Asia, and North America (p. 173). Although in Canada only Concordia University and McGill University are members of GUPES (UN, 2018), other

sustainability organizations have a focus on issues in the western world.

North America is also home to the Association for the Advancement of Sustainability in Higher Education (AASHE). Founded in 2005, AASHE was established in the USA to help coordinate and strengthen campus sustainability efforts at regional and national levels.

Institutions, colleges, and universities within the USA, Canada, and Mexico are the primary focus for research, knowledge exchange, and implementation of the Sustainability Tracking, Assessment & Rating System™ (STARS™), a self-reporting framework for post-secondary institutions to measure their sustainability performance (AASHE, 2015).

Many Canadian post-secondary education institutions are committed to increasing sustainability actions on their campus. A whole-school approach to sustainability is often taken because it incorporates “all elements of school life such as: school governance, pedagogical approaches, curriculum, resource management, school operations and grounds...[and] can imply links and/or partnerships with the local community” (Henderson & Tilbury, 2004, p. 9). PSE institutions often use established institutional standards that are similar, such as STARS™ to help guide their progress toward achievements in categories such as curriculum, research, campus operations, facilities, and community outreach (AASHE, 2017b; Lidstone, Wright, & Sherren, 2015a; Vaughter, Wright, McKenzie, & Lidstone, 2013). A study by Beveridge, McKenzie, Vaughter, and Wright (2015) detailed how sustainability assessments, policies, offices or officers, and commitments to various sustainability declarations were related to practices in 220 PSE institutions in Canada. They found that institutions in larger communities, as well as in British Columbia and Quebec, had higher sustainability initiative scores, while Saskatchewan and the territories had the lowest scores. The data emerging in research is important to identifying the trends in sustainability policies and actions, the common frameworks being used, and areas for improvement.

A broad definition of university research for sustainable development is “all research conducted within the institutional context of a university that contributes to sustainable development” (Waas, Verbruggen, & Wright, 2010, p. 630). Broad definitions can be a starting point for reviewing what is being done in PSE institutions since they are intended to serve the public interest but there is also a need for frameworks that can assist in establishing new ways of doing research as sustainability processes and policies increase.

Waas et al. (2010) proposed six content and sixteen process characteristics for

sustainability in higher education (SHE) research that could be applicable to research in all disciplines including, for example, biology, chemistry, economics, environmental science, history, physics, political science, and sociology. In content, the research characteristics include: different levels of scale (local – global), different time perspectives (short, medium and long term), distribution aspects, multidimensionality (economy, environment, institutional, social), north-south, and the precautionary principle⁷. In process, the research characteristics include: action oriented; collaboration (international and sectoral); continuity; environmental, safety and security management; independence; knowledge transfer; multi-/interdisciplinarity; normativity; participation (including local knowledge); proactive; problem oriented; public interest; societal peer review; impact monitoring; relevance check; and transparency (p. 633). Determining whether the SHE characteristics should be compulsory or optional in research need to be elaborated and tested operationally in a university research context to move forward with them (p. 635).

Waas et al. (2010) also recommend that since university research is intended to serve the public it should be independent from other stakeholder interests (p. 634). The authors suggest that research needs to be reviewed by society and that researchers must be transparent with respect to their positionality. Despite their own evidence supporting local to global networking, collaboration, and holistic foundations in research, the authors repeatedly advise that ESD research should be expert advice coming from the institution only. This position is problematic in terms of engaging with Indigenous communities. To generate support and cooperation, partners, the public, stakeholders, and Indigenous communities that are rights-holders in Canada, need to be involved in research generation, including process and content.

The increasing participation by PSE institutions in sustainability actions is encouraging, but there has been very little evidence that Indigenous perspectives inform this work, even as PSE institutions seek to define and implement Indigenization. Beckford, Jacobs, Williams, and

⁷ The precautionary principle denotes a duty to prevent harm, when it is within our power to do so, even when all the evidence is not in. This principle has been codified in several international treaties to which Canada is a signatory. Domestic law makes reference to this principle, but implementation remains limited (Canadian Environmental Law Association, 2017).

Nahdee (2010) argue that a new ecological ethos among mainstream learners can be developed through education, with Indigenous epistemologies providing a framework for engendering an ethic of stewardship and sustainability (p. 241). Bieler and McKenzie (2017) indicate achieving transformation in PSE might include “recognition of territory and treaty rights, as well as a focus on Indigenous knowledge in relation to sustainability engagement” (p.5). Internationally, education for sustainable development has taken an inclusive approach.

Practice – policy gaps. The literature reviewed in the previous section provides some information about the role and status of sustainability in PSE. Evaluating gaps among sustainability practices and policies can be accommodated through pre-established goals, objectives, and indicators measured through institutional reporting. Without these components, evaluation cannot be comprehensive or give rise to advice for improvement. Sustainability reporting frameworks are not consistent between local and international scales.

Sustainability education has existed in a variety of forms for decades but comparative empirical research on multiple post-secondary institutional sites is still limited (Vaughter, Wright, McKenzie, & Lidstone, 2013). In their review of eight leading international journals that focus on sustainability and education, Vaughter et al. (2013) said the majority of research was found to consist of case studies examining sustainability curriculum, campus operations, policies, practices, evaluative processes and outputs but there was “little examination of sustainability uptake and outcomes across broader institutional policies and practices” (p. 2252). As well, comparative research that does exist “focuses on university operations and governance, with little attention paid to curricular or teaching / learning outcomes” (p. 2258). These findings are significant because “the majority of the literature reviewed stressed that sustainability needs to be included if topics in postsecondary education are to remain relevant to students’ lives” (p. 2259). Inclusion of sustainability in PSE institutional policies may increase its application.

Recent studies of sustainability-related policies in PSE institutions revealed that more might be done. Bieler and McKenzie (2017) reported that in their study of sustainability as it relates to the domains of governance, education, campus operations, research, and community outreach in 50 PSE institutions, the strategic plans of those institutions indicated most were accommodating sustainability in only one or two of the domains. There were fewer PSE institutions that had developed policies to address all of the domains, but typically those institutions were participating in STARSTTM. Henderson, Bieler, and McKenzie (2017) found that

in Canada, about fifty per cent of PSE institutions have some type of climate change policies. Most of those focused on the campus environment and had less emphasis on research, curriculum, community outreach, and governance. These recent studies help illustrate where some PSE institutions are in policy development. Anticipated growth of sustainability policies and action means PSE institutions will need to invest in capacity building to include sustainability content in their programming.

Capacity building usually includes increasing human and financial resources. According to James and Card (2012), barriers to post-secondary institutional achievement in sustainability include having insufficient human resources dedicated to work on the initiatives and the extensive costs associated with the initiatives (p. 172). Generation and allocation of resources will be a challenge that many faculty members feel falls to PSE governance authorities and sustainability advocates. In a study of 32 post-secondary institutions, Wright and Horst (2013) found that, in general, faculty leaders understand the issues and challenges and would like improved sustainability in education, research, and daily operations. Most agreed that the most significant barrier to greater inclusion of sustainability was financial and it would require strong leadership, incentives, and demand to help overcome this barrier. Of note, Wright and Horst (2013) also found, with respect to the subject of sustainability in higher education, that “Most participants claimed they had either never considered the subject, or had never been given the opportunity to reflect or discuss sustainability and the university before” (p. 225). Even though the participants in Wright and Horst’s (2013) study were responsive to the questions and at hand, this telling observation may point to the need for increased professional development and normalization of including sustainability issues within faculty work in teaching and research.

The STARS™ program of AASHE is a voluntary evaluation and reporting initiative but individual institutions rely on their own sustainability policies, should they choose to participate. As such, comprehensive analysis of PSE institutional progress is difficult and will result in case study analysis, or occasional small-scale comparative research, unless a more comprehensive policy framework emerges. There are a multitude of sustainability reporting processes for governments, business, and education, but they appear to lack harmonization. The 2030 Sustainable Development Goals (UN, 2017a) may provide the basic orientation needed to address sustainability programming on a scale that PSE institutions are well placed to lead.

Broad pillars of social, environmental, and economic considerations in global

sustainability goals need the disciplinary, interdisciplinary, and multi-disciplinary expertise available to solve some of the most difficult crises faced in the history of humanity. PSE institutions have already moved away from solitary research agendas to collaborative partnerships and inclusive research, even though the path is often uncertain, tensions arise, and the disciplinary nature of institutions means resistance in advancing expertise if the full benefit cannot be gained within existing structures. The emergence of new structures that can better accommodate collaboration may yield more cooperation and results.

Sustainability science, discussed earlier in the literature on sustainability is one structure that may hold possibilities for increasing collaboration. Karatzoglou (2013) argues there is need for “a new research and teaching agenda for Universities as centers of development of the sustainability science as an innovative scientific field defined by the problems it addresses” (p. 45). Other researchers have supported this idea because, “Sustainability science focuses on the dynamic interactions between environment and society, is problem oriented, and is grounded in the belief that knowledge should be “coproduced” between science and society” (Waas, Verbruggen, & Wright, 2010, p. 630). They suggest further research would be useful on how sustainability science is related to university research for sustainable development (p. 635).

Canada lacks a comprehensive policy or guiding direction on development and implementation of sustainability in PSE. In Canadian PSE institutions, sustainability is often defined as commonly having “the three aspects of sustainability (economy, environment, and society) as well as all realms of campus life (including employees, students, and campus operations)” (Lidstone, Wright, & Sherren, 2015b, p. 727). PSE institutions implementing sustainability policies and actions are contending with a complex matrix of interconnected issues. James and Card (2012) argue that, “Institutions may best achieve sustainability success by utilizing both a top-down and bottom-up approach in instigating sustainability changes” (p. 174). That is, they need an institutional strategy, effective leadership with environmental expertise, and a campus community that supports a culture of sustainability (James & Card, 2012). Progress remains difficult to track because sustainability policy and actions vary from institution to institution.

A study on the state of sustainability reporting in Canada’s higher education sector revealed that educational organizations are reporting laggards (Fonseca, Macdonald, Dandy, & Valenti, 2011, pp. 23, 35). The practice of reporting is uncommon and those who do use diverse

sets of indicators emphasizing eco-efficiency, which result in limited usefulness for informing sustainability-oriented decisions. Using a framework developed from the Global Reporting Initiative (GRI) indicators and other campus sustainability assessment tools, researchers found most institutions are reporting on “emissions, effluents, wastes, energy, recycled paper, green buildings, green spaces, transportation, and water” (p. 30) but among the least addressed were indicators concerning human rights, society, and economic issues (Fonseca, Macdonald, Dandy, & Valenti, 2011). Improving reporting processes and ensuring human rights, social, and economic issues are included would seem to be an important next step for Canadian PSE institutions committed to meaningful action on sustainability.

Summary

The review of the literature focused on the three primary categories of: sustainability, Indigenous knowledges, and PSE education. These three discussions were taken up independently because there is very little research available that links all three together. In examining each of these topics separately, key issues are revealed as well as potential areas for synthesis and development of new insights in common areas. Concepts of sustainability and sustainable development are often compatible with Indigenous worldviews, even though there is a need to increase the understanding and application of these within PSE institutions. There has been a global call and plan to address sustainability and to recognize the rights of Indigenous peoples. PSE institutions in Canada are lagging in their responses to these calls; however, strong administrative leadership and appropriate capacity building can contribute to turning this around and re-creating themselves as sites of social leadership.

Chapter Three follows on research design and methodology describing the research problem and purpose, thesis statement, study design, methodology, setting and participants, data collection and analysis, and ethical considerations.

CHAPTER THREE

RESEARCH DESIGN AND METHODOLOGY

This research design and methodology chapter describes the methodological framework and methods of the research. I describe how the study was designed and provide a detailed account of the methodology used in the study. This is followed by a description of the settings and participants to the extent possible while respecting confidentiality. The chapter continues with information about data collection, instruments used, coding, and data analysis. These are followed by a description of the ethical process that guided my work, and a chapter summary.

This study focuses on the ways that faculty and administrators working in Indigenous PSE programs understand the concept, practices, and policies of sustainability in relation to Indigenous knowledge(s) in their setting. Applying this focus helps answer the overall research question about how Indigenous PSE places of learning address environmental sustainability. The study explores participants' discussions of Indigenous philosophical principles that concern environmental interconnectedness and sustainability; how they view practices and policies of institutional governance processes, curriculum, facility operations, research, and community outreach in relation to sustainability; how they believe sustainability is practiced in their setting; what barriers they believe exist; and what policies they believe drive sustainability practices.

Methodology

This research uses a decolonizing approach informed by Indigenous methodology and theory, critical theory, and emancipatory theory. Indigenous ontologies and epistemologies are recognized as holistic and relational (Kovach, 2009; Peat, 2005; Smith, 2012; Wilson, 2008), critical theory addresses ideologies viewed as obstacles to human liberation (Corradetti, n.d.; Dunbar Jr., 2008; Friere, 1985; Giroux, 2003; 2004; Mezirow, 1997), and emancipatory theory involves critical self-reflection and knowledge that contributes to transformative consciousness and empowerment of oppressed peoples (Antonio, 1989; Bowers, 1986; Knowles, 2012). These three theoretical approaches are useful in exploring decolonization issues of concern to Indigenous peoples because to evoke change, decolonization requires a critical view of dominant ideology and, further, the ability to discover the means of emancipation from these ideologies through personal reflection and understanding of the implications of disruptions of traditional Indigenous knowledge systems.

The qualitative research approach of this research uses socially constructed knowledge

claims and advocacy / participatory knowledge claims as the means of describing “what is knowledge (ontology), how we know it (epistemology), what values go into it (axiology), how we write about it (rhetoric), and the processes for studying it (methodology)” (Creswell, 2003, pp. 6-8). Socially constructed knowledge claims acknowledge that individuals understand the world through subjective experiences. The resulting complexity of views, rather than a narrowing of views, is desirable in meaning-making by the researcher. Participant social interactions, historical and cultural norms, as well as the specific contexts in which people live and work are taken into consideration by the researcher. Advocacy / participatory knowledge claims are used to inform this research design because they fit with research involving marginalized individuals or groups in that such claims are concerned with addressing issues of social justice (Silverman, 2005). The work of emancipatory theorists such as Habermas and Freire initiated advocacy/participatory research approaches, which integrate an action agenda for reform that considers politics and political agendas and may change the lives of participants (Silverman, 2005).

I privilege Indigenous methodology in this research because, as a Métis person, my commitment to the research has emerged from participation with various Indigenous communities, including my own, over several decades. In most interactions with Indigenous communities, I have found ancestral teachings about the importance of preserving the health of the natural world forms the basis for all other Indigenous social constructs. Much of the literature on Indigenous methodology is explained from the perspective of conducting research according to the traditions of a particular culture. While these cultural perspectives are unique, they do contain conceptual similarities, such as the importance of cultural identity, ontologies and epistemologies, holistic thinking, ancestral stories, relationality, and ethical processes (Battiste, 2013; Kovach, 2009; Smith, 2012; Wilson, 2001). Indigenous methodology is complex because it is not limited to a single formula since it accommodates the knowledge systems of particular Indigenous communities, which often differ from one another.

The variability of Indigenous knowledges among communities’ means the ways communities interpret knowledge also varies. Kovach (2009) postulates that, “Indigenous epistemology emphasizes its non-fragmented, holistic nature, focusing on the metaphysical and pragmatic, on language and place, and on values and relationships” (p. 57). The specificity of knowledge is unique to the cultural knowledge holders of a place, often learned through story.

For example, Atleo (2011) relates Nuu-chah-nulth historical recognition that personal and community well-being were dependent on water, land, plants, animals, humans, and other things they considered alive; but, they also recognized that “empirically knowable reality” was incomplete and sometimes unreliable as a source of information. In this context, Nuu-chah-nulth view “story as theory and vision quest as method” (p.5). The elements of Indigenous methodology are based on actualizing the elements of culture.

As a Métis person, I have a unique perspective of what constitutes an Indigenous methodology. The heritage of Métis is one that has combined many ways of knowing and honours the ancestral past of tribal grandmothers and grandfathers together with European ancestors (Vizina, 2008). Other Indigenous people, as well as those of European descent, often ostracized Métis. This led to a long process of thinking critically about what was possible and necessary to thrive as a people into the future. This process is not so different today for Indigenous peoples of many cultures.

Smith (2012) argues that theories, methodologies, methods, research questions, and writing styles that currently exist in modern research need to be critically examined and decolonized. She explains:

Decolonization, however, does not mean and has not meant a total rejection of all theory or research or Western knowledge. Rather, it is about centring our concerns and world views and then coming to know and understand theory and research from our own perspectives and for our own purposes. (Smith, 2012, p. 39)

As Smith (2012) infers, the importance of cultural expression is an important part of decolonization. In undertaking research that involves many cultures, worldviews, and perspectives, Indigenous methodology, in my view, breathes as it expands to encompass larger overarching concepts and contracts to accommodate and respect local knowledges.

The elements of Indigenous methodology that contributed to determining my research task included a variety of factors. My long-term involvement with Indigenous communities on environmental issues led to my understanding of the effects on Indigenous communities of not having accessible research on these matters. The research design also needed to facilitate the inclusion of multiple Indigenous cultures, and draw on participant advice to arrive at recommendations that could benefit a variety of communities. I was considerate of Indigenous ethical standards and protocols for inquiry, including respecting Indigenous intellectual property

by not mining specific Indigenous knowledges from participants, but rather seeking advice about Indigenous knowledges in relation to the questions. This involved taking time to explore potential relationships with participants. Wilson (2001) describes the heart of Indigenous methodology this way:

To me, Indigenous methodology means talking about relational accountability. As a researcher you are answering to *all your relations* when you are doing research. You are not answering questions of validity or reliability or making judgments of better or worse. Instead you should be fulfilling your relationships with the world around you. So your methodology has to ask different questions: rather than asking about validity or reliability, you are asking how am I fulfilling my role in this relationship? What are my obligations in this relationship? The axiology or morals has to be an integral part of the methodology, so that when I am gaining knowledge I am not just gaining some abstract pursuit; I am gaining knowledge to fulfill my part of the research relationship. This becomes my methodology, an Indigenous methodology, by looking at relational accountability or being accountable to *all my relations*. (Wilson, 2001, p. 177)

Wilson's (2001) description of Indigenous methodology contextualizes the researcher's position as an integral part of the research because it is responsive not only to the participants and the academy, but it is responsive to all parts of the larger natural and supernatural world, characterized as my relations.

There is a risk that in advocating for Indigenous worldviews, these be construed as archaic, romantic notions of culture (Battiste, 2013, p. 179; Wilson, 2001, p. 178). During the research process, I included traditional teachings from Indigenous cultures because they are relevant in a modern world. For example, in addition to the literature, the study participants described foundational teachings of respect, responsibility, relationship-building, and the importance of drawing on cultural teachings as the means to avoiding such things as disharmony and sickness. These teachings informed the findings of the study. This does not mean that all cultural communities have been able to uphold these teachings or that culture does not change, but these teachings remain relevant. Indigenous knowledge and theory has been studied in academic literature for decades and is accepted as an important foundation for working with Indigenous peoples because it contextualizes cultural worldviews (Kovach, 2009; Peat, 2005; Smith, 2012; Wilson, 2008).

My research draws on Indigenous methodological approaches developed in education. I have applied Indigenous methodology, rather than scientific methodology, to my study, which is in the field of environment and sustainability studies, to bring meaning to what is meant by “an indigenized understanding of sustainability” (Battiste, 2002, p. xiii). Since there are hundreds of self-determined Indigenous peoples, the term Indigenize encompasses many groups and their specific worldviews. Each Indigenous community has particular knowledges, practices, beliefs, and values and as such, the critical views of historical experiences of their members are unique to them, as are their visions for the future.

As a second approach integrated with my Indigenous methodological orientation, critical theory examines such issues as power relations, ideology, race, class, and gender that contribute to oppression and silencing of particular groups of people (Corradetti, n.d.; Dunbar Jr., 2008; Giroux, 2003; 2004; Mezirow, 1997). Critical theory has evolved from its origins with The Frankfurt School, where it emerged to examine human issues related to communism and capitalism, to include matters of agency, consciousness, pedagogy, politics, and education itself (Corradetti, n.d.; Giroux, 2004). Although a key aim of critical theory had been to lead to human emancipation through self-reflection and consciousness, it lacks specifying a political action strategy for social change (Corradetti, n.d.). In recent decades, exposing structures of power and domination, the need for political engagement through resistance, and contextualizing problems unique to peoples and places has provided additional utility to critical theory and the means of transformational learning (Friere, 1985; Giroux, 2003; 2004; Mezirow, 1997). Environmental writers, such as Bowers (1993) and Orr (1992), don't cite the Frankfurt School or critical theory in their work but address many of the same issues (Nichols & Allen-Brown, 2001, p. 10). This research uses components of critical theory described by the theorists above, to illustrate why First Nations, Inuit, and Métis, the Indigenous peoples in Canada, have found it necessary to overcome dominant non-Indigenous ideologies by advocating for, and creating, programs specifically designed for Indigenous learners. For example, integration of Indigenous worldviews in programming, empowerment and poverty alleviation through professional development, and understanding gender roles in traditional society all contribute to overcoming assimilation of cultural communities.

Finally, emancipatory theory seeks to address social action methods lacking in earlier iterations of critical theory, by avoiding universalisms and grand narratives and, instead,

examining epistemology and the inter-subjectivity as contexts of how communities of people bond with each other through sympathy and identification (Antonio, 1989; Bowers, 1986; Knowles, 2012). Emancipatory theory and the decolonization work done in education provide crucial insights into understanding why marginalized people need to have their own voice in addressing and resolving issues unique to their circumstances and sovereignty (Battiste & Henderson, 2009; Knowles, 2012). Together, facets of Indigenous, critical, and emancipatory theories help inform the data collection and analysis of my research.

Study Design

The study design describes the settings and participants, including site selection and aggregate data about participants included in the study. This is followed by a description of the data collection and analysis process, including the interviews and surveys, analysis, coding, and themes. Details of these are provided below.

Settings and Participants. Ten study participants from seven universities and three colleges were included in this study. The process of determining participant sites is described below.

Four geographic regions were originally established by the Sustainability and Education Policy Network (SEPN), at the University of Saskatchewan, in a census of 220 accredited post-secondary institutions in Canada for a national study on sustainability practice and policy in education (Beveridge, McKenzie, Vaughter, & Wright, 2015).

In reviewing the 220 accredited PSE institutions in Canada, SEPN designated 52 as having an Indigenous focus, using criteria established by the Aboriginal Institutes' Consortium (Beveridge, McKenzie, Vaughter, & Wright, 2015). The full Consortium criteria included: boards directed and controlled by Aboriginal communities; Aboriginal faculty who ensure a holistic approach to education; an infusion of Aboriginal culture, history, traditions, and values throughout curriculum; methods of instruction that address Aboriginal learning styles; integration of community throughout education process (including linkages and referrals to various community organizations); Aboriginal support staff that focus on creating student support networks; Elder support, spiritual and traditional teachings; programs that ensure recognition and preservation of Aboriginal knowledge and history (including recognition and respect for the land, environment, people and community as well as being designed and delivered by Aboriginal peoples for Aboriginal peoples); and community-based program and service

delivery (Aboriginal Institutes' Consortium, 2005, pp. 33-34). I worked from the SEPN list of 52 PSE institutions indicated above to confirm, and update, the list.

After reviewing the websites of each institution that were categorized as having an Indigenous focus, I created a new list which retained those institutions identified as having an Indigenous focus and removed some from the list that did not offer Indigenous PSE programming or no longer offered it. Some Indigenous PSE programs that were housed within non-Indigenous PSE institutions were not included in the original SEPN census. Since these programs could potentially provide important data for the study, I included them if their primary purpose was to serve First Nations, Métis, and Inuit learners and resulted in a degree, diploma, or certificate recognized by a provincial or territorial government. I also conducted Boolean searches on “Aboriginal Post-secondary” and “Canada” and other variations, to find additional sites that were not captured in the original list. The final list of 53 institutions that were potentially active Indigenous PSE places of learning (see Appendix A) was used for invitation to participate in the study.

Originally in my research design, I had hoped to include 25 Indigenous PSE places of learning because that constituted approximately 50% of the list of 53 institutions deemed to have an Indigenous focus. This was overly ambitious and not viable given the amount of time needed to be spent developing basic relationships with participants. The number of participating institutions was eventually limited to 10 so that data could be collected within a reasonable timeframe.

After the names of the Indigenous PSE place of learning were entered into a spreadsheet, I used a random number generator, to assign each Indigenous PSE place of learning a number using the =RAND() formula. I sorted the list of Indigenous PSE places of learning within each region by the random number column from smallest to largest number. Then, since randomly generated numbers change continuously, the numbers were copied and pasted into a new column as unchanging values.

Working from the sorted list, the institutions within each region were contacted by rotating through east, north, central, and west categories. I used a telephone script (see Appendix B) to have preliminary conversations with senior administrators, such as an academic vice-president or other comparable senior administrator, to identify potential faculty or administrative personnel knowledgeable about Indigenous knowledges and sustainability-related initiatives on

their campus, and discuss their willingness to participate. I provided senior administrators with a copy of the participant package, which included: a letter of invitation, research guide, consent form, and transcript release form (see Appendices C – F). Once a recommended participant name was gained, I contacted them and repeated the process. In two cases, I approached Indigenous faculty members from the list of institutions directly and reviewed the research and criteria directly with them. Once ten sites were confirmed with consent forms received from 10 individual participants at those sites, no further institutions were approached.

In most cases, it took multiple conversations over several months to establish a rapport, build trust, and develop relationships with institutions and/or participants. In some cases, both the researcher and participant carried out traditional protocols involving offering tobacco and prayers. Extending the study to include more than 10 participants would have required significantly more time than was available for the research to invest in a respectful process of relationship-building. Additionally, the study participants included were from diverse locations across Canada and able to bring unique territorial perspectives.

I used additional criteria to filter potential participating institutions including confirmation from participants that their institution had provincial or territorial recognition as a post-secondary education institution; that the majority of students served in participant programs were Indigenous learners; that a senior administrator or faculty member would undertake the survey and interview since it required in-depth knowledge of management and governance, curriculum, facility operations, research, community outreach, policy, and the concept of sustainability; and that the participant had some understanding of Indigenous community traditions in the territory where the school was resident. Participants were also invited to self-identify their setting as an Indigenous PSE place of learning, indicate that they were willing to participate, and if necessary, agree that their institution could provide translation for French language speakers. It was expected that not all Indigenous PSE places of learning would be able to participate because of capacity issues and the time involved with traditional processes related to trust- and relationship-building which have been identified broadly by Indigenous communities as key elements preceding knowledge exchange.

In all, 30 institutions were contacted. In Eastern Canada, two institutions were contacted and two persons participated. In Central Canada, 10 institutions were contacted and two persons participated. In Northern Canada, three institutions were contacted and two persons participated.

In Western Canada, 15 institutions were contacted and four persons participated.

At the outset of this research, I chose to approach randomly selected institutions in an effort to explore perspectives of people and places I was unfamiliar with and who were unfamiliar with me. Ultimately, this required a longer timeline for data collection, which I attribute largely to participant uncertainty with my motives as a researcher inquiring about Indigenous knowledges. My own Indigenous identity and experience afforded me personal insight into situations where Indigenous communities fear misuse or misinterpretation of information, individuals who are humble and do not want to put forward their own personal views, and people who work in small programs who are simply overwhelmed with their own work demands. These situations may account for some institutions non-participation and also may account for the longer time involved with the data collection process.

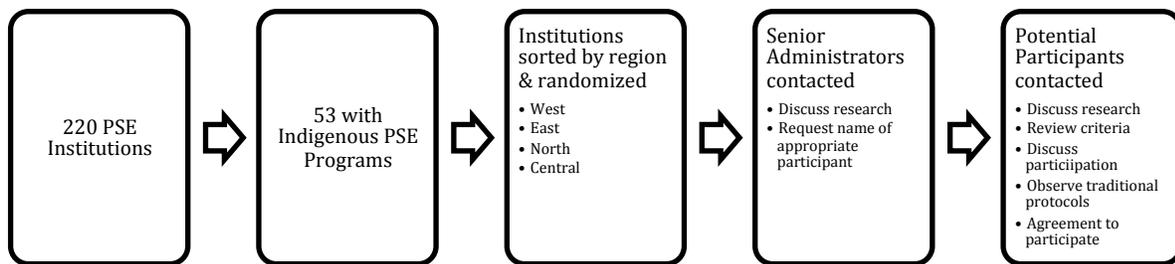


Figure 3-1 Approach for inclusion of PSE institutions

According to the survey results, my research participants included six administrators and four faculty members, one in each of the ten institutions. Eight of the participants identified as Indigenous and two identified as Canadian. Six participants identified as female and four identified as male. All of the participants had at least one degree and the majority held graduate degrees.

Table 3-1

Participant Characteristics

Category	Participants
Administrators	60%
Faculty	40%
Identify as Indigenous	80%
Identify as Canadian	20%
Female	60%
Male	40%
PSE Degree	100%
Graduate Degree	90%
Age 35-54	50%
Age 55-69	50%

Data Collection and Analysis

Two methods of data collection were used for this research. These included 60-120 minute face-to-face or telephone interviews and a 45-minute on-line survey completed by each participant. Interviews are an accepted method of data collection in qualitative research. They are useful in gaining views and opinions from participants through the use of open-ended or semi-structured questions (Creswell, 2003). The on-line survey used in this research provided useful participant insights into sustainability issues, even though “surveys can be of limited value for examining complex social relationships or intricate patterns of interaction” (Bloomberg & Volpe, 2012, p. 121). Interview data provided the majority of data used in this research.

Once agreement to participate according to the criteria was reached with participants, as described in the previous section, the data collection was able to proceed. Participation in the research required individuals spent time on the telephone to hear about the research, ensure they had the authority to participate, review the research invitation and documents, spend time thinking about their responses, respond to the survey (45 minutes or more), participate in a telephone interview (2 hours or less), review and edit quotes or transcripts, and review the completed research.

Participants from all four geographic regions (east, west, north, central) completed the

research in English, although some interviews included statements in Indigenous languages. To protect confidentiality, electronic files containing participant data were assigned code names.

While the majority of participants (eight) indicated they were Indigenous in the survey data, some participants (two) identified as Canadian, which might be interpreted as non-Indigenous. Criteria for participation in the study focused on the type of institutions, programs, and learners described in the research guide (Appendix D) and did not prevent non-Indigenous participants from contributing to the study. Institutional administration had been part of the recommendation process for participation of individuals deemed to be knowledgeable about the general research topic of Indigenous knowledges and sustainability. Data from Indigenous and non-Indigenous participants were given equal value in the study through the coding process.

The original research plan was to develop three separate manuscripts on: the concept of sustainability in relation to traditional knowledge, links to community-based conservation and environmental decision-making, and future networking on sustainability issues. Instead, data has been presented as a whole in order to create a foundation and conclude the study.

Interviews. Once agreement was reached to participate, the telephone interviews were carried out during the winter of 2015-2016. All interviews were recorded by the researcher and then fully transcribed into separate electronic files for each participant using ExpressScribe. Transcripts were then returned to participants for review and authorization of transcript release forms. Each participant transcript was assigned a code name to respect confidentiality in data analysis and research reporting. All files were loaded for analysis into Atlas/ti, a qualitative data analysis software program in preparation for coding.

For analysis of the interview data, a deductive codebook had been prepared containing the following code families: four major themes based on the manuscript research questions, five themes based on the topics of sustainability in post-secondary education drawn from the survey and interview questions, three Indigenous-focused themes used internationally as biodiversity indicators, and 14 additional themes synthesized from the First Nations, Métis, and Inuit Lifelong Learning Models (AERC & FNAHEC, 2007d). The primary codes were assigned sub-codes, for a total of 26 primary codes and 110 sub-codes (see Appendix G). The process of provisional coding, which is a process of establishing an initial predetermined set of codes prior to fieldwork is a means of preparing for anticipated categories that may arise in the data (Saldana, 2009, pp. 120-123). In the case of this study, the codes were developed to provide the

structure for categories and themes that would identify elements of the research topics and also reveal overlapping themes.

The interview transcripts were coded using the Atlas/ti auto-coding feature. The auto-coding process included: entering the theme codes and sub-codes into “Find”; entering the primary code as the interview text marker in “Code”; indicating Grep in “Matching” (GREP searching allows the use of characters that specify an operation, allowing the researcher to craft searches that cover a breadth of concepts such as a variety of different spellings of a word, or a specified date range); indicating the selection of a full paragraph in “Extending” the text around the code; and identifying the “Scope” to include all transcript documents. For each occurrence of a code identified by the software, I reviewed the portion of transcript text and retained it if it were appropriate or deleted it if it was an invalid application of the code (for example, if a reference to a document ‘landing’ on a desk was captured with other references to land). I further reviewed transcripts as necessary for alternative sub-codes that were not included in initial coding processes. If occurrences of the new sub-codes were found, these were added to the transcript. Codes and sub-codes among themes often overlapped, as might be expected within holistic worldviews that are based on the interconnectedness of life processes.

Pre-determined codes were applied for deductive analysis, with remaining gap areas of data without codes available for inductive coding and analysis. Using a combination of deductive and inductive approaches is appropriate for accommodating existing theories of Indigenous knowledges, contextualizing contemporary education for Indigenous peoples, and integrating traditional and contemporary knowledges in education (Mills, Durepos, & Wiebe, 2010; Thomas, 2003). The full transcripts were reviewed in Atlas/ti for any gap areas that remained without assigned codes; however, no significant gap areas occurred. Codes applied to researcher comments within the transcripts were removed unless they clarified participants’ statements. Quotations on each coded theme were then output as separate files for analysis.

I used a thematic analysis of the interview data, beginning with a review of all coded data sets and then reducing the number of coded themes for the final analysis. The preponderance of data generated by the full set of interview questions and associated codes has required that this research focus on the themes of sustainability, Indigenous knowledges, institutional governance, curriculum, operations, research, and community outreach, conservation, and networking.

I analyzed each of the thematic output documents for sub-themes and patterns of advice

common among participants. Quotes on common sub-themes within the coded documents were reviewed and copied from the original transcripts and then pasted into new documents to organize the quotes and further review what the participants said, identify subtle differences, and unique or divergent perspectives. For example, under a theme of institutional governance, participants' quotes about financial considerations would be grouped together. In this process, I was able to capture important messages from participants that pointed to a variety of considerations about a particular theme or sub-theme. I used printed files for the first review and electronic files for subsequent reviews of the themes. Participants' responses were used to answer the three research questions that framed the data analysis outcomes.

The first research question (In the territory you work, what Aboriginal philosophical principles concern the environment and interconnectedness in relation to sustainability in PSE?) relied on data retrieved from the codes on Indigenous knowledge and sustainability. These concepts were discussed at length in participants' interviews and their insights generated extensive data that was used to constitute the first two key findings.

The second question (In your PSE place of learning, how are curriculum, research, facility operations, institutional governance processes, and community outreach linked to sustainability through practice and policy?) included analysis of the five categories and their potential links to sustainability. Participants were not required to discuss these categories one by one, but were invited to consider the question as a whole. At various times during interviews, many of the participants did speak specifically about individual categories; however, it was not always at the same time or within their responses to that particular question. Often, information about a category was offered during discussion about another question. Coding was designed to capture the theme regardless of where it emerged in the interview. The multi-category question was included to raise these topics important in the research and data generated constituted the third key finding.

The third question (In your PSE place of learning, how is sustainability practiced, and what policies drive these practices?) was phrased this way to accommodate participants' responses with terminology. While the concept of sustainability might be understood in general terms, it was anticipated that participants' way of expressing an Indigenized view of sustainability practices and policies might employ different terminology. For example, the concept of policies could be understood as an outcome of bureaucratic processes or as an

informal outcome of traditional law. Participants were encouraged to see the words in the questions as placeholders for concepts and interpret them in their own way. The third question also included participants' responses to the themes of community-based conservation and sustainability networking because they were relevant to the methodological approach combining Indigenous knowledge and theory, critical theory, and emancipatory theory. That is, to examine the information critically and include potential action outcomes of benefit to Indigenous communities. Data from the third question were coded and constituted the fourth and fifth findings.

Focusing on selected themes that provided insight into participant responses to the research questions enabled only inclusion of relevant data. In cases where responses were unique, single coded references were indicated. In cases where there were multiple responses that were similar, all coded references were indicated. The original list of 26 primary codes could have facilitated additional thematic analysis. For example, data on each of the themes common to the holistic lifelong learning models may have generated additional information for the study; however, that data was often overlapping with the selected themes already included and would have resulted in repetitive results. Thematic saturation was considered to have been achieved when all relevant data for the selected themes was integrated and no new themes were required.

Survey. The Sustainability and Education Policy Network (SEPN) had developed an on-line survey, which was used in my research to augment information gained from participant interviews. The on-line survey⁸ included the following key sections: Sustainability Definitions, Sustainability in Practice, Sustainability Policy Development, Policy Effects, Influences on Policy Development, Drivers and Barriers, Governance, Curriculum, Operations / Facilities, Research, and Community Outreach. The survey was designed for use in a larger SEPN project and not specifically for Indigenous participants or institutions, but it was included as a data collection method because it contained important questions about sustainability in practice, drivers and barriers, influences on policy development, and policy effects.

SEPN established criteria for survey respondents, requiring that they be involved with the education system in Canada and have some awareness of the following:

⁸ The SEPN national survey can be accessed at: www.sepn.ca

- Existing sustainability practices in participants' work or study setting;
- Influences that have supported the development of sustainability practices in participants' work or study setting;
- Barriers that have hindered the development of sustainability practices in participants' work or study setting; and
- Whether there are any policies that address sustainability in participants' work or study setting, and if so, factors that may have contributed to their development and implementation.

Participants were asked to complete the survey before the interview to establish familiarity with sustainability terminology and usage; however, all ten participants indicated they wished to complete the on-line survey after their interview. While unexpected, conducting the interviews first was likely beneficial because it resulted in a good deal of exploration and dialogue about the meaning of sustainability. This extended dialogue may have also been of value in facilitating more understanding and clarity in survey responses. Each survey was assigned a code name in respect of confidentiality.

Survey data were retrieved from the Qualtrics website hosted by the University of Saskatchewan's Social Sciences Research Laboratories (SSRL). The survey comprised 75 major questions⁹ about institutional sustainability practices and policies. Responses were reviewed and collapsed through a binning process to compile similar answers. Tables of responses for each question were sorted in ascending order to indicate responses with highest to lowest percentages. A text summary and interpretation was synthesized for each survey question then summarized briefly for the research findings relevant to institutional governance, curriculum, facility operations, research, and community outreach.

The survey was initially included because it provided a comprehensive view of how sustainability is often discussed in academic research and collected data from participants in relation those typologies. In testing the survey, I found it to contain a broad variety of topics that contributed to my own thought processes about the potential scope of sustainability. I believed this would benefit the research participants in clarifying some of the study concepts from a

⁹ The SEPN survey included over 223 questions and sub-questions on sustainability practices and policies.

western academic perspective. While the survey yielded very informative data from the participants, only key messages were included in this thesis to augment the interview data.

A table of key messages from the survey on curriculum, research, facility operations, institutional governance processes, and community outreach was included with the findings from the interviews on these themes.

Synthesis. The interviews constituted the majority of data used in this study. The thematic analysis of each code family used provided insight into messages from participants that were crosscutting through questions and themes, appearing in various forms throughout the transcripts. These messages became the research findings. An analysis chart was constructed for data analysis as a framework that facilitated linking the research questions with the major findings. The chart also accommodated possible outcomes or consequences of the findings, leading to the formation of subsequent discussion categories, conclusions, and implications of the research study results. By using the analysis chart, I was able to assure the relationships between the questions, findings, discussion, conclusions, and implications were consistent.

Ethics

This research received approval from the University of Saskatchewan Research Ethics Office for: the ethics application, letter of invitation, research guide, consent form, transcript release form, and telephone script. The University of Saskatchewan Research Ethics Office approved this research on certificate BEH 15-268. The on-line electronic survey was developed by SEPN and approved by the University of Saskatchewan Research Ethics Office under certificate BEH 14-236.

Summary

Chapter Three provided an overview of the methodology, study design, data collection and analysis, and ethical considerations. The research methodology combined Indigenous knowledge and theory, critical theory, and emancipatory theory. Using interviews and surveys, data on sustainability and Indigenous knowledges were gathered from participants in ten PSE institutions across Canada and analyzed for convergences and divergences.

The following chapter describes the five key findings of the study.

CHAPTER FOUR

RESEARCH FINDINGS

The purpose of this study was to explore how the concept of sustainability is understood in relation to Indigenous knowledges by faculty and administrators working in Indigenous PSE programs across Canada. Data from 10 participant interviews and surveys revealed commonalities in participants' understandings, resulting in five key findings:

1. Indigenous worldviews are based in spiritual beliefs, which orient Indigenous knowledges and responsibilities for sustaining life on Earth.
2. Sustainability is expressed as a function of tradition linking Indigenous identity with culture, language, and environmental health.
3. Entrenching Indigenous knowledges in curriculum, research, facility operations, institutional governance processes, and community outreach is to sustain cultural identity.
4. National and international standards supporting Indigenous self-determination are primary drivers for the inclusion of Indigenous knowledges in PSE institutions and advance the underlying principle of sustainability.
5. Indigenous holistic learning includes social, economic, and environmental aspects of sustainability.

Findings 1 and 2 are based on participants' responses to the first research question: In the territory you work, what Indigenous philosophical principles concern the environment and interconnectedness in relation to sustainability in post-secondary education? An analysis of the themes 'sustainability' and 'Indigenous knowledge' in participant interviews provided data used. Finding 3 is based on participants' responses to the second research question: In your PSE place of learning, how are curriculum, research, facility operations, institutional governance processes, and community outreach linked to sustainability through practice and policy? These areas of inquiry were taken up as a whole in interviews but analyzed thematically in interviews and surveys. Findings 4 and 5 are based on participants' responses to the third research question: In your PSE place of learning, how is the concept of sustainability practiced and what policies drive these practices? Responses in interviews were drawn from themes on Indigenous knowledges, sustainability, conservation, and networking as they pertain to the practices and driving policies in participant settings. Each of the findings is presented in turn.

Finding 1: Indigenous worldviews are based in spiritual beliefs, which orient Indigenous knowledges and responsibilities for sustaining life on Earth

Analysis of the research data indicates participants described spiritual beliefs as central to how sustainability is understood in relation to Indigenous knowledge. In the analysis, sustainability emerged throughout participant interviews as an underlying principle of Indigenous knowledge, found within traditional worldviews, ways of knowing, value systems, and practices of Indigenous peoples. The process of integrating Indigenous knowledges within PSE was found to differ among cultures and programs, but integration of sacredness, respect, and decision-making considerate of future generations was revealed to be among the most important elements. The subthemes that appear below are interconnected and overlap to some degree as expected within holistic thinking. Finding 1 is presented under the following sub-themes: connection and renewal, intergenerational foundations, and transmission of worldviews.

Connection and renewal. Participants explained that in any walk of life or profession, the spiritual aspect of cultural identities link directly to responsibilities for acting sustainably as an Indigenous person. Ancestral knowledge must be carried forward and integrated into everyday life to be renewed. Therefore, both contemporary and traditional modalities of learning cultural worldviews facilitate learning about personal roles and obligations. Participants described their understanding of Indigenous responsibilities this way:

I think, for us, Aboriginal people, it's who we are. It's the land and sustainable ways of doing things is part of our culture. It's been part of our culture since the beginning of time. This is our responsibility. This is our sacred responsibility to be able to take care of the world, to be able to take care of the land. (PSE10-202)

The Elders are always telling us, or reminding us, that right from the beginning you have to adopt a perspective that you live in harmony with all of Creation and then you respect all of Creation because in that way of thinking, you're also ensuring the resources we have today will be passed onto the future generations and they, in turn, by the time they become adults...will know that they have the same responsibility. (PSE8-17)

Participants said that Indigenous knowledge explains our relationship to the universe and how to interact with other human and non-human entities. One participant said sustainability is about being a good human being, and those in western society need to “shift away from thinking just

about themselves” to thinking about “their responsibility for this whole world” (PSE7-71). Another participant expressed a belief that the Earth has its own consciousness and “when we walk on the Earth it feels us” (PSE10-54). All participants described Indigenous knowledges as being rooted in the land.

Understanding Indigenous knowledges requires that teachers and learners connect to the natural environment regardless of whether it is within urban, rural, or northern settings. One participant described how cultural activities lead to new awareness for students and teachers:

Sometimes, I get to bear witness to some of these students who, for the first time, go into a sweat lodge ceremony and they come out with this whole totally different renewed perspective on life and how they see themselves as part of it. (PSE9-169)

Both teachers and learners benefit from interacting in cultural settings through shared experiences, learning new knowledge, and talking in informal settings.

Intergenerational foundations. Participants indicated that principles of Indigenous knowledges are found within worldviews, epistemologies, methodologies, and practices of Indigenous cultures and that sustainability could be understood in relation to these. Several participants expressed their belief that sustainability includes the seven generations principle, which involves respect for this world, our lifestyles, and our responsibilities to the Earth for future generations. One participant explained, “We actually live and practice traditional knowledge...that is essential in sustaining our cultures...the actual physical, mental, and spiritual activities of doing those traditional practices reinforce sustaining those practices within our generation” (PSE6-164). Another participant described respect and responsibility as important principles embedded within Indigenous knowledges:

I think sustainability is just another word for respect. It’s about respecting this world and our responsibilities to it. My community was raised with the seven generations rule; the decision that we make today is going to have ripples and we have to think about it seven generations down the road. (PSE7-69)

Sustainability, as a principle of Indigenous knowledges, is understood through the cultural lens of particular Indigenous worldviews, involving the entire intergenerational scope of culture, its knowledge, and ways of knowing.

Transmission of worldviews. Across institutions, participants maintained that the inclusion of Indigenous knowledges in PSE involves accepting underlying assumptions about

cultural belief systems, including their foundations, purpose, and accommodation of traditional means of transmission. Some participants had students work with Indigenous community members off campus, while others had PSE institutions where traditional teachers were accessible on campus. One participant said, “Our Nokomis here on campus comes and shares teachings; she does some ceremony, but students have to go to her... she’s not there recruiting students” (PSE5-32). Having access to traditional teachers who bring various knowledge and skills can help learners build their comfort level and willingness to participate, including through communication of concepts in Indigenous languages that relate to sustainability.

One participant pointed out, “Your language conveys worldview” (PSE8-30). Another participant explained ancestral views about relationships with the natural world:

Our understanding of the Earth is that it’s a living being. So, even [in] our relationships with the animals and the plants, we personify them as if they were our closest relatives. I think that way of looking at the Earth and that way of looking at the natural world is so much more profound and deep than sometimes what is taught in environment-related types of education. (PSE10-26)

Through learning Indigenous concepts of an animate and relational world, described through particular languages, individuals are connected to the worldview of their culture.

All of the participants in this study indicated there was some access to traditional knowledge holders through their PSE institution. One participant made this point about the emergence of cultural practices:

I’m seeing a resurgence of cultural practices, spiritual practices across all of our students. We’re seeing a lot of that happening on campus and through these programs and through outreach with the Friendship Centre and with our Elder on campus. So, I think I’m seeing a shift ‘cause when I was in post-secondary it was very different. We didn’t have any of these services when I was in post-secondary. We didn’t have an Elder on campus. We didn’t have a lot of things. (PSE5-126)

Although participants described a variety of challenges for maintaining Indigenous programs, these were never said to be the result of sacred or spiritual elements of Indigenous knowledges but were almost always linked to financial issues.

Finding 2: Sustainability is expressed as a function of tradition linking Indigenous identity with culture, language, and environmental health

The second major finding was that participants viewed sustainability not as something taken up as an issue on its own within Indigenous PSE but, instead, as an outcome of traditional Indigenous cultural beliefs, practices, languages, and how these are related to the natural world. Participants explained the primary purpose of including Indigenous knowledges in PSE was to ensure learners connect to their own cultural identity through understanding relationships and active skill building. As a result, participants said involving local cultural knowledge keepers was essential to avoid pan-Indigenous approaches. Participants described food harvesting and consumption as important in learning about sustainability. Finding 2 is presented under the sub-themes of Indigenous knowledge, land, and language; active skill building; respect for local knowledges; and traditional sustenance.

Indigenous knowledge, land, and language. Participants said Indigenous specific programs were established to ensure the inclusion of Indigenous knowledges so students would have a better understanding of their cultural identities and worldviews. When we talk about Indigenous knowledges, one participant said, “We’re really talking about sustainable ways of thinking and being” (PSE10-18). Another participant reflected, “You know, what I find our most effective teaching of traditional knowledge is, we’re out there, on the land, we’re doing it” (PSE6-45). Participants said Indigenous knowledges connect learners to oral histories, cultural stories, traditional understanding of alliances and relationships (including treaty relationships), specific territorial knowledge, traditional health, wellness, and healing practices. They also indicated that Indigenous knowledges orientate learners to ancestral values systems and participation in sacred ceremonies.

Participants said Indigenous knowledge, land, and languages are intertwined. One participant said, “[The] notion of sustainability is embedded, I would argue, within Aboriginal Indigenous knowledges” (PSE1-14). Another participant described sustainability education and environmental education as being contained within the words, metaphors, analogies, sounds, dialects, and structures of languages, adding, “You can hear the bush in the language. You can hear the animals. You could hear the natural world in the language itself. So, when we’re talking about sustainable education, environmental education, it’s written right within our languages” (PSE10-66). Several participants described how language is tied to seasons, the land,

and traditional ways of doing things, such as how people hunted, trapped, and fished. In this regard, knowledge about conservation, harvesting animals, trapping, fur processing, plants, and medicines is part of Indigenous knowledges and languages.

Many students, however, have grown up without the means of learning Indigenous languages or land-based knowledges, which diminishes their understanding of sustainability from an Indigenous perspective. One participant said, “We have some real issues... that stem from the sustainability of our language. The various languages... are being challenged right now because the percentage of fluent speakers are dwindling” (PSE6-155). Another participant pointed out that, often, Indigenous language speakers are very shy and may not realize how important they are, adding these speakers may not see themselves as leaders and may need to be encouraged to share what they know.

Active skill building. Participants expressed their belief that PSE institutions need a place where local people can model the type of understanding, awareness, and skills that are valued by Indigenous communities and address sustainability. The responsibility to live sustainability and pass on those teachings was described as “our connection, not just to the past, but to the future” (PSE7-70). Some of the participants described the importance of building their own Indigenous knowledge while working within a PSE institution. One said this about the importance of traditional skills:

Without those skills, I have very little value to my family. Without those skills, I have very little reputation to actually instill those to my own grandchildren. So, in terms of language and the knowledge, these are, for identity purposes, really, really precious for me to carry on. (PSE4-49)

Participants often described their efforts outside the classroom to learn and practice traditional cultural activities, such as spending time building relationships with Indigenous people from the local communities, obtaining local wild foods, and participating in ceremonies. Investing the time to do this was described as essential to working with Indigenous knowledges.

One participant explained that cultural knowledge is built through ongoing relationships and participation in traditional activities. Others explained that since Indigenous knowledges are learned incrementally over time, knowing how to ensure the health and well-being of one’s community meant having extensive knowledge of the natural world, understanding the associated cultural responsibilities, and passing that knowledge on to others. One participant

described the processes of active knowledge development by the Indigenous people of that territory:

They made observations of the world around them... and then they learned also from the interactions with the environment. So, that's the knowledge base that they add on to the previous knowledge base that was passed on from the previous generations (PSE8-131). Accumulation of knowledge and skills passed on through oral tradition and participation in active learning develops learners' awareness of personal and collective relationships that contribute to community well-being and environmental health.

Participants said caring for the Earth requires learning and practicing local traditions that enable one to care for the self and others. This learning requires connecting to the land and original teachings to learn about such things as gender roles, relationships within families, and relationships to the Earth. One participant described a cultural perspective of collective identity:

The land is who we are. The land is a part of our existence. There is no separation between human beings and the land, the natural world. We are the natural world. We are the context. (PSE10-27)

Learning traditional Indigenous perspectives of sustainability involves active learning experiences that can clarify how human activity affects the natural world. One participant pointed out that just as children need learning spaces to accommodate this kind of learning, institutions also need to develop them.

Respect for local knowledges. Some participants warned there is a need to think critically about what Indigenous knowledge is being promoted or taught in PSE institutions. One participant said that when something is published it often gets passed around to places where it was not practiced, creating a danger of taking "a pan-Aboriginal approach to anything" (PSE1-86). For example, medicine wheel frameworks or tobacco offerings are not traditional in all Indigenous cultures. To overcome this, another participant has this advice:

You go meet with the Elders, get to know the Elders, and then have them share their knowledge with you so that you can also share that knowledge with your students, but we want to ensure that whatever you're sharing is going to be accurate. (PSE8-146)

Throughout the interviews, participants indicated there is a need to respect the Indigenous knowledges and practices of particular cultures, communities, and individuals because they differ among First Nations, Métis, Inuit, and regional ecological contexts.

Traditional sustenance. Several participants spoke about sustainability issues related to food. One participant described a need to increase institutional attention to issues of food sustainability and climate change. Others said, food is central to culture and Indigenous survival so the types of food consumed, such as berries, wild meat, and fish, need to come from the land. Sustenance was described not only in relation to food consumption but also in relation to social norms and health. One participant explained, “You take what you need [and] share what you have” (PSE2-139) to make sure everyone has enough. Another participant said traditional harvesting and sharing of local foods was important in avoiding other kinds of food that are “really bad for Indigenous health” (PSE4-91). Another participant said several First Nations communities have been active in forming partnerships to advance initiatives concerning environmental monitoring and assessment, fisheries and wildlife, and commercial food industries. Issues of food sustainability are relevant for all individuals because they connect people directly to the environment and can be taken up in a variety of ways within PSE education.

Finding 3: Entrenching Indigenous knowledges in curriculum, research, facility operations, institutional governance, and community outreach is to sustain cultural identity

The third major finding relates to institutional use of Indigenous knowledges. Participants felt strongly that any use of Indigenous knowledges within PSE should be primarily to sustain cultural identity. Throughout the interviews, most participants focused on the inclusion of Indigenous knowledges in curriculum and the need for institutional and personal leadership to advance these efforts. They explained that community outreach at their institutions often involved building relationships for curriculum development, engaging governance advisors, and conducting research projects. A few participants talked specifically about their experiences with research but most were not heavily involved in research. Some of the barriers to research participation, cited by participants, included the time needed to first build good community relationships, the labour intensiveness and specific skills needed to develop research proposals, and risks associated raising with community expectations in competitive grant applications. Participants discussed facility operations in the holistic context of institutional functionality, rather than limiting the scope to buildings and grounds maintenance. Finding 3 interview data is presented under the sub-themes of curriculum, research, facility operations,

institutional governance, and community outreach. The interview data is followed by a summary of the survey data.

Curriculum. Curriculum inclusive of Indigenous knowledges can be strengthened through inclusion of Elders and traditional knowledge holders. Elders and other cultural knowledge holders were seen by participants to be the cornerstone of Indigenous knowledges in general, and many of these Elders and knowledge holders brought their own personal land-based knowledge to PSE curriculum. One participant indicated their institution had a course based in learning from local knowledge keepers that included lectures and specific elements of sustainability thinking. The participant noted that the course was well received because it came “on the heels of recommendations of the Truth and Reconciliation Commission” (PSE2-137). In another institution, trappers, hunters, traditional land users, and Elders are invited to work with the students because they teach about the environment, the land, and lakes. Most participants believed the provision of culture camps, led by Elders or cultural knowledge holders who know traditional protocols, were valuable for future generations of learners. Some participants described their insights and experiences with Elders and land-based knowledge:

There are many Elders or resource people who speak to the whole role of our environment and how as Indigenous people, Métis, First Nations people, that much of our living and lifestyle has always been closely connected to the landscape of where we come from. So, there’s this process of relaying to the students, who are quite urbanized for the most part. (PSE9-28)

We utilize traditional knowledge on the land, travelling, and our field camps. We have Elders that come out... and have been doing this with me for the last 20 years (PSE6-158).

Participants observed that Elders teach students about such things as constellations, the local environment, and ways in which people are connected to the natural world. One participant said they had an instructor who taught about traditional plants and medicines by bringing in samples and also taking students out to teach them how to identify and harvest the plants. Another Elder teaches winter survival skills. It is hoped that in learning these skills the learner can, in turn, teach others.

Participants noted a lack of regional-specific print resources, like books, to help explain

the Indigenous knowledge of particular cultures. Even in cases where there is much valuable traditional ecological knowledge written about a particular culture, one participant felt PSE institutions were still not engendering that knowledge. Another participant said there was a need to open up discussion about the “Aboriginal economic, the political, the social, the historical kind of realities that we have...It’s not just about culture but the way in which we speak about those things” (PSE10-13). Another participant noted First Nations’ self-governing agreements have had a major influence on institutional policy and program development in that setting adding that, as a result, “our political landscape has been such that we have a lot more influence over those things” (PSE7-62). In that PSE setting, curriculum was reviewed for inclusion of Indigenous content and evidence of how self-determination was supported.

Participants also noted that educator philosophies and personal knowledge about Indigenous knowledges is important for creative development of curriculum. One explained the process in a teacher education program as “teaching teachers to think differently in relation to Indigenous education and cross-cultural issues” (PSE1-78). Another participant explained that hosting land-based programs benefits the instructors and the learners:

The Land-Based Program is an interesting one where I feel that I can at least invest the little knowledge that I have of the values and skills that are needed to be able to imagine a life that’s based on our ancestor’s ways of being. (PSE4-32)

One participant observed that Indigenous PSE institutions are very focused on mainstream programming that results in credentials for employment and do not realize the power they have to create programs that integrate traditional teachings.

Research. Participants described a variety of research in their regions on local and territorial Indigenous issues, including on land claims and sustainable food sources. Some participants highlighted the influence of land claims that contain legal provisions for maintaining and promoting Indigenous cultures in those regions:

We are very progressive here. In terms of research...whether its hard science research or whether its social research, they are primarily driven within the region, community driven research. (PSE6-92)

Our institution is really trying to break down those barriers and rebuild some of those relationships between research and Indigenous communities and they’re doing that by

partnering on all research. (PSE7-48)

Another participant explained that the Inuit, whose knowledge system is very different from western science-based knowledge, have equitable authority under the land claims. Researchers have been successful in listening to and helping translate Inuit oral traditions, resulting in these successful land claims, but the participant felt there are too few researchers who can do this really well.

Another participant told a story about being challenged by someone for using an Indigenous worldview in research:

The university has to recognize my way of thinking and my way of conducting research ...and I had to tell him, “I think it’s the university that has to reconcile that, not me. I’m just following what I’ve been exposed to all my life. I’m just following our worldview. I think the university has an obligation to recognize that and give it some validity so that we don’t have to assimilate into the western methods of doing things”. Yeah. (PSE8-110)

A number of participants indicated that developing Indigenous programming and including Indigenous community members in program delivery was seen as a valued method of representing Indigenous knowledges appropriately in PSE institutions.

There was a range of participant involvement in research across institutions. Some indicated that in their setting there was many research projects involving Indigenous knowledge, while others described arduous efforts to generate interest, build partnerships, and compete for research funding. One participant acknowledged, “Now, we have positions here in post-secondary... but we're still lagging in research” (PSE3-82). One participant pointed out that sustainability research in the sciences requires financial support; so having people capable of creating this support is key. Another participant said, “There should be targeted funding from SSHRC, for instance, around Indigenous ways of knowing and sustainable education” (PSE10-185). All participants were convinced Indigenous peoples should have a leading role in research pertaining to their cultures. One participant said this:

One of the things that we've been really pushing for...is to...start thinking about research and doing research in our own communities, 'cause it's time we did it ourselves. We understand what we need to have; we don't need to have people parachuting in and doing their research and then taking off and we never see anything again (PSE3-67).

Despite the variety of challenges that face those attempting to integrate Indigenous knowledge in their lives, including carrying out ceremonies, participants indicated their willingness to persevere and adapt as necessary. One participant explained it this way:

You go ahead and do it. Do it the best way you can with the resources you have, the space, because you're still following on those ideas about honouring the universe, the multiverse, the mother Earth, and the connection to the moon, and the importance of the moon to women, and the importance of water. You know, all of those pieces are important. (PSE1-91)

Another participant also described the challenges of having a professional training program with only intermittent access to natural settings for cultural activities. That participant wished they had an accessible and affordable place of their own for cultural activities but did not see this as a deterrent to continuing the existing cultural programming.

Facility operations. Participants generally interpreted facility operations as being more than simply the management of buildings and grounds at their institutions. Instead, they viewed operations as holistic, inclusive of how the institution ran and the kind of programming or curriculum offered. For example, regional Indigenous sovereignty was seen as a significant factor in shaping institutional operations. In one setting, a participant explained, “This is their land, their jurisdiction, their laws...[which] are protected by the Constitution...” (PSE6-41). Indigenous support and involvement ensure the institution serves the needs of regional communities.

Participants saw the development and delivery of Indigenous knowledges in curriculum as the primary link to sustainability in broad facility operations. Policy planning for “pulling together an Indigenous knowledges / keepers’ council” (PSE5-34) was seen as a way of assisting with how PSE could operate effectively for Indigenous learners. Participants described the need to engage more young people in learning Indigenous knowledges, while ensuring mainstream academic standards were not sacrificed, innovation in alternative energy sources was supported, and dedicated spaces were developed for Indigenous knowledges.

In general, participant interviews revealed that in regions where Indigenous peoples constitute the majority population, especially where land claims have been finalized, PSE institutions are more willing to design and implement operations based on Indigenous worldviews. In other regions, where Indigenous peoples are not the majority and have less

access to land, there is much more resistance to integrating Indigenous knowledges within the operations of PSE institutions. One participant described what happened when courses about Indigenous culture became mandatory in the latter setting:

The pushback from the faculty was just unbelievable, the pushback from the students, and these are mainstream students mostly, because they didn't see the relevancy of such a course. They didn't, couldn't, understand why they had to learn about Indigenous rights or Indigenous people. It was just a real eye-opener and just spoke to me about the need for such courses across all schools. (PSE5-4)

Participants described the importance of positive relationships among faculty and with Indigenous communities in advancing Indigenous knowledges and sustainability initiatives. These initiatives might involve non-Indigenous faculty who specialize in a certain discipline helping with Indigenous community-based projects. One participant also noted that the presence of Elders on campus was critical in Indigenous programming although the specific role of these Elders would vary from place to place.

Some participants described efforts to recycle paper or move to electronic filing systems to reduce paper but felt these were small efforts in relation to what might be possible. Land-based learning programs, culture camps, and dedicated spaces on campus for learning Indigenous knowledges were described as more meaningful as operational learning opportunities. One participant said building institutional infrastructure, such as facilities for advancing research on sustainability and the environment was valued, but developing that infrastructure was costly and required a significant effort by faculty members to generate the partnerships and revenue required. Most participants expressed the desire to have educational activities about Indigenous knowledges in natural settings.

Institutional governance. Participants said Indigenous knowledges are integrated into PSE so that Indigenous philosophies, knowledge bases, worldviews, and value systems flourish in the university. The integration process requires learning and using knowledge from Elders, then incorporating the knowledge into curriculum so that it is reflective of Indigenous realities and worldviews. One of the participants said, "I would really like to have a lot greater support for this program from within our faculty, our College because I have the community support" (PSE6-206). Supportive leadership was described by most participants as being a critical element, as well as the need for decision-makers to understand the underlying purpose for

integrating Indigenous knowledges into PSE institutions.

Participants emphasized that federal, provincial, and territorial statutes and policies related to land rights, historical factors, and self-determination were also important factors in understanding issues of concern to Indigenous peoples. They expressed the following:

We can't talk about sustainability without talking about Indigenous rights...we can't talk about economic and social and human prosperity without having a conversation about our rights as Indigenous people, on our land, with our waters, and the way that we live on our land. (PSE5-21)

There [are] declarations. There [are] all kinds of things that are happening. There's the Human Rights Declaration. There's the United Nations Declaration on the Rights of Indigenous Peoples. There's enough documents that can show us what to do if people take it seriously. (PSE1-42)

Even though participants were not familiar with sustainability declarations or the STARS™ manual on PSE sustainability, all participants were knowledgeable about Aboriginal and treaty rights¹⁰ and some had advanced understanding about land claims. Participants expressed interest in learning more about sustainability work in other PSE institutions, but they suggested this would only be helpful in so far as it advanced the work they were already doing on Indigenous knowledges in their setting.

Some participants felt they had strong institutional leadership, such as presidents and Indigenous councils, working on issues related to Indigenous knowledges that included multiple Indigenous community perspectives. One participant indicated that good long-term relationships with Indigenous communities help move initiatives forward, noting “Our University President is really supportive of those kinds of things” (PSE2-82). Another participant acknowledged the strength of Indigenous advisors at that institution and said, “We work really closely with them to try and integrate those worldviews” (PSE7-84).

Several participants expressed worry their programs would be discontinued because of

¹⁰ Terminology as referred to in the *Constitution Act, 1982*: “The existing aboriginal and treaty rights of the aboriginal peoples of Canada are hereby recognized and affirmed.”

funding cutbacks. They also worried that they were carrying out their work without full administrative support for activities involving Indigenous knowledges. Two participants described their efforts to maintain their programs:

[We have] a lot of issues, and funding and programming; we have to fight, beg, borrow, and steal to maintain our programs here. (PSE6-315)

We learned to do things very covertly where we're kind of under the radar and, as far as I know, we're not breaking any rules... so we do things as we need to and its not always understood by mainstream, in fact, its rarely understood by mainstream but we do them anyways because we know that it's good for the community, it's good for our families, it's good for our individuals. (PSE5-28)

Other participants expressed concern that the connection between reconciliation and integration of Indigenous knowledges in PSE was not fully understood by institutional leadership. One said this:

We're all interconnected. Whatever you do over there is going to affect where I am sitting over here, and it's going to affect the students and it's going to affect the support staff. So, it should be a holistic model that we're looking at right from the start, not just a little piecemeal here and there. (PSE3-242)

One participant pointed out that when people in general understand the connection between financial sustainability and environmental sustainability, they are more interested and willing to support it. For example, in one PSE setting, becoming carbon neutral generated hundreds of thousands of dollars in revenue. This achievement is believed to have led to other new initiatives because people have seen what is possible.

In addition to financial security, participants believe that having specific places, such as Indigenous centers, helps support cultural knowledge and traditions. One participant explained that the Indigenous peoples working in these places have a responsibility inherited from their ancestors to pass teachings on to new generations so that they will achieve their degree but have it grounded in “a strong cultural foundation, which would include those teachings about sustainability” (PSE8-124). Creating an atmosphere where Indigenous community members would feel comfortable could also help with building relationships with learners.

Community outreach. In all cases, participants noted that inclusion of Indigenous

knowledges requires building relationships with Indigenous communities and individuals. One participant said, “We’re always having to educate people that its more than just training people; it’s about building long-term capacity in First Nations so that they can sustain their own virtues, values, philosophies in the long run” (PSE5-19). Another participant explained that when a rapport is established, it creates a strong bond, with everyone working toward the same goals. Indigenous community-based projects might require help seeking funding, securing equipment or building capacity through developing courses or other training events. Some participants said an important aspect of PSE institutional outreach is that Indigenous communities are not seen as passive recipients of proposed ideas but rather as leaders in decision-making:

They need to be the ones that are steering the boat because far too many times I’ve seen colleges and universities, and ‘they’re the expert’ and ‘I’ll tell you what sort of curriculum you need’ and, you know, that sort of thing. We need to step back, and we need to allow communities to say “This is what we want our graduates to leave with” ... and that really is the basis of a true partnership. (PSE5-13)

So, first it was about basing it on the model of partnerships, having the College recognize that the First Nations are their partners, not just a stakeholder group. That makes a huge difference and so they have a lot of say, they have a lot of input and they see their actions and their requests form a big part of what the College does. (PSE7-85)

Building relationships and carrying out successful activities help institutional personnel and Indigenous communities see the value of Indigenous knowledge holders.

One participant noted, “We don’t recognize our own Indigenous knowledge keepers...the people that are practicing, that are living on the land. We reduce these guys, or these women, to ‘they don’t know anything’...that’s an internalized racism” (PSE5-30). Another participant observed that some individuals from local Indigenous communities are inspiring because they have a good approach, are knowledgeable about traditions, humble but confident, patient with others, and inclusive. These qualities are important for explaining “Aboriginal understandings of the environment, sustainability, [and other] things like that” (PSE2-134).

Participants suggested that creating a context for integrating Indigenous knowledges requires a broad spectrum of planning, which accommodates learning focused on positive human relations, interpersonal skills, and intercultural knowledge. One participant felt that young

people are losing their connections to the Elders:

I guess what happens is as a kid, a young kid, your world is so busy and so full of information and stuff that the method of delivery in education from an Elder's perspective, it's hard to mesh that into their brains and how they access information. (PSE6-182)

Some participants acknowledged that since being in an urban environment limits access to the natural world and ceremonies, there is a real need to find ways of overcoming these challenges.

One participant commented that if spaces are developed for traditional teaching in the institution, it would be important for Indigenous communities to validate instructors, to make sure things are being taught in a good way, a kind way. Another participant indicated the development of an inter-cultural student exchange within PSE would be a good idea, so students could gain insight into other Indigenous cultures.

Participants pointed out that some Indigenous staff and programs are supported with external funding. The participants suggested that this type of funding creates a feeling of invisibility, which likely would not occur if programs were entrenched in policy and staff members were recognized for the work being done with local communities. Accountability is an important aspect of building trust between Indigenous communities and PSE institutions. One participant said, "There's an outreach component and a communication component where these researchers have to come back with their research and disseminate it to the communities" (PSE6-128). Successful community-based work is a cornerstone of building relationships with Indigenous communities that is often undervalued in knowledge development and mobilization.

Survey results. Table 4-1 describes the survey findings by whole institution domains of sustainability activity indicated in research question two. The survey revealed in general that participants are deeply concerned about the state of the environment, believing it is in serious trouble. Participants indicated they do not believe that we understand enough about natural systems in order to avert what is happening and that a major catastrophe is imminent. Some of the key results of the survey are summarized in the following table.

Table 4-1

Survey Findings by Themes of Whole Institution Domain

Theme	Survey
Curriculum	Sustainability is taken into account in the overall curriculum in participant settings, especially in new interdisciplinary courses, existing courses, and discipline-specific courses but has not emerged as its own major area of study.
Research	Education for sustainability and environmental justice were said to be important areas of research in participant institutions. To a lesser extent, participants indicated research was being conducted on alternative energy, resource extraction, resource management, environmental protection or conservation, climate change, and the development of sustainable products / technologies.
Facility Operations	Recycling and energy use scored highest as sustainability initiatives in facilities management or operations. Building construction, cleaning products, hazardous chemical use and management of grounds were also said to be important. There was less focus on sustainable energy initiatives, transportation, and information technology. The lowest ranked initiatives involved housing, water conservation, dining, and hazardous waste disposal in those settings.
Institutional Governance	Sustainability is integrated into different aspects of management or governance but participants indicated it is a fairly weak integration. That is, sustainability is included in the big goals but when it comes to budgeting and investments, it does not have as big a role.
Community Outreach	All respondents said they partner with other post-secondary institutions for community outreach, while most also partner with industry or business, government, NGOs, and First Nations. Community outreach partnerships were national, provincial, or local in nature but none were international.

Finding 4: National and international standards supporting Indigenous self-determination are important drivers for including Indigenous knowledges in PSE institutions and advancing the underlying principle of sustainability

According to participants, driving forces for implementing Indigenous knowledges in practices and policies of PSE institutions include legal instruments, such as constitutionally protected Aboriginal and treaty rights, land claims, and international agreements that support Indigenous self-determination. Most participants felt strongly that the legal supports for self-determination need to play a larger role in PSE institutions since there are expansive differences in how institutional personnel respond to Indigenous knowledges. They articulated a need for systemic change, including understanding and applying Indigenous rights, supporting and taking part in cultural activities, and engaging in dialogue about Indigenous knowledges to better understand Indigenous perceptions of sustainability. Finding 4 is presented under the sub-themes of: Indigenous rights, pedagogy, engagement, awareness, regional sustainability, and conservation and environmental decision-making.

Indigenous rights. One participant explained that Indigenous peoples have rights but often have to abide by regulations set down by external institutions, which prevents them from practicing and honouring their own Indigenous knowledges. Marginalization of Indigenous knowledges within institutions has led to participants calling attention to instruments that support Indigenous self-determination:

I think one of the most important things in this conversation are the principles around UNDRIP, the United Nations Declaration on the Rights of Indigenous Peoples, that really speaks to sustainability from an Indigenous perspective. (PSE5-90)

We have those rights because of the Treaties, because of the Constitution Act. (PSE8-211)

Then, of course, the recent things that are happening with the TRC reports and who will take up what's happening? Who will take up developing programs and projects within universities? So, I think right now, at that policy level, at that guidance level, there's a lot happening on how to incorporate Indigenous knowledges and traditions into universities. (PSE1-145)

Participants recognize that Indigenous rights are not central within PSE institutions and believe institutional presidents are key to opening doors for new initiatives, listening, and supporting Indigenous interpretations of sustainability. As one participant said, “Those hot button topic kinds of issues need to be brought out into the open” (PSE10-56).

Policies that support the integration of Indigenous knowledges within institutional programs and curriculum often rely on the willingness and creativity of those involved in planning. Participants acknowledged, for example, that there is often a clash between Indigenous worldviews and science, but that, even in these cases, some progress has been made. One participant indicated that they are working to develop Indigenous programs and policies because they want students to take pride in knowing that their traditions of sustainability and environmental stewardship have value, adding, “Your values are just as important and just as recognized as the western values” (PSE7-31). In other institutions, participants said students take science and Indigenous methods or new science courses that are a combination. In the latter case, developing the new program required work among faculty to discuss the difference in worldviews that First Nations people hold, as well as concepts of interconnectedness and sustainability.

Pedagogy. Indigenous peoples in Canada have been part of the development of national and international standards such as RCAP, the TRC, Indigenous land claims, and UNDRIP, among others, which provide extensive descriptions about injustices experienced by Indigenous peoples in education and the need for educational institutions to respond to standards of Indigenous self-determination such as by using Indigenous pedagogical approaches. Under this theme, study participants spoke about Indigenous education, recovering from the trauma of residential schools, the importance of Elders, and culture as pedagogy.

One participant highlighted that Indigenous teacher education programs have been Indigenousized and engaged with Aboriginal communities for the past 40 years since residential schools were closing down in the 1970s. Another participant indicated that widespread historic trauma has left many Indigenous people struggling:

We have to be able to help ourselves and that means taking care of our spirit, it means taking care of our physical bodies, our mental health, our emotional health, ensuring that we're able to recognize when we're out of balance, cause when we're out of balance we don't see the dysfunction that's occurring in our own environment. (PSE5-233)

Another pointed out that pedagogical processes already in place in adult education can facilitate discussions about sustainability, such as storytelling, sharing circles, self-development, and seven generations thinking. These methods can be used for the benefit of learners in any discipline.

Learning from healthy, knowledgeable community members is important. One participant said, “We talk about our Indigenous knowledge keepers, our Elders, our practitioners, who are in community as being the experts” (PSE5-34). One participant addressed the benefits of including Indigenous knowledges in PSE institutions for Indigenous learners:

When they graduate they leave with confidence, with skills, and with opportunities so that when they’re out in the world doing their work they’re making more of an impact around ensuring that our Indigenous knowledges, that our understandings, that our values, our principles are being reflected in the work they do, whether its on the land or in education or in the healthcare field. (PSE5-12)

Other participants talked about the power of culture as pedagogy:

We live it. We practice it. Traditional knowledge, traditional practices come right from social aspects, you know, where we have traditional feasts, community feasts, drum dancing... right through into the aspect of conservation, harvesting animals. (PSE6-2)

One participant said it is a startling difference to experience Indigenous knowledge and practices rather than just being aware of them, saying, “You know when you hear that drum, at least when I hear it, I just want to go to it, be part of it, and maybe even start dancing” (PSE8-283).

Repeated calls by participants for specific spaces, curriculum, and people appropriate to teach traditional Indigenous knowledges indicated these are currently inadequate within PSE institutions.

Engagement. The processes of PSE institutions’ approaches to national and international standards of Indigenous self-determination will vary based on responses to Indigenous engagement. There was some uncertainty among participants about how institutional personnel or learners will respond to the inclusion of Indigenous knowledges. One participant said:

All this stuff starts with individuals, and now some people are going to engage in it and really say ‘You know what? This is fun. I like working with these communities and learning about these Aboriginal understandings of things’ [and] some other people are going to say ‘No, leave me alone. I want to go back to my lab’. (PSE2-54)

Participants did indicate that achieving Indigenization required involvement and support of non-Indigenous personnel and local Indigenous communities. One participant said there is, “a real desire at our administrative level to do more” (PSE2-11), highlighting the importance of willing leadership.

Another participant acknowledged efforts by non-Indigenous PSE colleagues “working to incorporate Indigenous science” and “environmental sustainability” with Indigenous perspectives (PSE1-49). Another participant reflected on non-Indigenous personnel in that setting:

When I think about the people here...who are concerned about the environment, they come to us... and so they want to know. They're concerned about the environment.

They want to know what can they do to help in general. (PSE8-277)

Another participant observed that often individuals and other programs rely on advice from colleagues who have already forged relationships with Indigenous communities and have a good understanding of Indigenous concepts, ideas, and practices. Some participants supported non-Indigenous educators' activity in promoting Indigenous knowledges, but others expressed concern with non-Indigenous persons claiming scholarly positions as experts in Indigenous knowledges even though they had very little understanding of it.

Some participants acknowledged that, as a result of the legacy of colonization, not all Indigenous people or communities feel connected to, or value, Indigenous knowledges. This disconnection from cultural knowledges and languages has been passed on intergenerationally. One participant told a story about traditional teachings:

They're timeless. They're still as relevant today as they were back before contact by European settlers. It's just, of course, ...you may have some changes in the material culture but the non-material culture is still alive and well. Some students ...tell me, “Well you can't live in accordance of the traditional teachings of your ancestors because things have changed now,” and I [say], “No, no you still can. Just because you have a change in material culture doesn't mean you abandon...the value system, the worldviews. They still influence you and are still a part of who you are. It's just now you're interacting...with new inventions that come along in the material culture but...the teachings of respect, harmony, balance, interdependence -- they're still an important part of our everyday interaction with all of Creation”. (PSE8-1)

The legacy of cultural disruption affects how traditions are understood and was an important

consideration to participants regarding processes of reconnection.

Participants indicated throughout interviews that Indigenous rights were linked to the transmission of cultural identity and were important elements in PSE institutions, but some suggested that every school and institution needs a vetting process for accreditation and validation of Indigenous instruction. For one participant, the protection of cultural integrity was felt to be at stake:

We must be able to situate ourselves and our Indigenous knowledges in a way that commands the amount of authority and respect that we know that its deserving of but I'm not 100% convinced at this point that this place is in mainstream colleges, universities, or institutions. I think that those places have a lot of growing to do. They have a lot of awakening yet to do and I don't think that we have the time to wait for them. (PSE5-37)

Others felt that having a high level Indigenous advisory committee has made jobs easier for those working on these issues.

Awareness. Some participants suggested that there is a need for a national awareness-raising conversation about Indigenous knowledges and sustainability. Some felt sustainability has become a buzzword and more understanding is needed about its meaning. One participant suggested that if people in PSE institutions were asked what they know “about Aboriginal knowledge and sustainability...most people aren't going to know” (PSE2-21).

Another suggested that federal and provincial government officials could be included in discussions about Indigenous worldviews and perspectives of sustainability because such inclusive discussions can influence their knowledge, resulting in “strong, effective policy on the environment” (PSE8-119).

Regional sustainability. The relationships between national and international standards supporting Indigenous self-determination and Indigenous PSE places of learning involve consideration of how the health of lands and waters are maintained in Indigenous territories. In this study, training and education were seen as being directly linked to regional sustainability. Participants were aware that Indigenous communities are often harmed by industrial activity, instead of benefiting from it. They suggested that PSE institutions could potentially have an important role in the long-term sustainability of territories and Indigenous communities by increasing education about Indigenous perspectives of sustainability. This education, they suggested, would help Indigenous learners know their own cultural traditions and also speak

from an informed place in the language of industry about “how we’re to live with Mother Earth” (PSE5-60). However, only one participant noted there was a sustainability plan on campus and that they had relationships with industry for sustainable energy development.

Conservation and environmental decision-making. All the participants expressed strong views about the need to sustain a healthy, natural environment since it is foundational to understanding Indigenous worldviews. However, advancing underlying concepts of sustainability was not seen by participants to be limited to activity within PSE institutions. Outside their respective PSE institutions, participants were involved in local or regional activities and were able to integrate Indigenous knowledges within their work through partnerships with local communities. Although they were not involved in international efforts concerning environmental sustainability, the participants believed their local activities to be supported by national and international standards for Indigenous self-determination such as those expressed in RCAP, the TRC, and UNDRIP.

In some regions, participants were very knowledgeable about conservation activities and environmental decision-making being carried out by local Indigenous communities. Participants said those Indigenous communities were well informed and actively involved in dialogues about conservation issues, development of alternative energy projects (wind and solar vs. liquid natural gas), and shared decision-making with other governing authorities. One participant indicated that their institution is quite involved in regional committees involved in conservation initiatives and environmental decision-making, saying, “You’ll often see faculty and researchers, that are staff at the College, sitting on those committees” (PSE7-52). Another participant also felt the research at that institution provided an important contribution to Indigenous resiliency: “We know the climate is changing” so the information produced is important for adaptation because “change is inevitable” (PSE6-8). This participant described how students are involved in conservation efforts through their program:

We have what we call a technical report, which is like a mini-thesis. So, our students...ask a question, pick a topic, research, investigate, develop protocols, and go and collect results, and then draw conclusions. A lot of our students are involved in their community and the communities may have a question so they can direct their tech reports toward that. (PSE6-7)

Relationships form a complex web extending among PSE institutions, students, and Indigenous

communities.

One participant explained, “We also have a strong link with the First Nations here...for example, they had some funding approved...to examine the traditional ways of protecting the environment. So, they came to us and we worked with them” (PSE8-135). That participant organized talking circles in the First Nation community and suggested that these knowledge-sharing events could also be done in urban settings. In another setting, a participant indicated a local Indigenous person was hired to work as a community liaison, including on matters of Indigenous protocols. The participant spoke about the key role this person plays:

[The community liaison] bridges that big canyon that’s been created between researchers and First Nations communities. He works to get the Chiefs and the leadership in the communities talking about potential research projects that would be a benefit to their communities. Then he bridges the researchers there. (PSE7-50)

The participant further explained that the community liaison works with researchers to determine partnerships of benefit to the community and also how to present research so Elders and community members can make sense of it.

In another setting, a participant indicated there are a number of conservation activities linked with the institution, which have also brought together various disciplines for “business development and monitoring activities” (PSE2-4). Some participants said species assessment, conservation initiatives on ongoing monitoring activities often involved a number of organizations and not all projects involved the PSE institution.

In other regions, although participants said local Indigenous communities are well informed and want to see increased local conservation activities, fewer achievements have been derived from partnerships with PSE institutions. One participant indicated their institution planned to offer a cultural immersion program for faculty members, adding “one component of the immersion program, and it’s going to be a major component, would be conservation, our worldviews in terms of how we see the world and our interactions with the world” (PSE8-6).

None of the participants were aware that Indigenous livelihoods, Indigenous land use and tenure, and Indigenous languages are used internationally as indicators linked to biodiversity health. Most participants said traditional livelihoods, land use, and languages do not have a significant place in the curriculum of their setting even though they constitute an important part of learning and cultural retention. One participant said that the institution was not involved in

providing traditional experiences, saying, “Most of the traditional livelihood and traditional land use parts come directly out of the First Nations governments” (PSE7-21). Another noted it is the “smaller northern isolated communities where traditional practices are still very much the norm, you know in terms of land use and harvesting” (PSE5-225). One participant felt Inuit were least served by universities in supporting traditional livelihoods and indicated most “livelihood activities and ways of being are exercised outside the learning institutions” by families, instead of through “these institutions that are supposed to be a mechanism for education” (PSE4-104).

Intercultural communication of concepts was seen as important to understanding how Indigenous peoples view themselves in relation to the natural world. One participant described the importance of paying attention to nature and the laws that govern nature because “much of what I understand our people knew was very scientific. They just described it in a different way” (PSE9-57).

Participants also discussed threats to the traditional way of life and the decline of traditional activities. The lack of regular opportunities to experience traditional activities and consume traditional foods was seen by participants as having a direct effect on youth values. One participant spoke of a lack of urgency: “There’s less and less of a romance with going out on the land. It’s almost like it’s ‘yeah okay I gotta go’ kind of thing” (PSE6-57). One threat mentioned by a participant is the influence of technology: “When you talk about traditional livelihood, we don’t see that among the younger generations because of influences of TV... influences of technology. So, they’re not interested in traditional livelihood anymore, they’re interested in whatever they see on TV” (PSE8-137). Another threat mentioned by a participant is urban life: “There’s a disconnection that happens with people I think just by the nature of living in the city” (PSE9-69). Another participant recalled what used to be a regular occurrence:

My older brothers and sisters tell me because they remember my dad going into the forest... he’d be gone for 2 or 3 days... and end of the week he’s going to be coming back with some moose meat or deer meat. I remember they’re happy when they see him with food supply for next couple weeks... but for me that wasn’t part of my experience. (PSE8-292)

Other participants spoke of the loss of Indigenous languages as a threat to traditional lifestyles. One explained, “If we don’t revive the language then we’re going to be losing that worldview... and of course our perspective on the environment” (PSE8-36). Some institutions

offer language programming and others rely on outside organizations to develop language revitalization plans. Another participant said, “We have a serious issue with languages” (PSE7-26). The participant recognized that many Indigenous languages in the region were at risk of being lost because of the prevalence of English. Despite this knowledge, the participant acknowledged the primary focus in that PSE setting was on career training but was not connected to land use, traditional livelihoods, or Indigenous languages. Another participant said even the type of marginal lands allocated to some Indigenous peoples makes it very difficult “to be able to address what sustainability is” after several generations of “experiencing this kind of extremely impoverished environment” (PSE4-65).

In addition to threats from technology, urbanization, and declining language use, one participant suggested that international environmental laws and political and media influences have affected traditional lifestyles. This participant indicated that the Inuit hunting lifestyle has become “very criminalized as far as various levels of international conventions and laws are concerned” (PSE4-101). International prohibitions, the effects of celebrity activists, and other lobby groups were seen as devastating to “sustainable ways of being” for cultural practitioners (PSE4-57). This participant felt in cases where barriers were seen as political, continuing the processes of colonization, engagement in international fora was seen as necessary to protecting existing Indigenous rights and “to actually address this rather than clash” (PSE4-108).

While all participants in this study indicated a strong understanding of the relationship between Indigenous knowledges and environmental health, most felt they lack of expertise in how their advocacy for inclusion of Indigenous knowledges in their setting might extend beyond cultural identity to formal environmental decision making processes. One participant voiced this concern about relying on PSE institutions to achieve an elevated role for Indigenous knowledges:

I don't know that there is any college or university that is there in terms of their Aboriginal partnerships because of the very fact that colleges and universities are based on a very culturally imperialistic ideology in terms of decision-making on environmental conservation or sustainability. (PSE5-241)

Some of the challenges and variations participants identified in interviews involve the extent of Aboriginal self-governance within the territory and subsequent influence on post-secondary education policies and practices; the willingness of faculty members to engage in community-based partnerships; and the availability of financial resources for institutional research and

programming. For example, in institutions where Indigenous knowledges and practices are taken up in curriculum, research, and community outreach, continued investment in these activities by the institution is already viewed by participants as precarious and often dependent on pressures and supports from local communities. In other examples, some participants observed that local Aboriginal communities have varying degrees of available land base and control over land and water usage and others have limitations to increasing teaching and learning in natural settings because of the urban locations of their PSE institution.

Finding 5: Indigenous holistic learning includes social, economic, and environmental aspects of sustainability

Finding 5 is presented with sub-themes of social, economic, and environmental considerations, and sustainability networking. Indigenous peoples are actively engaging in PSE as an effort to overcome historic trauma associated with colonization, according to participants. Individuals' success in PSE can contribute to economic stabilization for families, advance advocacy for practices and policies inclusive of holistic Indigenous knowledges within institutions, and influence power imbalances within society for a sustainable future. The social, economic, and environmental elements of sustainability found within holistic Indigenous learning processes affect all Indigenous communities and can be strengthened by inclusion of local Indigenous knowledges as well as interaction with other Indigenous communities.

This study asked participants about local Indigenous perspectives of sustainability, but participants often spoke inclusively of others beyond their particular setting. One participant pointed out that Indigenous worldviews are complex and involve understanding interconnectedness in the same way that sustainability is a circular process and a collective issue. That is, "We need to get away from that view of sustainability being the environmentalist" (PSE7-71). Personal and collective responsibility for sustainability is not meant to be limited to one group of people or another. Instead, participants described Indigenous knowledges as relational, participatory, and inclusive, reflecting a sacred view of the inseparability of land and all people.

Social considerations. Learning about sustainability through Indigenous knowledges requires a holistic process involving Indigenous communities in reconciliation and Indigenous efforts. This process is essentially social. One participant explained that the history of residential schools and assimilation silenced Indigenous people for a long time. Now

there is a need to bring out the real critical topics on colonization, sovereignty, rights, land rights and access, treaties, and have a dialogue about these topics. Another participant said, “I think what’s really important as part of any sort of talks around sustainability is that we often forget how much healing work that we have yet to do” (PSE5-119). One participant said people who do not understand their own connections to the natural world would not value it or act sustainably.

Another said PSE institutions have to recognize Indigenous ways of thinking and researching as an obligation in their efforts at reconciliation. Teachers and institutions need to model respect for cultural and sustainable worldviews, culture, language, and histories to foster the development of an environmental relational consciousness in young people. One participant said sustainability begins with the self, so, “If we can’t care for ourselves as an individual, our own bodies, how are we to care for the land?” (PSE5-44). There is a need to teach about sustainability from K-12 so that learners will have a better understanding and then become leaders. Leaders can then develop the policies and programs addressing sustainability from the perspective of Indigenous communities.

Physical space, as well as content, was seen to be an important element in bringing Indigenous knowledges into PSE institutions. One participant indicated that there is a need for equal space for Indigenous ways of knowing in education because different knowledge systems have every right to exist and to be part of the universities that Indigenous people attend. Another explained the importance of space this way:

Those spaces and places... need to be developed, defined, and delivered by us, for us, in such a way that we’re not going to be delegated to the back of the room or to a room all by itself over there and no attention paid to it. (PSE5-119)

Participants spoke positively about different types of knowledge systems, but all described their own primary focus was on integrating local Indigenous knowledge within their particular setting.

Some participants felt the development of Indigenous sustainability policies and practices depends on leadership to create collegial processes (rather than imposing them from the top down). Such processes can help initiate training programs so that individuals can increase their knowledge. Some mentioned that policies imposed from the top are at risk of not being put into practice. Others said institutions need Indigenous leadership, participation, learners, content, and for others to know Indigenous histories. One participant wondered whether Indigenous

knowledge keepers are being included in meetings or groups designing and developing policies. These knowledge keepers need to be involved in the development of policies to ensure they reflect Indigenous knowledges.

Economic considerations. Participants acknowledged the importance of economic issues within sustainability considerations. Some participants acknowledged the difficulty of connecting traditional knowledge to industrial activity such as oil and gas development, forestry, or other natural resource extraction. One participant said that, even while holding traditional views about the environment, it is important to recognize that “people still need to work and feed their families” (PSE5-74). Several participants indicated some PSE institutions are very entrenched in culturally imperialistic ideology, and so the concept of sustainability is very different in the northern and southern parts of Canada and among Indigenous and non-Indigenous peoples. Another participant said the fragmented approach to training and skill development “...never really meaningfully introduced the Inuit skills and knowledge directly as these relate to sustainability into these institutions” (PSE4-88). Another participant suggested that PSE institutions need to develop a full program on sustainability, so its foundations, theories, and active work are supported over time and not just left to disappear as sometimes happens with other courses. For some participants, the integration of Indigenous knowledges within PSE institutions requires both a concerted effort and a balanced approach that does not ignore economic considerations.

Environmental considerations. Participants felt Indigenous knowledges and the languages of Indigenous communities need to be part of what is taught in schools because they reflect sustainable ways of thinking and being, as part of cultural identity. Based on this premise, one participant indicated that the PSE institution in this individual’s particular setting is structured so that the community is part of the organization and Indigenous knowledges are interspersed throughout the organization. Another indicated that there is a need to change the mindset within institutions and increase knowledge of Indigenous peoples throughout the institution. One participant noted there is a growing understanding in PSE about the importance of sustainability, with different programs addressing it in ways appropriate to their particular setting. Another participant called for “...a specific policy in place for sustainability based on our cultural foundation...based on our knowledge system” (PSE8-125). Working collaboratively on a common issue is a starting point. One participant said, “I think an easy one to start with is

sustainability” (PSE2-51).

Sustainability networking. Participants believed there would be benefits to collaborating on Indigenous knowledges and sustainability issues through an Indigenous network. One said, “Instead of trying to reinvent the wheel, let’s try to find out what’s actually going on. I think that information sharing would just be wonderful.” (PSE3-270). Technology was seen as an important vehicle for information sharing, with a participant pointing out, “You don’t have to necessarily physically be in the same space anymore to network” (PSE9-73). Another participant indicated learning among Indigenous groups in various geographic locations can “build bonds and bridges,” while acknowledging “similarities and differences” in traditional activities (PSE6-368). A participant felt research and projects on local issues, such as food sovereignty, could be disseminated locally and “nationally or internationally, if we were involved with a network” (PSE3-138). Also, learning about new initiatives, such as “Aboriginal cooperatives” (PSE3-269) could provide valuable insights.

One participant said, “If the network believes that it’s important for the public to be aware of Indigenous worldviews on the environment, then we develop an education program for the public” (PSE8-119). Another participant suggested sharing was a key premise:

I think that universities have to share. You have to share what you did, what worked, what your plans are, what’s our way forward, what do we want to do moving ahead because maybe someone else wants to do the exact same thing and we can put our resources together. Instead of me developing a course and you developing the same course, well maybe I develop the first term of the course and you develop the second term of the course. Then we share it. You know, just simple things like that...I mean let’s face it; good ideas come when people talk. (PSE2-39)

Other participants commented that there are networks in fields of study such as Aboriginal languages that are already connected, but members of such networks may not be thinking about their work in terms of sustainability programming.

One participant suggested using existing modalities of interactions such as the Canada Research Chairs or the Canadian Association for the Study of Indigenous Education (CASIE) in order to maximize involvement and communication. Identifying existing individuals and networks would require some effort to “map that out” (PSE1-69). Another participant maintained, “regionally and nationally we’re so spread apart the right hand doesn’t often know

what the left hand is doing, but with technology you can bridge a lot of that” (PSE6-199).

Participants suggested that a national network could potentially be very useful for individuals in Aboriginal PSE institutions across Canada for collaborating on issues of sustainability as they relate to Indigenous knowledges in higher education. One participant said the formation of such a network is timely for several reasons:

Our Indigenous knowledge systems are filtered through, and watered down, in a lot of sectors in society. I think if we were to come together to strike a national Indigenous environmental network, we could be doing a lot of work that could reinforce, and definitely speak to, some of the collective and individual activities that could be done in different sectors, not only in education but in health, in justice, in education, and different sectors. So, I think there is collective responsibility...and...individuals’ roles and responsibilities that are attached to taking care of the environment. (PSE10-15)

In terms of involvement, one participant maintained, “We could be participating in developing this network” (PSE6-363). Another participant argued that the development of a framework required ensuring Indigenous “guiding principles” are built into it, to avoid defaulting to a process of creating policies, edicts, and directives without “talking to people” (PSE1-55).

Another participant claimed that such a network did not have to be an expensive venture and suggested, even though it could be a lot of work, to garner sufficient support, the leader of the network “really needs to be an Aboriginal person” (PSE2-179). Another participant observed, “We all have gifts...every community member has a gift. We have to use those gifts to reach common community goals and objectives but we have to pull together. We can’t fight one another” (PSE8-187).

Participants indicated that a network could serve multiple purposes. One participant said two important things came to mind about involvement in an Indigenous sustainability network: First, “It provides an opportunity for [individuals and groups] to share their knowledge, their understandings, what matters to them”; second, it creates “another forum for these communities to interact with one another” (PSE2-143). Several participants described the potential for positive interaction among people who care about environmental issues. One participant maintained, “When people come together, like-minded people, they want to achieve a certain thing and they want to be able to make change, transformative change within society, by coming together. It could be different people that are doing different things” (PSE10-100).

Participants claimed that networking across Canada or internationally on issues related to sustainability could benefit them in their work through increased knowledge and information exchange. One participant expressed it this way:

I want to know what's happening across the country...down States...other countries where they have Indigenous peoples. So that network will help us to become aware of what initiatives are in place, what has worked, what hasn't worked, and so on. It also helps you to connect with people, with like-minded people who are so concerned with what's happening with the environment. (PSE8-90)

Participants saw connectivity among individuals and institutions as a way of sharing information to problem-solve institutional challenges as well as environmental challenges.

When learning about differing paradigms, such as science and Indigenous knowledges, one participant emphasized the importance of having a safe space for conversations:

I don't think Indigenous people have done a great job of creating that safe space for people to ask those questions. We often make assumptions that people know things about us, and they don't. If we have that networking available, it will create a safe space for people to have these conversations and not feel like they're going to break protocol or damage relationships or anything like that. That networking can do that. (PSE7-42)

Participants recognized that networks can provide security that other forums perhaps cannot, and they pointed out that this security is needed for individuals and groups to build their capacity.

Participants also suggested that a network could help government officials to understand and apply Indigenous worldviews regarding environmental issues:

If you have both Native and non-Native members in the network...if they're in departments, federal departments, provincial departments, or in the government, then this is a way of lobbying to have a strong, effective policy on the environment. So, it gives us a chance to educate those ones who are curious, and then they want to ensure the policy that they adopt within the particular province is going to be reflecting Indigenous worldviews as well. (PSE8-119)

The key, I think, in order for it to make any effect on decision-making, would be able to show that it can be valuable to have those conversations and this is a network that can really be helpful for those policy makers. (PSE7-149)

Another participant claimed, “You have to acknowledge that if you start small then things will grow later on... You see some success and as soon as other people see those successes then they want to be a part of it. That network will expand” (PSE8-101). Another participant said there have to be opportunities to “ensure that people can develop policy and enact policies but people need to know what are the suggested action plans” (PSE1-53).

Barriers to sustainability networking were seen by one participant as potentially stemming from “people who don't believe in it or the naysayers” (PSE6-114). That participant also felt, “Those barriers will fall apart or diminish or be overcome through implementation” (PSE6-114) of such a network as it strengthened. Another participant pointed out some networks “only seem to exist when they're resourced and funded,” so longevity might be accommodated through academic associations (PSE1-52). Another participant expressed caution in taking a national approach unless it provided a framework for “funding models that could be used locally or regionally” and consideration for what local communities need “in terms of being able to develop plans that are reflective of their own knowledges, of their own practices, and understandings” (PSE5-34).

The diversity of Indigenous peoples might also present challenges in addressing environment and sustainability issues through networking. As one participant expressed it:

I think the biggest challenge is going to be bringing together First Nations groups, the Métis, the Inuit, and the non-Status to have that kind of discussion because each will have their own stance and experience on the issue. (PSE1-104)

Another barrier identified stemmed from potential conflict among individuals. One participant said, “They may agree on the objective but then they may disagree on the best way of achieving that objective” so this is why “Elders remind us... we have to pull together... we can accomplish quite a few objectives but we have to agree” (PSE8-156).

Summary

Details of the five key findings overviewed in this chapter show how participants viewed connections between Indigenous knowledges and sustainability, and in relation to PSE places of learning. Spirituality, a key premise of Indigenous worldviews, influences how sustainability is understood as a function of Indigenous tradition, and in relation to education. Inclusion of Indigenous knowledges within curriculum, research, operations, governance, and outreach processes of PSE institutions is generally supported, but should be driven by national and

international standards supporting Indigenous self-determination. Indigenous knowledges and sustainability is purposeful in that it connects to conservation and environmental decision-making outside PSE institutions. Social, economic, and environmental aspects of sustainability are found within Indigenous knowledges, but Indigenous programs in PSE institutions lack a network through which Indigenous people may build capacity for engagement in knowledge exchange and knowledge mobilization. In the following chapter, I discuss the findings in relation to the literature, describe my conclusions, indicate the practice and policy implications for PSE institutions, and make suggestions for future research.

CHAPTER FIVE

DISCUSSION, CONCLUSIONS, AND IMPLICATIONS

This research was initiated to identify potential links between sustainability and Indigenous knowledges by exploring the overarching research question of how faculty and administrators working in Indigenous PSE programs understand the concept, practices, and policies of sustainability in relation to traditional knowledge in their setting. Although there is literature on western notions of sustainability and literature on Indigenous knowledges, there is very little written about the two concepts in relation to each other and in the context of PSE institutions. The interview questions and survey resulted in five major findings, which were summarized in Chapter Four. The five findings are discussed in this Chapter in terms of their potential consequences and links to the three secondary research questions, resulting in the following three discussion categories: 1) Indigenous Cultural Identity, 2) Integrating Indigenous Knowledges for Sustainability, and 3) Expanding Sustainability Practices and Policies. These three categories are discussed in relation to the research questions, findings, and literature. Conclusions, implications for PSE institutions, and recommendations for future research follow the discussion categories.

Discussion Category 1: Indigenous Cultural Identity

With the first research question, I sought to discover philosophical principles concerning the environment and interconnectedness in relation to sustainability in various Indigenous post-secondary education settings. Findings 1 and 2 identified that spiritual beliefs orienting Indigenous knowledge systems form the basis of how sustainability is understood, including in Indigenous education settings. These findings are significant because they reflect an Indigenous ontology concerning sustainability that is expressed through cultures, languages, and identities. That is, through learning Indigenous knowledges, one creates an Indigenous interpretation of sustainability. With deeper understanding of Indigenous knowledges, gained through culture and language, there can be a deeper understanding of sustainability.

Goulet and Goulet (2014) argue that *Indigenous education* restores cultural identity through appropriate epistemological and pedagogical approaches, that *decolonizing education* addresses power relations, and that *Indigenizing education* usually refers to the integration of Indigenous knowledges in existing education processes (pp. 10-11). All three terms are relevant in this discussion because the principles discussed below illustrate that the primary purpose of

having Indigenous knowledges within PSE institutions is to develop Indigenous learners' cultural identity through Indigenous, decolonizing, and Indigenized education. Expansion of respect, understanding, and use of other ways of knowing that are on the periphery of our comfort zone are encouraged through “epistemological stretching” (Barrett, Harmin, Maracle, & Thomson, 2015, p. 18).

The following seven principles are theorized from the study findings as key elements of Indigenous sustainability.

Principle of spiritual beliefs. Spirituality, whether in reference to Creation by way of a Creator, animate Earth, or ancestral obligations, is a foundational factor in cultural identity. Integrating Indigenous spiritual beliefs into PSE must respect the comfort level of individuals to participate in, or adopt, unfamiliar belief systems. Individuals should be able to develop at their own pace, and cultural camps, land-based courses, and a variety of activities taught by Elders or other cultural knowledge holders can ensure that this happens. Cultural activities may vary from place to place, but their purpose is for participants to gain first-hand experience with some Indigenous knowledges. Experiential learning can be enlightening for individuals participating in cultural events as well as those observing. Spiritual ceremonies, such as sweat lodges, can bring personal transformation through affirmation of one's importance within Creation in spite of uncertainties, trauma, or other negative life experiences. This transformation is a process of ceremonial rebirth and new beginnings.

Belief systems, central to culture and language, were torn away from Indigenous peoples through forced assertion of colonial ideology as described in RCAP, the TRC, and other such research (RCAP, 1996a; TRC, 2015). The development of Indigenous PSE programs in Canada was an effort to create spaces of success where Indigenous learners could be connected to their cultural identity and gain professional career training. Indigenous communities that initiated Indigenous education programs maintained it was important to include Indigenous knowledges to help develop identity, protect intergenerational transmission of knowledge, and enable Indigenous learners to participate in colonial society without having to relinquish their own Indigenous worldviews. Indigenous peoples' responsiveness to environmental issues or sustainability is largely driven by core spiritual beliefs (Henderson, 2008; Michell, 2006; Tester & Irniq, 2008; Wilson, 2009). The various forms of educational programming, whether they be Indigenous education, decolonizing education, or Indigenizing education, are intended to convey

a worldview that extends, for the purpose of this study, to the relationship between environmental sustainability and Indigenous knowledges.

Principle of holistic thinking. The complexity of holistic thinking within Indigenous cultures means discussion about the physical environment cannot be separated from beliefs and value systems. Living and practicing mental, physical, spiritual, and emotional aspects of Indigenous knowledges reinforce and sustain cultures so they can be passed on intergenerationally. Knowledge, action, beliefs, and values are interconnected. This interconnection suggests that holistic thinking, as part of cultural identity, is weakened or fractured if separated during formal education in schools. Marie Battiste, Indigenous educator and author, elaborates on this idea:

Since Indigenous peoples have developed a physical and spiritual unity with their total environment and simultaneously with their cosmos, they have an obligation to act responsibly and ethically toward their environment and all elements in it. Traditional knowledge embodies those principles and practices which are enacted holistically in their ways of knowing and doing, in how they acquire their food and sustenance on the earth, in their rituals and ceremonies, in their beliefs and values, and in their language. (Battiste, 2013, p. 122)

The complex connections described by Battiste (2013) capture the intellectual ways of knowing, the physical actions of behaviour, the spiritual unity, and ethical elements that comprise Indigenous value systems. The environment, for example, has intellectual, physical, spiritual, and emotional aspects that are understood through the Indigenous knowledges of particular cultures. The environment and sustainability are interconnected within Indigenous social structures, economies, education, health, and other facets of self-determination of individuals and communities. Scholars have pointed out that because of these interconnections and because Indigenous knowledges reflect a way of life, when discussing them, it can be difficult to extract single topics, such as sustainability (Nadasdy, 2003).

Principle of language. Indigenous languages play a significant role in gaining a deeper understanding of sustainability as part of Indigenous knowledges because language conveys a worldview in its expression of concepts, sounds, and structures. Participants who were not fluent in their language were actively working to learn key words and phrases. Cajete (1999) describes learning Indigenous science as a language of its own, suggesting, “to begin to learn science as a

process of communication” learners “must be exposed to an environment which is acquisition-rich” (p. 143). Since immersion is recognized as the best method to successfully acquire language (Fortune, 2012), land-based language programming would seem to be pedagogically critical since it links land, language, and cultural knowledge. Globally, traditional Indigenous territories cover less than a quarter of Earth’s land but hold approximately 80% of its remaining biodiversity (Sobrevila, 2008, p. xii). The UN uses Indigenous languages as an indicator of environmental health:

Over the past few decades, it has become clear that biodiversity and cultural diversity (including linguistic diversity) are inextricably interrelated and interdependent, and that the permanence of loss of diversity in one realm closely tracks the permanence or loss of diversity in the other realm. (UNEP-WCMC, 2013)

Indigenous language losses mean the loss of worldviews built on thousands of years of accumulated knowledge and experience that has contributed to sustaining healthy ecological systems.

Principle of sustainability. Sustainability is a principle of Indigenous knowledges embedded in the philosophies, languages, and practices of Indigenous traditions; it is part of culture. Active and passive learning contribute to enhanced understanding of the connections between Indigenous knowledges and sustainability of life on Earth. As individuals’ understanding of Indigenous knowledges develops, they will be better equipped to access the deep transformative thinking sought in sustainability (Beckford, Jacobs, Williams, & Nahdee, 2010). As Battiste (2013) argues, “Education, therefore, needs to encourage the development and survival of that knowledge within educational sites as sources of knowledge for environmental sustainability” (p. 171). Learning and building on ancestral knowledge is an Indigenous responsibility for being accountable to the next seven generations. Similarly, the Bruntland definition of sustainability calls for accountability to future generations (WCED, 1987).

Principle of learning from nature. Participation in cultural activities is essential for deeper learning through observation and experience. Effective teaching that includes Indigenous knowledges involves practical application. The interconnectedness of Indigenous knowledges, land, and language is more effectively communicated by teachers and internalized by learners through the sensory experiences of being in nature than by learning passively in classrooms.

Acknowledging that fewer Indigenous people now have access to land-based learning, Cajete (1994) argues, “Experience with the land was the cornerstone of traditional education” as both the “medium and the message” and must become “one of the collective priorities of modern Indian education” (p. 86). The medium and the message of the natural world are the classroom and curriculum. They represent traditional ontologies and epistemologies of Indigenous peoples by way of the intellectual, physical, spiritual, and affective domains of knowledge considered in holistic learning.

Principle of respect and responsibility. Indigenous worldviews, epistemologies, methodologies, and cultural practices contain principles of Indigenous knowledges, such as respect and responsibility, which guide personal action, intergenerational thinking, and accountability. Shifting thought processes from personal gain to collective responsibility is a crucial part of Indigenous knowledge acquisition and leads to transformation in thinking and action. Cultural communities often hold Elders, Indigenous language speakers, and other knowledge holders in high regard because they possess skills and insights about local traditions that others may not. These skills and insights are considered gifts from the Creator, or ancestors, intended for sharing within and across generations because they contribute to harmonious relationships (Berkes, 2012; Stonechild, 2016; Tester & Irniq, 2008).

Principle of willing participation. Traditionally, learners have sought out cultural knowledge holders, observed local protocols, and spent time building relationships while going through a learning process. Formal education sometimes introduces learners to Elders’ teachings and other forms of Indigenous knowledge arranged by instructors that are part of coursework. Introduction of Indigenous knowledges within formal education brings about a conundrum of how to move beyond education as “the handmaiden of assimilation” (Deloria & Wildcat, 2001, p. 139) and expose learners to Indigenous knowledges and history, including spiritual belief systems, while not forcing it on them. Cote-Meek (2014) argues that taking up issues of on-going colonization, such as violence, ethnostress, and historical trauma can re-traumatize Indigenous learners. Her research showed that PSE students value a focus on personal development and access to cultural supports, such as ceremonies, medicines, and Elders. Other strategies suggested by Cote-Meek (2014) for Indigenous learners to navigate colonized classrooms include being briefed on difficult issues, being acknowledged and validated, being able to debrief after discussions, and having safe spaces always available (p. 144). As Lerias and

Byrne (2003) point out, the ripple effect of trauma can also adversely affect others not directly involved in the original events. Having safe spaces in PSEs and acknowledging feelings and experiences can help all those feeling the impact of colonization, stress, and trauma.

Contextualizing the principles. The principles are an effort to capture what appeared to be important to all participants concerning the inclusion of Indigenous knowledges in PSE institutions. Establishing a baseline of principles will help understand the challenges discussed later. For example, in Finding 1, participants indicated that the financial stability of programming was a key challenge they faced but did not cite resistance to Indigenous spirituality as a factor in financial uncertainty. This issue is taken up further in Discussion Category 2.

Participants highlighted the importance of avoiding ‘pan-Aboriginal’ approaches to teaching and learning, instead advising that local traditional knowledge holders be engaged to ensure the knowledge is accurate and appropriate. The seven principles described are intended to assist in understanding the relationship between Indigenous knowledges and sustainability, with the recognition that various local traditional knowledge holders will be able to provide practical and theoretical examples of what these concepts mean to local Indigenous communities.

Additional principles could have been articulated if the findings had been expanded. For example, the importance of future generations to Indigenous knowledges and decisions about the choices we make now about how we live might have been a principle of its own and discussed in more detail. Future research might explore connections between international definitions of sustainability and traditional Indigenous teachings about past, present, and future generations. Other research could focus on multiple themes found in First Nations, Métis, and Inuit Holistic Lifelong Learning Models.

Learning from local traditional knowledge holders can help avoid romanticizing Indigenous knowledges through discussion of their experiences. This discussion might include ideals vs. reality, the challenges of differing perspectives and worldviews, and the survival of Indigenous knowledges within a colonial society. The Indigenous perspective on multiculturalism by St. Denis (2011) helps explain how neo-colonial policy eliminates educational spaces for learning about the first peoples of Canada. Under the guise of advocacy for neutral space in education, multiculturalism creates a superficial view of cultures, focusing only on certain positive elements and minimizing or avoiding discussion of real lived experiences of cultural communities. While the multicultural approach might seem safe to some

educators, it creates unsafe spaces for Indigenous learners whose cultural identity is marginalized in their own homeland and within society.

Summary. The seven principles expressed as outcomes of Findings 1 and 2 reflect that cultural spiritual beliefs provide the orientation to how sustainability is understood and practiced as a function of tradition. The principles highlighted include the following: 1) principle of spiritual beliefs, 2) principle of holistic thinking, 3) principle of language, 4) principle of sustainability, 5) principle of learning from nature, 6) principle of respect and responsibility, and 7) principle of willing participation. Additional principles could be added by expanding the research and analysis. Ensuring local Indigenous knowledge holders are involved in PSE institutions can help avoid romanticizing and taking pan-Aboriginal approaches to Indigenous knowledges.

Discussion Category 2: Integrating Indigenous Knowledges for Sustainability

The second research question sought to discover how curriculum, research, facility operations, institutional governance processes, and community outreach are linked to sustainability through practice and policy. Finding 3 indicates that in each of these areas, integrating Indigenous knowledges for sustainability should be carried out in support of Indigenous cultural identity. This finding is significant because participants interpreted sustainability as part of the Indigenous knowledge and identity of cultural communities, showing a direct relationship between sustainability and Indigenization within PSE institutions. The relationship between western and Indigenous concepts of sustainability could be further explored and strengthened as PSE institutions throughout Canada work to Indigenize their campuses and also advance other sustainability programming.

Curriculum. Self-government agreements and supports for Indigenous self-determination were seen to be important in ensuring Indigenous knowledges were not marginalized within institutions. All participants were actively contributing Indigenous knowledges within curriculum established to facilitate professional careers for learners, but the tone of many interviews indicated there was a constant need to justify it, even though it has been validated in research and law. Social, economic, and environmental elements of sustainability mean making curriculum relevant through links to contemporary realities as part of culture and suggests the need to integrate content on political, social, and historical realities of Indigenous peoples.

In its world report on education for sustainable development, UNESCO (2017) acknowledges, “Since indigenous knowledge systems are still only loosely integrated into most curriculum content, the relevance of education as a mechanism for sustainable development still faces serious problems” (UNESCO, 2017, p. 66). Nevertheless, Canada has an opportunity to build on achievements in Indigenous education to transfer the means of addressing critical issues of sustainability throughout PSE institutions. If these institutions are to Indigenize their curriculum, they need to address issues of authority in its development, find ways of attracting Indigenous adult learners to reconnect with their languages, ensure pre-service teachers are equipped to address Indigenous knowledges, and develop the policies needed to enable Indigenous knowledge holders to become part of campuses (Timmons & Stoicheff, 2016). Even so, the connection between Indigenous knowledges and sustainability has not been clearly established by PSE institutions.

There are several sustainability declarations and statements available for use by higher education institutions around the world, such as the Talloires Declaration, Agenda 21, World Declaration on Higher Education, and the Declaration on the Responsibility of Higher Education. At least 26 such documents were created between 1972 and 2010 (Grindsted & Holm, 2012). Some similarities among them include the following: the moral obligations of universities to teach, do research, and operate in ways that promote sustainability; the consistency of themes with international declarations; and the notion that sustainability problems are viewed as being created outside institutions while the solutions are generated within institutions, thereby requiring adequate funding to work on the issues (pp. 33-39). Declarations and statements create important PSE institutional commitments to sustainability that then need to be actualized in whole institutions, including within curriculum.

Additional themes identified in sustainability declarations of the past 20 years include the requirement for universities to contribute to local, regional, and global sustainability; the need for public outreach; the expectation for universities to be models in their own communities; the role of physical operations within institutions; the need to foster ecological literacy; the development of interdisciplinary curriculum; the need for research related to sustainability; the establishment of multi-sectoral partnerships; and the expectation that universities will cooperate with each other (Wright, 2004). Many of these themes are also relevant to how PSE institutions approach the inclusion of Indigenous knowledges.

Although goals of sustainability and goals of Indigenous peoples are often very similar in that both seek social, economic, and environmental stability for the future, sustainability declarations and themes lack explicit connections to Indigenous peoples. In response to decades of calls by First Nations, Inuit, and Métis peoples to address inequities in educational processes, Canada's provincial and territorial governments have varying degrees of educational policy supporting Indigenous knowledges within K-12 education. Also underway is a national effort to 'Indigenize' post-secondary education institutions by developing policies that attract and retain Indigenous learners. Examples of documents that support this endeavour are *Principles on Indigenous Education* (Universities Canada, 2015) and the *Indigenous Education Protocol* (CICan, 2013). Linking sustainability issues and Indigenous education could lead to greater efficacy for both since they share many common concerns.

An important outcome of this study was the representation of 'kindness' found in the content and manner of advice offered by participants. One of the principles of Indigenous knowledges is respect and relationship building, which requires the ability to discuss curriculum development and content in a positive way. Decolonizing processes that address imbalanced power relations between Indigenous and non-Indigenous people can provoke strong emotional responses, including within PSE institutions, so the development of good relationships must not only exist in theory but also be exemplified by a positive exchange of knowledge, collaboration, and action. This does not mean avoiding the hard issues but addressing them in a way that promotes learning, justice, and equity (St. Denis, 2010; UNPFII, 2017).

Research. Participants maintained that Aboriginal rights mean that Indigenous communities should be full partners in creating and conducting research that involves them, their territories, or their knowledges. Indigenous participation in and oversight of research, including legal and moral imperatives for cultural protection, are often hampered by financial constraints, too few researchers, or institutional personnel who are already working at full capacity in their daily work. Indigenous communities want to develop and lead their own research on issues of importance to them.

Research ethics involving Indigenous communities have improved but still appear to be largely designed to assist non-Indigenous researchers (CIHR, NSERC, & SSHRC, 2014; UN, 2004). The survey for this study indicated that participants believe most research involving Indigenous knowledges is in the social sciences. Lack of information about other types of

scientific research involving Indigenous knowledges might indicate a gap in knowledge mobilization. Across Canada, there are collaborations involving Indigenous knowledges and science, but these may not be well known outside project areas. For example, SmartICE is a climate change initiative that links Inuit traditional knowledge with technological data for monitoring sea ice in Nunatsiavut, thus contributing to Inuit safety and food security (Bell, 2018). Sharing environmental expertise through partnerships can benefit all involved partners, providing valuable models and insights that can be used by others. Unfortunately, decision-making concerning environmental issues is often adversarial, requiring lengthy political and legal interventions. Participants in this study called for PSE institutions to be proactive in respecting Indigenous rights in all aspects of operations, including research.

Indigenous rights are relevant in PSE research because institutions are expected to advance the development of society through leadership in knowledge and skills that meet the needs of its citizens. This development requires attention to legal and political landscapes. In February 2018, Canada's Prime Minister announced the federal government would develop a rights-based approach to Indigenous affairs. This approach will involve creating the *Recognition and Implementation of Indigenous Rights Framework* in partnership with First Nations, Métis, and Inuit to accommodate stronger Indigenous rights and control over their own lives (Trudeau, 2018). Although the extent and value of the framework is yet to be determined, the announcement initially indicated inclusion of issues related to housing, drinking water, and youth suicide. However, considering the holistic worldviews of Indigenous peoples and the broad spectrum of Indigenous rights expressed in Canadian and international law, it is conceivable that the framework may affect current work on a variety of social, economic, and environmental issues.

In the February 14 announcement, Prime Minister Trudeau referred to the *Constitution Act, 1982* in his acknowledgement: "While Section 35 recognizes and affirms Aboriginal and treaty rights, those rights have not been implemented by our governments" (Trudeau, 2018). He went on to say that, "instead of outright recognizing and affirming Indigenous rights – as we promised we would – Indigenous Peoples were forced to prove, time and time again, through costly and drawn-out court challenges, that their rights existed, must be recognized and implemented" (Trudeau, 2018). The Prime Minister's statements to Parliament underscore the need to move away from adversarial processes. In Canada, Indigenous peoples have been successful over and

over again in defending their legal rights, including those that serve to protect the environment from exploitation and irreversible damage.

Two weeks after the announcement of the framework, the federal government announced a new conservation plan that will see Indigenous peoples take on new responsibilities for protecting large tracts of Canadian wilderness. The government said this about the responsibility:

[It] falls naturally to first peoples whose traditional territory encompasses most of the remaining undeveloped area of Canada, and who have both the traditional knowledge required to do the work and a personal stake in ensuring that the conservation projects are a success. (Galloway, 2018)

With or without the new government initiatives, there is a critical need for Indigenous peoples to increase their involvement and leadership in research about the environment and sustainability. Even though Indigenous communities have been active in environmental advocacy and initiatives, there is still a serious gap linking these activities to Canadian PSE institutions. There are several international instruments that should influence PSE research in Indigenous conservation processes.

At least 25 international instruments connect Indigenous rights with conservation standards. These include, among others, the *Universal Declaration on Human Rights*; the *International Covenant on Civil and Political Rights*; the *Convention on Biological Diversity*; and the *Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters* (Jonas, Makagon, & Roe, 2014, p. 12). These instruments became necessary because of conservation-related conflicts and human rights abuses, such as “denial of free, prior and informed consent; lack of engagement with indigenous institutions; eviction; unjust resettlement; destruction of property and livelihoods; denial of access and use of natural resources; intimidation and physical harm; and exploitative employment” (p. 10). Indigenous peoples have also put forward their own statements in anticipation of future work on sustainability.

The *Alta Outcome Document* was developed collaboratively by hundreds of Indigenous delegates at a UN meeting in Alta, Norway in 2013 (UN, 2013a). The Alta document was created prior to the 2030 Agenda on Sustainable Development and expressed key issues concerning Indigenous peoples. The four major themes identified in the document were as

follows: 1) Indigenous Peoples' lands, territories, resources, oceans and waters; 2) UN system action for the implementation of the rights of Indigenous Peoples; 3) Implementation of the Rights of Indigenous Peoples; and 4) Indigenous Peoples' priorities for development with free, prior and informed consent (p.3-8). When Indigenous peoples produce their own positions, such as within research, there is a greater freedom in how they can portray themselves and their connections to the environment.

Facility operations. The participants' holistic interpretation of facility operations was interesting because it reflects the holistic thinking inherent in Indigenous knowledges. It is not likely that sustainability offices are working on issues of sovereignty or land claims to support their work, yet participants raised these issues as important factors when discussing facility operations. The functionality of buildings and grounds was not discussed specifically by participants, and most did not have authority for decision-making in this regard. Instead, participants talked about the importance of creating or accessing the spaces where Indigenous knowledges could be conveyed in an appropriate setting. This discussion responds to the way participants interpreted operations, rather than limiting it to how buildings and grounds currently operate.

For some participants, adaptation to life within an urban, or larger institutional, setting was inescapable in order to meet the needs of their students. Self-determination in planning in those settings still emerged as an important element of decision-making on issues related to the use of cultural knowledge. The inclusion of various forms of Indigenous advisory councils or community liaisons suggested a recognition by PSE institutions that they are open to adapting and broadening existing operational programming based on Indigenous community advice. Adaptations might include access to land-based programming, cultural camps, and other spaces appropriate to the transmission of Indigenous knowledges that can accommodate place-based education (Michell, Vizina, Augustus, & Sawyer, 2008; Wildcat, McDonald, Irlbacher-Fox, & Coulthard, 2014).

Indigenous education programs were created to affirm cultural identity while providing professional training. The successes of these programs have led to recognition by PSE institutions of the importance of responsiveness to Indigenous peoples throughout disciplines. Sustaining cultural identity links PSE Indigenization efforts directly to sustainability as it is embedded within the principles and traditions of Indigenous cultures. My study revealed

processes of decolonization, Indigenous education, and Indigenization, as described in Goulet and Goulet (2014). Participants revealed varying degrees of actualization among participant's PSE institutions, which might indicate some are better placed to serve as leaders in assisting with development of other institutions that are struggling.

Governance. Participants strongly maintained that leaders in charge of institutional governance, policies, and budgets are key to determining the extent of Indigenous knowledges within PSE institutions. The survey indicated that participants felt that even if Indigenous considerations have a place of importance in policy, support for Indigenous programming is often insufficient or financially insecure. In places where legislation defines Indigenous rights, participants saw less resistance to integrating Indigenous knowledges within institutions, but, for all participants, national and international recognition of the rights of Indigenous peoples remained a priority. This acknowledgement might signal that if PSE institutions are not pressed by law to accommodate Indigenous knowledges, they are less likely to invest in such programs. Yet sustainability research tells us that deep systemic changes in human thinking and behaviour are urgently needed (Ripple et al., 2017; Sachs, 2015; Sterling et al., 2017).

Participants indicated that they had never been approached about discussing Indigenous knowledges and sustainability simultaneously, which might suggest that institutional leadership would benefit from new discourse on these matters, such as the relationship between Indigenous knowledges and sustainability (Johnson, Howitt, Cajete, Berkes, Pualani Louis, & Kliskey, 2016; Wright & Horst, 2013). Participants were unfamiliar with STARS™ (AASHE, 2017a) and other programs promoting sustainability in PSE institutions, indicating that a modality for Indigenous engagement may be lacking. In general, there appears to be a need for discussion on sustainability and Indigenous knowledges as mutually supportive processes.

A priority for participants was that their colleagues, especially high-level PSE administrators, be knowledgeable about reconciliation issues. If administration had this knowledge, existing practices and policies supporting Indigenous cultural identity would be more likely to be recognized, developed, and protected. Since the 1970s, research done by Indigenous peoples detailing their experiences with colonization has been made available to the public and governments (National Indian Brotherhood, 1972; RCAP, 1996; TRC, 2015). These documents contain valuable guidance and help explain Indigenous worldviews, ways in which their lives were disrupted, and the process of restoration.

Most participants in this study said they were thinking and talking about the relationship between Indigenous knowledges and sustainability for the first time. The research questions probed topics with which they were familiar and others with which they were less familiar. Although they spoke from diverse cultural territories and were separated by significant geographic distances, the participants displayed remarkable consistency in the advice they provided about all topics. The uniqueness of this topic to participants might also point to the absence of it in PSE governance discussions about Indigenization.

Community outreach. Despite what the name implies, community outreach is a bi-directional or multi-directional process, which demands effective relationships among Indigenous communities and PSE institutions. To develop these relationships, institutional leaders, educators, researchers, and even those within some Indigenous communities, need the capacity to increase their understanding of the value of Indigenous knowledges. As one participant made clear, not everyone in PSE is enthusiastic about taking part in Indigenous programming. This participant described a range of individuals, including students and institutional personal, unwilling to engage in programs and activities that included Indigenous knowledges. This lack of universal interest in Indigenous knowledges may be associated with deficient financial investment in Indigenous programming, which itself rests on a general low understanding of Indigenous knowledge: minimal awareness of its value in transformative learning; a misplaced sense that Indigenous knowledges are founded more on environmental concerns than on human concerns; and the failure of some to recognize its status as part of Indigenous rights. Additionally, those with a different worldview may perceive Indigenous knowledges as a threat to their differing beliefs and value systems. Taddese (2013) reports that the persistent resistance to Indigenous rights in Canadian society can be seen in the millions of dollars spent annually by the federal government to litigate cases opposed to Indigenous peoples. Lingering indoctrination of colonial ideology's superiority affects both Indigenous and non-Indigenous people in society. The key to community building and outreach lies in developing better relationships between PSEs and Indigenous communities and in advancing greater understanding of Indigenous knowledges through investments in PSE programming and activities.

Relationships can be built, even with those who have differing worldviews, if individuals participate in collaborative initiatives. Overcoming challenges of differing worldviews is

possible through a willingness to participate in collaborative initiatives. However, one barrier to collaboration is technology, which has diminished personal relations and discourages intimacy with the environment, even though the holistic nature of Indigenous knowledges would indicate there is a place for technology in learning. Several First Nations in Ontario have recognized the importance of technology by partnering with *Say It First*, a program that uses technology and community participation to breathe new life into Indigenous language learning (Thurlbeck, 2016). Of course, learning with technology is very different from learning on the land. This seeming contradiction perhaps opens more debate on the need to find a balance in responding to modern learners. What is certain is that social thinking needs to evolve, not through competition, but by drawing on natural laws of collaboration for sustainability and to support traditional accountability for seven generations.

Sustainability survey. The sustainability survey provided a quantitative and secular view of how participants viewed the following: sustainability definitions; sustainability in practice; sustainability policy development; policy effects; influences on policy development; drivers and barriers of sustainability implementation; institutional governance; curriculum; facility operations; research; and community outreach. The results of the survey presented under Finding 3 provide only a brief overview but indicate that most PSE institutions focus attention on social and environmental justice issues that emerged through the inclusion of Indigenous knowledges in PSE programming. For most of the survey participants, insecure funding support for Indigenous programs was a major concern. The survey indicated that most participants were more involved in Indigenous PSE programs than they were in research on alternative energy, resource extraction, resource management, environmental protection or conservation, climate change, and the development of sustainable products or technologies.

Participants had no difficulty identifying potential for growth and development within their programs. Their knowledge about Indigenous worldviews, histories, and contemporary realities already form the basis of taking up sustainability issues. Since climate change and other environmental issues are extremely important to Indigenous peoples, minimal participation by participants in research and associated activities might be attributed to limited access to research funding and partnerships with others working on sustainability issues.

Summary. The discussion of Finding 3 reflected on participant views of entrenching Indigenous knowledges in curriculum, research, facility operations, institutional governance, and

community outreach for the purpose of sustaining cultural identity. These views included the following: supporting self-determination in curriculum; ensuring Indigenous communities are full partners in research; taking a holistic Indigenous approach to PSE facilities and operations; ensuring sufficient and reliable funding for Indigenous programming through supportive and knowledgeable institutional leadership in governance; and creating strong long-term relationships between PSE institutions and Indigenous communities. Survey data showed most participants are concerned about environmental health and limited and insecure program funding, while some are concerned with social and environmental justice research. However, as noted, there is limited engagement in such areas as alternative energy, climate change, environmental protection, and conservation.

Discussion Category 3: Expanding Sustainability Practices and Policies

The third research question sought to discover how sustainability is practiced and what policies drive these practices. The question allowed for discussion of PSE conceptions of sustainability as well as Indigenous conceptions of sustainability. Findings 4 and 5 indicate that social, economic, and environmental dimensions of sustainability are practiced through Indigenous knowledges and driven by the right of Indigenous self-determination supported in national and international standards. The findings also indicated that Indigenous PSE engagement in conservation and environmental decision-making could be increased if those programs participated in a network to build their capacity on sustainability issues. These findings are significant because non-Indigenous sustainability processes could become more congruent with Indigenous knowledges, and perhaps more successful, if they also supported policies appropriate to Indigenous worldviews.

Sustainability and Indigenous knowledges. Participants in the research were unanimous that since a goal of cultural communities is to support Indigenous learners' cultural identity, Indigenous communities need to be involved with PSE institutions working to integrate Indigenous knowledges. Reliance on local Indigenous knowledge holders was seen by participants to be essential in ensuring integrity in teaching local traditions. The integration of Indigenous knowledges in PSE institutions results in a multi-directional benefit process, where Indigenous learners, communities, and sustainability education can be strengthened if Indigenous knowledges are included based on established standards and not simply appropriated in a hurried effort to Indigenize. Achieving equity and self-determination means working through issues of

non-recognition of Indigenous knowledges and traditional learning systems, assimilation and marginalization, and the need for a rights-based approach in Indigenous education (UNPFII, 2017, pp. 3-6).

The UNPFII (2017) *State of the World's Indigenous Peoples: Education* notes five key issues in its analysis of Indigenous education around the world, including non-recognition of Indigenous knowledge and learning systems; education as a vehicle for assimilation; marginalization of Indigenous peoples in formal education; working toward education that strengthens Indigenous rights; and taking a rights-based approach to Indigenous education (UNPFII, 2017, pp. 4-6). If sustainability is to be understood from an Indigenous perspective, it must come through understanding and application of Indigenous worldviews. This means the following: recognizing that Indigenous knowledges are intended to benefit Indigenous peoples through restoration of cultural identity, language, and environmental health; integrating national and international instruments protecting Indigenous self-determination in PSE practice and policy; and developing Indigenous learning solutions inclusive of traditional teachings about social, economic, and environmental elements of sustainability. Transformative thinking called for globally in sustainability can be achieved if there is a willingness to accommodate a greater understanding of Indigenous worldviews in PSE.

The process of naturalizing Indigenous knowledges in education (Little Bear, 2009) requires discussion of Indigenous rights. Most participants felt that PSE institutions did not have a good enough understanding of the Indigenous right to self-determination or the legal and policy instruments supporting these rights. Disruptions to self-determination, culture, and language associated with colonization and colonial policies are described, along with remedies, in the academic literature, policy documents, and legal instruments (RCAP, 1996; TRC, 2015; UNPFII, 2008; Walsh, 2017). These issues and remedies are generally known to Indigenous people but less so to others. To expand the discussion of sustainability practices and policies, a more holistic approach is needed. Such an approach will involve discussing issues of the past but also moving into new equitable collaborations.

Some communities and institutions do seem to be taking action to improve sustainability practices, although these plans may not be evident to all study participants. While only one study participant indicated there was a sustainability plan on campus, this does not necessarily mean that other participants' institutions lacked sustainability plans. However, it might suggest

that there is no dialogue among PSE personnel working to achieve sustainability goals in their own way and in their own spheres of work and subsequently that faculty and administrative participants in Indigenous programs were simply unaware of written plans. In other cases, formal sustainability plans might not exist if they would be considered redundant with Indigenous knowledges. Indigenous knowledges contain principles of thought and behaviour supporting sustainability that are holistic and anchored within oral traditions. Although sustainability planning may not be recorded in writing, Indigenous communities are aware of environmental changes within their traditional territories and take action when needed. Decisions made by Indigenous communities about sustainability are based on a confluence of factors that might include a variety of social, economic, and environmental considerations. The same variability exists within PSE sustainability work. For example, the University of Saskatchewan has risen from a bronze to a silver ranking with the Association for Advancement of Sustainability in Higher Education (AASHE) because of, among other things, contributions to research, improvements to buildings, creation of new project funding, Indigenous initiatives on campus, and because the President “has made increasing sustainability on campus a priority” (Glazebrook, 2017). The benefits and barriers to formal written sustainability plans vs. unwritten plans could be part of future dialogue on sustainability.

Institutional leaders in PSE governance were seen by participants to be key to the inclusion of Indigenous knowledges because they are responsible for policy development, financial allocations, and accountability of personnel. Some participants maintained that institutional leadership is still reluctant to invest in Indigenous knowledge programming. This reluctance might be overcome through increased exposure to Indigenous rights discourse and PSE policies on closing education gaps and economic contributions, both of which can contribute to forward momentum for Indigenous education (CICan, 2013; Universities Canada, 2015). The importance of leadership, human resources, and financial supports has been identified in the literature as critical for advancing sustainability programming (James & Card, 2012; Wright & Horst, 2013).

Social, economic, and environmental issues comprise important interrelated aspects of Indigenous holistic learning and are also the three pillars of sustainability. PSE programs that enhance cultural identity, by, for example, involving Indigenous communities, can enable learners to acquire professional skills that include cultural perspectives of relationships with the

natural world. The interaction of Indigenous knowledges and contemporary training suggests an innovative approach to the co-creation of new knowledge and insights in PSE. Transformation in human behaviour, called for globally, could benefit from the holistic integrated approach to sustainability found in Indigenous traditions (Beckford, Jacobs, Williams, & Nahdee, 2010; Loomis, 2000).

Some participants pointed out that it could be difficult to reconcile Indigenous knowledges with some forms of economic development, such as mining and other extraction industries, because they have different objectives. The same was once believed about education in Canada, in that the objectives of assimilation were at odds with Indigenous self-determination. Although difficult, it is possible to reconcile ideologies that appear to be oppositional by innovating and creating a new way forward. For example, with respect to mining and extraction, the 2030 Sustainable Development Goal 9 is to “build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation” (UN, 2017b). The concepts listed in Goal 9 - to be resilient, inclusive, sustainable, and innovative - steer away from business as usual approaches (Sachs, 2015). Innovation stems from individual creativity, collaboration, and the belief that change can be possible.

The holistic nature of Indigenous knowledges means there are themes common among First Nations, Métis, and Inuit. For example, the concept of balance originates with personal health. The ability to see the implications of balance and imbalance within the self is an important precursor to being able to recognize and respond to environmental or sustainability issues. Elders Danny Musqua and Jimmy Myo describe a lack of balance as disharmony in spiritual relationships that leads to suffering by individuals and the natural world (Stonechild, 2016, pp. 88-89).

Conservation and environmental decision-making. This research uses Indigenous knowledge and theory, critical theory, and emancipatory theory both to explore participants’ understanding of sustainability in relation to Indigenous knowledges and to examine impediments to implementation and find solutions to overcoming these impediments. The concepts of sustainability include what happens within PSE institutions but also extend out into communities and landscapes. The health of the natural world connects directly to the health of individuals in a cyclical process Indigenous peoples describe as holistic.

Understanding the connectivity in holistic systems contributes to how humans understand

and interact with the natural world. Gunderson and Holling (2002) describe transformative natural and human systems that exist in perpetual nested adaptive cycles of exploitation, conservation, release, and reorganization as “panarchies” (p. 74). This is conceptually similar to Indigenous holistic thinking in that it identifies cycles differently from those described in hierarchies. Berkes and Folke (2002) indicated a major finding in some of their work on traditional ecological knowledge and resilience showed, “traditional practices have certain similarities and parallels to the theory of complex systems, with emphasis on nonlinear relationships, threshold effects, multiple equilibria, the existence of several stability domains, cross-scale linkages in time and space, disturbance, and surprise” (p. 124). Regardless of terminology used, understanding the connectivity within systems contributes to how humans understand and interact with the natural world.

Participants expressed strong views about the need to sustain a healthy natural environment since it is foundational to understanding Indigenous peoples’ worldviews. In the literature, community-based conservation has been described in two main ways: 1) projects with environmental governance practices that have evolved at the community level to manage resources sustainably; and 2) those where resource management agencies promote projects not based on local residents own norms and institutions. Generally, projects that do not evolve from the local level are less successful, or fail, because they do not consider the spectrum of Indigenous knowledges that are based on intergenerational knowledge within a particular region (Balint, 2006). Some participants in this study also said that top-down approaches imposed on people do not work. People have to be part of the decision-making processes.

In this study, participants voiced several ways to advance environmental sustainability. Several maintained that institutional partnerships with local Indigenous communities would advance community-based projects. New technology, scientific processes, and Indigenous knowledges were all seen as important; however, participants emphasized that Indigenous communities have the right to drive sustainability projects. None of the participants were involved in international efforts concerning environmental sustainability; however, several were involved in local or regional action, and some were able to integrate Indigenous knowledges within their work through partnerships with local communities.

In some PSE settings, participants were very knowledgeable about conservation activities and environmental decision-making being carried out by local Indigenous communities. In these

cases, local Indigenous communities were described as well informed and actively involved through participation in dialogues about conservation issues, development of alternative energy projects, and shared decision-making with other governing authorities. In these settings, participants indicated their institutions were involved with Indigenous communities through research and curriculum, among other things.

In other PSE settings, participants indicated that although local Indigenous communities were well informed and wanted to see increased local conservation activities, fewer achievements have been derived from partnerships with PSE institutions. Partnerships take time to develop and carry expectations of timely results, which may not always be easy for PSE institutions to meet. Berkes and Folke (2002) argue that large institutions are often slow to adapt to change because required knowledge is not integrated into their management systems and has to be re-created for decision-making when crises occur. On the other hand, Berkes and Folke (2002) point out that knowledge is contained within the collective memories of Indigenous communities, facilitating faster decision-making.

In this study, variations in PSE settings were attributed to several factors. These include the following: the extent of Indigenous self-governance within the territory and subsequent influence on post-secondary education policies and practices; the willingness of faculty members to engage in community-based partnerships; and the availability of financial resources for institutional research and programming. Balint (2006) has argued that conservation programmers cannot circumvent international development issues of rights, capacity, governance, and revenue generation in project planning and implementation. These four variables are critical to success in community-based conservation projects. In this study, where the factors described by Balint (2006) were strong, there were strong partnerships between PSE institutions and Indigenous communities; where the factors were weak or absent, partnerships also appeared to be weak or absent.

Surprisingly, the participants did not mention Indigenous spirituality as a factor deterring or influencing partnerships, especially since the literature describes tensions between spiritually-based environmental values and economic values as a divergence between Indigenous communities and other proponents of community-based conservation (Bengston, 2004; Devin & Doberstein, 2004; Lewis & Sheppard, 2005). However, in describing successful partnerships and relationships, the participants may not have considered partnerships and relationships that

had either failed or did not get off the ground because of divergent views. Spiritual belief systems and other divergences in worldviews, may, for example, influence the following: 1) whether the natural environment is viewed as part of the Indigenous extended family or as a resource for exploitation (and how benefits would be evaluated and shared); 2) faculty members' comfort level for participating in conservation projects involving Indigenous cultures; and 3) the value placed by PSE institutions and other research agencies on supporting and funding community-based conservation projects based on spiritual beliefs. These are areas requiring further exploration.

Some of the existing partnerships among Indigenous communities and PSE institutions supported the inclusion of Indigenous knowledges in contemporary career paths. However, in at least two institutions, participants maintained that Indigenous knowledges were only marginally included in the curriculum, even though institutional representatives worked with regional Indigenous communities on their projects. It might be useful to investigate the potential for linking some career paths with Indigenous knowledges and building this into the curriculum. For example, the past decade has seen a significant increase in green economy jobs, many of which are in environmental protection, resource conservation, renewable and green energy, green services, sustainability planning and urban design, eco-tourism, energy efficiency and green building, and other fields (Eco Canada, 2012). In addition to career potential, all the participants felt inclusion of Indigenous knowledges was critical in the lives of the Indigenous peoples of their regions; however, the processes of inclusion varied significantly as they had developed in concert with the institutional dynamics and capacity of advocates.

None of the respondents were aware that Indigenous livelihoods, Indigenous land use and tenure, and Indigenous languages are used internationally as indicators of biodiversity health. These indicator topics did not have an explicit role in most participants' PSE institutions, even though participants saw their importance in cultural retention. Global research has shown that, among other things, Indigenous knowledges contain elements recognized as key in conservation planning such as the ability for constant monitoring and determining the intensity and frequency of use based on factors such as species' reproductive cycles, population abundance, and seasonal weather patterns (Natural Justice: Lawyers for Communities and the Environment, n.d.). Knowledge of these elements is gained through regular land use, so the access to natural environments and the retention of Indigenous languages are shown to have a direct relationship

with biodiversity health. Additionally, community experience “is central to the explanations and visions of conservation as well as the choice of appropriate conservation strategies” (Campbell & Vainio-Mattila, 2003, p. 423). Supporting increased expertise in Indigenous languages, traditional livelihoods, and land use would not only support cultural identities but also sustainability and environmental decision-making.

In some regions, where Indigenous knowledges and practices are taken up in curriculum, research, and community outreach, participants viewed continued investment in these activities by the institution as precarious and often dependent on pressure and support from local communities. Although participants in this study indicated a strong understanding of the relationship between Indigenous knowledges and environmental health, they said they lack expertise in how their advocacy for inclusion of Indigenous knowledges in their setting might extend beyond cultural identity to formal environmental decision-making processes.

Sustainability networking. Social, economic, and environmental elements of sustainability are, as participants indicated, connected to place but are also inclusive of broader issues that require collaboration, holistic learning, and problem solving. The findings indicated widespread interest and support for a national network on sustainability and Indigenous knowledges; however, because institutions lack capacity, participants generally felt that the network should be developed incrementally, allowing time to understand the subject matter and its relationship to their work.

Since academic institutions reflect and refine priorities of the society in which they operate (Calder & Clugston, 2003), the extent to which Indigenous worldviews are being taken up in PSE institutions is linked to environmental and sustainability issues. There are approximately 1.4 million Indigenous people in Canada with 46.2% under the age of 25 (Statistics Canada, 2011a), many of who are in post-secondary education (PSE). In keeping with Indigenous cultural beliefs and values, many individuals and communities are actively engaged in environmental issues. Across Canada, PSE institutions have been called on to better reflect Indigenous realities in their policies and practices (Association of Canadian Deans of Education, 2010; TRC, 2015). Specifics are left up to individual institutions.

Academics have pointed out the absence of literature on Indigenous worldviews and sustainability in environmental education and the need for its integration (Kapyrka & Dockstator, 2012; Kulnieks, Longboat, & Young, 2012; McKeon, 2012; Tuck, McKenzie, & McCoy, 2014).

One way to perhaps remedy this problem is to create more links among Indigenous academics and institutions. Research participants maintained that the formation of a national network would be very useful for PSE programs, enabling institutions to collaborate and take up issues of sustainability as they relate to Indigenous knowledges in PSE. A network focused on Indigenous knowledges and sustainability might also create important relationships with external organizations such as Idle No More and the Indigenous Environmental Network (IEN) who are concerned and active in addressing environmental challenges in Indigenous territories. Such a network might also result in a positive contribution to the literature that could be shared among institutions.

A network could be developed as a new entity or could use existing modalities of interactions for networking, such as Canada Research Chairs, Indigenous language networks, or the Canadian Association for the Study of Indigenous Education (CASIE). Maximizing involvement and communication may help build capacity. The interconnectedness of social, economic, and environmental issues would indicate that these should be taken up together. Now is the time for such a network to be developed, as, according to Calder and Clugston (2003), institutions of higher education will increasingly play crucial roles in contributing to societal success or failure in adopting new strategies that address the rising global population, issues of equity, and environmental sustainability.

As they reflected on the people and issues that could benefit from collaboration and research through a network, research participants seemed flexible on specific aspects of membership. As they saw it, the primary benefit would be to support Indigenous cultural identity through sustainability practice and policy development. As well, some participants thought a network could be potentially important for increasing public and government officials' understanding of Indigenous worldviews on environmental issues. The literature has pointed out that traditional protocols, principles of behaviour, languages, spiritual belief systems, kinship, and relationships with non-human life forms demonstrate how Indigenous peoples understand their reliance on the natural world (Michell, 2006; Relland, 1998; Tester & Irniq, 2008). Participants recommended that Indigenous people lead such a network since Indigenous knowledges would be central to the discussion and activities of the network.

Information on Indigenous knowledges and sustainability shared through a network could advance findings on the following: curriculum issues (including language retention, traditional

livelihoods, traditional land use and land tenure, and contemporary careers); research (including human rights issues and social, economic, environmental, and Indigenous perspectives on sustainability); facility operations; PSE governance processes; community action and outreach; and involvement in environmental decision-making within Canada and internationally. The network could also assist in bridging existing gaps between practice and policy; identifying benefits that might be gained by involvement in a network; identifying barriers and how might they be overcome; and discussing possible effects of increased sustainability programming and networking on Indigenous communities. Particular topics and processes would need to be determined by the network.

Connecting theory to action would rely on the function and operation of the network. In South Asia, for example, the formation of regional research networks has contributed to increased sustainability knowledge production and publication through building human capacity with “(1) knowledge transfer, (2) knowledge sharing, and (3) knowledge deepening” (Mukhopadhyay, Nepal, & Shyamsundar, 2014, p. 45). A study of German academic conferences suggested that some types of passive networking are complementary to active networking but others are not (Goel & Grimpe, 2013).

Sustainability may be described within institutional action plans or it may exist in the oral traditions, worldviews, and practices of Indigenous cultures. One should not replace the other, but opportunities exist for synthesis and shared energy. Networking could provide the means of discussing these opportunities and determining appropriate actions in particular PSE institutions. There is power in using Indigenous knowledges as pedagogy and in advancing regional sustainability. The drumbeat, talking circles, connecting to others, and learning to develop relationships in the human and non-human world all help extend knowledge beyond the self and formal institutions of learning. Indigenous knowledges contribute to individual and environmental health but specific aspects are unique to communities and respect for cultural differences among individuals and communities are essential. Differences in approaches to sustainability may also cause tensions among PSE personnel with different expertise.

Despite the support for Indigenous knowledges in PSE, some people in these institutions remain resistant to its inclusion, as mentioned in Discussion Category 2 on community outreach. Networking on Indigenous knowledges and sustainability may involve addressing some of the difficulties of resistance to inclusion of Indigenous knowledges in PSE institutions. Resistant

individuals may be Indigenous or non-Indigenous. Festinger (1962) elaborated a theory of cognitive dissonance, explaining “If a person knows various things that are not psychologically consistent with one another, he will, in a variety of ways, try to make them more consistent” (p. 93). According to Festinger (1962), dissonance in behaviours, feelings, and opinions can be made more consonant by changing an opinion or behaviour, but sometimes dissonance is made consonant by distorting perceptions and information about the world so that it reinforces original beliefs. Developing new perceptions takes time:

It is not always easy to reduce dissonance. Sometimes it may be very difficult or even impossible to change behavior or opinions that are involved in dissonant relations.

Consequently there are circumstances in which appreciable dissonance may persist for long periods. (Festinger, 1962, p. 94)

Since our beliefs and opinions form part of our identity, we usually want to protect them as being correct. Changing them can mean admitting we were wrong or that we did not have sufficient information. Engaging people with various degrees of knowledge and experience through networking can help orient individuals to new knowledge if there is a willingness to participate.

Summary. The discussion of Findings 4 and 5 addresses the research question on how sustainability is practiced and the policies driving those practices. Findings were discussed in relation to 1) sustainability and Indigenous knowledges, 2) conservation and environmental decision-making, and 3) sustainability networking. Sustainability is part of Indigenous knowledges, reliant on strong institutional leadership supporting Indigenous self-determination and a rights-based approach. If communities are involved in planning and decision-making processes, conservation within Indigenous territories can be successful. Imposed approaches will not work. There is a high interest in participating in an Indigenous-led sustainability network to support increased understanding and capacity on sustainability issues, increased collaborations, more publications of Indigenous perspectives on environmental issues, and greater presence of Indigenous knowledges in environmental education programs.

Conclusions

The main aim of this study was to generate insight into Indigenous conceptions of sustainability in PSE places of learning in an effort to overcome the near total lack of prior research on this topic. A major outcome of this study is that it contributes the personal insights and wisdom of ten administrators and faculty experienced in delivering Indigenous programming

in PSE institutions across Canada to a body of literature that can be used for further discussion on the issues raised. This is important because as PSE administrations work to Indigenize their institutions, philosophical and practical advice provided by the participants in this study illustrates that challenges across Canada echo what has been said globally about issues in Indigenous education.

In this study, I sought to respond to research questions about the principles, practices, and policies underlying Indigenous conceptions of sustainability in PSE institutions. In particular, I focused on how Indigenous philosophies of the environment and interconnectedness were interpreted; how these interpretations were taken up in curriculum, research, facility operations, institutional governance processes, and community outreach; and how policies drive practices.

In this section, my conclusions on each of the findings is provided, followed by implications for PSE institutions and future research on the subject of sustainability and Indigenous knowledges. I end with a brief overview of study limitations and I remain open to challenges, new insights, and interpretations based on this study.

It is important to note that although this study was intended to explore the relationship between sustainability and Indigenous knowledges in various PSE institutions across Canada, it became an exploration of much larger issues of cultural identity, Indigenous rights, and the struggles of those working to advance a paradigm shift within PSE institutions. As a Métis person who has worked on environmental issues in my own community and together with other Indigenous peoples, I recognized similarities among principles of Indigenous knowledges and sustainability but had not seen these principles described in literature. Indigenous peoples' sense of responsibility to land and waters, spiritual reverence acknowledged through ceremony, and personal commitments based on traditional teachings are common around the world. Even secular sustainability practices echo tenets of reverence and survival. Many participants in this study said they had little familiarity with western discourses on sustainability but were well acquainted with the Indigenous knowledges of their territory and understood the intentions of non-Indigenous notions of sustainability. The methods and processes of sustainability may differ, but the goals are very similar in meeting "the needs of the present without compromising the ability of future generations to meet their own needs" (WCED, 1987).

The lack of dialogue among personnel involved in Indigenous education and sustainability programming remains a mystery. Resolving this mystery might begin by

encouraging those working on sustainability issues in PSE institutions to consider engaging with Indigenous people on this very matter in light of the conclusions and implications listed below.

The conclusions from this study follow the research questions, findings, and discussion to address the five areas of the findings on: 1) the spiritual underpinnings of Indigenous perceptions of sustainability; 2) the expression of sustainability through cultural traditions; 3) Indigenous knowledges in PSE institutions; 4) standards supporting Indigenous self-determination and expression of sustainability; and 5) the holistic nature of Indigenous perceptions of sustainability.

Finding 1: Indigenous worldviews are based in spiritual beliefs, which orient

Indigenous knowledges and responsibilities for sustaining life on Earth. This finding indicated the importance of Indigenous spiritual beliefs within Indigenous knowledges that extend beyond communities and institutions. The belief systems learned and practiced by individuals connect them to all aspects of Creation, including accountability to non-corporeal and future generations of living beings.

A conclusion that can be drawn about this finding is that although there are common principles, Indigenous knowledges are specific to particular cultures and belong to the members of that cultural community. Inclusion of Indigenous knowledges within PSE institutions, therefore, is primarily for the reinforcement of cultural identity.

Finding 2: Sustainability is expressed as a function of tradition, linking Indigenous identity with culture, language, and environmental health.

This finding indicated that understanding sustainability from an Indigenous perspective and acting on that understanding is related to the depth of cultural knowledge, linguistic fluency, and continued viability of Earth systems. Indigenous language speakers have the ability to understand concepts related to sustainability in their mother tongue that do not easily translate into English, or other languages. While some individuals may not speak their Indigenous language, they may have extensive understanding and knowledge of cultural teachings. Indigenous cultures and languages are linked to the natural world, reflecting the state of each in relation to the other, and containing the knowledge to live sustainably.

A conclusion that can be drawn about this finding is that diminished Indigenous relationships with the natural world are detrimental to Indigenous cultures and languages. Consequently, weak knowledge of culture and language can negatively influence one's ability to understand how to live sustainably. A related conclusion is that developing knowledge about

a culture, its associated language(s), and the natural environment of the territory can support sustainability as it is expressed as a function of Indigenous traditions.

Finding 3: Entrenching Indigenous knowledges in institutional governance, curriculum, facility operations, research, and community outreach is to sustain cultural identity. This finding indicated that inclusion of Indigenous knowledges within PSE institutions is primarily for Indigenous learners. Meeting this need requires that others are equipped with some knowledge to be able to create the processes that can support inclusion of Indigenous knowledges. It also suggests that broader society and other PSE learners become part of the learning process. The various ways Indigenous knowledges manifest within the components studied show there is a continuum of inclusion depending on institutional willingness, support, and attention to advice from Indigenous people. Different programs and institutions have different strengths and weaknesses because there is, appropriately, no template for inclusion of Indigenous knowledges. Indigenous community members must be involved in partnerships with PSE institutions to facilitate inclusion of Indigenous knowledges and to avoiding breaches of traditional protocol.

A conclusion that can be drawn from this finding is that institutional personnel, including leaders of governance processes, faculty, administrators, and others need to understand why Indigenous knowledges should be included in their institutions. Because systems are integrated and comprise part of the holistic framework, relying only on Indigenous personnel is insufficient to understand the rationale of including Indigenous knowledges within institutions.

Finding 4: National and international standards supporting Indigenous self-determination are primary drivers for including Indigenous knowledges in PSE institutions and advancing the underlying principle of sustainability. This finding indicated that the application of Indigenous knowledges within PSE institutions must be drawn from local traditional cultural protocols, which are supported by national and international standards and instruments on Indigenous self-determination. The research and advice from the Royal Commission on Aboriginal Peoples, the Truth and Reconciliation Commission of Canada, and the UN Declaration on the Rights of Indigenous Peoples are among some of the many resources that PSE institutions should study and integrate within policy. Other standards and instruments available on Aboriginal and treaty rights, such as the *Constitution Act, 1982* and Canadian case law, provide critical information about Indigenous peoples and their knowledges.

It is through understanding these standards and instruments, as well as the processes that brought them to fruition, that Indigenous worldviews about sustainability might be better understood. It is, surely within PSE institutions that all learners should have some of the best access to key issues of concern to Indigenous peoples in Canada.

A conclusion that can be drawn from this finding is that PSE institutional personnel need to improve their understanding of the importance of local traditional protocols as well as national and international standards that support and protect Indigenous self-determination. A further conclusion is that use of these standards will lead to a greater understanding of how sustainability is advanced through Indigenous knowledges.

Finding 5: Indigenous holistic learning includes social, economic, and environmental aspects of sustainability. This finding indicates that the holistic nature of Indigenous knowledges means that it contains the same elements considered to be pillars of sustainability. Learning through an Indigenous worldview facilitates learning about the interconnectedness of the pillars and how they influence each other. Learning about social aspects of human life cannot be isolated from economic factors or the state of the environment. Each is important to understanding the other and the World Commission on Environment and Development pointed this out in 1987 (WCED, 1987). Over the past few decades action on sustainability has been manifested in the Millennium Development Goals and, currently, in the Sustainable Development Goals. Some environmental conservationists are promoting the concept of the ‘Half-Earth,’ targeting future conservation of 50% of the global environment (Wilson, 2018). They believe, since the majority of species that exist are unknown, there can be no advocacy for their protection unless huge portions of the Earth are protected. Based on a holistic perspective, Indigenous peoples would more likely say we need a ‘Whole-Earth’ conservation plan. The interconnectedness of social, economic, and environmental aspects of life are incongruent with attempting to isolate parts of Earth. The challenges we face for sustainability of life on Earth are not easy. Reversing the damage we are inflicting will require transformative thinking and actions that demonstrate our role as stewards of the environment.

A conclusion that can be drawn from this finding is that the walls within disciplinary learning must fade and allow for more interdisciplinary, transdisciplinary, and intercultural knowledge exchange and mobilization. An analysis of sustainability declarations, statements, and policies might initiate an exciting dialogue that sheds light on the convergences and

divergences with Indigenous knowledges.

A further conclusion is that PSE institutions already have many of the tools needed for adaptation to new realities of rapidly shifting global demographics, resulting from war, poverty, social inequities, climate change, and other conditions that contribute to environmental degradation. PSE institutions have the ability to re-create themselves and address learning processes that facilitate holistic thinking and professional development.

Implications

This research study was based on the premise that little was known about the status of sustainability programming in Indigenous post-secondary education places of learning in Canada. This premise was arrived at because little to no literature was found that described what the concept of sustainability means to Indigenous peoples in particular regions and how the concept manifests itself within PSE programs and institutions. With nearly half of Indigenous people in Canada under the age of 25, many of these young people will likely choose to attend a college or university in the future. Indigenous cultures are rooted in spiritual belief systems that honour the natural world, so it can be expected that Indigenous communities will continue to learn and practice those traditions. This study is significant because it begins the process of identifying the relationship between sustainability and Indigenous knowledges in post-secondary education.

This research will potentially benefit Indigenous communities, academics, and others concerned with global sustainability by contributing Indigenous perspectives to the body of academic literature and evidence that calls for greater Indigenous participation in environment and sustainability activities within PSE institutions and beyond. The findings of this research advance scholarly knowledge on the environment and sustainability and how they are understood in relation to Indigenous worldviews. Academic institutions can benefit from this research by using it to inform the future development of curriculum, research, facility operations, institutional governance processes, and community outreach as they relate to Indigenous peoples. This research may also lead to greater participation by Indigenous communities in environment and sustainability initiatives, together with PSE institutions, by providing a common frame of reference.

Based on the research conclusions, the implications for PSE institutions addressing Indigenous knowledges and sustainability include the following:

1. PSE institutions should have programs and financial supports that facilitate traditional knowledge holders' participation in appropriate locations on and off campuses. This recommendation is based on traditional teachings of reciprocity for associated use of Indigenous knowledges within PSE institutions.
2. PSE institutions should develop and offer Indigenous programs that combine traditional cultural knowledges, Indigenous languages, and environmental education for campus communities, professional development, and Indigenous communities.
3. PSE institutions should retain Indigenous personnel to collaborate on the development of holistic frameworks appropriate to their region. These frameworks should illustrate the relationship between sustainability and Indigenous knowledges for professional development and use in curriculum, research, facility operations, institutional governance processes, and community outreach.
4. PSE institutions should develop a series of training modules for professional and Indigenous community development, with information on national and international standards supporting Indigenous self-determination. These modules should be designed in association with the holistic framework on curriculum, research, facility operations, institutional governance processes, and community outreach. The modules should also be offered together with orientation on local Indigenous protocols, experiential learning through participation in community-based conservation activities, and opportunities for dialogue among institutional personnel, students, and Indigenous community members.
5. PSE institutions should provide resources that support the development of a national PSE Indigenous sustainability network. This Indigenous-led network would assist in developing their capacity to discuss and respond proactively to sustainability issues across Canada and with PSE efforts to Indigenousize their institutions. The network could also build relationships and collaborations with Indigenous communities, regional employers, and other PSE personnel to address sustainability practices and policies in relation to Indigenous knowledges.

In all cases, experienced individuals should manage work involving Indigenous knowledges.

Indigenous communities across Canada, and internationally, have worked diligently to ensure representations of their cultures are protected and remain under their own governance systems. Cultural appropriation or misuse by others is considered a serious breach of traditional protocols. Use of Indigenous knowledges is open to individual critique and may involve personal interpretation or preference in addition to that accepted in local Indigenous communities. Familiarity with ethical standards in working with Indigenous communities and cultural knowledges can help avoid breaches of traditional protocol when bringing Indigenous knowledges into educational settings (CIHR, NSERC, & SSHRC, 2014; UN, 2004; WIPO, 2017).

Future research. There appears to be a need for PSE institutions, in general, to take up local, regional, and global Indigenous perspectives to increase understanding of how they relate to social, economic, and environmental aspects of sustainability. In light of this, consideration could be given to:

1. Research studies at local, regional, and global levels on the relationships between Indigenous knowledges and sustainability.
2. Research studies involving PSE sustainability researchers and program administrators to explore inclusion of Indigenous knowledges in their work.
3. Research studies exploring how an increased Indigenous presence within organizations such as the Association for Advancement of Sustainability in Higher Education (AASHE) and others might support dialogue and collaboration on sustainability practices and policies, locally, nationally, and internationally.
4. Research studies defining benefits of Indigenous PSE programming in terms of the *2030 Sustainable Development Goals* and the seven generations philosophy.
5. Research studies on the integration of existing and new indicators that could be used to support longitudinal research on Indigenous knowledges and sustainability.

Limitations of the Study

This study is limited to post-secondary education places of learning that are intended to serve First Nations, Métis, and Inuit learners, and whose programming results in a degree, diploma, or certificate as recognized by a provincial or territorial government. This study was limited to telephone and electronic communication with participants. Available resources did

not allow for face-to-face interaction in most cases because of distance and travel costs. The study does not include Indigenous places of learning that offer only cultural programming, nor does it include post-secondary institutions that do not offer programming specifically for Indigenous learners. The scope of this study did not extend to PSE personnel employed in sustainability offices.

Final Remarks

The purpose of my research was to begin identifying the relationship between sustainability and Indigenous knowledges by exploring how faculty and administrators working in Indigenous PSE programs understand the concept, practices, and policies of sustainability in relation to Indigenous knowledges in their setting. It was my contention that if similarities existed between the purpose and goals of environmental sustainability and Indigenous knowledges, then post-secondary education institutions could become important sites across Canada where Indigenization is recognized as consistent with the social, economic, and environmental pillars of sustainability.

The findings brought forward responses from the participants that conveyed a story remarkably consistent across the involved PSE institutions in eastern, central, western, and northern regions of Canada. Participant messages were clear and focused, providing the evidence substantiating: that Indigenous worldviews are based in spiritual beliefs, which orient Indigenous knowledges and responsibilities for sustaining life on Earth; that sustainability is expressed as a function of tradition linking Indigenous identity with culture, language, and environmental health; that entrenching Indigenous knowledges in curriculum, research, facility operations, institutional governance, and community outreach is to sustain cultural identity; that national and international standards supporting Indigenous self-determination are important drivers for including Indigenous knowledges in PSE institutions and advancing the underlying principle of sustainability; and that Indigenous holistic learning includes social, economic, and environmental aspects of sustainability. These findings have meaning both individually and as a collective in advancing how PSE institutions can understand the relationship between sustainability and Indigenous knowledges.

There are several similarities between the purpose and goals of sustainability and Indigenous knowledges, supporting the contention that PSE institutions can be important sites in Canada where Indigenization is consistent with the social, economic, and environmental pillars

of sustainability. In answering the overarching research question of how Indigenous PSE places of learning address environmental sustainability, participants gave important advice on the steps PSE institutions need to take to support and improve what is currently being practiced.

The conclusions of the research indicate the inclusion of Indigenous knowledges can be beneficial in PSE institutions, but there must be a concerted effort to ensure its primary purpose is to support the cultural identity of Indigenous learners. To achieve this, PSE institutional personnel need to build their capacity to understand Indigenous rights and self-determination and then apply it within PSE curriculum, research, facility operations, governance, and community outreach. Through building this capacity, work inclusive of Indigenous knowledges and sustainability can be strengthened because conceptually sustainability is found throughout Indigenous knowledges.

One of the most difficult aspects of this research was the challenge of using terminology that linked sustainability with Indigenous knowledges. While the concepts share many common elements, they are not the same. Indigenous knowledges inherently include sustainability, but sustainability does not inherently include Indigenous knowledges. This is not a problem, only an observation. I had thought at the beginning of this research that I might come across some new term that would alleviate the separateness of the concepts. Perhaps it was a manifestation of *wâhkôhtowin* in trying to bring unity to the physical separation of the concepts. I did not arrive at any new term, but perhaps someone will. What has become apparent to me in this research is that sustainability and Indigenous peoples' knowledges are very compatible and a closer association of them is warranted.

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Appendices

Appendix A Target Institutions

Institution Name	Location	Contact Information
	EAST	
Cape Breton University (Unama'ki College)	Sydney, NS	Tel: (902) 563-1871 and unamaki@cbu.ca
	CENTRAL	
Algoma University	Sault Ste. Marie ON	Tel: 1-888-254-6628
Anishinabek Educational Institute	North Bay ON	Tel: (705) 497-9127
Cambrian College of Applied Arts and Technology	Sudbury ON	Tel: (705) 566-8101
Canadore College of Applied Arts and Technology	North Bay ON	Tel: 705.474.7600
Cégep de Chicoutimi (FR)	Saguenay QC	Tel: (418) 549-9520
Cégep de l'Abitibi- Témiscamingue (FR)	Rouyn-Noranda, QC	Tel: (819) 762-0931
Collège Édouard-Montpetit - Campus Longueuil (FR)	Longueuil QC	Tel: (450) 679-2631
Confederation College of Applied Arts and Technology	Thunder Bay ON	Tel: (807) 475-6646 Pat McGuire - Aboriginal Programs
First Nations Technical Institute	Tyendinaga Mohawk Territory ON	Tel: (613) 396-2122
Iohahi:io Akwesasne Adult Education Centre	Cornwall ON	Tel: (613) 575-2754
Kenjgewin Teg Educational Institute	Manitoulin Island ON	Tel: (705) 377-4342

Lakehead University	Thunder Bay ON	Tel: (807) 766-7219 Office of Aboriginal Initiatives; *mandatory Indigenous content in their programming as of 2014; several Aboriginal programs are visible on the website
Laurentian University	Sudbury ON	Tel: 705.675.1151 (Sudbury Campus) *strategic research plan emphasises TK values & general leadership in conservation; can't find any Aboriginal programming though.
Nipissing University	North Bay ON	Tel: 705.474.3450 Aboriginal Initiatives Office (student support services)
Northern College of Applied Arts and Technology	Timmins; Moosonee; Kirkland; Haileybury Campuses ON	Tel: 705.235.3211 ext 2233 Joseph Nakogee (Timmins);
Ogwehoweh Skills and Trades Training Centre	Ohswekan ON	Tel: (519) 445-1515
Oshki-Pimache-O Win Education and Training Institute	Thunder Bay ON	Tel: (807) 626-1880
Seven Generations Education Institute	Fort Francis; Kenora & Thunder Bay ON	Tel: (807) 274-2796 Fort Frances Main Campus
Six Nations Polytechnic	Dryden ON	Tel: 519) 445-0023
	North	
Aurora College	Inuvik NWT	Tel: (867) 777-7800

Nunavut Arctic College	Iqaluit & several other locations NU	Tel: (867) 979-7200
Yukon College	Whitehorse YK	Tel: (867) 668-8800
	West	
A-m'aa-sip Learning Place (Nuu-chah-nulth Tribal Council)	Port Alberni BC	Tel: (250) 724-5757 Nuu-chah-nulth Tribal Council Post Secondary Education (I don't know if this is PSE onsite or just funding)
Ahousaht Education Authority	Clayoquot Sound BC	Tel: 1-888-670-9662 vivien louis PSE counsellor (may be just PSE funding)
Blue Quills First Nation College	St. Paul AB	Tel: 780-645-4455 (James Lamouche)
Chemainus Native College	Ladysmith BC	Tel: (250) 245-3522 Josie Louis
Community Futures Dev. Corp. of Central Interior First Nations	Kamloops BC	Tel: 250-828-9727 Jackie Bandura
Cowichan Tribes - Quw'utsun Syuw'entst Lelum (Quw'utsun Employment and Training)	Duncan BC	Tel: 250-715-1022 x291 Dana Thorne
En'owkin Centre	Penticton BC	Tel: (250) 493-7181
First Nations University of Canada	Saskatoon; Regina; Prince Albert SK	Tel: 306-931-1800 saskatoon; 306-790-5950 regina; 306-765-3330 Prince Albert
Gabriel Dumont Institute	Saskatoon; Regina; Prince Albert SK	Tel: (306) 242-6070 saskatoon; (306) 764-1797 suntep PA; (306) 975-7095 suntep saskatoon; (306) 347-4110 suntep regina; (306) 242-6070 DTI
Gitksan Wet'suwet'en Education Society	Hazelton BC	Tel: 250.842.0216
Gitwangak Education Society	Kitwanga BC	Tel: (250) 849-5330

Heiltsuk College	Bella Bella BC	Tel: 250 957 2754 Lois-Anne Hanson Arnold, Bella Bella Coordinator, Bella Bella NITEP Centre
Kitimat Valley Institute	Kitimat BC	Tel: 250-639-9199
Louis Riel Institute	Winnipeg MB	Tel: 204-984-9480 Sharon Conway - GM
Maskwacis Cultural College	Hobbema AB	Tel: (780) 585-3925
Native Education College	Vancouver BC	Tel: (604) 873-3761
Nelchi Training, Research, & Health Promotions Institute	St. Albert AB	Tel: 780-459-1884
Nicola Valley Institute of Technology	Merritt; Burnaby BC	Tel: (604) 602-9555 vancouver campus
NORTEP	La Ronge SK	Tel: (306) 425-4416 Dr. Herman Michell
Old Sun Community College	Siksika (Calgary) AB	Tel: (403) 734-3862
Red Crow Community College	Cardston; Lethbridge AB	Tel: (403)737-2400 Cardston; (403) 327-6984 Lethbridge (Ryan Heavyhead)
Saskatchewan Indian Institute of Technologies	Saskatoon; Regina; Prince Albert SK	Tel: (306) 244-4444
Seabird College	Agassiz, BC	Tel: 604-796-6896 Diane Janzen (Agassiz, BC)
Secwepemc Cultural Education Society	Kamloops BC	Tel: (250)376-0903
The Coastal Training Centre	Prince Rupert BC	Tel: (250) 627-8822
Ts'zil Learning Centre	Mount Currie BC	Tel: 604-894-2300
U of S EFDT Land-Based Indig Cohort	Saskatoon SK	Tel: (306) 966-2509 graduate secretary

Wilp Wilxo'oskwahl Nisga'a	Gitwinksihlkw BC	Tel: 250-633-2292
Yellowhead Tribal College	Edmonton AB	Tel: (780) 484-0303
Yellowquill College	Winnipeg MB	Tel: (204) 953-2800

Appendix B Telephone Script

vizina telephone script 3.docx
August 13, 2015

1



Hello,

My name is Yvonne Vizina. I am a PhD Candidate at the University of Saskatchewan in the School of Environment and Sustainability. I am working with the Sustainability and Education Policy Network in the College of Education for my research project.

Can you tell me who is responsible for authorizing research participation on behalf of your institution?

Can you tell me whom I might speak to about my research and to see if your institution would like to participate?

Can I get their name, title, and direct telephone number?

When connected to the next person, I will repeat the above inquiry to confirm I am speaking to the appropriate person. If so, I will give them the following information:

I am an Aboriginal person and a member of the Métis Nation. I am working on a PhD at the University of Saskatchewan. My research includes First Nations, Métis, and Inuit perspectives about how education policy and practice can better support the transition to more environmentally sustainable societies.

Specifically, this research is designed to determine the status of sustainability practices and drivers in select Aboriginal post-secondary education places of learning. It is also intended to identify how Aboriginal PSE capacity for engagement in culturally relevant community-based conservation and environmental decision-making may be advanced through a national Aboriginal PSE sustainability network. The relationship between sustainability and Indigenous knowledges comprise an important part of the research. The completed dissertation will be shared with participants and reported in a series of manuscripts suitable for publication.

My overarching research question for this study is: How do Aboriginal post-secondary education places of learning address environmental sustainability?

To answer this question, there is a survey and a personal interview. The three research questions are:

1. How do educators in Aboriginal PSE places of learning understand the concept of sustainability in relation to traditional knowledge?
2. How are Aboriginal PSE places of learning linked to: a) community-based conservation; and b) international, national, and sub-national decision-making in environmental conservation and sustainability?
3. What role might individual and collective Aboriginal PSE places of learning play in a national Aboriginal sustainability and traditional knowledge network?

There are additional secondary research questions to help answer each of the three main research questions. All questions are provided in the research guide.

If you are interested in participating in this research I can provide the institutional criteria I am working with so we can determine if you are eligible:

For this research, Aboriginal post-secondary education places of learning are defined as post-secondary institutions or programs that **primarily serve First Nations, Métis, and Inuit learners**. The institution must be **recognized** by a provincial or territorial government and **must be degree, diploma, or certificate granting**. Alternatively, the institution may be **affiliated, or in a partnership**, with a degree, diploma, or certificate granting institution recognized by a province or territory.

It is recommended that a **senior administrator or faculty member** undertake the survey and interview since it requires in-depth knowledge of management and governance, curriculum, operations and facilities, research, community outreach, policy, and the concept of sustainability. The participant should also have some understanding of Aboriginal community traditions in the territory where the school is resident.

It is important that if you choose to participate that you comply with any internal consent processes of your institution. This will minimize risk to you and your place of learning. It will also help to ensure I am complying with any research protocols required by your institution or program. Are there any institutional consent processes that I should be aware of?

If the representative of the Aboriginal PSE place of learning representative is interested in participating, I will ask the following questions:

What is the name of your institution or program?

Can you give me your name and contact information?

Name

Tel:

E-mail:

Address:

In which geographic region are you located? (may be self explanatory from address)

- North: *Northwest Territories, Nunavut, Yukon*
- Central: *Ontario, Quebec*
- East: *Atlantic provinces*
- West: *Manitoba, Saskatchewan, Alberta, British Columbia*

Does your institution or program identify as an Aboriginal PSE place of learning?
(yes/no)

Are you willing to participate? (yes/no)

Can your institution provide translation for non-English participants? (yes/ no)

I will ask:

How would you like to receive the research documents (by email or by postal mail)?

I will explain:

There are privacy limitations with electronic or physical correspondence and this is explained in the research documents.

I will ask:

Are there local traditional protocols that I should observe to initiate the research relationship? In my local territory, it is often appropriate to offer tobacco or tea

| vizina telephone script 3.docx
August 13, 2015

4

when making a request of an Aboriginal Elder or talking to someone about traditional knowledge. In your case, if there are protocols you would like observed, can we accommodate them through distance correspondence?

I will provide you with the research documents for your review. If you have any questions about the content of the documents you may contact me. The survey and interview can proceed when the signed consent forms are received. At that time, we can make a plan so that we can do the interview soon after you have completed the on-line survey.

Do you have any questions or comments?

You are welcome to contact me at any time for more information. I can be researched by email at:

Yvonne.vizina@usask.ca

Or by Telephone at (306) 668-1393

Thank you very much for your time and I hope we can speak more in the near future.

Appendix C Letter of Invitation



Letter of Invitation

Dear Participant:

My name is Yvonne Vizina. I am a doctoral student in the School of Environment and Sustainability at the University of Saskatchewan. I am writing to invite you to participate in my dissertation research study.

The title of this research is:

Sustainability and Indigenous Knowledge in Aboriginal Post-Secondary Education Places of Learning

The purpose of my research is to determine the status of sustainability practices and drivers in select Aboriginal post-secondary education places of learning and identify how their capacity for engagement in culturally relevant community-based conservation and environmental decision-making may be advanced through a national sustainability network.

For this research, Aboriginal post-secondary education places of learning are defined as post-secondary institutions or programs that primarily serve First Nations, Métis, and Inuit learners. The institution or program must be recognized by a provincial or territorial government and must be degree, diploma, or certificate granting. Alternatively, the institution or program may be affiliated, or in a partnership, with a degree, diploma, or certificate granting institution recognized by a province or territory.

Aboriginal post-secondary education places of learning research sites will be selected with the following criteria:

1. Recognized post-secondary place of learning (institution or program)
2. Self-identification as an Aboriginal PSE place of learning
3. Willingness to participate
4. Institutional provision of translation for non-English participants
5. Geographic location (East / Central/ North / West)

I am inviting 25 Aboriginal post-secondary institutions and programs to participate in this study. Together, we will have an opportunity to consider issues of sustainability in higher education and determine a future course of action that may strengthen individual sites by sharing and exchanging knowledge. I have attached the background information, study questions, and a consent form to this letter, which detail the parameters of the study, your right to withdraw at any time, and other issues pertaining to your participation.

The research timeline is: September 2015 – August 2016. Participating in this study means that you will:

1. Review the research consent form and provide your signature or oral agreement for your participation. Ensure you comply with any required internal processes at your institution required for your participation in this research.
2. Mail an original copy of the signed consent form to me using the self-addressed stamped envelope.
3. Participate in:
 - a. an on-line survey on behalf of your post-secondary institution or program that may take 30-45 minutes; and
 - b. an audio-recorded telephone interview with me (the researcher) that may take up to 120 minutes.
4. Spend approximately 60 minutes reviewing your interview transcript, which will be sent to you following the interview, and provide me with any required transcript changes.
5. Provide me with a transcript release form that has your signature, or provide your oral agreement.

A copy of the completed dissertation will be shared with you so that your institution or program can use it. Portions of the dissertation will also be distributed in scholarly publications, websites, and at conferences to raise awareness and contribute to a knowledge base about sustainability and Indigenous knowledge in higher education.

I am the researcher and can be contacted at:
Yvonne Vizina, Graduate Student,
School of Environment and Sustainability, University of Saskatchewan
Tel: (306) 668-1393 Email: yvonne.vizina@usask.ca

My Supervisor for this research is:
Marcia McKenzie, Associate Professor and
Director, Sustainability Education Research Institute (SERI)
College of Education, University of Saskatchewan
Tel: 306-966-2319 (SERI); 306-966-7551 (office) Email: marcia.mckenzie@usask.ca

Your participation is voluntary. If you have any additional questions, please contact me by telephone or email. Should you wish to participate, please sign the consent form attached and return it to me in the stamped self-addressed envelope or provide me with your oral agreement. If there are traditional local protocols you would like followed for knowledge exchange please let me know. If you do not wish to participate, you may disregard this invitation or notify me by email.

Yours truly,

Yvonne Vizina
School of Environment and Sustainability
University of Saskatchewan

The University of Saskatchewan Research Ethics Board has approved this research. If there are any concerns or complaints about this project, please contact any of the above-named

persons or the Research Ethics Board directly at 306-966-2975 or by email at ethics.office@usask.ca.



School of Environment and Sustainability

Research Guide

Sustainability and Indigenous
Knowledge in Aboriginal Post-
Secondary Education Places of Learning
Yvonne Vizina, PhD Candidate

Yvonne Vizina, PhD Candidate
School of Environment and Sustainability
University of Saskatchewan
Tel: (306) 668-1393
Email: Yvonne.vizina@usask.ca

2

Project Title

Sustainability and Indigenous Knowledge in Aboriginal Post-Secondary Education Places of Learning

This research is designed to determine the status and influences of sustainability practices in select Aboriginal post-secondary education places of learning and identify how their capacity for engagement in culturally relevant community-based conservation and environmental decision-making may be advanced through a national sustainability network. The relationship between sustainability and Indigenous knowledges comprise an important part of the research. The completed dissertation will be shared with participants and reported in a series of manuscripts suitable for publication.

For this research, Aboriginal post-secondary education places of learning are defined as post-secondary institutions or programs that primarily serve First Nations, Métis, and Inuit learners. The institution must be recognized by a provincial or territorial government and must be degree, diploma, or certificate granting. Alternatively, the institution may be affiliated, or in a partnership, with a degree, diploma, or certificate granting institution recognized by a province or territory.

It is recommended that a senior administrator or faculty member undertake the survey and interview since it requires in-depth knowledge of management and governance, curriculum, operations and facilities, research, community outreach, policy, and the concept of sustainability. The participant should also have some understanding of Aboriginal community traditions in the territory where the school is resident.

By participating in this survey and interview, you will help identify how education policy and practice can better support the transition to more environmentally sustainable societies.

Yvonne Vizina, PhD Candidate
School of Environment and Sustainability
University of Saskatchewan
Tel: (306) 668-1393
Email: Yvonne.vizina@usask.ca

3

The SEPN Survey

The Sustainability and Education Policy Network (SEPN) project at the College of Education, University of Saskatchewan was founded on the belief that sustainability policy and practice in education would benefit from coordinated analysis and development. SEPN is examining existing and new policies, practices, and innovations in relation to curriculum, research, facilities operations, governance, and community outreach to determine which are the most promising for enabling educational change for a more sustainable future. By focusing on the policy-practice gap, SEPN research uses *practice* to critically examine *policy* and develop research-based situated models for advancing sustainability policy and practice in education. SEPN's national multi-stakeholder approach is designed to mobilize diverse communities, institutions, and networks to carry out research most likely to influence positive change. Part of this mobilization includes an examination of the relationship between Aboriginal post-secondary education (PSE) institutional policies and sustainability education, including how Indigenous philosophical principles of environmental stewardship and interconnectedness are related to education. This research will contribute to SEPN's overall Goal of examining and enabling the evolution of policy and practice in education in relation to Canadian environmental issues.

To participate in the SEPN survey, participants must be involved with the education system in Canada and have some awareness of the following:

- Existing sustainability practices in your work or study setting;
- Influences that have supported the development of sustainability practices in your work or study setting;
- Barriers that have hindered the development of sustainability practices in your work or study setting; and
- Whether there are any policies that address sustainability in your work or study setting, and if so, factors that may have contributed to their development and implementation.

As a participant, please complete the survey first and then contact me to complete the follow-up interview. The SEPN survey can be accessed here: [SEPN National Survey](#)

Yvonne Vizina, PhD Candidate
School of Environment and Sustainability
University of Saskatchewan
Tel: (306) 668-1393
Email: Yvonne.vizina@usask.ca

4

Project Interview

In Canada, there is little research in the fields of environment and sustainability coming from Aboriginal post-secondary education places of learning that could potentially benefit Aboriginal communities and policy decision-makers. The failure of federal assimilation policies and the subsequent journey of recovery is an important parallel to how we have also failed to connect Aboriginal traditional knowledge systems with sustainability and environmental decision-making in a manner that has Aboriginal Peoples in a central role. The restoration of Aboriginal cultures and languages is reliant on a healthy environment. In turn, Aboriginal Peoples traditional knowledge and value systems can contribute to maintaining environmental health. Indigenous knowledge and theory developed in education can be used to address Aboriginal Peoples' roles in environment and sustainability.

While some information can be found about Aboriginal community activities in relation to sustainability, little is known about the role Aboriginal post-secondary education places of learning might play in furthering sustainability, for example, within their institutions, through initiating or studying community-based conservation projects, or in contributing to sub-national, national, and international decision-making processes on environmental issues. There is a gap in scholarly literature on linkages between Aboriginal PSE places of learning and policy decision-making on environment and sustainability issues, even though policy-making authorities rely on academic research to make decisions that affect Aboriginal lives. The gap in literature reflects an absence of scholarly perspectives of First Nations, Métis, and Inuit on sustainability initiatives such as the role of Aboriginal faculty members in research and publishing, curriculum development, and community-based projects. Subsequently, there is also a gap in literature on how Aboriginal PSE places of learning might support each other to build capacity and increase proactive participation in sustainability matters locally and beyond.

The questions on page 5 are the questions I will be answering in my PhD research. The questions on pages 6 and 7 will be asked in your interview.

Yvonne Vizina, PhD Candidate
School of Environment and Sustainability
University of Saskatchewan
Tel: (306) 668-1393
Email: Yvonne.vizina@usask.ca

5

Research Questions

My overarching research question for this study is: How do Aboriginal post-secondary education places of learning address environmental sustainability?

To answer this question, there are three additional research questions:

1. How do educators in Aboriginal PSE places of learning understand the concept of sustainability in relation to traditional knowledge?
2. How are Aboriginal PSE places of learning linked to: a) community-based conservation; and b) international, national, and sub-national decision-making in environmental conservation and sustainability?
3. What role might individual and collective Aboriginal PSE places of learning play in a national Aboriginal sustainability and traditional knowledge network?

Interview Questions

The interview is scheduled for up to 2 hours. This provides about 30-40 minutes for each research question. At the conclusion, I will ask you if you have any additional comments to add about any of the previous questions or the topic in general.

Research Question 1:

How do educators in Aboriginal PSE places of learning understand the concept of sustainability in relation to traditional knowledge?

1. In the territory you work in, what Aboriginal philosophical principles concern the environment and interconnectedness in relation to sustainability in post-secondary education?
2. In your PSE place of learning, how are curriculum, research, facilities operations, institutional governance processes, and community outreach linked to sustainability through practice and policy? (Please add any comments that may not have been reflected in the SEPN survey.)
3. In your PSE place of learning, how is the concept of sustainability practiced?
 - a. What policies drive these practices?

Research Question #2:

How are Aboriginal PSE places of learning linked to: a) community-based conservation; and b) international, national, and sub-national decision-making in environmental conservation and sustainability?

4. Is your PSE place of learning involved with any environmental conservation projects involving local Aboriginal communities? Please describe the involvement or comment on why there is no involvement.
5. Is your PSE place of learning involved with decision-making on environmental conservation or sustainability? Please describe the involvement or comment on why there is no involvement.
6. How do sustainability initiatives in your PSE place of learning support Aboriginal language retention; traditional livelihoods; traditional land use and land tenure; and contemporary careers?
7. What barriers or challenges exist?
8. What supports could contribute to increased participation in conservation and sustainability decision-making?
9. What benefits might be realized?

Yvonne Vizina, PhD Candidate
School of Environment and Sustainability
University of Saskatchewan
Tel: (306) 668-1393
Email: Yvonne.vizina@usask.ca

7

Research Question #3:

What role might individual and collective Aboriginal PSE places of learning play in a national Aboriginal sustainability and traditional knowledge network?

10. What role might your PSE place of learning play in a national Aboriginal sustainability and traditional knowledge network?
 - a. How might this improve:
 - i. Curriculum (including on language retention, traditional livelihoods, traditional land use and land tenure, and contemporary careers);
 - ii. Research (including human rights issues, social, economic, environmental, and Indigenous perspectives concerning sustainability);
 - iii. Facilities operations;
 - iv. PSE governance processes;
 - v. Community action and outreach; and
 - vi. Involvement in environmental decision-making within Canada and internationally.
11. How could a network bridge existing gaps between practice and policy?
12. What benefits might be gained by involvement in a network?
13. What barriers exist and how might they be overcome?
14. What effect might increased sustainability programming and networking have on Aboriginal communities in general?

Closing Question:

15. Are there any other comments or questions you would like to make?

Thank you very much for assisting in this research study

Appendix E Participant Consent Form



Participant Consent Form

Project Title:

Sustainability and Indigenous Knowledge in Aboriginal Post-Secondary Education Places of Learning

Researcher:

Yvonne Vizina, Graduate Student
School of Environment and Sustainability, University of Saskatchewan
Tel: (306) 668-1393 Email: yvonne.vizina@usask.ca

Supervisor:

Marcia McKenzie, Associate Professor, Educational Foundations
Director, Sustainability Education Research Institute (SERI)
College of Education, University of Saskatchewan
Tel: 306-966-2319 (SERI); 306-966-7551 (office) Email: Marcia.mckenzie@usask.ca

Purpose and Objectives of the Research:

The purpose of my research is to determine the status of sustainability practices and drivers in select Aboriginal post-secondary education places of learning and identify how their capacity for engagement in culturally relevant community-based conservation and environmental decision-making may be advanced through a national sustainability network.

The objectives of this research are to:

1. Interview select Aboriginal post-secondary places of learning about their sustainability practices and policies, community-based conservation practices, and involvement with national and international decision-making processes on environmental issues;
2. Produce a dissertation containing three publishable manuscripts based on research data collected including:
 - 2.1. A manuscript on existing sustainability policies and practices in Aboriginal post-secondary education places of learning;
 - 2.2. A manuscript on linkages of Aboriginal institutional sustainability practices with community-based conservation and national and international decision-making on environmental issues; and
 - 2.3. A manuscript with components of a new model that could build local capacity to engage in networking on environment and sustainability issues.
3. Contribute research findings to the larger SEPNI study being conducted on the practice-policy gap of sustainability education and its linkages to larger Canadian environmental issues.

Procedures:

I am inviting 25 Aboriginal post-secondary institutions and programs to participate in this study. Your contribution will include completing an on-line survey and a telephone

***Sustainability and Indigenous Knowledge in Aboriginal Post-Secondary Education
Places of Learning***

interview that can be done at a place and time of your choice. Together, we will have an opportunity to consider issues of sustainability in higher education and determine a future course of action that may strengthen individual sites by sharing and exchanging knowledge.

The research timeline is: September 2015 – August 2016.

Participating in this study means that you will:

1. Review the research consent form and provide your signature or oral agreement for your participation. Ensure you comply with any required internal processes at your institution required for your participation in this research.
2. Mail an original copy of the signed consent form to me using the self-addressed stamped envelope.
3. Participate in:
 - a. an on-line survey on behalf of your post-secondary institution or program; and
 - b. an audio-recorded telephone interview with me (the researcher) that may take up to 120 minutes.
4. Spend approximately 60 minutes reviewing your interview transcript, which will be sent to you following the interview, and provide me with any required transcript changes.
5. Provide me with a transcript release form that has your signature, or provide your oral agreement.

The on-line survey was created by the Sustainability and Education Policy Network, College of Education, University of Saskatchewan and includes 32 questions related to Sustainability in Practice, Drivers and Barriers, Influences on Policy Development, Policy Effects, and Personal Information about your post-secondary institution. The SEPN survey should take 30-45 minutes and is to be completed first, followed by a 2-hour interview with the same person who completed the survey. Data from the survey and interview will form the basis for three publishable manuscripts. Manuscript One focuses on institutional sustainability practices and policies, including how they are related to Aboriginal traditional knowledge. Manuscript Two focuses on how Aboriginal post-secondary education places of learning connect with Aboriginal communities to support conservation and environmental decision-making. Manuscript Three explores the potential for a national Aboriginal PSE network on sustainability.

Please feel free to ask any questions regarding the procedures and goals of the study or your role.

Funded by:

The researcher funds this study. There is no existing or potential conflict of interest on the part of the researcher or sponsors of this research.

Potential Risks:

There are no known or anticipated risks to you by participating in this research.

You are encouraged to only answer those questions that you are comfortable with.

Potential Benefits:

***Sustainability and Indigenous Knowledge in Aboriginal Post-Secondary Education
Places of Learning***

This research is intended to benefit Aboriginal communities, academics, and others concerned with inclusion of Indigenous perspectives in global sustainability efforts. The absence of Aboriginal Peoples' perspectives in the study of sustainability issues is a grave concern. This research is intended to contribute Aboriginal perspectives to the body of literature and also provide an opportunity to initiate Aboriginal community action for greater participation in sustainability networking with higher education. Through this research, scholarly knowledge will potentially be advanced in education, environment, and sustainability on how sustainability is understood in relation to traditional cultural knowledge in Canada. Academic institutions may benefit from research that can inform academic programming on Aboriginal perspectives of environment and sustainability education. This research may also lead to greater participation by Aboriginal post-secondary education places of learning in environment and sustainability issues, development of new sustainability practices and policies with a focus, for example, on customary sustainable use of biological diversity, culturally relevant community-based conservation, and contributions to environmental decision-making processes locally, nationally and internationally through engagement in a national sustainability network. These benefits are not guaranteed but are anticipated with successful completion of the research.

Compensation:

There is no financial compensation provided for participation in this study. A small gift (such as tobacco, sewing needles, tea, or other small items) may be provided in accordance with the Aboriginal traditional protocols of particular regions for knowledge exchange.

Confidentiality:

Your participation is voluntary and you are free to withdraw from the research project at any time. If you withdraw, your data will be deleted from the research project and destroyed, if desired.

Identifying information (i.e. consent forms and the master contact list) will be stored separately from the data collected. The master contact list of identifying information will be destroyed when data collection is complete and it is no longer required.

Your participation may involve inclusion of the identity of Aboriginal Peoples resident in the territory, communities, institutions, and traditional Indigenous protocols associated with the study but your personal identity, or that of others, will be confidential.

Group data of all participants will be used in the study outcomes when possible and participant code names will be assigned for individual participants, institutions and programs. After your interview, and prior to the data being included in the final report, you will be given the opportunity to review the transcript of your interview, and to add, alter, or delete information from the transcripts as you see fit. Your consent will be sought for quotations utilized in the research.

Precautions will be taken to protect the confidentiality of the source data provided by you, including the storage of audiovisual recordings and transcripts. These will be safeguarded and securely stored by research Supervisor at the University of Saskatchewan for a minimum of five years after the research is published. When the data is no longer required,

***Sustainability and Indigenous Knowledge in Aboriginal Post-Secondary Education
Places of Learning***

it will then be destroyed according to the University of Saskatchewan procedures for disposal of confidential information.

Please be advised that there are limits to confidentiality of Internet based correspondence. You should remove 'cookies' from the computer used for the web-based survey. The web-survey company that is located in the USA is the host of the survey for this on-line research. This company is subject to U.S. laws, in particular, the US Patriot Act that allows authorities access to the records of Internet service providers. The web survey company servers record incoming IP addresses - including that of the computer that you are using to access the survey. However, no connection is made between your data and your computer's IP address. If you choose to participate in the survey, you understand that your responses to the survey questions will be stored and accessed in the USA.

Electronic communication of the consent form and transcripts may potentially identify you to others resulting in the potential loss of anonymity. To minimize this potential, correspondence will be limited to private email, fax, or postal mail marked "confidential".

A/V recordings will be done with a digital recording device for use with transcription software. You may request that the recording device be turned off any time during your interview.

Data collected will be reported in a manuscript-style dissertation as part of the requirements for a PhD. Three of the manuscripts included in the dissertation will be submitted for publication in scholarly journals. Some group data will be used, some direct quotations will be used, and some summarized information will comprise evidence in the dissertation. Portions of the dissertation will also be communicated at conferences or reported on websites.

There are several options for you to consider if you decide to take part in this research. You can choose all, some or none of them. Please put a check mark on the corresponding line(s) for each statement:

I grant permission to be audio taped:	Yes: <input type="checkbox"/> No: <input type="checkbox"/>
I grant permission to be videotaped:	Yes: <input type="checkbox"/> No: <input type="checkbox"/>
I grant permission to have my organization's name used:	Yes: <input type="checkbox"/> No: <input type="checkbox"/>
I wish to remain anonymous:	Yes: <input type="checkbox"/> No: <input type="checkbox"/>
You may quote me and use my name:	Yes: <input type="checkbox"/> No: <input type="checkbox"/>
I wish to remain anonymous, but you may refer to me by a pseudonym:	Yes: <input type="checkbox"/> No: <input type="checkbox"/>

Right to Withdraw:

Your participation is voluntary and you can answer only those questions that you are comfortable with. You may withdraw from the research project for any reason, at any time without explanation or penalty of any sort until the date that data has been pooled and analyzed. After this date, it is possible that some form of research dissemination will have already occurred and it may not be possible to withdraw your data.

Follow up:

*Sustainability and Indigenous Knowledge in Aboriginal Post-Secondary Education
Places of Learning*

Yvonne Vizina, PhD Candidate
School of Environment and Sustainability, University of Saskatchewan
Yvonne.vizina@usask.ca
Participant Consent Form

5

A summary and web-link to the final results of the research will be shared electronically with each participating institution.

The results of the study may also be obtained by contacting:

The Researcher
Yvonne Vizina
Email: Yvonne.vizina@usask.ca or Tel: (306) 668-1393

The Research Supervisor
Dr. Marcia McKenzie
Email: Marcia.mckenzie@usask.ca or Tel: (306) 966-2319

Questions or Concerns:

If you have questions or concerns, contact the Researcher or Research Supervisor using the information above or at the top of page 1.

The University of Saskatchewan Research Ethics Board has approved this research project on ethical grounds. Any questions regarding your rights as a participant may be addressed to that committee through the Research Ethics Office at:

Email: ethics.office@usask.ca
Tel: (306) 966-2975 or Toll free (888) 966-2975

Consent:

The consent form will apply to the on-line survey, primary interview, and any follow-up interviews during the data collection process.

Yvonne Vizina, PhD Candidate
School of Environment and Sustainability, University of Saskatchewan
Yvonne.vizina@usask.ca
Participant Consent Form

6

SIGNED CONSENT

Your signature below indicates: I have read and understand the description provided. I have had an opportunity to ask questions and my/our questions have been answered. I consent to participate in this research. My institution or program consents to my participation in this research. A copy of this Consent Form has been given to me for my records.

_____	_____	_____
<i>Name of Participant</i>	<i>Signature</i>	<i>Date</i>
_____	_____	_____
<i>Name of Researcher</i>	<i>Signature</i>	<i>Date</i>

A copy of this consent will be provided to you, and the researcher will retain a copy.

ORAL CONSENT

Consent may also be provided by audio or videotape. If consent has been obtained orally, it is recorded here.

Researcher: I read and explained this Consent Form to the participant before receiving the participant's consent, and the participant had knowledge of its contents and appeared to understand it.

_____	_____	_____
<i>Name of Participant</i>	<i>Researcher's Signature</i>	<i>Date</i>

Appendix F Transcript Release Form



**Research Ethics Boards (Behavioural and Biomedical)
TRANSCRIPT RELEASE FORM**

Title: Sustainability and Indigenous Knowledge in Aboriginal Post-Secondary Education Places of Learning

I, _____, have reviewed the complete transcript of my personal interview in this study, and have been provided with the opportunity to add, alter, and delete information from the transcript as appropriate. I acknowledge that the transcript accurately reflects what I said in my personal interview with Yvonne Vizina. I hereby authorize the release of this transcript to Yvonne Vizina to be used in the manner described in the Consent Form. I have received a copy of this Data/Transcript Release Form for my own records.

Name of Participant

Date

Signature of Participant

Signature of researcher

Appendix G Data Codes

Code Families	Primary Codes	Sub-codes
Research Question 1	Indigenous knowledge	knowledge*
Research Question 1	Sustainability	sustain*
Research Question 2	Conservation	preserv* maintain* protect* manage* safeguard
Research Question 3	Network	network* partnership* collaborat*
PSE Sust Ed	Institutional governance	governance leadership President council committee facilitate conflict (resolution) supportive (non-supportive) planning strategy goals objectives
PSE Sust Ed	Curriculum	class course syllabus instructor professor pedagogy teacher
PSE Sust Ed	Operations	function energy recycling
PSE Sust Ed	Research	subject topic methodology method ethic protocol partnership consultation
PSE Sust Ed	Community Outreach	outreach partner*
Biodiversity Indicator	Land Use & Tenure	land use tenure
Biodiversity Indicator	Livelihood	living
Biodiversity Indicator / FNMI-LL	Languages	speak
FNMI-LL	Balance	good know harmony well mental (physical/emotional/spiritual)
FNMI-LL	Culture	cultur* ceremon* worldview* perspective*
FNMI-LL	Economic	job wealth money business resources work
FNMI-LL	Harmony	balance agree* coordinat*
FNMI-LL	Health	life sickness treatment well-being happy strength*
FNMI-LL	Land	water climate energy natural world environment
FNMI-LL	People	leader elder youth women (cannot code for 'man')
FNMI-LL	Physical	institutions community school territory
FNMI-LL	Political	government governance authority rights declaration agreement
FNMI-LL	Self	personal* identity
FNMI-LL	Sila	air climate life
FNMI-LL	Social	relationship communit* sharing share
FNMI-LL	Spirituality	belief Creator Creation ceremonies stories practices
FNMI-LL	Traditions	tradition* histor* custom* ritual* practice* belief*

* indicates a syntax operator for variations on the word