SUSTAINABILITY ON A SMALL CAMPUS:

A CASE STUDY OF GRENFELL CAMPUS, MEMORIAL UNIVERSITY OF NEWFOUNDLAND

by:

Natasha Pennell
Student Number:
201104304

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ABSTRACT

Education has been identified as a key component in sustainable development and sustainability transitions, as exemplified by the UN's Decade of Education for Sustainable Development (2004-2015), thus, it is important for universities to understand the current state of their sustainability education and outreach efforts. The purpose of this research is to present a case study of a small campus that is making active efforts towards advancing its sustainability profile. This research uses transdisciplinary sustainability as a theoretical framework, using a social science approach and a mixed research method. Through a series of 10 expert interviews with faculty and staff at Grenfell Campus, Memorial University of Newfoundland, and a survey administered to the student body, this research unveils areas where Grenfell Campus has been successful at sustainability implementation and where it can improve, according to the Holistic Campus Sustainability Framework. This research reveals that while Grenfell Campus has increased its sustainability profile considerably in recent years in areas such as Operations and Engagement & Collaboration, there are still key areas in need of improvement, namely in the areas of Governance, Food Production & Services, Sustainability Communications, and Assessment & Reporting.

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ABC – Attitude-Behaviour-Context
ANOVA – Analysis of Variance
ASD – Attitudes Towards Sustainable Development Scale
BEAS – Boreal Ecosystems & Agricultural Sciences
CBPPL – Corner Brook Pulp and Paper Limited
CNA – College of the North Atlantic
$C0_2$ – Carbon Dioxide
DESD - Decade of Education for Sustainable Development
EE – Environment Education
EfS – Education for Sustainability
EMS – Environmental Management System
ENSU – Environment and Sustainability
ENVS – Environmental Science
EPI-Lab – Environmental Policy Innovation Lab
ESD – Education for Sustainable Development
GCSU – Grenfell Campus Student Union
GDP – Gross Domestic Product
GNL – Government of Newfoundland & Labrador
IPCC – Intergovernmental Panel on Climate Change
IQ- Intelligence Quotient
IUCN – International Union for Conservation of Nature
MAEP – Master of Arts in Environmental Policy
MUN – Memorial University of Newfoundland
NL – Newfoundland & Labrador
SD – Sustainable Development
SDGs – Sustainable Development Goals
SPSS - Statistical Package for the Social Sciences
STARS - Sustainability Tracking, Assessment and Rating System
SWOT – Strength, Weaknesses, Opportunities, Threats
TBL – Triple Bottom Line
TRSU – Transdisciplinary Sustainability
ULSF – University Leaders for a Sustainable Future
UN – United Nations
UNEP – United Nations Environment Programme
UNESCO - United Nations Educational, Scientific and Cultural Organization
VBN – Value-belief-norm
WRWM – Western Regional Waste Management

1. Introduction

1.1 The Need for a Sustainability Transition

There is a myriad of environmental and social issues that highlight the need for a fundamental shift in human society, a shift that radically changes how humans interact with the natural world and with each other. Human economic activity is driving land-use change and along with-it environmental degradation. While a portion of environmental degradation can be attributed to population growth, economic growth has become the predominant contributor of atmospheric CO_2 emissions in the new millennium (IPCC, 2014, p. 5). The continued rise in economic growth is concerning, as a subsystem within planet earth the economy is inherently constrained by the biosphere, with the limits to economic growth predicted to occur within this century (Meadows et al, 1972, p. 23). The limits to growth are already being felt around the globe, with humanity already exceeding the earth's planetary boundaries in terms of climate change, loss of biosphere integrity, land-system change, and altered biogeochemical cycles (phosphorus and nitrogen) (Steffen et al., 2015). Biodiversity loss has become such a dire issue that scientists have now concluded that a sixth mass extinction is well underway. Ceballos et al. (2015) determined that modern extinction rates (under highly conservative and conservative scenarios) are between 8 to 100 times higher than the background extinction rate. The authors additionally found that "modern vertebrate extinctions that occurred since 1500 and 1900 AD would have taken several millennia to occur if the background rate had prevailed" (Ceballos et al., 2015, p.3). This mass extinction event, coupled with the fact that land-use change will likely have an observable impact on the geological record for millions of years has led many

scientists to propose that humanity is even entering a new geological epoch called the Anthropocene (Crutzen & Stoermer, 2000; Lews & Maslin, 2015).

Climate change and environmental change are not only concerning for the organisms that share this planet, but there is also potential that this can have a profoundly negative impact on human society. Healthy ecosystems provide many services that are ecosystem functions essential to human well-being, livelihoods, and survival such as pollination, water filtration, waste assimilation, and food production, and declining biodiversity is a direct threat to the functioning of such services (Ceballos et al., 2015). Climate change and biodiversity loss also have the potential to exacerbate existing social inequalities around the world. Marginalized people are disproportionately impacted by the effects of climate change. This occurs for several reasons; first, inequality increases exposure to the impacts of climate change, this leads disadvantaged groups to become more susceptible to the destruction caused by climate hazards while decreasing their ability to cope and recover from such damages (Islam & Winkle, 2017). As extreme weather events increase, those who are impoverished will disproportionately be impacted by the aftermath of these events. This has potential to lead to a 'vicious cycle' where those who are socially disadvantaged face greater impacts of extreme weather events that lead to greater subsequent inequality (Islam & Winkle, 2017). This interlink between climate change and social inequality highlights the need for a transition to a sustainable society. While sustainability is a contested term with a variety of proposed definitions, this thesis will use two definitions of sustainability as a working tool. Kopnina & Shoreman-Ouiment (2015, p. 3) explains sustainability as "the capacity to support, maintain or endure; it can indicate both a goal and a process. In ecology,

sustainability describes how biological systems remain diverse, robust, resilient and productive over time, a necessary precondition for the well-being of humans and other species". Dasgupta (2020) further defines sustainability in the context of the human economy, stating that "Sustainability means accepting that our economy is embedded in nature, not external to it. This forces us to recognize the limits nature places on the economy, shaping our understanding of sustainable development and growth." These definitions of sustainability distinguish it from the concept of sustainable development (SD), which is defined as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (WCED, 1987), by emphasizing the importance of ecological integrity. While sustainability and SD are distinct concepts, they are often used synonymously in the literature, thus for practical reasons, they will be used interchangeably throughout this thesis.

Recent research related to the COVID-19 pandemic also emphasizes the need for a transition to a sustainable society. Using data from 110 countries, a study (Ozkan, Ozkan, Yalaman & Yildiz, 2021, p.1) has found that "the greater the climate risk; the lower the readiness to climate change and the more individualistic the society, the higher the pandemic mortality rate" and that overall, countries that create sustainable societies are better equipped to cope with climate and public health emergencies. As land use change associated with human development "all modify the transmission of infectious disease and can lead to outbreaks and emergence episodes" (Foley et al, 2005, p. 571), the transition to a sustainable society is paramount in order to cope with future public health emergencies. Furthermore, the fact that countries where individuals look after each other and the environment were more well-equipped to handle the pandemic

(Ozkan et al., 2021) highlights the need for a fundamental shift in how humans interact with each other and the environment.

1.2 The Complex Process of Sustainability Transitions

Climate change, environmental degradation, and now a global pandemic: these contemporary issues all highlight the need for a transition to a sustainable society. The socio-technical systems of modern society, which consists of a variety of actors, institutions, material artefacts, and knowledge that interact to provide services to the public (such as water, energy, food production, waste management, and transportation) are in dire need of an overhaul (Makard, Raven & Truffer, 2012). Unfortunately, transitions in such systems typically play out over prolonged periods of time (25 or more years) while the contemporary environmental issues of today need imminent attention (Farla, Makard, Raven & Coenen, 2012).

Sustainability transitions are a proposed solution to modern problems and can be defined as the "long-term, multi-dimensional, and fundamental transformation processes through which established socio-technical systems shift to more sustainable modes of production and consumption" (Makard, Raven & Truffer, 2012). As a mode of socio-technical transformation, sustainability transitions require not only a change in technology, but also a change in user behaviour and institutional structures (Makard, Raven & Truffer, 2012) and are typically framed from the systems-thinking perspective (Farla et al., 2012). This is a complex task to achieve, as such a transition requires "far-reaching changes along different dimensions: technological, material, organizational, institutional, political, economic, and socio-cultural" (Makard, Raven & Truffer, 2012).

The lack of a universally accepted definition for the concept of sustainability (Mensah, 2019) and the complex array of factors that influence individual behaviour also add complexity to this task. As human behaviour has a variety of influential components such as attitudinal factors, personal values, contextual factors, personal capabilities, and habits, sustainability transitions require a multi-faceted approach that involves a wide variety of societal actors and institutions. The actors and institutions involved in sustainability transitions are broad in nature and essentially encompass all of society. Actors that have been identified in the literature include policymakers and public authorities, firms, social movements, civil society, consumers, experts and research organizations, as well as individuals (Farla et al., 2012). Given the wide range of actors that play a role in sustainability transitions and the lack of an accepted definition for sustainability, sustainability transitions are an inherently political process. It is unlikely that all participants will agree about the direction of the transition, the means to reach it, and given that sustainability transitions aim to fundamentally change socio-technical systems, there is the potential for some actors to come out as winners and others as losers (Köhler et al., 2019). This political nature adds an additional layer of complexity to sustainability transitions.

1.3 The Role of Universities in Sustainability Transitions

As sustainability requires that people learn new ways of relating to the environment and to each other, education systems have a crucial role to play in sustainability transitions. Education has been identified as one of the factors that influence human behaviour, with more years of education being associated with higher levels of pro-environmental behaviour (Gifford & Nilsson, 2014). However, it is important to note that there are a

number of factors that influence human behaviour. A person with a high level of environmental knowledge may live in an area where the available infrastructure and built environment inhibit pro-environmental behaviours. For example, an eco-conscious individual with mobility issues has a limited ability to lower the environmental impact of their personal transportation habits if they live in an area without robust public transit. In this regard it is a contextual factor that inhibits their pro-environmental behaviour, rather than a lack of knowledge. Nevertheless, the education system has a vital role to play in sustainability transitions, with universities playing a key role. This is due to the primary functions that a university serves in society, namely teaching and learning, research and development, and public engagement, all of which can produce long-term environmental effects and social change (von Oelreich (2004) as cited in Ralph & Stubbs, 2014).

Universities can contribute to sustainability transitions by teaching the leaders and influencers of tomorrow the competencies needed to perform sustainable actions in both their work and personal lives. Research and development activities can lead to the discovery of new sustainable technologies and can help to identify the most effective policies and practices for enabling sustainability transitions. Universities can also engage their local communities to become more sustainable through partnerships with local municipalities, non-governmental organizations, educational institutions, and businesses. Furthermore, universities can hinder or enhance their local environments through their day-to-day operations. Given the myriad of functions that occur within universities, university campuses have an environmental impact similar to a small city (Alshuwaikhat & Abubakar, 2008). Universities that actively try to engage in

sustainable operations limit their impact on their local environment and campuses that actively engage in bioremediation practices can enhance their local ecosystems.

While universities can make substantial contributions in the transition towards a sustainable society, they have generally lagged behind businesses and governments with regards to sustainability implementation (Merkle & Litton (2004) as cited in Ralph & Stubbs 2014). However, since the UN declared 2004-2015 as the Decade of Education for Sustainable Development (DESD), universities around the world have been increasing their sustainability initiatives (Lozano et al., 2014). A growing number of universities are actively trying to reduce their environmental footprint through "campus greening" efforts that aim to improve their operations in terms of energy efficiency, water use, and waste management (Alshuwaikhat & Abubakar, 2008). However, it is important to note that these campus greening efforts are merely a starting point for campus sustainability. Universities that engage in the whole-of-university approach to campus sustainability, whereby sustainability considerations are integrated into the teaching, research, operations, and engagement efforts of the university in a synergistic manner, are the most effective at achieving the task of campus sustainability. The literature review for this thesis will discuss this approach and its barriers and enablers in greater detail.

Given the role that universities have in society, they play a crucial part in sustainability transitions. This research helps to highlight this vital role by providing a case study of a small campus that is actively undergoing a sustainability transition and in doing so is providing benefits to the local community. The rest of this chapter will highlight the

significance of this study, provide the case study context, and give an overview of the research objectives, questions, and general layout of the rest of this thesis.

1.4 Significance of Study

This research presents a case study of a university campus that is actively trying to improve its sustainability profile and enhance its educational offerings towards sustainability. This study will investigate the attitudes and perceptions of the Grenfell Campus community towards the concepts of SD and ESD through an anonymous survey administered to the student body, and a series of expert interviews with faculty, staff, and administration at Grenfell Campus, as well as with a representative from the City of Corner Brook who is involved in several campus-community partnerships. Understanding how students currently view sustainability can benefit Grenfell Campus in several ways. This data can be used as a baseline measurement to evaluate the effectiveness of campus sustainability outreach programs and to assess the impact of different programs with regards to shaping positive attitudes towards sustainability. As Grenfell Campus strives to position itself as a sustainable campus, this information will be valuable in assessing the overall effectiveness of current campus sustainability efforts and teachings. Gaining an understanding of how faculty, administration, and staff view campus sustainability is equally important. These members of the campus community tend to be involved in campus operations and are present on campus longer than students, thus they offer valuable insights into the sustainability of operations, teaching, and engagement. Their insights will identify areas where sustainability can be easily integrated and improved throughout the campus as well as opportunities for engagement with the greater Corner Brook community.

This research will reveal areas where Grenfell Campus is performing well in sustainability and areas where there is a need for improvement. It will investigate the views of the students, faculty, and staff regarding SD and the role of higher education in promoting sustainability. The author has chosen to focus the attention of this research on the higher education sector, rather than the education system in general. While it is important to embed sustainability across all levels of the curriculum, teachers need the proper knowledge and competencies to do this, which is best addressed through teacher education programs in universities.

As exemplified by the UN resolution to declare 2004-2015 as the DESD, and Sustainable Development Goal (SDG) 4 – Quality Education, institutes of higher education have a major role to play in shifting society's attitudes towards more sustainable behavior. Gaining an understanding of how these views differ throughout the globe and identifying the factors that help shape these views can assist universities in developing pedagogy and communication strategies surrounding sustainability. By surveying the attitudes and perceptions of students at Grenfell Campus, this research contributes to the literature on sustainability attitudes and education for sustainable development (ESD). This research can also benefit Grenfell Campus by providing baseline data which the Grenfell Campus Sustainability Committee can use to assess the effectiveness of sustainability outreach and communications on campus. It can also help inform pedagogy by identifying programs where students have statistically lower attitudes towards sustainability.

Additionally, as this thesis consists of social science research completed during the COVID-19 outbreak, it provides valuable insights into how public health emergencies impact university operations and the wellbeing of their students, staff, and faculty. These insights can help universities better prepare for future public health emergencies, which may occur at greater frequency in the future due to the impacts of environmental degradation and climate change.

1.5 Case Study Context

This research will explore the role of higher education institutions in sustainability transitions by using Grenfell Campus, Memorial University of Newfoundland (MUN), as a case study. This section will give a brief overview of the case study context, delving into sustainability issues within the province of Newfoundland and Labrador (NL), sustainability in the City of Corner Brook, as well as giving an overview of current sustainability efforts at MUN and Grenfell Campus.

1.5.1 Sustainability in Newfoundland and Labrador

The province of NL is facing environmental, social, and economic issues. The province is already experiencing the effects of climate change, average annual temperatures are 0.8 degrees Celsius over the historical norm, leading to increased frequencies of tropical storms, coastal erosion, sea-level rise, and dangerous storm surges (Government of Newfoundland and Labrador, 2019, p. 6). Climate change also increases risk to public health in NL, with rising temperatures bringing vector-borne diseases such as Lyme disease to the province, increased rates of respiratory illnesses and allergies, and declining levels of sea ice which impacts access to country food for

coastal Indigenous communities (Government of Newfoundland and Labrador, 2019, p. 42). Recognizing the impact of greenhouse gas emissions on global climate change, the Provincial Government released the vision document *The Way Forward on Climate Change in Newfoundland and Labrador in 2019*, which sets the provincial approach to dealing with climate change over the next 5 years. This plan focuses on climate change mitigation, green economic growth, and climate change adaptation, calling for a carbon pricing program, incentives for clean economic growth, reducing transportation emissions, reducing agriculture and forestry emissions, improving energy efficiency in buildings and homes, integrating climate monitoring tools in infrastructure planning and development, addressing the health impacts of climate change, and educating the public regarding climate change. It should be noted that a section of the plan dealing with public education is lacking. It does not emphasize the need for environmental education (EE)/ESD within the provincial schooling system, nor does it emphasize the role that MUN, the only higher education institution in the province, can play in public education. It simply emphasizes the need for public outreach campaigns to raise awareness and knowledge, which is not enough to ensure that people will behave in a sustainable manner.

In addition to the environmental problems that the province is facing, NL is experiencing economic hardships due to the declining price of oil since 2015 and the Covid-19 pandemic. Regarding the social dimension of sustainability, the province is facing population decline and brain drain, with many young people choosing to leave the province for greater work opportunities in mainland Canada. Given NL's myriad of

sustainability issues, it is a good place to investigate the effectiveness of sustainability initiatives and policies.

1.5.2 Sustainability in the City of Corner Brook, Newfoundland & Labrador

Grenfell Campus is a small university campus located in the City of Corner Brook, NL. Home to 19,806 people during the 2016 census, Corner Brook is a municipality that is relatively small by Canadian standards but large in the NL context. In 2006 the City joined the Partners for Climate Protection, a network of municipal governments throughout Canada that are committed to reducing greenhouse gases and engaging in climate action (City of Corner Brook, n.d). Corner Brook is one of the first municipalities in Atlantic Canada to incorporate Integrated Community Sustainable Planning (ICSP) measures into their municipal planning policy and regulatory framework, resulting in the 2012 Integrated Municipal Sustainability Plan (IMSP) (City of Corner Brook, 2019). The IMSP outlines "policies for the overall physical design and development of the City of Corner Brook (City) for the next ten years in order to improve the physical, social, environmental and economic well-being of the community." (IMSP, 2012). This plan is a hybrid document that combines the goals and objectives of an integrated community sustainability plan with the legislative authority of a municipal plan and covers policies, regulations, and implementation targets for the physical design and development of the city (Federation of Canadian Municipalities (FCM, n.d). The IMSP holds legislative authority under the province's *Urban and Rural Planning Act* and is fully expressed in two documents: the IMSP itself and the City of Corner Brook's development regulations (FCM, n.d).

In 2019 the City of Corner Brook released its Community Climate Action Plan, which has a goal to reduce greenhouse gas emissions from municipal operations by 20% and total community emissions by 6% from 2008 baseline levels over 15 years (City of Corner Brook, 2019). As of 2019 the City of Corner Brook has achieved a number of goals outlined in this plan including achieving LEED certification for City Hall, creating a strategic wastewater treatment plan, completing a water audit, and completing an energy efficiency review of all City-owned buildings (City of Corner Brook, 2019).

1.5.3 Sustainability at Memorial University of Newfoundland

MUN is a multi-campus university with five locations across the province and one campus in Harlow, United Kingdom. Founded in 1925 as a living memorial to Newfoundlanders and Labradoreans who died in the First World War, MUN is the province's only university and one of the largest universities in Atlantic Canada, with 18,308 students registered during the 2019-2020 academic year (MUN, 2020-b).

As the province's only university, MUN plays a considerable role in the provincial economy. A study of the economic impact of MUN revealed in the 2012-2013 fiscal year that over $1 billion in provincial GDP originates from MUN activities and that MUN employed 5.6% of the province's full-time workforce in 2013 (Locke & Lynch, 2014). This report also revealed that municipalities in NL incur significant economic benefits from MUN activities, with the City of Corner Brook incurring $1.8 million in benefits from Grenfell Campus in 2013, equivalent to 5.9% of the city's operating revenues in that same year (Locke & Lynch, 2014).

In 2006 MUN began its campus sustainability journey by embarking on an Energy Performance Contract (EPC) with Honeywell in order to save energy costs and reduce resource consumption (MUN, 2006). Phase 1 of the EPC began in 2008 and consisted of retrofits of eight buildings across the St. John's Campus, resulting in more than $13 million in energy savings for the university from 2009-2015 (MUN, 2017). Phase 2 of the contract began in 2017 and targeted 45 facilities across both the St. John's and Grenfell Campuses and was anticipated to reduce the university's annual greenhouse gas emissions by 1,634 tonnes (MUN, 2017).

In 2009, MUN signed a sustainability declaration with a mission to "minimize its adverse environmental impact while supporting the realistic needs and aspirations of individuals and communities and will provide a transparent account of these activities and their impacts" (MUN Sustainability Declaration). This declaration is further reflected in sections 2.4 and 2.5 of the MUN's purchasing policy, which state:

> "2.4 In keeping with the Memorial University of Newfoundland Sustainability Declaration, the University endeavours to integrate sustainable considerations into purchasing decisions. Purchasing decisions should take into account the following principles:
> - Adoption of the concepts of reduce, reuse, recycle
> - Conservation of natural resources
> - Reduction of carbon emissions
> - Reduction of energy and water use
> - Utilization of total life-cycle cost in evaluating product cost

> 2.5 The University is committed to conducting its purchasing in a socially responsible manner by doing business with vendors that commit to demonstrating social responsibility and ethics in their business operations." (MUN Purchasing Policy).

Sustainability is also listed as one of the university's values, though it does not appear in the institution's vision or mission statements (MUN, n.d.-c).

In 2010, MUN opened the Sustainability and Climate Action Office charged to determine priorities for sustainability initiatives and to develop, promote, and implement sustainability initiatives at MUN (MUN, n.d.-b). While these policies[1] are present across the entire MUN multi-campus network, other sustainability initiatives at MUN are predominately grassroots in nature and vary by campus and department, thus, for the purpose of this paper, only initiatives at Grenfell Campus will be included for analysis.

1.5.4 Sustainability at Grenfell Campus, Memorial University of Newfoundland

Grenfell Campus (henceforth "Grenfell"), MUN, is a small campus located in Corner Brook, NL, with 1420 registered students in the Fall 2019 term (MUN, 2020-a). It was established in 1975 as the West Coast Regional College (WCRC), with the intention to provide students with the opportunity to complete the first two years of their undergraduate studies on the west coast, before transferring to the St. John's Campus (MUN, 2020-b). In 1979, the WCRC was renamed Sir Wilfred Grenfell College in honour of British medical missionary pioneer Wilfred Grenfell and in 2010 Sir Wilfred Grenfell College was renamed "Grenfell Campus, Memorial University of Newfoundland" (MUN, n.d.-a). Since then, the campus has considerably expanded its facilities and course offerings. In recent years, the campus has extended its Arts & Science building, built a new residence building, and added several major enterprises including the Boreal Ecosystem Research Initiative, the Environmental Policy Institute,

[1] While the Sustainability and Climate Action Office is based on the St. John's campus, it does co-ordinate with the Grenfell Campus Sustainability Committee.

and the Aging Research Centre – Newfoundland and Labrador (*Committing to Communities*, 2020).

Grenfell is home to MUN's School of Science and the Environment, and thus offers several degrees at both the graduate and undergraduate levels with a sustainability-focus, including the Bachelor of Environment and Sustainability (ENSU) (previously the Bachelor of Arts in Environmental Studies), the Bachelor of Science in Environmental Science (ENVS), the Master of Arts in Environmental Policy (MAEP), the Master of Science in Boreal Ecosystems and Agricultural Sciences (BEAS), and a newly added PhD in Transdisciplinary Sustainability (TRSU). Additionally, there is a proposal for a new PhD in Boreal Ecosystems and Agricultural Sciences currently under development (MUN, 2020-b). In addition to the university-wide sustainability declaration and purchasing policy, Grenfell has many initiatives related to sustainability teaching, research, and implementation.

Grenfell has several research institutes and facilities with a focus on sustainability. The Environmental Policy Institute is dedicated to teaching, research, and public engagement surrounding environmental policy issues in NL and Canada. The institute is home to the Master of Arts in Environmental Policy, and the Environmental Policy Innovation Lab (EPI-Lab). The EPI-Lab partners with entities in the greater community to provide *pro bono* collaborative research. The guiding principles for EPI-Lab projects are that they are partner-focused, evidence-informed, environment-oriented, policy-relevant, province-prioritized, and student-engaged (*Environmental Policy Institute*, n.d.). The Boreal Ecosystems Research Facility houses a high-end analytical facility

with three laboratory spaces, a pre-processing unit that allows for preliminary processing and drying of raw samples before they are analysed in sterile conditions, an extraction and standard chemical analysis laboratory, and a molecular biology laboratory (Grenfell Campus, n.d.-a). This lab has a particular focus on analysing soils, plants, air, and water, and thus has the potential to increase Grenfell's agricultural research capacity.

Regarding campus sustainability implementation, the Grenfell Campus Sustainability Committee was formed to "co-ordinate the diverse initiatives at Grenfell Campus and to bring together the various departments to discuss the campus's role as a leader in environmental innovation" (Grenfell Campus, n.d.-e). This committee meets monthly and consists of faculty, staff, students, and several representatives from local organizations. It currently operates on a relatively ad-hoc basis, with members volunteering to sit on the committee rather than being formally appointed by their schools. Given that this is not a committee with formal appointments, it has a relatively low position in the campus's internal decision-making hierarchy. Nevertheless, the committee has been responsible for several successful sustainability initiatives on campus. In 2017 it formed the Waste Management Subcommittee (now the Grenfell Campus Waste Management Committee), a student-run volunteer organization that oversees the campus's recycling program and delivers regular workshops on how to live more sustainably through reducing waste. Grenfell Campus Student Housing also hosts the Free Store where students can donate gently used items and receive them for free.

In addition to these environmentally focused initiatives, Grenfell has initiatives related to economic and social sustainability. The campus has partnered with the Corner Brook campus of the College of the North Atlantic (CNA) on the Navigate Entrepreneur Centre. Formed in 2004 as Gateway West, the Navigate centre provides business coaching and support to local entrepreneurs and staff, faculty, and students at Grenfell and CNA, and has helped over 300 clients begin their business journeys since opening in 2004 (Navigate Entrepreneurship Centre, n.d.-a). This program has three pillars, an entrepreneurship centre, the Makerspace, and a business incubator. The Makerspace provides benefits to local entrepreneurs and the Grenfell and CNA communities by providing a free communal workspace and access to tools such as 3D printers, laser cutters, digital looms, and more (Navigate Entrepreneurship Centre, n.d.-b). Additional services provided by the Makerspace include prototype development and testing, workshops, and special events for makers[2], networking and mentorship opportunities and open community making nights. While sustainability is not a focus area for this centre, there is potential for it to be integrated more in sustainability initiatives through their offerings and services, which will be discussed in greater detail later in this thesis.

The Office of Engagement is also involved with sustainability in the local community, with a vision to "provide leadership and support in community-engaged scholarship, teaching and learning, and entrepreneurship that contribute to the sustainability of

[2] While the Navigate Makerspace does not define the term “maker” itself, Halverson & Sheridan (2014, p.496) broadly defines the “maker” movement as “the growing number of people who are engaged in the creative production of artifacts [sic] in their daily lives and who find physical and digital forums to share their processes and products with others,” thus, a maker is someone who partakes in this movement.

Western Newfoundland and beyond" (Grenfell, n.d.-d). This office was formed with the intent to build a culture of collaboration between Grenfell Campus and Western NL and has been successful at building partnerships between the campus and local entities in recent years. In 2016, the Office of Engagement partnered with the City of Corner Brook to launch the CityStudio project (Callahan, 2016). The CityStudio model originated in Vancouver, B.C, in 2011, and was formed with the intent to "accelerate sustainability in higher education and provide students with direct opportunities to work in and with the city on urban challenges" (CityStudio Vancouver, n.d.). CityStudio brings together students, faculty, and City staff to co-create knowledge for innovative solutions to complex municipal problems. At Grenfell Campus, the CityStudio is incorporated into the courses Geography 3550: Community and Regional Development and Planning, and Environmental Policy 6001: Applied Environmental Problem Solving. Students in these courses attend lectures at the local City hall and engage in projects focused on municipal issues. At the end of the course, students present their final projects to City councillors. Each year the Geography class focuses on a new theme for their final projects, with past projects such as Downtown Public Space Animation, Sustainable Waterfront Redevelopment, Winter Outdoor Recreation Hubs, and Support the Vitality of West Street (Grenfell Campus, n.d.). At the graduate level, students look at sustainability-related policy issues within the city and provide suggestions and recommendations for future policies within the City of Corner Brook.

In addition to these on-campus sustainability initiatives, Grenfell has numerous partnerships within the local community that are focused on improving and enhancing

socioeconomic sustainability. Partnerships with local entities include the City of Corner Brook, Corner Brook Pulp and Paper Limited (CBPPL), the Corner Brook campus of the College of the North Atlantic (CNA), a local waste management company, and several local food vendors.

Grenfell & the City of Corner Brook: As previously mentioned, Grenfell has partnered with the City of Corner Brook for the CityStudio program. The City of Corner Brook is also partnered with the EPI-Lab on several short research projects, including a report on Japanese Knotweed, an invasive species in Corner Brook. Grenfell is also partnered with the City on the development of a new regional aquatic centre, which will replace the currently decommissioned swimming pool on campus and increase recreational offerings within the region.

Grenfell, CNA, CBPPL & The City of Corner Brook: Grenfell has partnered with CNA and CBPPL on the development of a Centre for Research and Innovation. There are three components to this project: 1) the development of an Innovation Centre in downtown Corner Brook; 2) research on the use of waste by-products of the Corner Brook Pulp and Paper mill and new product development; and 3) the development of training opportunities by CNA. The goal of the project is to "jump start sustainable regional development for the western region of Newfoundland by strengthening collaboration between industry, post-secondary institutions, government and community partners" (Gill, 2020, p. 9). The regional innovation centre will provide a physical space to bring together these partners and enable collaboration. When developed, this centre will host space for research activities,

training, a business incubator, the Makerspace, and the CityStudio project (Crocker, 2019). As this centre brings together the diverse actors who are involved in sustainability transitions, this centre has the potential to contribute to regional development in a manner that is sustainable.

Partnerships with Local Businesses: Grenfell also has partnerships with several local businesses. Due to fiscal restraints, Grenfell had to shut down its industrial composting facility in 2016, creating a pause in the campus's composting program until 2018, when two backyard composters were installed on campus by student volunteers. This backyard composting program, while successful, was insufficient to meet Grenfell's composting demands and was unable to accept waste that included meat or dairy products. To remedy this, administration at Grenfell made a deal with a local waste management company to give them their industrial composter in exchange for free composting collection. Since this partnership started, Grenfell has diverted 1648 kg of organic waste from the landfill (Personal correspondence, February 11th, 2021). Recognizing the importance and sustainability of supporting local companies, Grenfell also contracts its on-campus food services to local vendors.

This growth in sustainability programming and community engagement exemplifies Grenfell's commitment to increasing its sustainability profile, as outlined in the campus's latest strategic plan. Released in 2020, the strategic plan entitled *Committing to Communities* highlights Grenfell's vision and mission for the next five years. Sustainability holds a prominent position in this strategic plan and is featured in both the vision and mission statements. This plan outlines Grenfell's mission to "continue to

grow as a student-focused and community-engaged campus that utilizes its strengths to innovate, to respond to the needs of its stakeholders, and to lead in achieving transformative change for sustainability" (Committing to Communities, 2020). In addition to a clear commitment to sustainability outlined in the mission statement, this plan has several goals related to sustainability and community engagement throughout. Theme 8 of the strategic plan is dedicated solely to environmental sustainability, with goals to increase the environmental sustainability of campus operations, to increase food production and sustainable food initiatives on campus, and to enhance awareness and recognition of, and contributions to environmental sustainability. Having an entire theme dedicated to environmental sustainability within the strategic plan indicates that Grenfell Campus understands and values the importance of this pillar of sustainability.

The strategic plan *Committing to Communities* also has several goals related to social and economic sustainability. Under the theme of health and wellness, Grenfell has a goal to enhance health and wellness supports available to the campus community, to foster a healthy work environment, and to ensure that campus spaces are welcoming and inclusive. While Grenfell has a considerable range of supports in this area for a campus of its size, they are severely strained. For example, at peak times, students can wait up to three weeks for an appointment for psychological services (Committing to Communities, 2020). Grenfell is also aiming to increase its research activity and collaboration with external partners, such as the local community and Indigenous peoples, and these partnerships have the potential to contribute to sustainability within the Western NL region. Another major goal for Grenfell is to increase its public engagement through implementing strategies to better connect students with local and

regional communities and to support regional development and sustainability through reciprocal engagement initiatives. Support and respect for cultural diversity is also a major theme within this strategic plan, with a goal to enhance understanding, interaction and integration between international students, domestic students, and the broader community as well as to engage in Indigenization.

This new strategic plan has considerably more goals related to environmental sustainability and community engagement than the previous Grenfell Campus strategic plan, *Vision 20/20*, which outlined goals for the 2015-2020 period. While sustainability is part of the vision statement in *Vision 20/20*, the term sustainability appears merely twice throughout the entire document, and there is no theme dedicated to environmental protection (Vision 20/20, 2015). Given the elevated position that sustainability received in the *Committing to Communities* strategic plan it appears that sustainability is gaining a higher level of importance and acceptance amongst the Grenfell community. As Grenfell is actively making efforts towards increasing its sustainability profile, it presents a good opportunity to conduct a case study of their campus sustainability and ESD efforts.

1.5.5 A Note on the Case Study Context

This research was conducted during the COVID-19 pandemic, which has had a major influence on the results of this thesis. Many sustainability initiatives discussed in this research are in the context of regular campus operations and do not reflect the current operations present during the pandemic. At the time of writing, MUN is operating on a remote learning basis so some of these initiatives, such as the recycling

and composting programs, are currently on hiatus with the assumption that they will return to normal after the pandemic is over and regular operations have resumed on campus.

1.6 Research Objectives

The purpose of this research is to assess Grenfell's current efforts towards implementing, communicating, and teaching sustainability and to provide recommendations for improvement. To achieve this, there are several objectives for this research:

1. To qualitatively assess the current state of campus sustainability and EfS at Grenfell Campus and to provide recommendations to administration for improvement.
2. To investigate the perceptions of senior faculty and staff at Grenfell Campus towards the concepts of sustainability/SD and to identify areas where Grenfell Campus can integrate sustainability further. This portion of the research is more inductive in nature and does not have any hypotheses associated with it.
3. To contribute to the growing body of research on ESD and campus sustainability. Case studies of campus sustainability initiatives provide rich information for other campuses that want to increase their sustainability efforts. While these studies may not be generalizable, they can provide good data for researchers undertaking jurisdictional scans, and there is potential that the results of this thesis can benefit other campuses that are similar to Grenfell in size and offerings.

1.7 Research Questions

The primary research question for this study is:

1. In what ways has Grenfell Campus been successful at sustainability implementation, how can it improve these efforts, and what are the opportunities and challenges associated with sustainability implementation at Grenfell Campus?

Secondary research questions include:

1. What are the attitudes of students at Grenfell Campus towards the concepts of sustainability/SD and ESD?
2. What are the perceptions of faculty, staff, and administrators at Grenfell Campus towards the concepts of sustainability/SD and campus sustainability?
3. In what ways can universities in small municipalities enhance the sustainability of their local community and contribute to SD?

This thesis can be used as the initial study to begin Grenfell Campus's sustainability data collection process. The analysis of this study clearly shows the potential of a small university campus to enhance its sustainability profile provided that it follows a holistic approach to campus sustainability whereby the whole academic community (students, faculty, and staff) is actively involved in the design and implementation of concrete sustainability projects. Additionally, this sustainability profile is further enhanced when the university campus engages in research and development with various entities in their region such as municipalities, businesses, and non-governmental organizations.

1.8 Thesis Overview

The thesis is organized as follows:

Chapter 2 provides an in-depth literature review on the importance of education in sustainability transitions. It gives an overview of the concepts of sustainability, SD, and ESD, before delving into the factors that influence pro-environmental behaviour and the pedagogies that enable students to gain the competencies needed for sustainability transitions.

Chapter 3 gives an overview of the research methodology and methods used in this study. This includes a discussion of the research design, theoretical framework, analytical framework, data collection procedures, and data analysis techniques.

Chapter 4 gives a high-level overview of the results of the research. The statistical analysis of the student perceptions survey is presented followed by an overview of the emergent themes from the expert interviews.

Chapter 5 provides a detailed discussion of the findings. The results of the survey analysis are interpreted and related to previous findings in the literature. The results of the expert interviews are discussed in detail, including interviewee quotes, and are analysed in the context of the Holistic Campus Sustainability Framework, which has been developed for the purpose of this thesis.

Chapter 6 provides policy recommendations that can help Grenfell Campus enhance its current efforts towards campus sustainability and ESD.

Chapter 7 concludes the study by recapping the significance of the study, its findings, recommendations for Grenfell Campus, and suggestions for future research.

2. Literature review

2.1 Introduction

The purpose of this thesis is to demonstrate the important role that universities play in sustainability transitions and to present a case study of a small campus that is actively striving to improve its sustainability practices. As this topic is broad and complex in nature, this literature review will be wide-ranging in scope and will examine sources from academic journals, published books, and reports by intergovernmental organizations. As sustainability transitions require a transdisciplinary approach[3], this section will draw on literature from several different fields including environmental studies, education, psychology, economics, and political science. This broad overview will paint a holistic picture of the vital role that higher education institutions play in the transition to SD; ranging from their ability to impart knowledge and to influence the attitudes and behaviours of their campus community, to the impact of their operations and facilities on the environment, to the contributions of their research and innovation, and their contributions to local sustainability. This literature review will begin with the historical roots of the concept of "sustainability" and how it has transitioned into the concept of "sustainable development", before delving into a discussion of the UN Sustainable Development Goals (SDGs), its pitfalls, and other conceptualizations of sustainable development present in academic literature. This will then be followed by an overview of the similar, albeit later, transition from EE to ESD. This will be followed

[3] The International Bureau of Education – United Nations Educational, Scientific and Cultural Organization defines a transdisciplinary approach as "an approach to curriculum integration which dissolves the boundaries between the conventional disciplines and organizes teaching and learning around the construction of meaning in the context of real-world problems or themes."

by a discussion regarding competencies for SD/ESD, ESD pedagogies, and the importance of the “whole-of-university" approach to ESD.

2.2 From “sustainability” to “sustainable development”

Climate change, the destruction of habitats, pollution, and biodiversity loss may seem like contemporary issues; however, there is evidence that humans have been aware of the negative impact of resource exploration and extraction on the environment for much of the recorded history. In a historical deep dive into the concept of sustainability, Du Pisani (2006, p. 85) identifies many striking examples of the concept throughout recorded history. Classical scholars such as Plato, Strabo, and Columella documented environmental degradation resulting from activities such as farming, logging, and mining while calling for practices that would maintain the “everlasting youth” of the planet. While the impact of resource extraction on the environment has been documented throughout much of recorded history, the term “sustainability” would make its first appearance in the 18th century when German forester Hans Carl von Carlowitz first suggested sustainable use (‘nachhaltende Nutzung’ in German) of forest resources. This practice consisted of “maintaining a balance between harvesting old trees and ensuring that there were enough young trees to replace them” (Du Pisani, 2006, p. 85).

The most striking historical example of the sustainability concept, as identified by Du Pisani, occurred at the end of the 19th century. In the book ‘The Wonderful Century’, British naturalist Alfred Russel Wallace retrospectively assessed the success and failures of the 19th century. Within this book a chapter is dedicated to the plunder of the earth, which identifies all themes that would appear a century later in the Brundtland

Report (Van Zon, 2002, p. 101, as cited in Du Pisani, 2006). Du Pisani concludes from his overview that while the roots of the sustainability concept can be traced to ancient times, population growth and material consumption triggered by the Industrial Revolution and medical advances brought forth awareness of the need to manage natural resources in a sustainable manner. Despite the increased awareness about the need for sustainability, these concerns would not become widespread throughout the globe until the second half of the 20th century. After the conclusion of World War Two, human population tripled, and economic activity grew substantially in a period sometimes referred to as 'the Great Acceleration' (Steffen et al., 2011), which would continue until the onset of a global economic recession in the 1970s (Du Pisani, 2006). Around this time a paradigm shift in the development discourse caused SD to become the dominant development paradigm in the international discourse.

While the concept of sustainability has been present since at least the classical era, the concept of SD arrived much later and is considered by some to be a derivative of the field of economics, citing the Malthusian population theory (Mensah, 2019, p. 6). Proposed in 1798 by English economist Thomas Robert Malthus, the Malthusian population theory hypothesizes that population growth will one day outpace agricultural production (Malthus, 1798). This theory would increase international discussion on the capacity of earth's limited natural resources to support population and economic growth (Mensah, 2019, p. 6). These discussions surrounding the impact of resource extraction and population growth on the environment would continue within the field of economics, with John Stuart Mills first proposing the idea of the "stationary state" economy in 1848 (Du Pisani, 2006, p. 86). The stationary state, also referred to as the

steady state economy, is an economic paradigm where “both the stock of people (population) and the stock of artifacts (physical capital) would be constant – not static, but in a state of dynamic equilibrium” (Daly & Farley, 2011, p. 55).

In 1972 the Club of Rome released The Limits to Growth report which, much like Wallace’s reflection on the 19th century, emphasized the impact of human economic activity on the biosphere and the consequences that the business-as-usual scenario will have on the future. It concluded that if the current trends in population and economic growth, pollution, and environmental degradation continue, humanity will reach the limits to growth within the next 100 years (Meadows et al, 1972, p. 23). Awareness of the impact of economic activity on the environment and the consequences that it can pose on human health and society continued to grow after the release of this report, eventually leading to the creation of the Brundtland Commission. Originally formed as the World Commission on Environment and Development (WCED), this commission would produce the 1987 report “Our Common Future”, and with it the most cited definition of SD: “development that meets the needs of the present without compromising the ability of future generations to meet their own needs” (WCED, 1987). Today, sustainability is a core concept in the global political agenda while the concept of SD with its three dimensions (ecological, economic, and social) dominates the development discourse (Gerin (2006) and Abubakar (2017) as cited in Mensah, 2019, p. 6). While the two terms are often used interchangeably within the literature, they are not synonymous. Gray argues, rather, that SD is a process by which the end state of sustainability is achieved (cited in Mensah, 2019). Despite these definitions, it is important to note that both the concepts of sustainability and SD are contested, with

numerous and sometimes contradictory meanings, as will be discussed throughout this chapter.

2.2.2 The Sustainable Development Goals

On September 25, 2015, the United Nations adopted Resolution 70/1: *"Transforming our world: the 2030 Agenda for Sustainable Development",* which outlined 17 goals and 169 targets that "provides a shared blueprint for peace and prosperity for people and the planet, now and into the future" (UNOSD, n.d.). These goals build upon the previous Millennium Development Goals, which focused primarily on social development, to include consideration of ecological issues. The SDGs are the major international framework for implementing SD and were adopted by all UN member-states in 2015.

While the end-goal of the SDG framework is a society that ensures global prosperity for all while operating within ecosphere limits, this framework does not come without major criticisms, particularly with regards to SDG 8 (decent work and economic growth). As economic growth is one of the major sources of environmental degradation, this calls into question the effectiveness of including it as part of the SD paradigm. According to the Intergovernmental Panel on Climate Change (IPCC) the two major sources of atmospheric carbon are population and economic growth, with economic growth's contribution growing in recent years. While population growth's contribution to CO_2 emissions has remained relatively the same since the 1970s, CO_2 emissions from economic growth rose sharply between 2000-2010 (IPCC, 2014, p. 5). Economic growth's contribution to greenhouse gas emissions is further exemplified by the

reductions in greenhouse gas emissions that occurred because of lockdown measures during the COVID-19 pandemic. Le Quéré et al (2020) found that the average daily global CO_2 emissions were 17% lower in April 2020 compared to April 2019 and that, at its peak, emissions in individual countries decreased by 26% on average.

When one considers how often impact occurs during the lifecycle of a product, it paints a clear picture of how economic activity is the predominant driver of global environmental change and how it is encroaching upon the ecological limits of the biosphere (Rockstrom et al., 2009). When considering the lifecycle of an item, its impact is not simply the sum of the materials used to produce it; rather, it encompasses all resources that have been used at all points in its supply chain, from conceptualization to disposal (Braungart & McDonough, 2002). Impact occurs when a product is first conceptualized, as its creator must use some form of medium to convey their schematics or ideas before delving into production. The resources used in conveying the schematics and building the product have an environmental impact embedded in them, associated with their extraction, processing, and transportation, which may occur in various places around the globe. Building the product then requires energy which, in most parts of the world, comes from predominantly non-renewable and polluting sources. Marketing the product then requires either paper or energy resources (or both) depending on if the producer chooses to advertise via print or digital media. The product is then packaged and shipped, oftentimes over a long distance with polluting modes of transport, to finally reach the customer - who will likely throw the product in the garbage once it no longer serves them. Focusing on materially growing the economy without reducing the impact of production first will simply result in continuous environmental degradation.

There is also evidence that the emphasis on economic growth may impede progress towards other SDGs. In a statistical analysis of the synergies and trade-offs present in the SDGs, using the UN indicator framework, Pradhan et al (2017) found that SDG 8 (decent work and economic growth) is correlated with trade-offs in the following goals: SDG1: No poverty, SDG2: Zero hunger, SDG3: Good health and well-being, SDG4: Quality education, SDG5: Gender equality, SDG6: Clean water and sanitation, SDG7: Affordable and clean energy, SDG9: Industry, innovation and infrastructure, SDG10: Reduced inequalities, SDG13: Climate action, SDG15: Life on land, and SDG17: Partnerships for the goals. While the authors caution that correlation does not equal causation, they state that "the analysis shows associated synergistic co-benefits and problematic trade-offs that exist among and within the SDGs under past and current conditions of socio-economic operation" (Pradhan et al. 2017, p. 1171). Given the considerable number of trade-offs associated with SDG 8, it calls into question the effectiveness of including it within the SD paradigm, evidenced by some alternative conceptualizations of SD present in academic literature.

Another issue present in the SDG paradigm lies in SDG4 Quality Education. In the document *Unpacking Sustainable Development Goal 4: Education 2030,* the United Nations Educational, Scientific and Cultural Organization (UNESCO) gives an overview of the objectives outlined in SDG4. This document acknowledges that education is both a public good and a fundamental human right, that gender equality is inextricably linked to the right to education for all, and that quality education is linked to SDG 3: Health and Wellbeing, SDG 5: Gender Equality, SDG 8: Decent Work and Economic Growth, SDG 12: Responsible Consumption and Production, and SDG 13:

Climate Change Mitigation. While target 4.7 calls for "ensur[ing] that all learners acquire the knowledge and skills needed to promote sustainable development, including, among others, through education for sustainable development and sustainable lifestyles, human rights, gender equality, promotion of a culture of peace and nonviolence, global citizenship and appreciation of cultural diversity and of culture's contribution to sustainable development" it does not emphasize the ecological dimension of SD. The targets under SDG 4 are focused predominately on the socio-economic dimensions of SD by increasing access to education around the world and by advocating for peace and understanding amongst different cultures. While achieving these socio-economic targets are certainly an important part of sustainability, addressing global climate change and environmental degradation is equally as important. While target 4.7 calls for ensuring that all students receive the knowledge and skills needed to promote sustainable development, the indicator framework used to assess progress on this target is somewhat lacking and again focuses predominately on socio-economic dimensions. Of the five indicators used to assess progress in this goal, only two are explicitly linked to educating for sustainability, and these two indicators still have a social focus. For example, indicator 4.7.1 assess the "[e]xtent to which (i) global citizenship education and (ii) education for sustainable development, including gender equality and human rights, are mainstreamed at all levels in: (a) national education policies, (b) curricula, (c) teacher education and (d) student assessment." While this goal does contain education for sustainable development, it is still mixed amongst social goals. Similarly, indicator 4.7.4 assesses the "percentage of students by age group (or education level) showing adequate understanding of issues relating to global citizenship and sustainability", which still mixes environmental and social goals.

While one can argue that indicator 4.7.5 covers the environmental dimension of sustainability by assessing the "[p]ercentage of 15-year-old students showing proficiency in knowledge of environmental science and geoscience", these courses do not necessarily teach the skills needed to incorporate sustainability into one's lifestyle. While these courses help to impart important knowledge surrounding the earth system and global climate change, as will be discussed in-depth later in this thesis, imparting knowledge is not enough to ensure that people engage in pro-environmental behaviours.

2.2.3 Conceptualizations of Sustainable Development in Academia

While the Brundtland definition of SD is the most cited definition and the UN SDGs are the predominant international framework for implementing sustainability, there are other conceptualizations of SD within academic literature. For example, Mensah (2019) conducted a systematic review into the definition of SD and identified several conceptualizations of sustainability present in the literature. These conceptualizations include 1) the dictionary definition of the word: a capacity to maintain something over time; 2) the efficient and equitable distribution of resources both inter and intra-generationally such that the socio-economic system remains in ecosystem limits; and 3) the equilibrium between population and carrying capacity of its environment, where the population can flourish to its full potential without compromising carrying capacity.

Another popular conceptualization of SD is the Triple Bottom Line (TBL), though this concept does not come without criticisms, most notably from its own creator John Elkington. Sometimes coined as the 3Ps or "people, profit, planet", this concept has

been well-incorporated into the business lexicon and is often taught in business schools as a sustainability framework that assesses the impact that a business has on the economy, environment, and society. As the TBL is typically taught, when a business accounts for all three dimensions it is only then considering the full cost of doing business. However, according to Elkington the concept was originally intended to be more holistic and that the "TBL concept has been captured and diluted by accountants and reporting consultants" (2018). While the TBL is largely presented as an accounting tool today, Elkington states that this was not his original intention for the concept. Elkington's intentions for the TBL were to "provoke deeper thinking about capitalism and its future" but many early adopters viewed it as a balancing act. Companies now produce thousands of TBL reports annually, but it is unclear if the data is being aggregated in a way that allows decision-makers to track, understand, and manage the systemic effects of human economic activity (Elkington, 2018).

In response to the economic focus of dominant SD paradigms such as the SDGs and the TBL, Seghezzo (2009) proposed a new five-dimensional sustainability triangle that represents people, place, and permanence. Place occupies three of the five dimensions and is the physical realm in which intra-generational equity occurs and culture is formed. Permanence is the dimension where planning occurs and consideration of today's actions on the future is taken. People inhabit their own dimension, as merging individuals and society together fails to capture the true complexity of human behaviour. This dimension recognizes that people are not insatiable utility-maximisers, and that personal happiness is largely disconnected from economic wealth. Seghezzo argues that this new five-dimensional sustainability framework is

“more inclusive, plural, and useful to outline specific policies towards sustainability.” He emphasizes that the dimensions of the sustainability triangle interact in complex ways, and because of this interaction the dimensions of the triangle cannot be tackled in a fragmented manner, reflecting the systems-thinking perspective needed for sustainability.

Sustainability can also be thought of as a continuum from “weak sustainability” to “strong sustainability”, which is one of the many contributions from the field of ecological economics to the sustainability discourse. In ecological economics sustainability depends on the maintenance of capital stock, which consists of manufactured capital, human capital, social/organizational capital, and natural capital (Ekins et al, 2003). The notion of weak sustainability consists of maintaining the total capital stock without regard to its composition, assuming that manufactured capital can be substituted for natural capital (Ekins et al, 2003). Strong sustainability, on the other hand, requires that all capital stocks be maintained intact separately and views natural and manufactured capital as complements, rather than substitutes (Goodland & Daly, 1996). In this view, the “substitutability of manufactured for natural capital is seriously limited by such environmental characteristics as irreversibility, uncertainty and the existence of 'critical' components of natural capital, which make a unique contribution to welfare” (Ekins et al, 2003).

Another important contribution from ecological economics is the vision of the economy as embedded in the biosphere. While classical economics identifies land as a factor of production, thus embedding the biosphere within the economy, ecological economics

reverses this view and embeds the economic system within the biosphere. Viewing the economy as a subsystem within the greater biosphere implies that there are limits to economic growth, as a subsystem cannot expand beyond the limits of the system that it is embedded in without dire consequences. In this vision, economic growth results in an opportunity cost as the macroeconomy expands upon the finite and non-growing biosphere which results in resource depletion and eventually leads to uneconomic growth, whereby the costs of continued economic expansion outweigh its potential benefits (Daly & Farley, 2011, p. 16).

Sustainability can also be conceptualized as a scientific field. Since the late 1990s, sustainability's issues have been tackled by a distinct scientific field entitled sustainability science (Kates et al. 2001; Komiyama and Takeuchi, 2006; König, 2019). Sustainability science is an emerging field of inquiry seeking to understand "the fundamental character of interactions between nature and society" (Kates et al. 2001), and "a problem-driven and solution-oriented field that follows a transformational agenda" (Lang et al. 2012). This research field is important, as it promotes trans-disciplinary research which aims at "bridging the gap between problem solving and scientific innovation" (Lang et al. 2012) by bringing together insights from multiple disciplines and from other stakeholders or knowledge users. In a systematic review of the methods carried out in sustainability science, Salas-Zapata, Rios-Osorio, and Cardona-Arias (2016) identify three ways of understanding sustainability: 1) a teleological understanding of sustainability as a vision; 2) an ontological understanding of sustainability as a behaviour of specific systems; and 3) the incorporation of environmental criteria into human activities. Thus, sustainability can mean a purpose,

a behaviour, or a set of social-ecological criteria (Salas-Zapata et al, 2016). Additionally, their findings indicate that sustainability science is currently an evolving field that lacks the characteristics of a mature science such as the existence of a scientific community, a set of theoretical assumptions and methodological prescriptions, and shared techniques. While their findings indicate an immature scientific field, this is likely due to the transdisciplinary nature of sustainability science. An agreement is emerging in academia that sustainability challenges require new ways of knowledge generation and decision-making, thus, sustainability science openly promotes transdisciplinary processes that include actors from outside of academia in the research process (Lang et al, 2012). These research processes follow a sequence of three phases: 1) building a collaborative research team and jointly defining the problem, 2) the co-production of knowledge through collaborative research, and 3) integrating and applying the knowledge both in science and practice (Lang et al, 2012). Thus, sustainability science is a "problem-driven and solution-oriented field that follows a transformational agenda" (Lang et al. 2012) based on scientific innovation. Thus, sustainability is a perennial field of inquiry about humans' relation with nature, while SD on the other hand is primarily connected with the socio-economic development agenda and is largely concerned with how humans can instrumentally use nature to their own advantage. Therefore, it is important that students learn about sustainability as well as sustainable development as this is essential for their formation of Earth inhabitants that preserve their home rather than exploit it for development based on unending economic growth.

Another conceptualization of SD is that it is a learning process. As humans currently behave in a collectively unsustainable manner, SD will inherently be a learning process where these behaviours are transformed. Scott & Gough (2003) go as far as stating that SD and learning do not simply go hand-in-hand, but rather, "that there will be no sustainable development where learning is not happening" (pg. Xiv). To exemplify SD as a learning process, Scott & Gough (2003, as cited in Vare & Scott, 2007) have identified three types of approaches to thinking about SD, learning and change. Type one approaches assume that the key issues faced by humanity are environmental in nature and can be resolved through changing human behaviours towards nature and the development of new technologies. Type two approaches assume that the source of humanity's issues lie in the social/political dimension and that these issues create environmental symptoms. In both type one and two approaches the primary goal is to bring about social change and learning is presented as a tool to achieve this. Type 3 approaches assume that current knowledge is inadequate and that "desired 'end-states' cannot be specified". This approach gives way to a more open-ended learning style, which is an essential tool "if the uncertainties and complexities inherent in how we live now are to lead to reflective social learning about how we might live in the future" (Vare & Scott, 2007, p. 193).

The plurality of conceptualizations related to sustainability and SD is one of the complexities inherent in sustainability transitions and ESD (Salas-Zapata et al, 2016). Regardless of which conceptualization one chooses to frame the sustainability/SD discourse, the main goals are clearly intergenerational equity, ecosystem integrity, and good lives and wellbeing for all. Given that contemporary environmental problems are

predominately the result of human economic activity, which is driven by humanity's collective wants and needs, a shift from materialism towards biocentrism within all individuals in society is needed. The need for this fundamental shift makes it evident that the education system will play a leading role in this process, as education has been identified as one of the influential factors in the development of an individual's attitudes and behaviour.

2.3 From Environmental Education to Education for Sustainable Development

The origins of EE as it is known today can be traced back to 1948 with the Conference for the Establishment of the International Union for the Conservation of Nature (IUCN), which prioritized the protection of habitats (Carter & Simmons, 2010, p. 4). This conference gave way to the early strives towards EE, particularly in the United States, as concern for the environment grew along with the nation's growing protest movement in the 1960s (Carter & Simmons, 2010, p. 6). This would lead to the introduction of environmental legislation throughout the U.S. including the Wilderness Act of 1964, the Species Conservation Act of 1966, The National Environmental Policy Act of 1969, and the Environmental Education Act of 1970 (Carter & Simmons, 2010, p. 6), and the introduction of the Environmental Protection Agency in 1971. The international community would quickly catch-up to the USA, with the importance of EE for fostering conservation values being officially recognized at the Stockholm Conference in 1972 (Huckle & Wals, 2015; Lozano, Lukman, Lozano & Huisingh, 2013; Carter & Simmons, 2010). Also known as the United Nations Conference on the Human Environment, the Stockholm Conference was the first major conference on international environmental issues and was a major turning point in environmental politics (United

Nations, nd). The conference set the stage for greater awareness of the need to advance EE (Carter & Simmons, 2010, p. 8) and resulted in the inception of the concept of sustainability in higher education (Alshuwaikhat & Abubakar, 2007, p. 1777; Mogandas, Corral-Verdugo & Ramanathan, 2013, p. 1446). The major outcome of this conference was the Stockholm Declaration, which established 26 principles concerning the environment and development. Principle 19 of the Stockholm Declaration emphasizes the need for EE:

> "Education in environmental matters, for the younger generation as well as adults, giving due consideration to the underprivileged, is essential in order to broaden the basis for an enlightened opinion and responsible conduct by individuals, enterprises and communities in protecting and improving the environment in its full human dimension." (UN General Assembly, 1972, p.5).

In addition to the need for EE outlined in Principle 19, Principle 20 establishes the need for all countries to engage in research that addresses environment and development issues and that "the free-flow of up-to-date scientific information and transfer of experience must be supported and assisted, to facilitate the solution of environmental problems" (UN General Assembly, 1972, p.5).

While the Stockholm Conference helped to set the stage for the international discourse on EE, two other conferences are regarded as seminal in the field (Carter & Simmons, 2010, p. 8). The first is the 1975 International Workshop on Environmental Education. This workshop resulted in *the Belgrade Charter*, which includes the most widely accepted definition of EE (Carter & Simmons, 2010, p. 8). The *Belgrade Charter* defines EE as:

> A process aimed at developing a world population that is aware of and concerned about the total environment and its associated problems, and which has the knowledge, attitudes, motivations, commitments, and skills to work

> individually and collectively toward solutions of current problems and the prevention of new ones. (UNESCO-UNEP 1976, p. 2).

The second seminal conference in the field of EE is the first Intergovernmental Conference on Environmental Education, held in Tbilisi, Georgia, USSR in October 1977. This conference resulted in *The Tbilisi Declaration*, which established goals for the field of EE and provided the framework for majority of the work that has been completed in the field since (Carter & Simmons, 2010, p. 8). The three goals of EE, as established in the *Tbilisi Declaration* are:

> "(a) To foster clear awareness of, and concern about, economic, social, political and ecological interdependence in urban and rural areas;
>
> (b) To provide every person with opportunities to acquire the knowledge, values, attitudes, commitment and skills needed to protect and improve the environment; and
>
> (c) To create new patterns of behaviour of individuals, groups and society as a whole towards the environment" (UNESCO 1978, p. 26).

In 1990, the importance of universities in EE was recognized at a conference in Talloires, France. The resulting declaration from this conference *The Tallories Declaration* would become the first official statement made by university presidents and chancellors that would outline a commitment to environmental sustainability in the higher education sector (University Leaders for a Sustainable Future (ULSF), 2021). The preamble to the declaration outlines the important role that universities play in sustainability transitions, stating:

> "We, the presidents, rectors, and vice chancellors of universities from all regions of the world are deeply concerned about the unprecedented scale and speed of environmental pollution and degradation, and the depletion of natural resources […] We believe that urgent actions are needed to address these fundamental problems and reverse the trends. […] Universities have a major role in the education, research, policy formation, and information exchange necessary to make these goals possible. Thus, university leaders must initiate and support mobilization of internal and external resources so that their institutions respond to this urgent challenge." (ULSF, 1990).

The *Tallories Declaration* outlines a ten-point action plan for incorporating sustainability and environmental literacy in teaching, research, operations and outreach at colleges and universities. The goals of the *Tallories Declaration* are 1) Increase Awareness of Environmentally Sustainable Development, 2) Create an Institutional Culture of Sustainability, 3) Educate for Environmentally Responsible Citizenship, 4) Foster Environmental Literacy For All, 5) Practice Institutional Ecology, 6) Involve All Stakeholders, 7) Collaborate for Interdisciplinary Approaches, 8) Enhance Capacity of Primary and Secondary Schools, 9) Broaden Service and Outreach Nationally and Internationally, and 10) Maintain the Movement (ULSF, 1990). Since its original signing in 1990, over 500 universities from 50 countries have signed the declaration (ULSF, 2021).

EE would continue to be the dominant paradigm in international political discourse surrounding education for a sustainable future until the new millennium. In December 2002, the UN General Assembly passed a motion to declare 2004-2015 as the DESD (Wals, 2014). The goal of the DESD is to establish "a world where everyone has the opportunity to benefit from education and learn the values, behaviours, and lifestyles required for a sustainable future and for positive societal transformation" (DESD (2014), as cited in Huckle and Wals, 2015, p. 491). Much like the field of EE, the DESD strived to instill in students the knowledge of contemporary environmental issues and the awareness of the impact of human activity on the environment, while providing the skills needed to engage in pro-environmental behavior and active citizenship.

Since the DESD, the international discourse surrounding EE has been replaced with ESD (Stevenson, 2007, p. 267). Stevenson (2007, p. 267) notes that ESD has a more broad and complex agenda than EE, that is "simultaneously more ambitious and ambiguous". Stevenson raises concerns that this can leave teachers and schools feeling overwhelmed, as "the increased scope, complexity, and ambiguity become significant concern for practice as additional intellectual and pedagogical demands are placed [on them]." This concern is amplified by the lack of educator involvement in the development of international discourse on ESD, as international conferences tend to bring together professionals from the environmental or development fields, rather than educators (Stevenson, 2007, p. 267-268).

This transition in the international discourse has led to a plethora of views regarding the relationship between EE and ESD. As summarized by Eilam & Trop (2007, p. 44), there are four predominant views on this relationship present in the literature. In the first view, ESD and EE are regarded as different fields that have some overlap, with some viewing them as complementary disciplines which share common goals (McKeown & Hopkins, 2007, p. 18). In the second view of this relationship, ESD has replaced EE and expanded its goals and processes. The third view sees the two fields as separate, however, EE is regarded as the foundations of ESD. In the fourth view, they are regarded as completely overlapping.

The second view is interesting to delve into deeper. Much of the literature on ESD debates whether its replacement of EE is a regressive or progressive move, and these views seem to coincide with whether one regards ESD as too

anthropocentric or biocentric. For example, Kopnina (2011) regards the transition in the international policy discourse from EE to ESD as a regressive move, and views ESD as largely replacing the field of EE. She argues that ESD is too anthropocentric in nature, stating that the discourse on ESD underestimates the social and environmental costs of development while assigning superior value to the predominately Western ideal of economic growth (Kopnina, 2011, p. 77).

While scholars like Kopnina view ESD as too anthropocentric and call for a return to the bio-centric nature of EE, there are other scholars holding an opposite opinion. Leal Filho et al (2018, p. 287, and citations within), for example, believe that the biophysical dimension of sustainability has been overemphasized in the integration of SD into the curriculum, and that academics "need to rethink the organizational learning process to enhance students' understanding of the drastic consequences for human life resulting from the overexploitation of a planet with finite resources." Given that positive attitudes towards the environment are not universal, emphasizing the consequences of environmental degradation on human well-being may appeal to a broader range of people who may be more motivated by social or self-serving purposes.

Regardless of how one perceives the relationship between ESD and EE, it is evident that both fields share a common goal: a shift in the behaviours of individuals in all societies, so they operate within the limits of the biosphere and in a manner that is socially just for all, including future generations. Thus, to gain an understanding of how universities can help to shape sustainable behaviours within their campus communities it is important to address the complexity of human behaviour.

2.4. Translating Knowledge into Action: Factors that Influence Behaviour

Given the continuous increase in environmental degradation due to growth in material consumption, the question arises as to whether EE and ESD are achieving the goal of societal behaviour change. If students are learning the proper knowledge about the state of the environment and humans' place and relationship with nature, it is evident that there is a failure to translate this knowledge into behaviour change en masse. This phenomenon has been well studied; a plethora of research exists in the fields of environmental psychology, behavioural sciences, and environmental ethics that attempts to explain the gap between the possession of environmental knowledge and pro-environmental behaviour (Stern 2000; Arbuthnott, 2008; Kollmuss & Agyeman, 2002; and citations within).

The predisposition to do good for the environment is the strongest factor that influences pro-environmental behaviour (Stern, 2000, p. 416), thus in many cases, changing attitudes is a prerequisite to behaviour change (Arbuthnott, 2008, p. 153). Early theories in environmental psychology built off this fact and assumed a linear relationship between environmental awareness and pro-environmental behaviours. The assumption in these theories is that people do not behave in environmentally friendly ways due to a lack of knowledge. However, these theories would be quickly disproven, with current literature indicating that simply imparting knowledge about environmental issues is not enough to ensure behaviour change (Kollmuss & Agyeman, 2002, p. 241). This does not mean that knowledge is not an important factor with regards to environmentally

friendly behaviours. People with higher levels of environmental knowledge and people with more years of education, regardless of their field of study, have the tendency to show higher levels of environmental concern (Gifford & Nilsson, 2014). While environmental knowledge is a necessary antecedent to environmental concern, knowledge alone is not a sufficient condition for ensuring that people behave pro-environmentally (Gifford & Nilsson, 2014, p. 142). As it is evident that knowledge is not enough to ensure that individuals behave in an environmentally-friendly manner, understanding the factors that influence pro-environmental behaviours is important.

Behaviour is a complex phenomenon, and it is important to understand the factors that influence it when designing ESD programs and policies. While it is not possible for a single article to sum up all the factors that influence behaviour (Gifford & Nilsson, 2014, p. 142), there are several factors that appear frequently in the literature surrounding pro-environmental behaviours. Stern (2000), for example, proposes the value-belief-norm (VBN) theory of environmentalism to explain the factors that lead to pro-environmental behaviours. This theory builds off of value theory, norm-activation theory, and the New Ecological Paradigm to describe a causal chain of variables that lead to pro-environmental behaviours. Value theory refers to theories that look to values to explain pro-environmental behaviours. Schwartz (1994, as cited in Stern 2000), for example, links general theories of values to environmental concern and behaviour, finding that self-transcendent or altruistic values are stronger amongst those that engage in pro-environmental behaviour. The moral norm-activation theory holds that altruistic behaviours occur when personal moral norms are activated in individuals that believe that particular conditions (such as environmental degradation) pose threats to others and

that they have a personal responsibility to behave in a way that does not pose a threat to others (Stern, 2000, p. 412). The New Ecological Paradigm perspective holds that humans should be viewed as one of many interconnected species on planet earth, that humans are influenced by their biophysical environment, that human affairs are constrained by their biophysical context, and that there is a limit to growth on human society (Catton & Dunlap, 1980). These three theories work together to form a casual chain of variables to explain pro-environmental behaviours. As Stern (2000, p. 413) explains "the causal chain moves from relatively stable, central elements of personality and belief structure to more focused beliefs about human-environment relations, their consequences, and the individual's responsibility for taking corrective action." In essence, this theory proposes that values influence pro-environmental behaviour via pro-environmental beliefs and personal norms.

Whilst the VBN Theory of Environmentalism is one of the best exploratory accounts of the factors that influence non-activist environmentalism (Stern et al., 1999, as cited in Stern, 2000), it is important to note that there are other factors that influence behaviour identified in the literature apart from this model. Behaviour is a complex phenomenon and single-variable explanations are limited in their ability to inform efforts towards behaviour change (Stern, 2000, p. 419.) The rest of this section will be dedicated to explaining the other factors that influence pro-environmental behaviour identified in the literature, including contextual factors, personal capabilities, habits, intention specificity, perceived control, self-regulation depletion, and personal/social factors.

Contextual factors are broadly reaching and include interpersonal influences, community expectations, advertising, government regulation, economic incentives, the physical difficulty of certain actions, technological capabilities and constraints, public policies, and features of the broader socio-political context that the individual lives in (Stern, 2000). For example, when there are barriers to performing an environmentally friendly behaviour within an institution, such as inconvenience or cost, people are less likely to change their behaviour regardless of their attitudes or intentions (Arbuthnott, 2008, p. 156). Social and cultural factors also influence an individual's context, as cultural norms play a key role in shaping behaviours, with Kollmus & Agyeman (2002, p. 294) hypothesizing that cultures in small, highly populated countries tend to be more resource conscientious than societies in large, resource-rich countries.

Personal capabilities include the knowledge and skills required to take particular pro-environmental actions, the availability of time to act, and general capabilities and resources such as literacy, money, social status, and power (Stern, 2000, p.417).
Habits are an often-overlooked factor with major implications, as behaviour change often requires breaking old habits and establishing new ones (Stern, 2000, p.417). Youth throughout much of the Western world have grown accustomed to a "throw-away" society that emphasizes convenience, which is further exacerbated by businesses promoting novelty and planned obsolescence. As many of the behavioural changes that are required for a sustainable world are inconvenient and effortful, changing habits will pose a challenge (Arbuthnott, 2008, p. 153).

Arbuthnott (2008) conducted a review of the factors that influence the translation of knowledge into action as identified in the field of environmental psychology. In addition

to the habitual and contextual factors already discussed, Arbuthnott identified intention specificity, perceived control, and self-regulation depletion as factors that influence behaviour. Intention specificity refers to the extent to which an intention is personal and specific: the more personal and specific an intention is, the more likely it will translate into behaviour change. Perceived control refers to the level of control a person feels they have over an issue. A person who possesses an internal locus of control is more likely to believe that their individual actions will have an impact on the environment (Cleveland, Kalamas & Laroche, 2012, p. 297). However, a person with an external locus of control will be less motivated to act as they perceive environmental protection as the responsibility of "powerful others" such as governments and corporations and feel that their personal efforts are ineffective (Kalamas, Cleveland & Laroche, 2015, p. 13). Self-regulation depletion relates to the exercising of self-control, which will be required to break unsustainable habits. Self-control is a finite resource that, when depleted, leads to impaired performance in subsequent self-control tasks (Hagger, Wood, Stiff & Chatzisarantis, 2010, p. 495). The state of depleted self-control is referred to as 'ego depletion' and has a medium-to-large effect size on perceived difficulty and subjective fatigue, and this effect is generally the same regardless of the sphere of control tested (Hagger et al., 2010, p. 515). There is also evidence that managing a bad mood can lead to self-regulation depletion, as people are shown to engage in less conservation behaviours when they are in a poor mood than when they are in a positive one (Knapp & Clark, 1991, as cited in Arbuthnott, 2008).

Similarly, Gifford & Nilsson (2014) conducted a review of personal and social factors that influence pro-environmental behaviour. Personal factors identified by the authors

include childhood experience in nature, knowledge and education, personality and self-construal, sense of control, values, political and world views, goals, felt responsibility, cognitive biases, place attachment, age, gender and chosen activities. Social factors identified by the authors include religion, urban– rural differences, norms, social class, proximity to problematic environmental sites and cultural and ethnic variations. From their review, the authors suggest that people who show high levels of environmental concern are more likely to have a certain social/personal profile (though this profile is not universal to all environmentally concerned individuals):

> "[S]uch persons are likely to have spent time in nature as a child, to have accurate knowledge of the environment, its problems and potential solutions, to have an open, agreeable and conscientious personality, to consider the future consequences of their actions, to feel in control of their behaviours, to harbour biospheric, post-material, liberal values and responsibility for environmental problems, to be among the upper half of the economic classes, to hold personal and descriptive norms about pro-environmental action, to adhere to a religion that teaches a stewardship orientation to the earth, and to spend time in non-consumptive nature activities." (Gifford & Nilsson, 2014, p. 151).

These factors (identified by Stern, Arbuthnott, Gilford & Nilsson, and their citations within), all work together to influence an individual's behaviour towards the environment. As these contexts vary widely depending on the individual, a multifaceted approach is needed to instil a culture of sustainability within the university community. Gardner & Stern (as cited in Stern, 2000, p. 419) reviewed four major types of interventions for environmental behaviour change: moral approaches that appeal to personal values to change world views, educational campaigns to change attitudes, using monetary incentives/penalties to change the material structure of behaviour, and community management through the establishment of shared rules and expectations. They found that each of the four intervention structures can change behaviour, but they are by far the most effective when enacted in together and that

"moral and educational approaches have generally disappointing track records, and even incentive- and community-based approaches rarely produce much change on their own" (Stern, 2000). Despite this poor track record, a new approach to character education based on environmental virtue ethics is currently being researched (Jordan & Kristjánsson, 2016). Virtue ethics focuses on issues of character, excellence, and human flourishing while environmental virtue ethics sees environmental protection as key to promoting the flourishing of human and non-human life (Cafaro, 2019). In the field of virtue ethics education is incredibly important, as development of the virtue is just as important as the virtue itself (Jordan & Kristjánsson, 2016). Jordan & Kristjánsson (2016) proposes a virtue ethics approach to sustainability by identifying "harmony with nature" as a virtue and identifies educational strategies to help develop this virtue. This virtue recognizes that human society is embedded within nature and is ingrained in the concept of whole systems thinking. It also recognizes that sustainability is a non-fixed, changeable, and context-specific phenomenon. Jordan & Kristjánsson (2016) assert that value ethics' educational counterpart, character education, must embrace the sustainability agenda as "fostering a deep connection with nature indicates a change in character rather than principle" (Carr 2004 as cited in Jordan & Kristjánsson, 2016). They propose four strategies where character education and sustainability education can connect and contribute to sustainability transitions. The first strategy consists of institutional exemplars within the education system that adopt environmental values as a part of their campus culture. The second strategy consists of maximizing the purposeful reflective time that children experience in nature as research indicates that spending time in nature increases one's interconnectedness to the natural world (Cheng and Monroe 2012; Schein 2014, as cited in Jordan & Kristjánsson, 2016). The third

strategy focuses on the intellectual virtue of *phronesis,* which is the practical wisdom that one gains through experience. One way that *phronesis* can be developed is by engaging students in case studies or dilemmas where they can explore the complexities that occur in real-life sustainability challenges. The fourth strategy concentrates on developing good citizenship for sustainability through nurturing 'intellectual', 'civic' and 'performance' virtues such as critical thinking, citizenship, and resilience. The authors note that these intellectual virtues as morally neutral and may not be used for virtuous ends, thus, it is equally important to cultivate moral virtues such as compassion and honesty. While the field of environmental virtue ethics offers a new approach to sustainability education, it is important to note that more research is needed in this area both in the school context and within society at large (Jordan & Kristjánsson, 2016).

As traditional educational campaigns have failed, universities must engage in a multi-faceted approach to ESD that encompasses teaching, research, and leading by example through engaging in sustainable operations. Changing attitudes through education will not be sufficient to enable sustainability transitions. According to the Attitude-Behaviour-Context (ABC) theory, as explained by Stern (2000, p. 415), "the attitude-behaviour association is strongest when contextual factors are neutral and approaches zero when contextual forces are strongly positive or negative, effectively compelling or prohibiting the behaviour in question." Thus, universities that do not enable sustainability to be practiced due to institutional barriers will have little success in changing the behaviour of their campus community.

2.5 The Role of Universities in Sustainable Development

While SDG 4: Quality Education calls for "ensur[ing] equal access for all women and men to affordable and quality technical, vocational, and tertiary education, including university" (UNESCO, 2017), it unfortunately does not address what universities can do to contribute to a sustainable society. Fortunately, in 2014 the United Nations Environment Program (UNEP) Environmental Education and Training Unit released the *Greening Universities Toolkit V2.0*. The Greening Universities Toolkit has an objective to "inspire, encourage, and support universities to develop and implement their own transformative strategies for establishing green, resource-efficient and low carbon campuses" (UNEP, 2014). This toolkit provides universities with basic strategies and tools for greening the campus and focuses on the sustainable planning, design, development, and management of a university campus. The toolkit gives an overview of what sustainability means in the higher education context, strategies for initiating sustainability transitions on a university campus, a list of sustainability indicators, strategies, and technologies for implementing campus sustainability, an overview of sustainability policies, governance, and administration at a university campus, a list of other relevant resources, and case studies of exemplar universities from around the globe.

While it is important to incorporate ESD throughout all stages of the education system (from early childhood to adulthood), institutes of higher education, such as universities, colleges, and vocational schools have a significant role to play due to the typical age of their students. Late adolescence is a time when many people first explore their occupational options and ideological opinions, which in turn lead to the formation of

their personal ideologies [4] (Marica, 1980; Whitley and Yoder, 2015; as cited in Lertpratchya, Besley, Zwickle, Takahashi & Whitley, 2017). Therefore, the content of coursework, communication efforts, and policies within the university can influence students to be more accepting of and motivated to engage in sustainable related conversations and behaviours. Additionally, the variety and complexity of functions present on a university campus makes their environmental impact similar to that of a small city (Alshuwaikhat & Abubakar, 2008), thus the sustainability of university operations has a direct impact on the local environment. This section will discuss how university coursework can enable positive attitudes towards sustainability while influencing behavior change through the development of sustainability-related competencies, before delving into the notion of systemic campus sustainability. This will paint a picture of the need for a holistic approach to campus sustainability that uses the whole campus and the greater community as a learning tool.

2.5.1 Teaching and Learning for Sustainability

2.5.1.1 Competencies for Sustainability

One of the major goals of ESD is to impart the knowledge and skills needed for a transition to a sustainable society. As environmental degradation and climate change are common-pool problems that are impacted by and affect everyone, it is important that all students learn the necessary knowledge and skills for sustainability so they can integrate them into their personal lives and professional careers. According to Rieckman (2018, p. 38), "in order to contribute to sustainable development, individuals need to learn how to understand the complex world in which they live, and

[4] De St. Aubin (1996) defines personal ideologies as "an individual's philosophy of how life should be and of what forces influence human living."

how to deal with uncertainties, trade-offs, risks and the high velocity of societal (global) change." This requires developing competencies for sustainability, which can be defined as "a functionally linked complex of knowledge, skills, and attitudes that enable successful task performance and problem solving with respect to real-world sustainability problems, challenges, and opportunities" (Wiek, Withycombe & Redman, 2011, p. 204). In addition to sustainability-specific competencies, traditionally taught competencies such as critical thinking, communication, pluralistic thinking, research, and data management are also important for sustainability-focused programs and courses, as these competencies underlie every academic program of quality (Wiek et al, 2011, pp. 211-212). According to Rieckman (2018, p. 41), "the competence approach is based on establishing which approaches work best in the real world and then identifying how to foster the necessary learning" to bridge the gap between knowledge and action. Thus, it is important to understand the competencies required for sustainability when designing ESD programs.

In an exhaustive literature review on sustainability competencies, Wiek et al (2011, p. 205) identified five key competencies that are needed for sustainability transitions:

1. Systems-thinking competence – the ability to analyze complex systems across various domains and scales, thereby considering feedback loops and other systemic features related to sustainability.
2. Futures-thinking/anticipatory competence – the ability to craft "pictures" of the future, including risk and uncertainty, related to sustainability issues.

3. Values-thinking/normative competence – "the ability to collectively map, specify, apply, reconcile, and negotiate sustainability values, principles, goals, and targets" (p. 209).

4. Action-oriented/strategic competence – the ability to design and implement interventions and engage in transformative governance for sustainability.

5. Collaboration/interpersonal competence - "the ability to motivate, enable, and facilitate collaborative and participatory sustainability research and problem solving" (p. 211).

In a later article, Wiek et al (2015, p. 243) noted that a sixth "meta-competence" is implicit in this list; it involves the meaningful integration of the other five competencies and is referred to as the "integrative problem-solving competence". In addition to the six competences identified by Wiek et al (2013; 2015), critical thinking competency and self-awareness competency are generally agreed upon as key competencies for sustainability within the ESD discourse (Rieckman, 2018, pp. 44-45). While competencies are well-identified in the literature, it is difficult to assess competence development in ESD, as "much remains to be done to operationalize and model sustainability competences" (Rieckman, 2018, p. 54). Wiek et al (2015, p. 242) note that competences "are rarely operationalized as specific learning objectives for different education levels", and this lag between their conceptualization and the formulation of learning objectives may explain the slow incorporation of sustainability competencies within university curriculums. Due in part to this lack of operationalization, there is, unfortunately, little known about the quality of ESD programs to date (Rieckman, 2018, p. 51). Further research into the evaluation of such programs is needed to determine the

accuracy and importance of the competencies identified in the literature (Wiek et al., 2013).

Closely related to sustainability competencies are ESD competencies, which are the professional competencies that teachers develop for teaching about sustainability. For ESD to be fully integrated throughout all levels of education, teachers must possess the proper competencies for SD as "educators interpret and create their own meaning of policies or reform proposals in light of their own particular theories or understandings and circumstances" (Stevenson, 2007, p. 272). An educator that does not possess the knowledge and skills necessary for ESD will have difficulties with integrating sustainability concepts throughout their teachings. Rieckman (2018, p. 57) goes as far as stating that "ESD should provide the fundamental orientation for teacher education". Unfortunately, many student teachers feel unprepared to tackle the task of sustainability education, feeling that they lack the required competencies for ESD, and very few teachers have graduated from programs where education for sustainability (EfS) courses is required (Merritt, Hale & Archambault, 2019, p.1). This lack of competency development amongst teachers is concerning. A recent report entitled *The Dasgupta Review on the Economics of Biodiversity* emphasizes the importance of teaching sustainability to children and calls for "a transformation of our education systems towards one where children from an early age are encouraged to try and understand the infinitely beautiful tapestry of processes and forms that is Nature" (Dasgupta, 2020, p. 49), noting that humans must collectively appreciate that they are a part of nature and are nurtured by nature in order to achieve sustainability. Teachers that do not possess the competencies to impart this understanding to their students may

be unsuccessful at instilling pro-environmental values within their students. Fortunately, EfS courses aim to address this issue by giving student teachers the knowledge, skills, and motivation needed to create a more sustainable future through education (Merritt et al., 2019, p.1), and several studies indicate that these types of courses can teach students the competencies required for sustainability. The effectiveness of ESD/EfS courses typically depends on the pedagogy employed (Rieckman, 2018, p. 48).

2.5.1.2 Pedagogies for ESD

While university coursework can help shape positive attitudes towards sustainability, there are certain pedagogies that are shown to be more effective than others at achieving the goals of ESD. Pedagogy refers to the methods and practice of teaching and plays a key role in all forms of education. To influence changes in behaviours and values, pedagogical approaches to ESD should be learner-centered, action-oriented, and transformative (Rieckman, 2018, p. 48). Eilam & Trop (2011, p. 43) note the need for a transformation in current pedagogies in order to facilitate ESD, stating that "the prevailing pedagogy is still the same as it was throughout the 100 years in which the environmental crisis was developed."

Eilam and Trop (2011) propose four essential components of the ESD pedagogy that must be implemented together in order to achieve the goals of ESD: 1) the traditional academic style of teaching and learning, known as non-natural learning, 2) multidisciplinary learning, 3) multidimensional learning, and 4) emotional learning. Non-natural learning is the predominant academic style of learning, where learning

takes place in a closed space (classroom) that has no relation to the learnt subject (Eilam & Trop, 2011, p. 46). While this traditional style of learning is important, it is not sufficient to ensure that the goals of ESD are met. Multidisciplinary learning, like transdisciplinarity, brings together approaches and perspectives from multiple disciplines. Such approaches are capable of "supporting [the] acquisition of systemic thinking and the formation of linkages between cause and effect within systems" (Eilam & Trop, 2011, p. 47). Multidimensional learning expands upon multidisciplinary learning to include the dimensions of time and space, enabling students to think about the consequences of their actions on the future. Emotional learning refers to management of one's feelings so "they are expressed and controlled appropriately and effectively" (Goleman, 1998, as cited in Eilam & Trop, 2011). This type of learning has been traditionally driven out of classrooms due to the assumption that it will cause biased thinking and lead to indoctrination. However, with the emergence of new learning theories, such as constructivism[5] and emotional intelligence[6], as well as the dominance of EE/ESD in international education discourse, it gave way to the introduction of emotional learning within education (Eilam & Trop, 2011, p. 49). This learning is important in the efforts towards SD as "emotions inherently involve raising questions of values and ethics" (Eilam & Trop, 2011, p. 49). Additionally, unlike the intelligence quotient (IQ), emotional intelligence is not genetically fixed, it appears to be largely learned and can continue to develop throughout adulthood (Goleman, 1998,

[5] While there are several different definitions for constructivism, Jones & Brader-Araje (2002) state that the common thread amongst these definitions is the idea that "development of understanding requires the learner actively engage in meaning-making […] thus, constructivists shift the focus from knowledge as a product to knowing as a process."

[6] Emotional intelligence is defined by Salovey & Mayer (1990) as ", a set of skills hypothesized to contribute to the accurate appraisal and expression of emotion in oneself and in others, the effective regulation of emotion in self and others, and the use of feelings to motivate, plan, and achieve in one's life."

as cited in Eilam & Trop, 2011), allowing this style of learning to be effective in the university population.

Eilam & Trop (2011) tested the validity of the four essential components of ESD pedagogy by analyzing six case studies in the field of EE. They found that when the four principles (non-natural learning, multidisciplinary learning, multidimensional learning, and emotional learning) are implemented together, they can influence behaviour change regardless of the educational strategy used, subject matter, age group, and context-specific factors. However, when elements of the four principles were missing, the goal of behaviour change was not achieved. The authors noted that the most predominant recommendations for ESD pedagogy are inclusive of these four principles. Recommended pedagogies are those that are action-oriented, blending elements of self-directed learning, participation and collaboration, problem-orientation, inter and transdisciplinarity, and creating linkages between formal and informal learning (Reickmann, 2018, p. 40). Pedagogical approaches to ESD should be learner-centered, action-oriented, and transformative; thus, ESD favours methods that 1) utilize active learning such as service-learning, vision-building exercises, analysis of complex systems, and 2) foster critical and reflective thinking, such as class discussions and reflective journals (Reickmann, 2018, p. 48).

2.5.1.3 The Impact of ESD Coursework on Sustainability Perceptions

Studies show that university coursework can impart holistic knowledge regarding SD, shape positive attitudes towards sustainability, and can lead to self-reported increases in pro-environmental behaviours. For example, Merritt, Hale & Archambault (2018)

conducted a case study of a required EfS course at Arizona State University, using a pre and post-test design. The course utilized the *Sustainability Education Framework for Teachers,* which targets four key competencies for sustainability education: futures thinking, values thinking, systems thinking, and strategic thinking. Students reported significant positive changes in their sustainability-oriented values, agency, consumption practices, and motivation. Students also reported significant changes in their perceptions of sustainability education, and the extent to which they felt it was relevant in their classrooms. Students reported major gains in their self-perceived responsibility for sustainability, their self-efficacy towards sustainability, their locus of control towards sustainability, as well as their motivation to take action to improve society. Students additionally reported greater use of sustainable consumption practices at the end of the course. The results of this study indicate that required courses in sustainability education can positively impact pre-service teachers' attitudes towards SD and their motivation to include ESD elements in their teachings. The authors cautioned, however, that teachers face many obstacles towards ESD/EfS once they enter the workplace, and that they will need proper supports from their peers, administrators, and community members in order to successfully implement ESD in their classrooms (Merrit et al, 2018, p. 155).

Nousheen, Zai, Waseem & Khan (2020) reported similar results in their investigation of the impact of an EfS course on pre-service teachers' attitudes toward SD. The authors found that ESD had a significant impact on the pre-service teachers' attitudes towards SD and that student-teachers attitudes increased the most in the environmental dimension, followed by educational, social, and economic dimensions. Clark

& Zeegers (2015) reported comparable results in their investigation of the impact of a Seminar in Sustainability course on students' perceptions towards SD. The authors found that prior to the course students were familiar with terms related to environmental sustainability but were unfamiliar with terms in the social or economic dimensions. After the course, students increased their familiarity in all dimensions, but the most dramatic increases occurred in the social and economic dimensions. This is in-line with an earlier finding by the authors (see Zeegers & Clark, 2013), as well as Fisher & McAdams' (2015), finding that courses which integrate the concept of sustainability or directly emphasize it result in students with more holistic perceptions of the concept.

Perrault & Albert (2017) investigated the impact of a communications course on student attitudes towards SD. The course was conducted at a mid-sized university in the Midwestern United States and used a project-based learning approach. Students were tasked with designing a strategic communications campaign for the school's Student Office of Sustainability. The authors found that the project led to positive attitudes towards sustainability as well as increases in sustainable behaviours among participants. Their findings indicate that university courses which incorporate high-impact, project-based learning can be an effective way to increase awareness and attitudes toward sustainability, which is in-line with the literature surrounding recommended pedagogies for ESD programs (Rieckmann, 2018; Eilam & Trop, 2011).

Tang (2018) studied the correlation between sustainability education and engineering students' attitudes towards sustainability. Upon completing a course on sustainability in engineering, the authors found that students acquired basic knowledge of

sustainability regarding economics, environment, and society. The course was satisfactory in imparting values and beliefs related to sustainability, which positively affected attitudes and intentions. Unfortunately, this course did not create sufficient motivation among the students to pursue sustainable lifestyles and practices. As the course studied did not appear to have an experiential or project-based learning method, the lack of motivation observed by the students in this course may be explained by the fact that imparting knowledge about sustainability is not enough to ensure that behaviour changes occur.

Research also indicates that there is a need for more transdisciplinary perspectives in courses regarding sustainability and SD for students to develop a holistic understanding of sustainability. For example, Fisher & McAdams (2015) studied the effect of the amount and type of coursework on student sustainability perceptions, finding that students conceptualize sustainability based on their academic discipline. The authors found that students who take natural science courses tend to view sustainability in a purely environmental sense, while students who take courses in economics or public policy tend to focus on market or entrepreneurial-centered approaches, and students who take a course in social sciences tend to focus on community well-being. The authors also found that courses which integrated or directly emphasized the concept of sustainability resulted in students with more holistic perceptions of sustainability. These results indicate the need for greater interdisciplinary dialogue, as one of the main challenges with implementing sustainability is the plurality of conceptualizations related to it (Salas-Zapata et al., 2016). Another interesting finding from this study is that the number of courses that a student has taken did not have a statistically significant

impact on perceptions across any domain studied, indicating that mere exposure to the concept in a particular class has more impact on shaping perceptions than continued exposure to the topic in several courses (Fisher & McAdams, 2015, p. 416). If these results prove to be replicable on other campuses, then simply having a single required course on the topic of sustainability can have a major impact on shaping student perceptions. However, as discussed throughout this literature review, shifting perceptions is not enough to ensure behavior change; therefore, this recommendation should not be misconstrued as advocating against integrating sustainability throughout curriculum and campus operations, this integrated approach to campus sustainability is needed if the main goal of the institution is long-term behavioral changes rather than simple attitude change.

2.5.2 Campus Sustainability

While university coursework is the most obvious area in which the higher education system can contribute to sustainability/SD, universities can also contribute to local sustainability through their operations, partnerships, services, and outreach. Such approaches to sustainability in higher education constitute major components of campus sustainability. In its most basic conceptualization, campus sustainability refers to the adoption of sustainable practices within a university; however, the term lacks a common and accepted definition (Moganadas, Corral-Verdugo & Ramanathan, 2013, p.1447). This lack of a common definition has resulted in a plethora of strategies that universities engage in with regards to campus sustainability. Alshuwaikhat & Abubakar (2008) note that some universities consider themselves as meeting the challenge of campus sustainability by simply signing declarations, others feel that universities are sustainable

if they have environmental guidelines or plans, and some universities create individual sustainability policies and engage in green building initiatives to achieve campus sustainability. The authors note that this ad-hoc manner is inefficient and cannot guarantee campus sustainability. Instead, they propose a more integrative approach to campus sustainability by employing three strategies: 1) university environmental management systems, 2) public participation and social responsibility, and 3) promoting sustainability in teaching and research (Alshuwaikhat & Abubakar, 2008, p. 1778). Universities that wish to employ such an integrative approach to campus sustainability should take into consideration the six categories of sustainability implementation identified by Filho et al, 2019: 1) Institutional frameworks, 2) Campus operations, 3) Teaching, 4) Research, 5) Outreach/Collaboration, and 6) Assessment and reporting (Leal Filho et al, 2019).

1) Institutional Frameworks for Campus Sustainability: encompass the governance frameworks for achieving sustainability within the institution, and typically comprise of internal procedures/policies, environmental management systems (EMS), and their implementation (Leal Filho et al, 2019, p. 1395). Frameworks can be as simple as a policy statement committing the institution to sustainability, or up to fully fledged sustainability plans that detail how it will be implemented (Vaughtner, McKenzie, Lidstone & Wright, 2016). EMS is a common component of fully-fledged sustainability plans and "constitutes the set of overall practices, procedures, processes and resources for developing, implementing, achieving, reviewing and maintaining university policy" for a sustainable environment (Alshuwaikhat & Abubakar, 2008, p. 1781). EMS can provide universities with a standard for identifying and prioritizing

their environmental impacts. Typical components of a university EMS include energy efficiency, waste management, resource conservation, and water conservation (Alshuwaikhat & Abubakar, 2008, p. 1782).

2) Campus Operations: encompass the use of resources and their disposal (Leal Filho et al, 2019, p. 1395). Even relatively small university campuses, such as Grenfell Campus, have a large amount of built area and users, leading them to be major consumers of energy and material resources. Therefore, universities can contribute to or hinder local sustainability depending on how they choose to operate. The predominant strategies for integrating sustainability in university campus operations include sustainable transportation, environmental certification of buildings, energy efficiency measures, on-campus renewable energy generation, passive building design, the harvesting of rainwater for irrigating green spaces, wastewater treatment, recycling, reduction of paper use, and lighting/temperature control in buildings (Amaral et al, 2020, p. 6). Despite the plethora of strategies related to campus sustainability, planning for them and implementing them is neither an easy nor clear-cut task. For example, energy efficiency and sustainable buildings are an oftentimes challenging aspect of campus sustainability, as the infrastructure on many campuses has already been built in an unsustainable fashion before integrated approaches to sustainability were considered (Alshuwaikhat & Abubakar, 2008, p. 1779). Additionally, there has been a funding crisis in higher education throughout much of the globe for the past 30 years (Lebeau et al., 2012), while the number of students attending university continuously increases (Calderon, 2018), leaving universities tasked with expanding services to a growing number of students under increasingly difficult financial circumstances.

3) Research: universities can contribute to sustainability by implementing sustainability components within their research programs and by supporting both theoretical and applied research on, for, and about sustainability/SD (Leal Filho et al, 2019, p. 1395). Research for sustainability/SD should be transdisciplinary in nature and integrate views from a wide variety of academic disciplines and non-university stakeholders, which consist of government, businesses, and the local community (Mogandas et al., 2013, p. 1457). As SD is a socio-political model for societal change, research should include the knowledge of stakeholders outside of the academic community (Hirsch Hardon, Bradley, Pohl, Rist & Wiesmann, 2005). Bringing the greater community into the research process allows for a more holistic understanding of the sustainability issues at hand and brings to light potential solutions to the problems and the risks that they may pose to various stakeholder groups. By including a variety of stakeholders in the research process, the potential of unintended consequences from the application of science is reduced, by bringing forth a variety of expertise and worldviews (Hirsch Halton et al., 2005).

4) Outreach/Collaboration: this strategy seeks inclusive stakeholder participation in achieving campus sustainability. It entails three major components: public participation and partnership, community services, and social justice (Alshuwaikhat & Abubakar, 2008, p. 1782). Given the level of environmental impact associated with universities and the role that they play in shaping society, it is important for universities to engage in partnerships with their greater community by collaborating with businesses, local governments, and non-governmental organizations (Didham & Ofei-Manu, 2018; Reickmann, 2018; Scholz, 2020). Such partnerships allow for the co-production of

knowledge, which occurs when stakeholders are brought together in a manner that allows them to understand each other's contexts and concerns, diverse values and interests, allowing for a joint definition of the problem and the creation of research that delivers more effective solutions (Evans, Jones, Karvonen, Millard & Wendler, 2015, p. 1). In such settings, universities can conduct research that has a tangible and real-world benefit on their local community, allowing the university to operate as a public good. This synergy between the university community (staff, faculty, students) and stakeholders within the local community is regarded by some as the hallmark of campus sustainability (Mogandas et al., 2013, p. 1456).

5) Assessment and Reporting: concerns the "documentation and dissemination of work performed, and results achieved" (Leal Filho et al, 2019, p. 1395). Numerous tools have been developed to assist with sustainability assessment in the higher education sector, including the Sustainability Tracking, Rating, and Assessment System (STARS), the Auditing Instrument for Sustainability in Higher Education, the Graphical Assessment of Sustainability in Universities tool, and the Sustainability Tool for Auditing Universities Curricula in Higher Education (Berzosa, Bernaldo & Fernandez-Sanchez, 2017). While each sustainability assessment tool differs in their focus, as some are more oriented towards assessing curricula while others are geared towards operations, they generally share four key areas of focus, namely education, research, operations, and community engagement. Assessing and reporting the current state of campus sustainability has many advantages for universities; it allows them to gain a better understanding of the state of their current sustainability efforts while identifying key areas for improvement. It can also enable universities to track the benefits incurred from

their sustainability efforts, such as cost savings from energy efficiency projects. To provide accurate recommendations to campus decision-makers, sustainability assessment should be a continuous and iterative process. Despite the benefits of sustainability assessment and reporting, this category of sustainability implementation is considered to be currently underutilized in the higher education sector (Lozano et al., 2015).

In addition to the categories of implementation identified by Leal Filho et al (2018), communication strategies are also a valuable tool for raising awareness about sustainability issues, as universities are an effective avenue for communicating with a wide-ranging audience (Alshuwaikhat & Abubakar, 2008, p. 1783). Lertpratchya et al (2017) assessed the role of colleges as a sustainability communication channel by surveying undergraduate students at a large midwestern United State university. The college in this study had conducted a variety of communication initiatives surrounding the environmental dimension of sustainability in prior years. The authors found that students in upper years exhibited more positive attitudes and behaviours towards sustainability than first-year students. A general decreasing pattern in standard deviation was observed in later years with students who held neutral or negative attitudes towards sustainability moving closer to positive or neutral positions in their later years. The results of their study indicate that as students are exposed to more sustainability messaging throughout their time in university, the more positive their attitudes and behaviours become.

2.5.2.1 Phases of Campus Sustainability Implementation

According to Krizek, Newport, White & Townsend (2011) there are four phases that typify or predict a campus's response to sustainability implementation (though this is only one possible model of sustainability implementation). The phases include: phase 1) grassroots, phase 2) executive acceptance of the business case for sustainability, phase 3) the visionary campus leader, and phase 4) a fully self-actualized and integrated campus community. The authors note that these phases are not exclusive and that elements of each phase can be found at any time on a given campus.

The grassroots phase sees sustainability advocates pushing for various sustainability-related services on campus, with administration either resisting or being minimally responsive, leading advocates to pursue ad hoc solutions. Campus leaders should respond to the evolution of these programs in a timely manner and ensure that this phase is kept to a minimum. Campuses should avoid having ad hoc solutions become the de facto nature of campus sustainability, as "in this case, it is difficult to integrate subsequent efforts into emerging over-arching governance structures, as their disparate origin renders them difficult to coordinate." (Krizek et al., 2011, pp. 21-22).

In phase 2 of campus sustainability implementation some high-level executives accept the proposed business case for sustainability. Activities in this phase are usually carried out by the facilities management department and typically focus on resource conservation. At this phase, a campus sustainability committee may be formed, but their initiatives are constrained by costs, with campus leaders accepting suggestions that lead to cost savings or enhanced brand reputation while shying away from initiatives that require stakeholder inclusion or full-cost evaluation.

The third phase of sustainability implementation is typified by a visionary campus leader. In this phase, top executives promote sustainability as a campus vision, reprioritizing sustainability efforts to include stakeholder engagement, robust goal setting and transparency, and full cost evaluations. Sustainability professionals are either promoted from mid-level coordination positions to executive positions or they are required to report directly to an executive. Sustainability leaders have many challenges in this phase as they tackle the issue of poorly coordinated silos and legacy ad hoc programs while applying an interdisciplinary approach that is oftentimes at odds with the traditional reductionist structure of the university.

The final phase of the sustainability implementation is one that few universities have accomplished to date. In this phase, the campus is fully self-actualized with sustainability integrated throughout its culture. In this phase, leadership is fully engaged and students in all majors learn about sustainability and observe it through exemplary practices on their campus. Campuses using this approach enhance their educational outcomes "by synergizing them with sustainability-related operations, student life, staff, and community engagement activities." (Krizek et al., 2011, p. 23). Thus, this phase constitutes a 'whole-of-university' approach to campus sustainability, where the campus becomes a living example of innovative sustainability practices. This concept will be discussed further in the following section.

In addition to identifying these four phases, Krizek et al (2011) offer seven recommendations to help key campus sustainability stakeholders to better tackle the

issues identified in phase four, including 1) communicate a consistent institutional stewardship philosophy; 2) detail clearly defined roles and responsibilities; 3) feed off professional memberships/organizations; 4) foster an environment of innovation and creativity; 5) value people and reward them; 6) value measurable goals and objectives; and 7) clearly communicate the mission, and values of the campus vis-a-vis sustainability.

2.5.2.2 Whole-of-University Approach to EfS/ESD

An essential element that is missing from Alshuwaitkhat & Abubakar's (2008) integrated campus sustainability framework is the concept of the 'whole-of-university' approach to campus sustainability. In their model, campus operations are connected to public participation and social responsibility, but not to promoting sustainability in teaching and research, and sustainability teaching and research are not explicitly linked to public participation and social responsibility. This lack of integration in their model may be explained by the fact that operations and facilities management are generally viewed as having little relevance to curriculum and research (McMillin & Dyball, 2009), despite opportunities to include them as part of the learning environment.

"Whole-of-school" approaches to EfS/ESD recognize that the university is a readily available laboratory for hands-on projects (McMillin & Dyball, 2009), by actively making use of university grounds and operations for experience-based and practice-based learning opportunities, linking curriculum and research with sustainable campus operations (Didham & Ofei-Manu, 2018). Under this model, the university acts as a role model for sustainable operations, policies, practices, and community collaboration

(Reickmann, 2018, p. 46), which allows the entire institution to transform into a learning tool that demonstrates real-world applications of sustainability concepts (McMillin & Dyball, 2009, p. 56).

There are several models of the ‘whole-of-university' approach present in the literature. The Living Lab model is a type of transdisciplinary process and form of experimental governance, where university stakeholders (such as local businesses, governments, and NGOs) work together with academic disciplines to co-produce knowledge about new sustainability models, technologies, and services and to test them in real-world settings, either on university grounds or within the greater community that the campus is situated in (Evans et al, 2015). While there are a diverse range of initiatives undertaken by such laboratories, they all share three core characteristics: 1) a geographically or institutionally bounded space, 2) experiments that aim to make social and/or material alterations, and 3) they incorporate an element of iterative learning (Evans et al, 2015).

The Sustainability Office/Green Office model is another method that can be used to engage in a whole-of-university approach to campus sustainability. This model creates “a sustainability platform that empowers students and staff to embed sustainability in the curriculum, research, operations, community, and governance” of the university (Leal Filho et al, 2019, p. 1396). Such offices have a dedicated budget and staff, allowing them to overcome the barriers of a lack of funding and a lack of human resources that are typical to campus sustainability implementation. Leal Filho et al (2019, p. 1397) found that the majority of sustainability offices are equipped with 2-5 staff members, that many larger universities (with 20,000+ students) employ at least 5

people in their Sustainability/Green Office, and that the majority of offices offer student volunteer opportunities. These offices typically oversee certain areas of campus operations such as waste management, sustainability campaigns, implementation of the SDGs, extracurricular EfS, energy efficiency, campus community gardens, water management, and sustainable procurement (Leal Filho et al, 2019, p. 1397).

Given the wide range of activities that these offices typically oversee, universities that explicitly link their sustainability office with their curriculum can provide valuable experiential learning opportunities for their students. This is exemplified by the ANUGreen office at the Australian National University (ANU), of which McMillin & Dyball (2009) conducted a case study. This office actively engages in a 'whole-of-university' approach to sustainability by explicitly linking research, educational, operational, and outreach activities. The ANUGreen office is located within ANU's facilities division to foster a strong link between the office and various university departments. Relationships were formed between facilities management and academics that teach/research sustainability, with ANUGreen staff acting as guest lecturers in sustainability courses and instructors including applied project work with the ANUGreen office as a part of their course outlines. For example, students in the courses 'Greenhouse Science' and 'Corporate Sustainability' were involved in several carbon emissions and mitigation projects on campus and have conducted analyses of the greenhouse gas emissions produced through campus travel, various carbon abatement schemes, the benefits of on-site composting, on-campus renewable energy generation, and campus carbon offsetting. The findings of student reports were presented to ANUGreen staff, who peer reviewed their submissions for

accuracy and possibility of implementation. Academics involved in courses that partner with the ANUGreen office were enthusiastic about the projects involved with the office, noting that they meet key learning goals, save them planning time, and generate student enthusiasm. Additionally, it has been found that the time invested in student supervision of ANUGreen projects was made up for in the operational gains that ANU experienced from the program.

From their analysis of the ANUGreen office, McMillian & Dyball (2009, p. 61) identified pedagogical, operational/reputational, and capacity building benefits related to the 'whole-of-university' approach. Pedagogical benefits included the promotion of interdisciplinary knowledge, systems thinking, the ability to apply knowledge to real world problems, and the building of critical thinking and problem-solving skills. Operational benefits included the ability to enhance a campus's sustainability performance by providing a means to monitor environmental performance, provide feedback, and by developing new innovative ideas for university operations. With regards to capacity-building benefits, involving students in campus sustainability initiatives empowered them to become change agents while enhancing their sense of ownership and connection to the campus.

2.5.2.3 Barriers and Enablers of Campus Sustainability

There are several barriers and enablers of campus sustainability present in the literature, that impact the implementation of campus sustainability initiatives. According to Velazquez, Munguia & Sanchez (2005) the most common barriers to campus sustainability are: 1) a lack of awareness, interest, and involvement, 2) the

organizational structure of universities, 3) a lack of funding, 4) lack of support from administrators, and 5) a lack of time. Velazquez et al (2005, p. 385) have noted that a university's organizational structure is "characterized by its lack of integration due to decentralized management, bureaucracy, student and faculty turnover, and many non-standardized processes", and that the compartmentalization of science slows progress. As a result, the organizational structure of universities makes it difficult to integrate sustainability holistically throughout campus. The most significant enablers of campus sustainability are closely related to removing these barriers. The most significant enabler of campus sustainability is visionary leadership towards sustainability from top management (Mogandas et al, 2013, p. 1456), with funding and community engagement being other important drivers (Amaral et al, 2020, p. 3). Therefore, universities that are most equipped to deal with the task of campus sustainability are those that have visionary leadership for sustainability within top management, already are engaged in trans- and interdisciplinary processes, have funding earmarked for sustainability initiatives, have motivated, and engaged students, and have staff dedicated to the process of campus sustainability.

2.6 Conclusion

This literature review is based on an extensive review of peer-reviewed literature (articles and books) and intergovernmental reports undertaken by the researcher between June 2020 and September 2020. It covered the differences between the concepts of sustainability and SD, the transition from EE to ESD and their goals, the factors that influence human behaviour, the pedagogies of ESD, and the concepts and approaches to campus sustainability. It has demonstrated that human behaviour is

the ultimate source of environmental degradation and global climate change, highlighting the need for a paradigm shift in how society functions. This requires changing the behaviour of each individual to reduce their environmental impact, a task that will be difficult given the complex network of factors that interact to influence behaviour. Thus, universities must engage in a multi-faceted and holistic approach to EfS that addresses the wide variety of factors that influence human behavior.

3. Methodology

The overall purpose of this research is to present a case study of a campus that is making active efforts towards advancing its sustainability profile and to provide recommendations to its decision makers regarding campus sustainability implementation. This section gives an overview of the research design, theoretical framework, analytical framework, and research instruments used in this thesis. It will begin with an overview of the research design, theoretical framework, and analytical framework. This will be followed by an overview of the quantitative research instrument, its data collection procedures, and its data analysis methods. An overview of the qualitative research instrument, its data collection procedures, and its data analysis methods will then be presented.

3.1 Research Design: A Mixed Methods Approach

This research follows a mixed method approach to assess the current state of sustainability efforts at Grenfell Campus and consists of two major phases:

1) A survey of student perceptions towards SD and ESD at Grenfell Campus, MUN. This survey also gathered demographic information to test the influence of level of study (undergraduate vs. graduate), gender, and school of study on sustainability attitudes.

2) A series of expert interviews with key faculty, staff, and senior administrators at Grenfell Campus, as well as a representative from the City of Corner Brook. The interviews investigated Grenfell's current efforts towards sustainability, where these efforts can be improved in both operations and

teachings, and how Grenfell can contribute to sustainability in the greater Corner Brook area.

Each phase has its own data analysis process, with the survey undergoing simple statistical analysis while the interviews were analyzed using thematic coding.

3.2 Theoretical Framework: Transdisciplinary Sustainability

The theoretical framework for this thesis is grounded in the field of transdisciplinary sustainability science. As this field of science aims to address complex societal problems, such as the need for a sustainability transition, the involvement of actors from outside of academia is crucial in the research process and is a hallmark feature of the principle of transdisciplinarity. Transdisciplinarity is defined by Bergmann et al (2012) as "a reflexive, integrative, method-driven scientific principle aiming at the solution or transition of societal problems and concurrently of related scientific problems by differentiating and integrating knowledge from various scientific and societal bodies of knowledge." As such, transdisciplinary research must comply with three requirements: it must focus on societally relevant problems, it must enable mutual learning processes between researchers from different disciplines and actors outside of academia, and it should aim to create socially robust and solution-oriented knowledge that can be applied in both social and scientific practice (Bergmann et al., 2012). Furthermore, Scholz (2020) argues that for transdisciplinarity to produce ground-breaking sociotechnical solutions it must "serve (a) the public good and (b) calls for independence, academic freedom, institutionalization, and proper funding schemes."

3.3 Analytical Framework: Holistic Campus Sustainability

To assess the holisticness of Grenfell Campus's current sustainability efforts, a framework entitled the Holistic Campus Sustainability Framework was developed for this thesis. The framework draws its inspiration from the literature review for this thesis, particularly Alshuwaikhat & Abubakar's (2008) integrated approach to campus sustainability and the categories of sustainability implementation identified by Leal Filho et al (2019). The Holistic Campus Sustainability Framework (see Figure 3.1) consists of eight categories of sustainability implementation within a university campus and includes: Campus Governance, Campus Operations, Teaching & Research, Outreach & Collaboration, Communications, Assessment & Reporting, Food Services & Production, and Health & Social Wellbeing. A non-exhaustive list of examples of themes under each category in the framework are present in Fig 3.1.

In this framework, all categories of campus sustainability implementation have some form of a connection, representing the university as a system and conveying the "whole-of-university" concept. The circle encompassing the model represents the greater system that the university of study is embedded in. For the purpose of this research this outer circle represents the greater Corner Brook community and western Newfoundland; however, this circle can be changed to represent any other system that a university is embedded in, such as the economic system, the anthroposphere, or the biosphere.

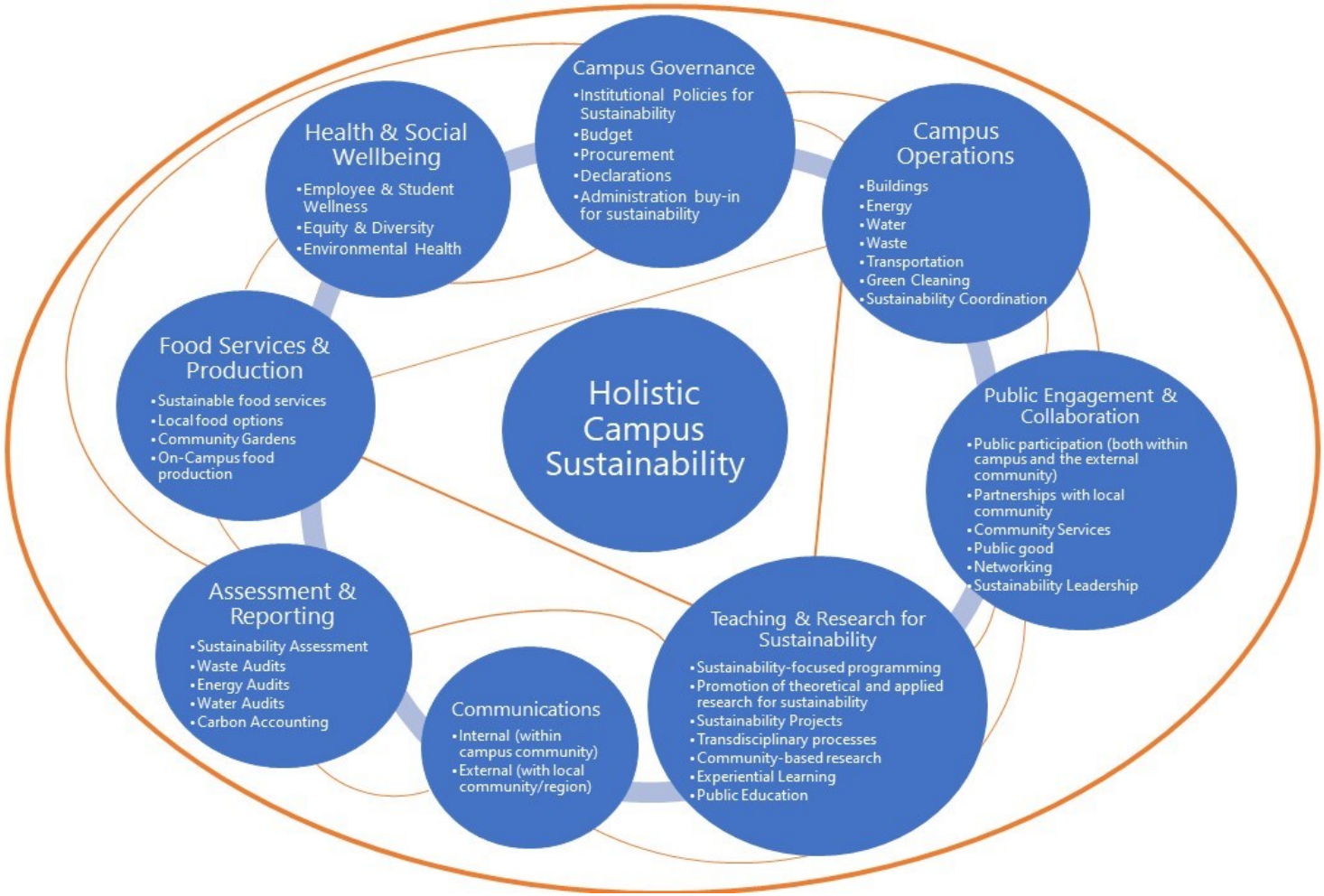


Figure 1: Holistic Campus Sustainability Framework

3.4 Quantitative Research - Survey

The first phase of this methodology consists of an online survey administered to students at Grenfell Campus to explore their perceptions and attitudes towards the concept of SD. The author developed the research instrument based on items from the Attitudes Towards Sustainable Development Scale (ASD), developed by Biasutti and Frate (2017), items from the Student Sustainable Development Survey developed by Michalos et al (2011), and items developed by the author. The ASD was developed in response to the United Nations Educational, Scientific and Cultural Organization's (UNESCO) call for the creation of evaluation tools that assess SD (Biasutti & Frate, 2017, p. 226). It introduces a fourth pillar, education, which is one of the reasons why some items from this scale were chosen for this research's questionnaire. Since this tool was specifically developed in the Italian context and has been translated from Italian, several items were adapted for clearer language. Items 5,6,8,10,14,17,18 & 19 from the ASD were used in this survey, and all items were adapted for clarity except for item 10 which was taken verbatim. The ASD was developed using an expert panel and has been validated using Cronbach's Alpha for internal consistency of the scale. The instrument was designed for the purpose of understanding how students perceive SD and can be used to investigate the relationship between sustainability attitudes and other variables such as program of study and gender (Biasutti & Frate, 2017). Additionally, the tool can be used to assess the effectiveness of curricula revision that infuses sustainability concepts. Given this feature of the tool, Grenfell Campus can use data obtained through this research as a baseline assessment of student attitudes towards sustainability. This can be used as a proxy measure to gage the effectiveness of sustainability outreach programs and curriculum on campus.

The Student Sustainable Development Survey, developed by Michalos et al (2011), was created to assess the sustainability knowledge, attitudes, and behaviors of 10th grade students in Manitoba. Items were chosen from this scale due to their cultural relevance, as the survey was developed in Canada, as well as the ease of their wording given that the originally intended audience were 10th grade students. The authors developed this survey with the intention to "[p]rovide the measures to other jurisdictions in Canada and internationally, which might be seeking to set similar baselines and monitor progress on ESD efforts", thus other researchers are able to use the items in this survey with proper credit given. Items A5, A13, B12, A4, A14, A10, and B1 were used from the Student Sustainable Development Survey.

The final survey instrument (see Appendix A) consists of three sections where Part I identifies demographic variables such as school of study, level of study (undergraduate vs. graduate), and gender in order to assess the influence of these variables on sustainability perceptions. Part 2 consists of questions related to the three pillars of SD and has questions that concern environmental, economic, and social sustainability, all rated using a 6-point Likert scale. Part 3 consists of questions related to students' experience with and perceptions of ESD at Grenfell Campus and contains a mixture of yes/no and Likert scale questions.

Where Likert-style questions were used, a 1-6 Likert scale was employed. While the ASD and Student Sustainable Development Survey both used a 1-5 Likert scale, where 1=strongly disagree and 5=strongly agree, for the purpose of this research an additional item has been added to this scale which represents the response "I do not know". This

is to prevent people from forming a pseudo-opinion, as some respondents may choose an arbitrary answer so they do not appear to be uninformed if the wording suggests that they should have an opinion (Krosnick, 1999). Additionally, adding no responses to a survey instrument that investigates perceptions and attitudes towards a topic may enable a more nuanced analysis of the research. Wright and Niemi (1983) found that the stronger one's attitudes are towards a topic the less likely they are to choose "I don't know" when asked about other issues within the domain (as cited in Krosnick, 1999). Additionally, no responses are common from people for whom an issue is of low importance to them (Krosnick, 1999).

3.4.1 Risk of Bias

It is important to address the risk of bias that is present in the survey portion of this research. As this survey was administered online and participants were recruited via email there is a potential for selection bias. Students who are already pro-sustainability and environmentally minded may be more likely to respond to a survey regarding sustainability perceptions than students who have a negative opinion towards sustainability and environmental protection. Additionally, many of the questions in the survey are normative statements, where some general level of agreeability can be expected. This bias can typically be addressed by including both negative and positively worded questions, as this results in scores that are less extreme (Kamoen, Holleman, Mak, Sanders & van den Bergh, 2017). Despite the ability to reduce bias, questions that use negative evaluative terms require more processing time and are reread and longer and more often than their positive counterparts (Kamoen, Holleman, Mak, Sanders & van den Bergh, 2017).

3.4.2 Data Collection Procedures

Data were collected online from November 18th - December 18th using the Qualtrics platform. An email was sent to students via the Grenfell-students listserv to reach all 1420 students at Grenfell Campus. As Grenfell Campus communicates with students heavily via email this was determined to be the most efficient way to reach the whole student body, especially as classes were conducted online during the Fall 2020 semester due to the Covid-19 pandemic.

3.4.3 Data Analysis

Survey responses were analyzed using GNU PSPP. PSPP is a program for the statistical analysis of sampled data that interprets commands in the SPSS language and is thus meant to be a free replacement for the IBM Statistical Package for the Social Sciences (SPSS) (Gol, Bri, Garcia & Lloret, 2008). Descriptive statistics were generated for School of Study, Gender and Level of Study. Independent sample t-tests and ANOVAs were performed to test the influence of these variables on perceptions and attitude.

3.5 Qualitative Research - Expert Interviews

The second piece of this methodology is a series of semi-structured expert interviews conducted with faculty and staff at Grenfell Campus as well as a representative from the City of Corner Brook that is familiar with city-campus partnerships. These interviews explored perceptions surrounding SD, the role of higher education institutions in SD, how sustainability can be better integrated at Grenfell Campus, and how Grenfell Campus can contribute to sustainability in the City of Corner Brook. Due

to the small size of Grenfell Campus and the City of Corner Brook, interviews were completely anonymous, and interviewees will be referred to simply as "participant" in the Discussion section.

3.5.1 Data Collection Procedures

Ten interviews were conducted between November 24th and December 10th and lasted between 15-70 minutes each. To adhere to social distancing guidelines that were in place at the time, interviews were conducted through video conferencing on Microsoft Teams. Interviews were recorded with permission from the interviewees using screen capture. Video files were uploaded into NVivo and NVivo Transcription was used to generate interview transcripts. Transcripts were reviewed by the researcher for errors in the transcription process. Transcripts were then returned to interviewees for review so they could make corrections or redactions and add any additional information that did not come to mind during the interview.

3.5.2 Data Analysis

Expert interviews underwent qualitative analysis using thematic coding based on the categories present in the Holistic Campus Sustainability Framework. This data, along with the quantitative data, will be used to help assess the current state of sustainability implementation at Grenfell Campus by identifying areas where the campus has been successful, where it can improve, and the opportunities and barriers related to campus sustainability at Grenfell Campus.

4. Results

This section reports on the findings of the student perceptions survey and expert interviews.

4.1 Student Perceptions of Sustainable Development Survey – Results

A total of 100 surveys were received representing 7.04% of 1420 students. Questions 1-4 collected demographic information from participants such as their gender, school of study, and level of study.

Gender: 23 respondents were male, 71 were female, and 6 chose to self-identify. Students who chose to self-describe identified as nonbinary, genderqueer, and transgender.

School of Study: 26 respondents were from Arts and Social Science, 45 were from Science and the Environment, 11 were from Nursing, 14 from Fine Arts, 3 Undeclared majors, and 1 missing response.

Level of Study: 71 students indicated that they were undergraduates whilst 29 students were in graduate programs.

Questions 5-19 investigated students' attitudes towards the concepts of SD and sustainability. Students reported their opinion on a 1-6 Likert Scale: 1= Do not know,

2=Strongly Disagree, 3=Disagree, 4=Neutral, 5=Agree, and 6=Strongly Agree. The mean and standard deviation for this section are reported in Table 1.

TABLE 1 STUDENT SUSTAINABILITY PERCEPTIONS SURVEY RESULTS - QUESTION 5-19

	N	Mean	Std Dev
5. Human actions are contributing to changes in our atmosphere and climate systems.	100	5.76	.45
6. Humans should limit impact on the biosphere to stay within its limits.	100	5.51	.77
7. "Maintaining biodiversity" means maintaining the number and variety of all living beings. This is essential for sustainable development.	100	5.52	.59
8. Preserving and protecting the Earth's life support systems, biodiversity and renewable resources should have priority over economic growth.	100	5.21	.96
9. Government economic policies should provide support for sustainable production even if it increases the national budget.	100	5.26	.94
10. People should make consumption decisions based on their needs, not on their wants.	100	5.07	.90
11. Government economic policies should promote fair trade in international exchanges.	100	5.26	1.10
12. Government economic policies should hold companies that do not have sustainable development plans accountable.	100	5.48	.83
13. People who pollute the land, air or water should be held accountable for damage done to communities and the environment.	100	5.60	.64
14. A culture of peace based on principles of justice is essential for sustainable development.	99	5.01	1.18
15. Respect for cultural diversity is necessary for sustainable development.	100	5.33	.90
16. Society should promote equal opportunities for males and females.	99	5.77	.74
17. A society is sustainable when it provides basic necessities, like healthcare, for everyone.	100	5.44	.86
18. The present generation has an opportunity to leave a better world for future generations.	100	5.18	1.14
19. Communities should adopt sustainable development plans as a priority.	100	5.64	.61

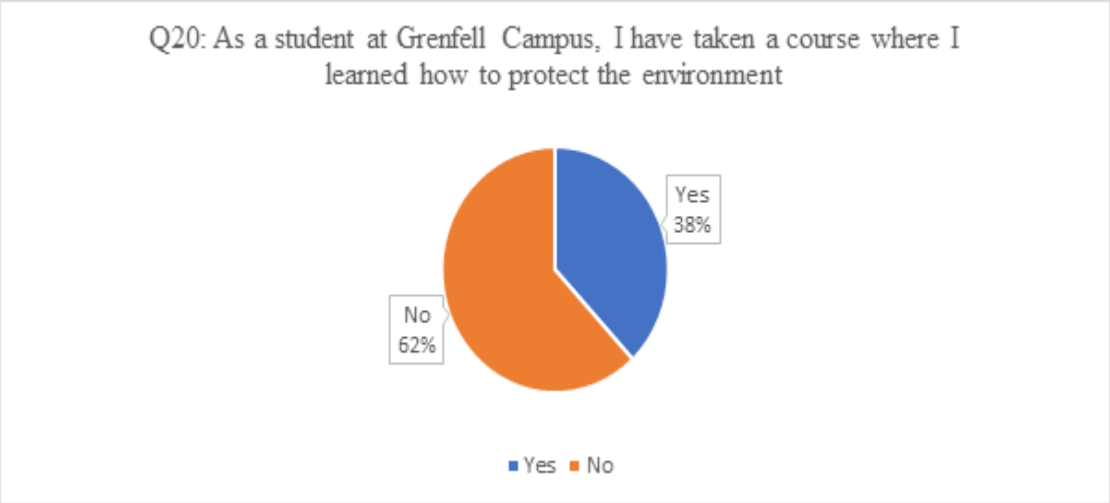
Statistical analysis was performed on this question to investigate the influence of gender, school of study, and level of study on sustainability perceptions.

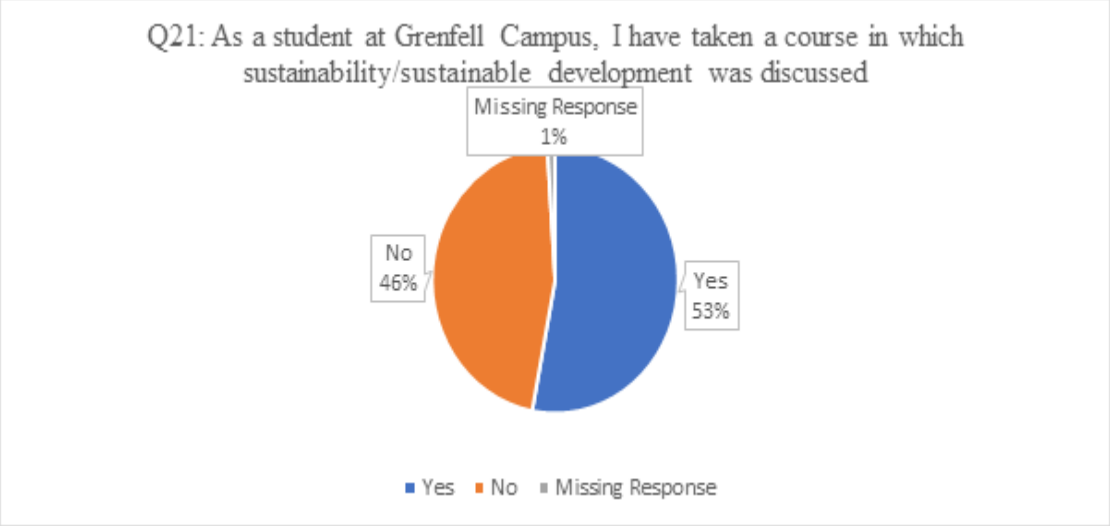
Gender: An ANOVA was performed on gender, revealing no statistical difference between genders for any of the survey items.

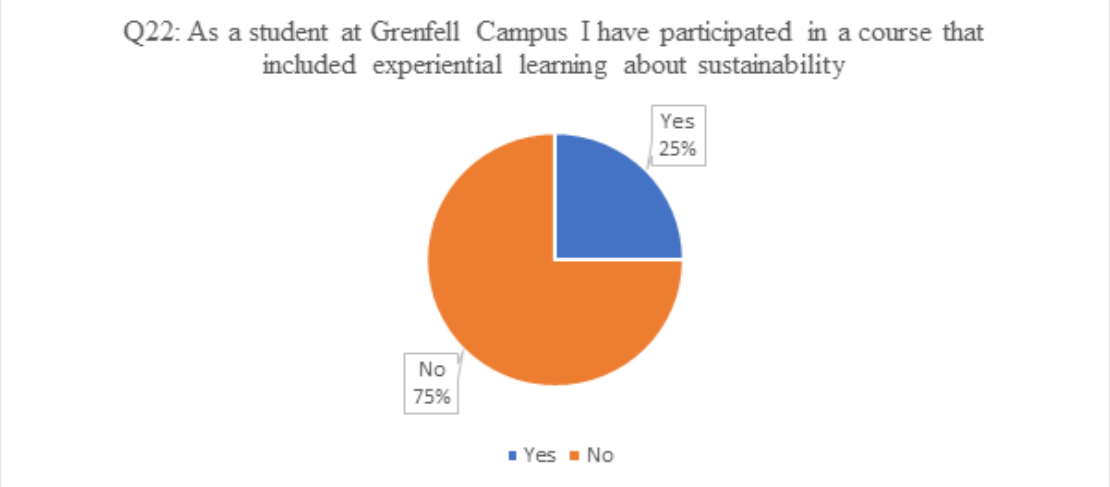
School of Study: An ANOVA was performed on school of study. Significant differences between groups were found for the question 10 "A culture of peace based on principles of justice is essential for sustainable development" ($p=0.037$) and question 13 "A society is sustainable when it provides basic necessities, like healthcare, for everyone" ($p=0.043$). A Tukey post-hoc test was performed on each variable. For question 10, statistically significant differences were found between students in Arts and Social Science and Undeclared majors ($p=0.018$), between students in Science and the Environment and undeclared majors ($p=0.018$), and students in Fine Arts and undeclared majors ($p=0.038$). For question 13, a statistically significant difference between students in Arts and Social Science and Undeclared majors ($p=0.049$) was found.

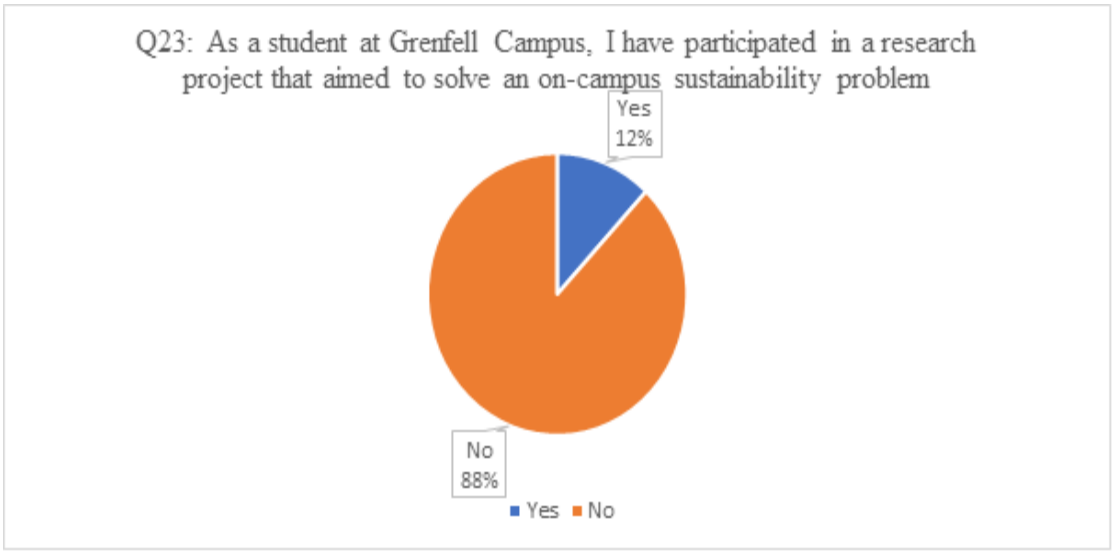
Level of Study: The t-test on level of study revealed no significant difference between undergraduate and graduate students for any of the survey items.

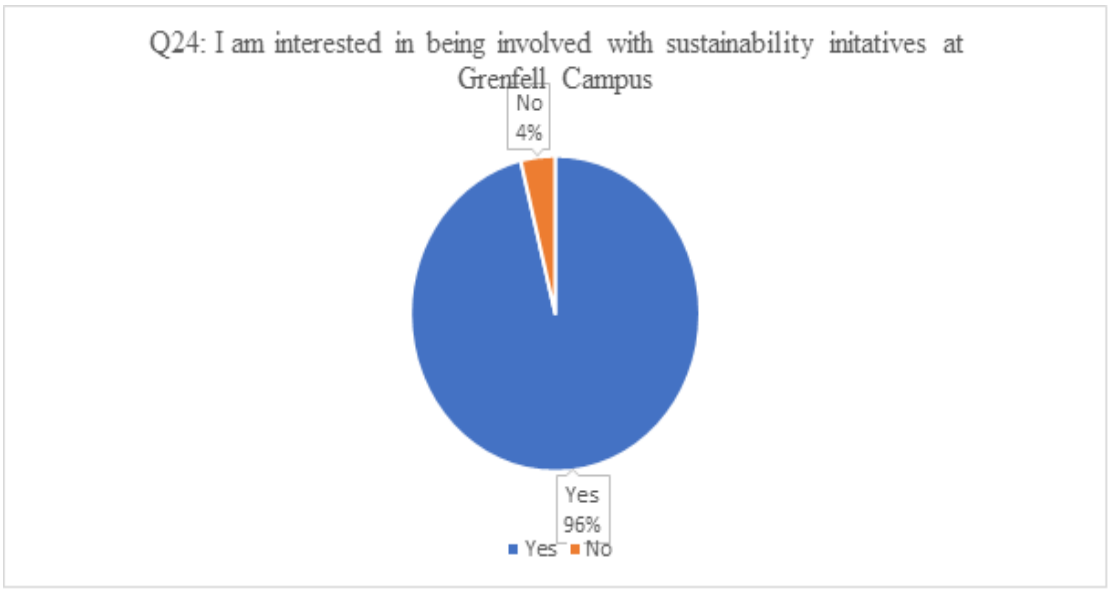
Questions 20-25 consisted of a series of yes/no questions that investigated students' experiences with ESD at Grenfell Campus. The results of these questions are reported in the following figures:

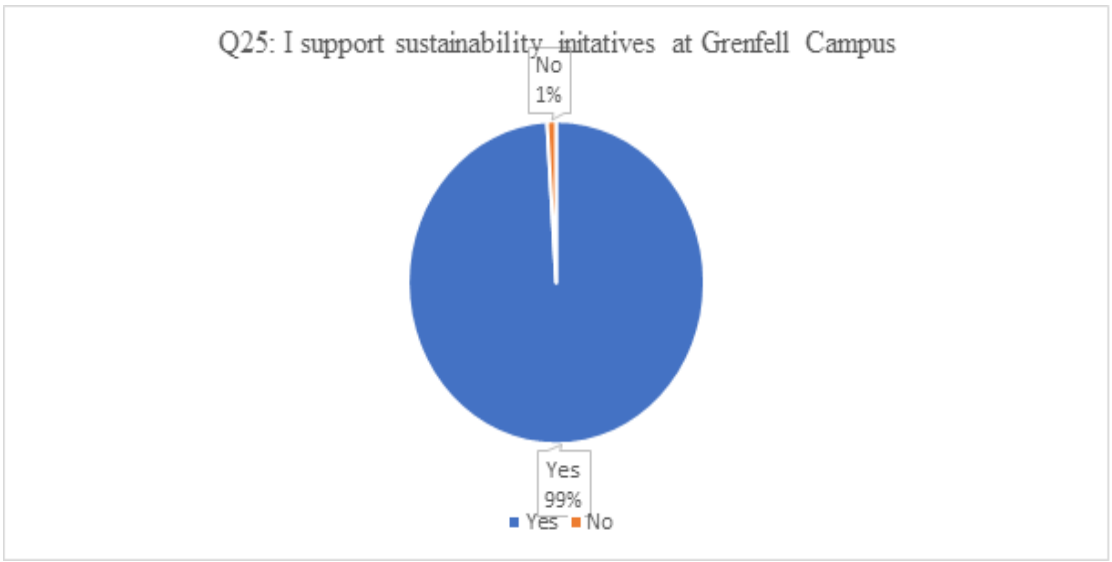







Q23: As a student at Grenfell Campus, I have participated in a research project that aimed to solve an on-campus sustainability problem
Yes 12%
No 88%
Yes
No


Q24: I am interested in being involved with sustainability initatives at Grenfell Campus
No 4%
Yes 96%
Yes
No


Q25: I support sustainability initatives at Grenfell Campus
No 1%
Yes 99%
Yes
No

Questions 26-32 investigated students' attitudes towards ESD. Students rated their opinion on a 1-6 Likert Scale: 1= Do not know, 2=Strongly Disagree, 3=Disagree, 4=Neutral, 5=Agree, and 6=Strongly Agree. The mean and standard deviation for this section are reported in the table below:

TABLE 2 STUDENT SUSTAINABILITY PERCEPTIONS SURVEY RESULTS - QUESTION 26-32

	N	Mean	Std Dev
26. Education for sustainable development should be a part of core curriculum at all education levels	99	5.17	.98
27. Sustainable development requires access to good-quality education for everyone	99	5.32	.98
28. Every person should receive education that teaches the knowledge and skills necessary for sustainable living	99	5.49	.75
29. Universities should teach sustainability/ sustainable development courses as a priority	99	4.99	.87
30. University courses should promote future-oriented thinking in addition to historical knowledge	99	5.52	.76
31. University courses should promote interdisciplinary teaching and learning	99	5.25	1.16
32. University courses should promote the connection between local and global issues	99	5.55	.63

Statistical analysis was performed on this set of questions to investigate the influence of gender, school of study, and level of study on sustainability perceptions.

Gender: An ANOVA and Tukey post-hoc tests were performed to test the influence of this variable. No significant differences were found between gender identities for any of the investigated variables.

School of Study: An ANOVA and Tukey post-hoc tests were performed to test the influence of this variable. Statistical differences were found between students in the School of Science and the Environment and Undeclared majors ($p=0.019$) and between

students in the School of Fine Arts and Undeclared majors (p=0.027) for question 31. Significant differences were found between students in the School of Science and the Environment and Undeclared majors (p=0.013) for question 32.

Level of Study: A t-test and independent samples t-test were performed on level of study to test its influence on perceptions. Statistically significant differences were found for questions 30, 32, and 33. The results indicate that graduate students were more likely to feel that universities should teach sustainability/SD courses as a priority than undergraduate students. Graduate students were also more likely to feel that university courses should promote interdisciplinary teaching and learning than undergraduate students. Graduate students were also more likely to feel that university courses should promote the connection between local and global issues than undergraduate students.

4.2 Interview Results

The analysis of the expert interviews was conducted in two phases, one to gain an understanding of the participants' general views towards campus sustainability and another one to assess the state of campus sustainability by applying the Holistic Campus Sustainability Framework to Grenfell Campus.

4.2.1 Thematic Analysis Part 1

Part one of the thematic analysis examined interviewees responses to three questions regarding campus sustainability and identified emergent themes.

1) What role, if any, should universities in general play in sustainability?

One major theme arose from participants within the Grenfell Campus community, *Sustainability Leadership*, the idea that universities should play a leadership role in sustainability transitions.

2) What makes a university campus sustainable?

Three themes emerged from this question: sustainability in operations, sustainability programs and research, and sustainability in people. *Sustainability in Operations* deals with the environmental impact of the day-to-day operations of the campus and the way it addresses these issues. *Sustainability in Programs and Research* encompasses the degree and course offerings and research output that a university dedicates to sustainability. *Sustainability in People* deals with the health and wellbeing of campus occupants and the ability of a campus to attract students and the right faculty to campus.

3) What makes a university campus unsustainable?

The predominant themes that arose under this question were waste and a lack of commitment to sustainability. *Waste* encompasses more than just waste management and includes being wasteful in terms of both natural and monetary resources. *Lack of commitment* deals with the lack of monetary and human resources dedicated towards sustainability and that initiatives are done in a piecemeal manner without proper integration.

4.2.2 Thematic Analysis – Part 2

Part two of the thematic analysis identified areas under the Holistic Campus Sustainability Framework where Grenfell has been successful, where it can improve, and the opportunities and challenges related to sustainability implementation on campus. These areas were chosen rather than the traditional strengths, weaknesses, opportunities, and threats that are found in the SWOT analysis, as the interviews revealed several themes that cut across these categories. For example, while the interviews revealed that Grenfell Campus has been successful with regards to sustainability-focused programming, there were still opportunities for improvement identified in the interviews. Thus, if a traditional SWOT analysis were to be applied to Teaching & Research category of the Holistic Campus Sustainability Framework, the theme of sustainability-focused programming would not fit neatly under strengths, weaknesses, or opportunities. Additionally, several participants said that there are challenges related to sustainability implementation but no real barriers that prevent it from fully happening, hence the choice to change "threats" to "challenges".

This section will provide a general overview of the themes that arose under each category of the Holistic Campus Sustainability Framework during the interviews. These major themes will be discussed in greater detail in the following chapter, which will also identify other topics that single participants brought up but did not arise across multiple interviews.

Governance

Themes that emerged under campus governance include the budget, sustainability coordination, sustainability policies, and changing perspectives.

The Budget deals predominantly with the provincial economic situation, as MUN receives 85% of its operating grant from the provincial government. This theme falls under the category of challenges to sustainability implementation, as the university has been facing continued budget cuts for several years in a row, which has had an impact on its operations and daily functioning.

Sustainability Coordination deals with the campus's overall approach to sustainability in terms of implementation. This area cuts across categories in the "SWOT" analysis, as initial successes, such as Grenfell Campus's partnerships with various entities within their local community, have been identified, but there is still need for a more integrated and coordinated approach to sustainability implementation at Grenfell.

Sustainability Policies deal with the rules and regulations set forth in the university with regards to sustainability and is an area where Grenfell Campus can improve its sustainability implementation

Changing perspectives deals with the cultural mind-shift needed for sustainability transitions. This theme presents an opportunity for Grenfell as the interviews indicated

that there appears to be this mind shift happening amongst decision makers in the Grenfell community.

Operations

Two major themes arose under the category of operations, waste management and energy efficiency.

Waste Management was discussed in both the context of waste disposal and reducing resource consumption. This was another cross-cutting theme as waste management was identified as an area where Grenfell Campus has been successful in recent years, but there is still considerable room for improvement given the state of waste management in NL. Numerous opportunities to improve this aspect of campus operations were also identified through the interviews.

Energy efficiency deals with the efficiency of energy consumption within buildings on campus, but also included issues such as electric vehicle chargers and renewable energy generation on campus.

Engagement & Collaboration

Three major themes arose under engagement and collaboration: partnerships, outreach, and community exhaustion related to the coronavirus pandemic.

Partnerships deals with collaborations between Grenfell and other entities in Corner Brook and Western NL for teaching, research, and community development. This is an

area where Grenfell has had considerable successes in recent years and numerous opportunities to expand upon these partnerships and to create new ones were identified.

Outreach deals with Grenfell Campus's educational efforts within the community, such as visiting local classrooms and delivering lectures to the public. This is an area where Grenfell Campus can improve its sustainability efforts.

Community Exhaustion deals with the overextension and exhaustion that students, faculty, and staff have been feeling because of the Coronavirus pandemic. This theme presents one of the major challenges facing Grenfell Campus and the university sector as the pandemic enters its second year.

Teaching & Research

Three themes emerged under the category of teaching and research: sustainability-focused programming, sustainability-focused research, and curriculum-operations integration.

Sustainability-focused programming deals with academic degree offerings and courses that have an environment or sustainability focus. Due to the wide variety of such offerings on campus, this is an area of success for Grenfell. Opportunities to enhance the current offerings were also identified, while the main challenge related to this theme is the budgetary situation.

Sustainability-focused research deals with research that concerns at least one pillar of sustainability but is mainly focused on research with an environmental lens. This is another area where Grenfell Campus has been successful, with opportunities to grow this capacity.

Curriculum-Community & Curriculum-Operations Integration deals with experiential learning activities that integrate university coursework with either the local community, or with on-campus operations, such as conducting campus waste audits as a part of a course. This sort of integration is currently limited at Grenfell Campus and expanding such integration presents a major opportunity for Grenfell to not only enhance its course offerings, but to also increase the sustainability of its operations and contribution to local sustainability.

Food Services & Production

Two themes emerged under the category of food services and production: community garden and waste.

Community Garden deals with the Grenfell Campus Community Garden. The community garden started in 2011 (Personal Correspondence) as a place where staff and students alike can learn and practice organic gardening (Grenfell Campus, n.d.). This project is regarded as a sustainability success on campus and many participants expressed the desire to see it expanded. There are considerable opportunities to expand on-campus food production via the garden.

Waste deals with the waste (both organic and plastic) that is associated with on-campus food services such as the cafeteria and coffee outlet on campus. This is an area where Grenfell needs to improve its sustainability efforts, though there are challenges associated with this, given that food services are currently contracted out via the Grenfell Campus Student Union.

Communications

Two themes emerged under communications: university structure and sustainability communications.

University Structure refers to the way the campus is organized via schools and departments. This theme presents a challenge to sustainability implementation at Grenfell Campus as various units with distinct functions and structures are expected to work together to deliver the services that the campus has to offer. This theme also deals with the difficulties inherent in communication between universities in general and various entities in their local community.

Sustainability Communications deals with how the campus communicates its sustainability efforts to both the campus community and the greater community that it is situated in. This is an area where Grenfell can improve its sustainability implementation, particularly with regards to communicating with the greater community.

Assessment & Reporting

This was one of the lesser discussed categories in the Holistic Campus Sustainability Framework, with only two participants discussing topics related to this area, leading to one emergent theme: the need for data collection. Grenfell is currently not monitoring its sustainability performance in a systematic manner, making this category a major area that needs improvement for Grenfell. Several opportunities to do this were identified, such as integrating a waste audit into a course as well as offering the graduate Sustainability Assessment course annually.

Health and Social Wellbeing

Two themes emerged under the category of health and social wellbeing: the Coronavirus pandemic and mutual respect.

The Coronavirus pandemic deals with the response to the global health emergency and its impact on students, faculty, and staff at Grenfell Campus. This issue currently poses a major challenge for the campus as it is negatively impacting the wellbeing and engagement of the campus community. This theme is a temporary issue for the campus.

Mutual respect deals with the idea that sustainability advocates cannot win people over to their side by shaming those that they do not agree with. This theme presents a challenge as there is growing divisiveness in society and shame tactics are commonplace, mostly on the internet.

5. Discussion

5.1 Overview of Discussion

This section will provide a discussion on the results of the student perceptions survey and expert interviews as they relate to the literature. The discussion of the student perceptions survey will be presented first, followed by a discussion of the results of the expert interviews. These discussions will then be followed by an assessment of the current stage of sustainability implementation at Grenfell Campus and the extent to which the campus engages in holistic campus sustainability.

5.2 Student Perceptions of Sustainable Development Survey

The results of the survey indicate that, on average, students at Grenfell Campus have strong, positive attitudes towards the concepts of SD and ESD. This can likely be attributed to the range of environmental programming on campus, as Grenfell is home to majority of MUN's environmentally focused courses. Contrary to previous works in the literature (see Fisher & McAdams, 2010; Kagawa 2007; Al-Naqbi & Alshannag 2018; Bahaeee et al., 2012), gender did not have a significant influence on attitudes towards SD. This may be attributed to the small male population size in the study, with only 27 of the 100 participants identifying as male.

Unexpectedly, for the majority of the variables investigated, no significant differences were found between the various schools on campus. For the variables where significant differences were found, students with a declared major had the tendency to have stronger attitudes towards SD and ESD. No statistically significant difference was found

between any of the schools of study. This result was unexpected given that previous research indicates that students conceptualize sustainability based on their field of study (Fisher & McAdams, 2015). A likely explanation for the lack of significant difference between the schools is Grenfell's breadth of knowledge requirement in its undergraduate courses. Grenfell Campus requires all undergraduate students in the School of Arts and Social Science and the School of Science and the Environment to complete six courses across three different categories of knowledge. Group A consists of courses in the humanities such as classics, English, history, and religious studies. Group B courses consists of social science and business courses, such as anthropology, economics, environment and sustainability, and folklore. Group C consists of natural science courses such as biology, chemistry, environmental science, and mathematics. This requirement means that undergraduate students graduate with a large breadth of knowledge that goes beyond their chosen degree program. Each group also contains at least one course offering with an environmental or sustainability focus, with the courses 'Humanities and the Environment' and "Religion, Worldviews, and the Environment" meeting the breadth of knowledge requirements for Group A. While these requirements are not present for students in the School of Fine Arts or in Nursing, several survey respondents indicated that they did learn topics related to sustainability in these programs. Questions 21-23 provided a space for respondents to indicate which course(s) they have taken where they learned about environmental protection, SD, or participated in experiential learning about sustainability. One student indicated that they have learned to take care of the environment within a visual arts course, while a visual arts student indicated that their 4th-year project is focused on pointing/calling out environmental impact, especially as it relates to Indigenous culture. Several nursing

courses were listed as discussing SD, including Nursing Foundations and Health Promotion. Several respondents from the School of Fine arts also indicated that sustainability is present in their program, with one respondent stating, "We often practice sustainability in our art" and another listing "Fine Arts" when indicating which courses they have learned about SD in. One visual arts student also indicated that they have participated in experiential learning about sustainability in the course "Experimental Learning: Community Engaged Arts."

Another possible explanation for the lack of statistically significant views between the various schools could be the small size of Grenfell Campus. As will be discussed later in this chapter, one participant noted a higher level of integration between the various schools at Grenfell Campus compared to other institutions that they have studied and worked at, mentioning the small size of the campus. On smaller campuses, faculty, staff, and students can become familiar with a large portion of the campus community, leading to a greater sense of cohesion and community. This greater sense of community likely makes it easier to promote a culture of sustainability on campus when compared with large university campuses across the country.

No statistical differences were found between graduate and undergraduate students for the items on the Attitudes towards Sustainable Development Scale, which was an unexpected finding. This may also be attributed to the breadth of knowledge requirement and the presence of the Environment and Sustainability program[7].

[7] Introduced in 2018 as the result of the amalgamation of the Environmental Studies and Sustainable Resource Management programs, this program is the only truly interdisciplinary program at Grenfell Campus.

Graduate students did have stronger attitudes towards ESD than undergraduate students, with graduate students more likely to feel that universities should prioritize sustainability courses that universities should promote interdisciplinary teaching and learning, and that university course should promote the connection between local and global issues. This could be due to graduate students having more years of education under the belt, as people with more years of education, regardless of their field of study, have the tendency to show higher levels of environmental concern (Gifford & Nilsson, 2014). Additionally, three out of the four graduate programs offered at the time of writing this research have an environmental focus including the Master of Arts in Environmental Policy, the Bachelor of Science in Boreal Ecosystems and Agricultural Science, and the PhD in Transdisciplinary Sustainability, and the other graduate program is the Master of Fine Arts, which has sustainability pieces baked into it.

It is important to note that these results should be interpreted with caution. Only 100 responses were received for the survey, representing 7.0.4% of the student population, making it not a statistically significant sample to make inferences from. The results of this survey may or may not be generalizable to the entire student population at Grenfell. The result of this survey indicates that, for the population surveyed, students have strong positive attitudes towards both SD and ESD. However, it is noteworthy that multiple interviewees perceived Grenfell as having a student body that, in general, understands sustainability.

5.3 Campus Sustainability Perceptions of Expert Interviewees

The expert interviews were analysed in two parts. Part one of the thematic analysis examined interviewees responses to three questions:

1. What role, if any, should universities in general play in sustainability?
2. What makes a university campus sustainable?
3. What makes a university campus unsustainable?

These responses elicited interviewees' opinions on campus sustainability in general, with later questions investigating the state of sustainability at Grenfell Campus specifically.

It is important to note that the representative from the City of Corner Brook that was interviewed had a different semi-structured interview guide, which focused on uncovering sustainability issues and projects in the City of Corner Brook while identifying areas of success and improvement for the current partnerships between Grenfell and the city. While this may seem like it skews the results of this research in favour of Grenfell having a considerably higher level of success with regards to community partnerships than other categories in the Holistic Campus Sustainability Framework, even with this interview removed from the data analysis the results remained the same. As this interview provided rich information on the current partnerships between Grenfell and the City, it is still included in the aggregated results. Without this interview, it is difficult to accurately assess the quality of Grenfell's engagement and collaboration within the local community, as the opinions of the Grenfell community regarding these engagements provide only one side of the story.

5.3.1 What Role Should Universities Play in Sustainability?

The major theme that arose from this question is *Sustainability Leadership*. All interview participants from Grenfell Campus felt that universities should play a lead or trendsetting role within their community when it comes to sustainability transitions. As one participant stated, "I feel that universities should be leaders in their community for achieving sustainability. We should be leading by example. People look up to us for being innovative and being leaders." Participants feel that universities should lead by example through engaging in sustainable operations, educating the public, and undertaking theoretical and applied research for sustainability. As another participant stated: "I think the university should be the lead in sustainable development and coming up with strategies and processes that can be applied everywhere". Participants also felt that universities should contribute to addressing sustainability challenges within their local community and contribute to the public good, as another participant described "I think universities should play a larger role in sort of creating social goods, to be trying to make the world better." This contribution to local sustainability and the idea of the university as a public good falls under the umbrella of sustainability leadership, as a campus that is truly leading by example with an integrated approach to sustainability would already be engaging in such activities.

This question was phrased with regards to local sustainability during the interview with the representative from the City of Corner Brook, who noted that the role of the university within the local community is context specific and influenced by the size of the municipality:

> "I mean, I think that one is context-specific and so it's important, when you look at the relationship that we have with Grenfell, to consider the context of the size

> of Corner Brook the size of our municipal staff and the departments that we have is very important. When it comes to sustainability or sustainable development, like I say, I'm the only dedicated position, whereas a bigger municipality might have a sustainable development department with portfolios for invasive species, climate change, whatever else, falling underneath it and a bunch more staff to kind of deal with it. So, the way that a university in that municipality would interact around objectives of sustainable development is going to be really different than here for us. Specifically, in our context, I think that the ideation and research capacity is a huge one, like I already mentioned. So, we have limited staff capacity and limited time. So, for me, for instance, leveraging the research capacity that comes from our partnerships with Grenfell allows me to prioritize other projects, and manage time commitments more efficiently."

Whilst smaller municipalities can incur greater benefits from partnering with their local university than larger municipalities, this does not mean that universities in bigger centres cannot contribute to local sustainability, but rather, that universities in smaller municipalities have a bigger opportunity to make contributions in their local municipality due to the financial and human resource constraints that small centres face. Municipalities with only one or two staff members dedicated to SD have a limited capacity to perform jurisdictional scans and must prioritize sustainability issues on their agenda. In these cases, being able to reach out to a university to perform research on lower priority, but still important issues, allows the municipality to tackle a wider range of issues on their agenda than municipalities that do not have such institutions within their region.

5.3.2 What Makes a University Campus Sustainable?

Sustainability in Operations

The majority of participants discussed sustainability in campus operations, viewing a sustainable campus as one that does its best to minimize environmental impact through the wise use of resources. As one participant described, this can be done through several mechanisms such as "taking on initiatives such as practicing energy efficiency in design

and operation, using environmentally friendly materials, recycling, composting, offering courses on environmental issues and sustainability, and investing in sustainable practices." Another participant described a sustainable campus as "one that has a low carbon footprint and has more of a social impact on the community as opposed to a physical impact," noting the vital role that universities can play in their local community. As improving operations to "green the campus" is regarded in the literature as one of the first steps of sustainability implementation (Alshuwaikhat & Abubakar, 2008), it is not surprising that participants had strong opinions regarding sustainable operations. As discussed in the literature review, due to the variety of functions that are performed on a university campus, their environmental impact is closer to that of a small city. This makes operations one of the most important areas for universities to address when engaging in sustainability implementation. Improving the environmental efficiency of campus operations not only decreases the ecological footprint of the campus, by having examples of sustainable operations it provides campus occupants with a real-world example of sustainability in action.

Sustainability Programs and Research

Many participants also viewed having programs and research dedicated to sustainability as a major part of a sustainable campus. As one participant stated: "I think we have to start with the operational side. I think you add even more to the sustainability contributions when you educate, when you have research projects and academic programs that are really targeted at sustainability, that brings it to a whole another level." Given that the primary function of a university is to educate and provide innovative research, it is not surprising that this would arise as one of the major aspects

of a sustainable campus. This opinion is reflected in several frameworks for campus sustainability implementation in the literature, including Alshuwaikhat and Abubakar's (2008) campus sustainability framework. The importance of having sustainability-specific programs and courses is furthermore reflected by Fisher & McAdams' (2015) finding that students conceptualize sustainability based on their program of study, and that students in sustainability-focused programs tend to have a more holistic understanding of sustainability.

Sustainability in People

Participants also commented on the importance of managing the social aspects of the campus, such as its human resources and students. One participant described sustainability in terms of attracting students and having sustainable levels of enrolment, noting that their perspective came from their position as a dean. This view reflects the dictionary definition of sustainability, as attracting and maintaining student enrolment is vital for a university to survive in the long run. The same participant noted the ability of a university to hire and attract the right faculty as an important feature of campus sustainability, as this impacts the quality of programming on campus. This participant also noted the importance of maintaining the health and social wellbeing of campus occupants, stating:

> "So, sustainability also has to do with the quality of life and quality of work experience that people have. That's also key, you just don't have the same kind of institution if people are disaffected or constantly off sick or can't do their work because there's some health and safety problems in the building or whatever."

The notion of maintaining health and social wellbeing was mentioned by several participants and reflects the importance of achieving social sustainability in addition to

ecological integrity. Achieving a healthy environment through sustainability transitions requires healthy and well-functioning societies as "healthy, happy individuals with a strong sense of place, identity and hope for the future are more likely to make protection of their environment a priority" (Rogers et al., 2012, p.3).

5.3.3 What Makes a University Campus Unsustainable?

Participants viewed an unsustainable campus as one that is wasteful in both natural and monetary resources. As one participant responded: "having unrealistic goals, being wasteful, and that could be with energy, water, materials, as some examples. And implementation of activities, lack of involvement and interest from occupants and a lack of education." One participant noted a lack of commitment to sustainability implementation as a feature of an unsustainable campus, noting that sustainability initiatives are often constrained by the number of resources that the institution is willing to commit. Another participant noted arbitrary budget cuts as a feature of an unsustainable campus, something that Grenfell Campus is akin to due to its nature as a publicly funded institution in a province with chronic budget deficits. A culture that does not respect and celebrate diversity was identified by one participant as another feature of an unsustainable campus.

Apart from these two predominant themes, several participants raised additional points. One participant noted the lack of involvement of long-term staff in sustainability initiatives and the lack of succession planning as hinderances towards campus sustainability, noting:

> "the non-academic staff here tend to be long term and then the students and some faculty tend to be short term. So, what ends up happening? A lot of times

> different initiatives get started and when the non-academic staff are not included, the consistency from student to student or we could say class to class, I don't think happens. It seems like a lot of times with different programs, it's like we always start from scratch as opposed to having a succession plan."

Another feature of an unsustainable campus that was discussed during these interviews was academic travel, with one participant noting that it is an area where academia does worse than the rest of society. As they described:

> "I think flights like international, interprovincial flight is one of [those areas] where researchers don't model good behaviour on that sort of thing. They're given big cushy travel budgets and they use them to travel all over the place. And there's pollution caused by that and maybe other problems that come from that sort of thing. But I think as a demographic university, researchers are really bad for that compared to the average.

The same participant also included local transportation within this realm, noting that there appears to be an expectation at most university campuses that if you are a student or work there, that a parking spot should be guaranteed. Given the sheer number of people that attend university campuses, the expectation that everyone should be able to park on campus hinders local sustainability. It contributes to traffic congestion within their communities and adds unnecessary greenhouse gas emissions to the atmosphere that would be avoided if this mindset were to shift.

5.3.4 Summary of Campus Sustainability Perceptions

Overall, participants have a healthy and holistic understanding of what makes a university campus sustainable. This indicates that there is a good understanding of sustainability amongst faculty, administration, and staff at Grenfell Campus. Though it is important to caution that this understanding is not universal within the Grenfell community, the same issues that apply to society also apply within the university environment, and positive attitudes and values towards sustainability is not something

that is universally shared. One participant indicated that there was some push-back received during the development of the Transdisciplinary Sustainability PhD program, noting that people wrote to say that this would not be possible. Despite this push-back, there is still some indication that the Grenfell community has a better understanding of sustainability than the average citizen. First, the Transdisciplinary Sustainability PhD program was approved and successfully implemented in the Fall 2020 semester, indicating that there was ultimately more buy-in than push-back for this program within the Grenfell/MUN community. Second, respondents from the student perceptions survey had strong positive attitudes towards sustainability, this is likely due to the number of sustainability-focused programs on campus. As one participant described:

> "Building on the programming aspect, I think because we have those programs, we have a student body that is... I can't say they're all knowledgeable because we have a few ignorant amasses within our student population and in our faculty, staff, too. I mean, we're not all perfect. But I do think that per capita, we probably have a student population that has a healthy understanding of what it means to be sustainable."

This healthy and holistic understanding of what makes a university campus sustainable provides Grenfell with considerable opportunities to increase its sustainability profile. A lack of awareness, interest, and involvement from campus participants and a lack of support from administrators have been identified as some of the major barriers towards campus sustainability (Velazquez et al., 2005). It is important to note that this healthy understanding of sustainability is only the starting point for campus sustainability implementation. As the literature review demonstrated, these positive views and attitudes do not necessarily translate into pro-environmental behaviours. Pro-environmental behaviours are a complex phenomenon that are influenced by a myriad of contextual and personal factors. Thus, universities must ensure that they

are providing the proper context within their institution for sustainability transitions. The following section will evaluate the contextual factors of campus sustainability at Grenfell Campus.

5.4 The Holistic Campus Sustainability Framework & Grenfell Campus

This section gives an assessment of the current state of campus sustainability at Grenfell Campus using the Holistic Campus Sustainability Framework. It combines data gathered from the student perceptions survey, expert interviews, and the literature/document review. Policy recommendations are introduced in this section and are expanded upon in the following chapter.

5.4.1 Governance

The themes that emerged under campus governance include the budget, sustainability coordination, sustainability policies, and changing perspectives. The budget represented the biggest sustainability challenge facing Grenfell Campus, and is an issue that is largely out of the campus's control, as it will be explained below. Sustainability coordination was another emergent theme that represented both a challenge and an area in need of improvement. Sustainability policies are another area where implementation can be improved on campus, though there are some challenges related to this due to Grenfell being a part of a multi-campus university. Lastly, the changing perspectives towards sustainability from campus decision-makers represents the biggest opportunity related to governance that participants identified.

The Budget

The biggest challenge facing Grenfell Campus (and MUN as a whole) is the university's operating grant. As a publicly funded institution, MUN receives a considerable portion of its operating budget from the provincial government, with GNL providing 85.2% of MUN's budget in the 2017-2018 school year (MUN Budget, 2018). As a result, any fiscal woes that the province experiences are also felt at the university level. As one participant aptly described:

> "We are incredibly dependent on our government grant, it's not really just about the tuition. More than any place in the country we keep our tuition low, and we are really dependent on government. So, the provincial budget environment is critical to our sustainability. But of course, that's also regulated according to formula. It's also about us attracting students. So, again, it's all intimately connected. That's also a theme that I understand in the little I know about sustainability. It is kind of the butterfly effect. That's the sense that you need this balance of factors. And sometimes an imbalance in one area can have all kinds of repercussions on the rest of the system. So there does need to be some understanding of the university, not simply, as I've said, a student-oriented community, but there needs to be the knowledge base of the university as a system and the way in which the parts are interrelated, interconnected, the way that there's an impact in one area, it spills out into others."

Unfortunately, there does not seem to be this understanding of the university as a system within the Government of Newfoundland and Labrador (GNL). MUN has been facing budget cuts for years while striving to keep tuition fees low through maintaining a tuition freeze. In 2020, after 4 consecutive years of budget cuts, GNL ordered MUN to save 2.7 million dollars a year over the next two years, prompting the outgoing president to state that there are only so many budget cuts that the institution can handle before it impacts core programming (CBC News, Feb 12, 2020), with one interviewee echoing this sentiment, stating that they have asked the finance office at the St. John's campus "At what point is Grenfell no longer sustainable with these budget cuts?" One

participant also raised a question about the ability of the campus to attract the right faculty to Corner Brook given the provincial dire economic situation, stating:

> "I think there could be long term a question of the ability to attract the right faculty to this part of the world simply because the same kind of factors that are driving people to move to Alberta or southern Ontario or whatever potentially apply in terms of people who work at an academic institution. There's a sense of consolidation in big, big urban centres. And so, there's a sense that it's really important that Corner Brook itself not be diminished as a community, as a centre, because that's also going to impact people's decisions to come and spend their career here. And we've already experienced people resigning because they're just pulled to other places in Canada."

While Grenfell may be in a more precarious situation with budgets than other universities due to its dependence on MUN government funding, it is important to note that this lack of funding is not something unique to Grenfell. Universities around the world have been facing budget cuts for many years, with one participant describing how this has been an issue throughout their academic career:

> "Budget - it will always be an obstacle; it will always be a challenge. It's been so throughout my entire career when I was at Ottawa U or Mount Royal or when I was a graduate student, I've constantly heard always about the fact that we never have enough resources to do the things that we want to do."

Sustainability Coordination

Sustainability coordination is an area where Grenfell can considerably improve its sustainability implementation. Several respondents noted the Grenfell Campus Sustainability Committee as an asset in this area, with one participant describing the committee as "one of our most active and successful groups." Despite the success of the committee, there is still a need for a more coordinated approach to sustainability on campus. As the same participant described the current state of sustainability on campus:

> "The actual implementation of sustainability is, it seems to me, to be sort of piecemeal and happenstance, determined by budgets always, and I don't think

> it's particularly well-coordinated and really meaningful for what we, what we should be doing. We waste a lot of energy. We do not perform as well as what we should and on organics and biodegradables. So, I think that we also sometimes do things as a university to show what we're doing, almost like a PR initiative, but we actually don't undertake a coordinated and meaningful and comprehensive approach to it. Now, that's easier said than done, because, again, it all comes back to the fact that universities are struggling under budgetary restraints."

This coordination could be improved by giving the sustainability committee a higher position within the institution's decision-making hierarchy, given its successes with sustainability implementation in the past. As one participant argued:

> "I think that our administration needs to place more importance on the sustainability committee. I don't think it should be ad hoc the way it is now. I think it should report to, I think it is reporting to the Campus Council now, and that's I guess that's fine going forward. But I would love for it to be a committee that the schools have to nominate somebody to be on in an official capacity, that is run through their school councils."

It is important to note, that this issue is actively being addressed. Since conducting the interviews for this research, the Grenfell Campus Sustainability Committee has changed its reporting structure, now reporting directly to the Vice President – Grenfell Campus, rather than the Campus Council (Personal Correspondence, Feb 17, 2020). However, there is still room to give the Sustainability Committee more credibility. As one participant noted, students are currently bringing more to this committee than faculty and staff, with students attending meetings at a much more consistent rate. The same participant also noted that the current chair of the committee is a non-academic staff member, as opposed to a faculty member. For the committee to gain the credibility it needs within an academic institution, there needs to be a higher level of involvement from faculty and staff on the committee, particularly from academic staff members. Academic staff members on the committee currently volunteer to be in their position and are not formally appointed by their school councils. If appointments to the Sustainability Committee were done in a more formal manner, such as

schools formally nominating their representatives, it may remedy this issue as there would be an expectation to provide updates at school council meetings. Nevertheless, the change in reporting structure for the sustainability committee during this research indicates that this is an area that Grenfell Campus is actively trying to improve.

In addition to giving the Sustainability Committee a more prominent position, there is the need for staff that are dedicated towards sustainability implementation, with one participant recommending that the campus a sustainability coordinator. Without staff dedicated towards campus sustainability, Grenfell may continue down the path of ad-hoc sustainability implementation. Until a dedicated staff member is hired to oversee sustainability initiatives, the lack of human resources dedicated towards sustainability will continue to be a challenge with regards to sustainability implementation. The option to hire a sustainability coordinator to address the issue of ad-hoc sustainability implementation will be discussed in the following chapter as a policy recommendation.

Sustainability Policies

As discussed in the introduction, MUN signed a university-wide sustainability declaration in 2009, with the principles of the declaration present in the university-wide purchasing policy. Whilst sustainability appears as a criterion in the purchasing policy, the term "sustainability" appears in only one other university policy, the policy on research chairs, and in this context refers to budgetary sustainability (i.e., the dictionary definition of sustainability). Currently, the sustainability aspects of the university purchasing policy are inadequately communicated to campus decision makers, leaving the impression that this is a relatively low priority for MUN. As one participant, an

administrator at Grenfell, asked “is sustainability one of the criteria that we're supposed to be using in our purchasing right now? And if not, it should be.” Whilst sustainability considerations are outlined in MUN’s purchasing policy, as discussed in the introduction, it is not transparent how sustainable purchasing is on campus or within the multi-campus network, as there appears to be no reports published related to the matter. This is concerning given that transparency is a part of the mission statement in the university sustainability declaration.

As sustainability is currently not well incorporated into university-wide policies, sustainability policies are an area where Grenfell Campus can improve, though as it is part of a multi-campus university there are some challenges associated with this. According to MUN’s policy on the Development, Approval and Administration of University Policies (also known as the “Policy on Policies,” all non-academic, university-wide policies require approval from the Board of Regents (MUN, 2015). This potentially limits Grenfell Campus’s ability to systematically include sustainability considerations across campus-wide policies, as a number of these policies are institution-wide and require much broader consultations. Additionally, as this research focused specifically on sustainability implementation at Grenfell Campus, it is unclear how well engrained the sustainability ethos is at other MUN campuses. However, individual academic and administrative units can develop local policies for their own operations as long as these policies and their development are consistent with university-wide policies. Additionally, any academic staff member, with the approval of their unit head, can propose new policies or amendments to existing campus policies. Thus, there is opportunity for the administrative and academic units at Grenfell to

incorporate sustainability considerations into their local policies and potentially influence university-wide policies. As one participant suggested, Grenfell should systematically examine its local policies to identify areas where sustainability can be incorporated or strengthened. While changing local policies may not have an impact on the entirety of MUN's multi-campus network, they still have the potential to enhance the sustainability profile of Grenfell Campus and enable campus sustainability transitions. For example, the facilities management at Grenfell Campus has committed itself to engaging in green cleaning and as a result 90% of the cleaning supplies used on campus have some form of a green certification (Personal Correspondence, December 2019).

Changing Perspectives

Several participants alluded to the previous administration having a lack of sustainable vision, with one participant stating: "if you look at the campus master plan a couple of years ago, I think more than one person, myself included, was a bit critical of the lack of sustainability that we saw in that plan" and another participant expressing disappointment in the past administration for shutting down the old industrial composter. Fortunately, this research revealed that the current administration has a healthy understanding of what it means to be sustainable. As one participant, comments:

> "I do think that Grenfell campus administration understand the holistic view of sustainability that it's not just like I said before, it's not just about green things, greening things, although that is an important element of it. I think that the administration has a healthy understanding of what it means to be sustainable."

Another participant, a senior administrator, exemplified these sentiments in a comment regarding the campus Sustainability Committee:

> "I found the sustainability committee at Grenfell really inspirational for the stuff that you guys have championed and brought forward and kind of feel guilty that we haven't done more. So, I really like the fact that you guys are pushing, and I really think you guys should push. You can you got me on tape saying that."

This healthy understanding and vision for sustainability is a major opportunity for Grenfell Campus, as research indicates that visionary leadership towards sustainability from top management is a significant enabler of campus sustainability (Mogandas et al, 2013, p. 1456). While this understanding is important, it must be present in the majority of the campus community to enable a wide-spread buy-in for campus sustainability. Fortunately, another opportunity identified via the interviews is that there appears to be the beginnings of a cultural mind-shift towards sustainability happening at Grenfell Campus. One participant noted that scarcity is creating an opportunity: "I think that to me is the most promising thing, that perhaps scarcity is making people think a little bit differently about resources and this desire to use what we already have rather than just scrapping it and building new." Another participant had a similar lament when discussing the idea of sustainability upgrades as investments rather than sunk costs:

> "But as the thinking on that shifts and again, because we have to deal with tighter budgets and think about things a bit differently, that thinking is shifting. And so, for us now and we're having this conversation right now to go, "you know what? We're going to make an upfront investment in some equipment, but we are going to save and we're going to save over this period of time" is being met more warmly and more positively than it would have been even three years ago. People would've said no, forget it. So, I think,I really do think that there's a shift in how people are thinking about these things."

This shift in perspective regarding resource scarcity and sustainability investments is a major opportunity for Grenfell Campus, as the literature review for this thesis discussed, attitudes, values and knowledge are important antecedents of behaviour change. This

growing openness to wise resource use and a changing mindset in spending for sustainability indicates that there is a growing awareness and value for sustainability within the campus community, setting the ground floor for behaviour change. As changing behaviours is extremely important for enabling sustainability transitions, this shifting mindset offers enormous potential if it is enabled and nurtured through proper funding, support, and recognition for Grenfell's sustainability efforts. While the budgetary situation will continue to pose a challenge, this is something that Grenfell should rise to, as sustainability transitions require a reduction in resource consumption and reduced consumption ultimately leads to cost savings. Many participants also noted that there are sustainability projects that do not need a significant amount of funding attached to them and that small projects should also be pursued and celebrated.

5.4.2 Operations

Given that universities have an impact similar to small cities, improving the sustainability of campus operations is regarded as one of the first steps in implementing campus sustainability. As such, Grenfell has improved the sustainability of its operations in recent years, particularly with regards to energy efficiencyand waste management. These themes are both aspects of campus operations where Grenfell has been successful, but areas for improvement have still been identified, along with several opportunities. Another emergent theme was transportation, which is currently a challenge that may become more complex as the campus grows. Other areas of campus operations, such as water management, were not sufficiently discussed in the interviews to draw conclusions (save for one participant indicating that Grenfell does not really address water management at all). A scan of the Grenfell Campus website did not uncover further information, indicating that the campus has not sufficiently considered

all aspects of sustainable campus operations. The lack of attention to water management could be attributed to the climate in Corner Brook, which experiences a significant amount of precipitation throughout the year. Nevertheless, this is an area where Grenfell should improve the sustainability of its operations so it can lead by example.

Waste Management

In terms of waste management, the campus has been successful in both composting and recycling in recent years, though these improvements have come with hiccups along the way. Grenfell used to host an industrial composter on-site, but due to fiscal restraints in 2016 the industrial composting program was shut down, much to the disappointment of many interviewees. In 2019, Grenfell began a partnership with a local waste management company to remedy the loss of the industrial composting program, with Grenfell gifting its industrial composter to this company in exchange for free organic waste collection. This deal helped to remedy the loss of the industrial composting program on campus and has contributed to local sustainability by supporting a local company in their organic waste management endeavours which, in turn, has increased the accessibility of organic waste collection for local businesses. Since beginning this partnership, Grenfell has diverted 1648 kilograms of organic waste from the landfill (Personal Communication, February 11, 2021), and it is important to note that for much of the year 2020 collection was put on hold due to the campus switching to remote learning.

In 2017, the Grenfell Campus Sustainability Committee formed the Waste Management Subcommittee (which is now referred to as a committee rather than subcommittee). This committee introduced a recycling program for used beverage containers, using the funds from this initiative to host sustainability-focused workshops on campus. The introduction of this program ensured that Grenfell was well ahead of the game when the Western Regional Waste Management (WRWM) board introduced a new recycling policy for the industrial, commercial, and institutional sectors in 2019, which came fully into force in January 2021 (WRWM ICI Policy, 2019). As one participant commented:

> "We've implemented a successful recycling program. We've been recognized as leading the process in our community for institutions. I think [Western Regional Waste Management] commented on that when they recently rolled out the changes in recycling for institutions and they said we're well ahead of the game."

It is important, however, to note that this success is contextual, as one participant points out:

> "Certainly, the waste management committee has made great strides […] I think waste management is an area where we've done well. But I want to say that we have to consider that in context, that we still have to keep it up and we still have a long way to go, really, particularly when you look at relative to other places. And I think we could do a lot more."

The Western NL region lacks robust infrastructure to recycle many waste streams. Glass is not recyclable on the island, save for used beverage containers, and industrial composting is not a widespread practice, though Grenfell is fortunate to have access to this service. Additionally, waste is transported from Corner Brook over a considerable distance before reaching the Central Newfoundland Waste Management Centre in Norris Arm. While Grenfell may be a leader in waste management for institutions in western Newfoundland, the campus would likely be considered a laggard in the context

of waste management at Canadian universities. Several participants also expressed concerns regarding the volunteer-run nature of the waste management program, with one participant stating “Some will argue, well, it runs great on volunteers now. But I'll say after my experience here, that it may run great now, but in a couple of years' time, when some of these experienced students leave, it'll flounder.” With another participant echoing this sentiment: “waste management is a really important feature of our Sustainability Committee. But you know what? If you guys all graduated and left tomorrow and students coming in didn't have the same passion about it, that wouldn't happen. Like it would die on the vine. So, I think there needs to be more structure around the work that you guys are doing as well.” A similar sentiment was reflected by another participant, who noted that due to students graduating, there is a change in the campus community every 2-3 years. Some cohorts of students are incredibly engaged, while others are more apathetic to involvement in campus life.

The current state of the waste management program at Grenfell Campus falls under the first phase of campus sustainability implementation as identified by Krizeck et al (2011). The program is primarily grassroots in nature, it is driven by students with minimal involvement from campus decision makers, thus efforts should be made to integrate this program within the Facilities Management Division to ensure that its ad hoc nature does not become the *de facto* state of campus sustainability vis-a-vis waste management. In addition to the volunteer-ran aspect of the campus recycling program, there are several other areas of Grenfell’s waste management strategy that can improve. One participant noted that more waste streams could be added, and that there is potential to have a full waste sorting facility on campus if funding were available. It is important

to note that the Waste Management Committee is currently addressing this task by introducing various TerraCycle boxes on campus (Personal Correspondence, Feb 20, 2021). Additionally, waste management is an area on campus where there are considerable opportunities to improve Grenfell's EfS efforts by integrating campus operations within the curriculum. One participant noted the importance of such integrations, stating:

> "I think that's really important point - the integration of the programming with the operations side. Because you can learn by doing everyone talks about how important experiential learning is. So, it's very effective for the students to learn by something that's right there and something they care about and affect their lives, like their campus, their residence."

Another participant shared a similar remark and gave an example of programming-operations integration at their alma mater:

> "There's no reason that we also can't integrate some of the courses with on campus sustainability stuff. And you reminded me that when I was at UVic, we were we were dealing with some data in an undergraduate ecology course that I was teaching. We didn't actually do this, but I know this was done the previous year or some other course had done a waste audit. So, they did the waste audit. They would have had to partner with the facilities management division to do that. So, they counted through the bags. They put things into piles. They did that and came up with some really interesting data."

This anecdote gives a good example of a low-hanging fruit for curriculum-operations integration that has been practiced at many university campuses. As there are two professors on campus that are already creating a proposal to incorporate a waste audit into an introductory level Environment and Sustainability course (Personal Correspondence, January 18, 2020), there is considerable opportunity for Grenfell to begin this operation-curriculum integration. Incorporating this data collection into a course will not only benefit students by providing an experiential learning experience but will also help to improve Grenfell's waste management practices as waste audits are regarded as one of the first steps in a comprehensive campus waste management

program (Smyth, Freedhan & Booth, 2010). This option will be discussed in further detail in the policy recommendations section.

Energy Efficiency

Regarding energy efficiency, the campus has recently undergone upgrades to the Arts and Sciences building, the Fine Arts building, the Forestry Centre, the Library and Computing building as well as the student residences/chalets as part of MUN's energy performance contract with Honeywell (Woolfrey-Fahey, 2017). Despite these upgrades, participants still noted areas where energy efficiency can be improved on campus. One participant noted a particular door on campus that is often out of order and suggested a solution for improvement:

> "So, at our last meeting, those suggestions that we forwarded on to the Greater Memorial University Committee, things like saving on heat or doors constantly blowing open. Instead of paying the handyman to come in and fix that door right by Marcomm that's always and forever blowing open and getting broken. I mean, I laugh now when I see yellow tape across it because it's just ridiculous. So instead of paying the handyman eight times a year to come in and fix it, take that money and build a proper porch there, right?"

Several participants also noted that the RecPlex is in dire need of upgrades, but that the campus currently lacks the funds to make the necessary upgrades:

> "I'll give you a case in point; we have a building down in the parking lot down below, the RecPlex where the old curling club was, it needs money because it leaks energy like crazy. It is asbestos laden and it's a huge waste of resource. But we don't have the funds to actually make it into the type of building that it should be - energy efficient and not a place where people can't go and have the space because they're afraid of getting asbestosis."

Transportation

The issue of transportation was another theme that arose from the interviews. Several participants noted that the public transportation system in Corner Brook is not very

accessible for students, with one participant explaining "…one of the ones that I hear a lot is about students living on campus and the accessibility of the transit system. The transit system right now is not very accessible for students living on campus or international students. It doesn't run after hours, like into the evenings." Another participant had a similar remark: "I'd love for the campus to be able to do something about public transit, but I know public transit is just a perennial problem here because of the structure and size of the city, it is a bit different." As Grenfell is increasing its program offerings and will be home to the new regional aquatic centre, it may face a situation where there is traffic congestion and a lack of parking on campus if public transportation continues to be an issue within Corner Brook.

Another topic that arose under this theme is electrical vehicles, with several participants expressing a desire to see electric vehicle charges on campus while noting the constraints on making this investment. As one participant discussed:

> "I would love to see us have electric vehicle chargers, and I hope that we will. But the first question then is, well, given that there's no new funds coming to the university, what is it you're going to cut? What are you not going to buy in order to buy the electric vehicle charger? So, they're really difficult decisions to be made. And there's lots of new things that are coming out that we would like to be able to do. But the question always is, where is the money going to come from for that? So that to me, that's probably the big challenge, how to move our sustainability initiatives forward in the context of budget constraints and even cuts."

Another participant noted that installing electric vehicle chargers could contribute to sustainability within Corner Brook, stating "…if there was one at Grenfell, it would say something about the drivability of electric cars in Corner Brook, even if the only chargers were on campus. So, it would contribute in that sense." Electric vehicle chargers on campus would also provide an opportunity to upgrade the Campus

Enforcement and Patrol vehicles to electric when it comes time to replace the current fleet. One participant noted that there are still challenges to this:

> "I think that there's no opposition to the idea of putting electric charging station on campus. Absolutely. It's a no brainer. Who wouldn't want to do it, symbolically it's beautiful as well because it sends the right message? But we're finding that there are very few places that not only sell, but even fewer that service electric vehicles. So that's, I guess, an issue as well."

While servicing electric vehicles in Corner Brook may be a current challenge, it is important to note that many countries are implementing a ban on the sale of new gas-powered vehicles. Norway aims to ban the sale of new gas-powered vehicles by 2025, India has its sights set on 2030, and France and Britain have a later goal of 2040 (Kass, 2018). As more countries commit to this change in policy, vehicle manufacturers will have to convert their fleets to electric in order to stay relevant in the industry. Some manufacturers are already preparing for the switch, with Volvo recently announcing that it will make its entire line-up electric by 2030 (Cary & Soderpalm, 2021). Thus, this issue is only a temporary challenge, it is only a matter of time before electric vehicles are serviced in Corner Brook, as the policy changes that are occurring around the world dictate that electric vehicles will have a dominant share over gas-powered vehicles within the relatively near future.

5.4.3 Engagement & Collaboration

Three major themes arose under engagement and collaboration: partnerships, outreach/community engagement, and campus community exhaustion. Partnerships are a major area of success where several recommendations for improvement were identified. Outreach is an area where Grenfell can improve its sustainability implementation. University community exhaustion is currently the biggest challenge

related to engagement that the campus is facing and is unique to the timing of this research.

Partnerships

Participants noted Grenfell's connections and integration with the local community as a major area of success for the campus, with one participant stating, "I think another strength that we have is that we're really integrated with our community." and another echoing their sentiment: "…in the last five years or so, there's been a really excellent collaboration with the local community." Several participants noted Grenfell's partnership with CBPPL and CNA for the development of a Regional Innovation Centre as sustainability success, with one responded stating: "Another good example is the way that the old mill offices are now being rejuvenated with this collaboration between Grenfell, CNA, and the mill. It's a much more collaborative atmosphere right now and people as a result are finding resources." This partnership can contribute to local sustainability in several ways if sustainability becomes a part of this centre's culture as well. Several opportunities to include sustainability initiatives within the Regional Innovation Centre are identified in the following chapter under policy recommendations.

The teaching and research partnerships between Grenfell and the City of Corner Brook were also regarded as a success in this area. As discussed in the introduction, Grenfell and the City of Corner Brook have partnered on several teaching and research projects. The CityStudio model is providing benefit to both students and the City staff, with the master's iteration of the course even providing tangible products that the City can use.

As the City of Corner Brook representative describes: “I think we ended up having like five new policies. They're ready, basically all I need to do is just kind of polish them a tiny little bit and then they can be sent to council to be adopted. Those are products of last year's course.” Not only is this providing benefit to the City, but it is also providing benefits to students by offering an experiential learning opportunity that integrates their learning with real-world sustainability problems.

In addition to the CityStudio partnership, the City of Corner Brook is a research partner for several small projects with the EPI-Lab. Given the relatively new nature of these initiatives, there is room for improvement, with the City of Corner Brook representative providing valuable insight on how this partnership can be enhanced based on their experience. Using a report that the EPI-Lab produced for the City as an example, the representative painted a picture of the need to “speak each other’s language” when engaging in these types of partnerships. This report on Japanese Knotweed, an invasive species in Corner Brook, listed challenges related to the species in terms of natural science, listing issues such as its impact on erosion, bank stability, and displacement of native species. However, socioeconomic challenges that the City would face related to the species such as its impact on the line of sight in roadways and congestion on trail networks were not discussed in this report, highlighting the need for partners to understand each other’s context when working on research projects. The representative offered a suggestion to improve this relationship going forward:

> “I think that's where it's important as we continue to develop this relationship, that there's a kind of like familiarization period or getting to know each other. Whereby staff at Grenfell can get to know the needs of the city and how we think and how we might do this if we were to do it on our own. So that when you do come in to fill knowledge gaps or provide research or whatever it is, whether that's proactive or reactive, it's more usable, it's a better product. It's not

> just doing research for the sake of research that doesn't really benefit us because we can't do anything from it. It doesn't benefit the community because nothing actually changes. Then in the same way it's important for us to get to know the needs of students and whatnot, so that as we continue to run engaged learning courses like 6001 or CityStudio or whatever we're providing you guys with the right kind of opportunity that that meets your needs."

This familiarization period could become a formal part of how Grenfell engages in community-based research, as it would help to ensure that the research produced is more meaningful for both parties. While there is still room to improve the workings of this current relationship, it shows considerable promise. These partnerships should continue to be supported and expanded so Grenfell Campus can provide the research capacity that the City needs to tackle the sustainability issues on its portfolio. Given the size of the City of Corner Brook, it has limited capacity to dedicate resources to sustainability initiatives, with only one staff member dedicated to SD, making this partnership something that the City sees value in. As the City representative stated: "My director is really excited about. So, we see the benefit. And I think that kind of in the long run, when it comes to the sustainable development of the city, we need you guys. We can't go it alone and expect to learn everything and gain all the knowledge that we need in such a rapidly changing world."

Outreach/Engagement

Despite these successes, there are areas where Grenfell can improve its engagement and collaboration with the local community. Many participants feel that Grenfell Campus should continue and enhance its current outreach efforts, noting the need for sustainability outreach at the local high school, as one participant describes:

> "So, let's talk about this, taking on this kind of leadership role - trying to be an example, I think, that is inadequately communicated to the community. I think, again and I'm just drawing a little bit on my own anecdotal type of experience

> here, but when I see the high school and I see it as a kind of - it is actually one of the filthiest places in town. There's all kinds of factors there, in terms of the maturity of the students and all that kind of stuff. But it just seems like a real disconnect there, that's obviously something they're not learning, or they're not being taught or they're not understanding. They're being taught it. But it's just going up. It's just not being understood. And I wonder whether we could be inspiring, especially young people, when it comes to sustainability, because its implications are most urgent for young people."

Grenfell Campus could deliver educational lectures to students at this school that discusses the consequences of poor waste management and excessive consumption on the environment while teaching students tools to integrate sustainable practices into their own lives. Such lectures can expand beyond the high school to include middle and primary schools as well as community groups. As multiple participants noted, Grenfell should also ensure that it has some form of representation at local events geared towards sustainability, such as the city's annual Trash for Cash event, to demonstrate Grenfell's commitment to local sustainability.

There are also several opportunities to increase engagement and collaboration for sustainability within the Grenfell Campus community itself. As previously discussed, due to the impact of environmental programming at Grenfell, the campus community generally has a good understanding and appreciation for sustainability. This presents opportunities to engage the student body in sustainable initiatives, especially given that 80% of survey respondents indicated that they have interest in being involved with sustainability initiatives on campus. While this only represents 80 students within the Grenfell Campus student body of 1420, if all these students were to be engaged and involved it could make a real difference given the size of the campus. There is also an opportunity to bring more stakeholders into the partnership between Grenfell and the City of Corner Brook, as the City representative noted:

> "The next kind of step is taking the partnership beyond just us. So, when you kind of bring in other stakeholders or actors, whether that be other educational institutions like CNA or other universities, or whether that be kind of community or city or regional wide committees or joint councils around sustainability specifically. The reason that I would mention that is, for instance, with our Partners for Climate Protection commitments and ideas and projects, a lot of long-term ones are to establish community wide committees or boards on energy efficiency or greenhouse gas reduction. But I think that's kind of another side or another level that we could take it to. So that would be an opportunity."

Campus Community Exhaustion

This challenge is unique to the timing of this research and is the result of the COVID-19 pandemic. With all classes moved to a remote teaching format, students are disengaged from campus life and are having difficulties adjusting to an online learning environment. Information Technology Services administered a survey to the student population in Fall 2020, investigating their experiences with remote instruction. 70% of students reported that the workload for remote instruction was higher than they expected, with 22% of students reporting that they dedicated over 12 hours a week per course and 26% of students reporting that they dedicated between 8-12 hours a week per course. Staff are also feeling the impacts of the pandemic, with one participant describing the Fall 2019 term as "gruelling" stating "everybody that I know at Grenfell is tired, like bone tired. It's been a gruelling, gruelling term. And to ask people to be passionate about these things and to care and generate, their time is already at a premium, and then to pile something on top of that is really, really difficult." One can only speculate what the lasting impacts of the pandemic may be. There is a possibility that people may be more engaged when lockdown measures are lifted and life returns to normal, but Grenfell should be cautious in assuming this. It may take some time after quarantine measures are lifted for the campus community to return to its current levels of engagement simply due to people experiencing pandemic fatigue.

5.4.4 Teaching & Research

Four themes emerged under the category of teaching and research: sustainability-focused programming, sustainability-focused research, curriculum-operations integration, and professional development. Sustainability-focused programming and sustainability-focused research are areas of major success for Grenfell Campus. Curriculum-operations integration is an area that presents major opportunities for campus sustainability implementation, as it is part of the 'whole-of-university' approach to sustainability. Professional development offers an opportunity for Grenfell to better educate its campus and greater community in sustainability.

Sustainability-Focused programming

Participants regarded the high level of sustainability programming present at Grenfell as a major success, reflecting their views that teaching and research have a significant role to play in campus sustainability. Grenfell has a considerable amount of programming related to sustainability, including the Bachelor of Environment and Sustainability, the Master of Arts in Environmental Policy, the Master of Science in Boreal Ecosystems and Agricultural Sciences, and the PhD in Transdisciplinary Sustainability. These programs are quite successful with one participant noting "Grenfell does have great strength in agricultural sciences and environmental sciences and environmental policy" and another echoing their sentiment: "I think we're known not only across the province but beyond for environmental policy, for example, [and] for I think the Boreal Ecosystem and Agricultural Sciences program, certainly for looking at sustainable agriculture in the province and in northern boreal regions."

Sustainability successes in this area are not limited to the environmentally focused programs on campus either. As demonstrated in the results of the student perceptions survey, there are many courses that fall outside of this realm that also have sustainability principles baked into them. One participant expanded on how sustainability is integrated within the School of Fine Arts, noting that the theatre program has become proficient at reusing materials and that the visual arts program is heading down the same path:

> "So, the theatre program is very good at recycling. I mean, we've got a warehouse full of stuff that we keep to reuse. Visual arts is cruising down the same way. One silly anecdote annually, the VA program would rent a dumpster, park in front of the fine arts, and throw materials ever year, stuff that students leave behind or whatever. And at some point someone went, 'this just looks bad and what are we throwing away?' Right. So, our technicians would go out and salvage as much material as possible to reuse it. Everything from silkscreens to wood, everything. And that footprint has gone down and down so much. I don't think they really do [that] anymore because we just use [the] materials. And again, that's great. I wish I could tell you it was for absolutely altruistic reasons, but it's kind of not, it's because we can't afford to be wasteful."

While this reuse of materials may not have been for environmental or social reasons, this anecdote demonstrates the interconnectedness of the pillars of sustainability. Reducing waste to save money has significantly reduced the environmental footprint of this department. The School of Fine Arts is also moving away from toxic materials, and if they must be used it is done so in a controlled environment. As the same participant explains:

> "I mean, we cannot afford to be wasteful and increasingly and rightfully absolutely rightfully, health and safety has become an issue as we've moved away from non-sustainable materials right down to, I mean, you mentioned dyes and we've moved away from any hint of toxicity or dangerous materials. And that's meant being careful to source stuff that has meant, I think, a greener footprint and a lot of ways less waste, less harmful waste. And we're not exposing students to toxic materials or if we have to, it's in a very regulated and careful environment […] And that has gone into teaching because we're also teaching students to be careful with resources, mindful and safe. I mean, let's not underscore that. I mean, part of this is simply not exposing students to and giving

> students the authority to say, I can't use this material because it's toxic or whatever."

There are also considerable opportunities for Grenfell to enhance its sustainability-focused courses and integrate sustainability into courses that do not have an environmental focus. One participant noted that each course could begin with a sustainability teaching moment: "With respect to programming I think maybe every single class needs to have a sustainability moment before they begin the year. So, the first day of class is part of the housekeeping is as part of sustainability practices I will not be asking you to hand in any paper or I'm not going to be handing out the syllabus."

Sustainability-focused research

Sustainability related research on campus was also identified by interview participants as a success at Grenfell Campus. Several participants noted the research partnership between the BERI lab and CBPPL as an example of a sustainability success, stating: "I think the work that we're doing in research is promoting that as well, with the work we're doing with the mill on transforming wood waste into soil nutrients through work that we're doing on agriculture, it is important for sustainability and food security in the province." Food security is an area where Grenfell has the potential to make significant contributions to local sustainability. NL is facing food insecurity issues, approximately 90% of the fresh vegetables consumed in the province are imported and there is only a 2-3 day supply of fresh produce available if ferries are delayed (Food First NL, 2018). Local soil health is poor, with many areas having soils that are too acidic for efficient agricultural production. If this research results in a soil amendment that can improve the health of the province's agricultural soils, there is a possibility that it could have a real impact on local food security within NL.

This is an area of research that is attracting an increasing number of graduate students to study at Grenfell. As one participant notes, building graduate offerings in this area can enable sustainability integration on campus by increasing its revenue and profile:

> "Another way, I think is to is to build those graduate programs like we're doing, to get high quality HQPs, students, to advance agricultural research. I think that's going to be key for our campus. We are attracting a number of students in sustainability and food security. I think that's going to be also a real growth area, because what we see is that those students, we're going to get more research funding as a result of students working with professors. And that has sort of an upward spiralling effect because the more success that you have, the more students you obtain, more international students, more revenue. It's an upward cycle instead of a downward cycle - and that raises the profile."

The TRSU doctoral program offers potential for the campus to attract greater research funding and raise its academic profile. This program offers opportunities for the campus to engage in more innovative research with the greater community. Grenfell appears to be well equipped to make this a successful program, with one participant describing Grenfell's level of sustainability integration:

> "Coming here, I felt that I was more integrated than many other universities are because it's smaller and because of the school structure. You know me, for example, I'm a political scientist, but I'm in the same faculty meetings as all the natural scientists in my school. So, I mean, it's honestly a bit weird to put the political scientists and the economists into the science school, but I love it. Like, I think it's just such a great opportunity. It would have been hard to develop things like the Transdisciplinary Sustainability PhD without that set up."

The EPI-Lab was also noted as a success by multiple participants. This policy shop works with local partners to provide free research on environmental issues. The City of Corner Brook views this as particularly beneficial for a municipality of its size, with the City representative stating:

> "I mean, obviously, we're a city, but we're not a huge city. We don't have a huge municipal staff with lots of resources and time to really delve into the latest and greatest all the time ourselves. So, it's been awesome to have the EPI-lab there to say, "hey, we need to know more about this specific thing. Is there a student or is there someone within the EPI-lab that can come and take on this research for us?"

As this policy shop is still relatively new, there are opportunities to improve and grow. The PhD program presents an opportunity for this lab, as the length of the PhD program versus the Master's program allows for researchers to be involved in longer-term projects, leading to the potential for the EPI-Lab to engage in longer-term projects with community partners. PhD students can also help contribute to the lab by drafting formal policies and procedures for its daily functioning and helping to peer review reports that the lab produces.

In addition to the current sustainability related research projects underway at Grenfell, the representative from the City put forth the idea of dedicating a percentage of research output to locally relevant issues, stating:

> "I think the university should, and I think that the university does want to be like an active member of the community and something that helps benefit the wider community, right? So, having that proactive role in reaching out and maybe you want to say, like, we're going to make sure that 10 percent of our research output is going to be focused on topics that are relevant to the community, and we're going to make a point of actively sharing and engaging with the community on that. We're not just going to do the research, publish it and not tell anyone, you know what I mean."

Given that this suggestion is in line with Grenfell's strategic plan and long-term goals, this idea is discussed in greater detail in the following chapter as a policy recommendation.

Curriculum-operations & Curriculum-community integration

Whilst Grenfell has been successful in offering a sizable amount of sustainability programming for an institution its size, the campus should increase its experiential learning offerings related to sustainability, as 75% of survey respondents indicated that

they have not taken a course at Grenfell that includes experiential learning about sustainability. There is potential to increase the amount of experiential learning opportunities within Grenfell's course offerings via integrating coursework with sustainability issues solving on campus and within the community. Much like the ANUGreen Office case study discussed in the literature review, Grenfell can engage in a "whole-of-campus" approach to EfS by using the campus grounds as a living laboratory (this option will be discussed in detail in the next chapter dedicated to policy recommendations). Additionally, there is opportunity to integrate experiential learning components within the community, expanding upon the current learning partnerships between the campus and the City. One participant noted that there is already interest in this on campus, sharing that "a Prof with the Environmental Science Program, said that she was really looking for a way to integrate her students with the community, like she wanted to do analytical chemistry in partnership with the City."

5.4.5 Food Services & Production

Two themes emerged under Food Services & Production: the community garden and waste. The Grenfell Campus Community Garden is an example of a success in this area and several opportunities to improve it were identified. Food waste associated with the on-campus food vendors is an area where Grenfell needs to improve, with several challenges related to doing so.

Grenfell Campus Community Garden

The Grenfell Campus Community Garden was regarded by many participants as a success. According to one participant who is involved with the community garden committee, the garden was implemented around 10-12 years ago with the

support of provincial funding. The garden committee provides plots and gardening tools for faculty, staff, and students to rent during the summer. In recent years, an increase of graduate students on campus had led to an uptake in student interest in the garden, with summer 2020 being the most successful year for plot rentals to date (Personal Correspondence, February 25, 2021). This growing demand presents an opportunity to expand the community garden, which can lead to an increase of on-campus food production that can be diverted to the Grenfell Campus Food Bank. Many participants feel that the community garden should continue to be supported and expanded, with one participant stating "as a committee we'd like to see it continue to have the support and we can enhance it and have potentially more stable foods, like fruit trees and stuff," noting that this would increase capacity to divert harvest to the campus food bank as this is currently not possible due to the size and number of plots currently available in the garden. It's hard to grow food and 4X8 plots to the feed students in the fall of the year. We could start looking at how we can do that, fruit trees, all sorts of things like that." Recommendations to expand the garden are discussed in the following chapter.

Waste

Several participants noted that there is a significant amount of waste associated with on-campus food services that can be reduced. The main dining hall uses paper plates and plastic cutlery for both eat-in and take-out services, creating a considerable amount of avoidable waste on campus. When on campus events are catered by the main dining hall, food is often brought in on plastic trays. However, there are challenges associated with increasing the sustainability of on campus food services. The current contract for the main dining hall is controlled by the Grenfell Campus Student Union (GCSU),

rather than by Grenfell Campus itself. This gives Grenfell less control over the content of the contract, such as stipulating the use of reusable dinnerware and a dishwasher. Unless the campus takes over this contract from the Student Union, there is little that the campus can do to force the current operator to increase its sustainability practices. Additionally, one participant noted that finding reusable and biodegradable options for takeout containers in Corner Brook is a challenge, adding to the difficulty in increasing sustainability in this area.

Despite these challenges, addressing the waste associated with on-campus food services is essential. The current practices conflict with some of the goals set out in Grenfell's Strategic Plan, namely the goal to "reduce litter, increase waste diversion, and encourage recycling on campus" and the goal to "abolish plastic bottles and other non-biodegradable eating utensils and plastic bags" (Committing to Communities, 2020). Grenfell cannot consider itself as having met these goals if the main dining area on campus is still using plastic utensils and paper plates. A campus that espouses a sustainability ethos while not addressing the low hanging fruit of providing reusable dinnerware gives off the appearance that they do not practice what they preach. Despite this waste generation, it is important to note that one participant observed the social sustainability of having local food vendors on campus. This helps to contribute to local sustainability through supporting local businesses over large corporate food vendors. This pillar of sustainability appears to have been overlooked by many participants when discussing the state of on-campus food services, as most participants focused on the waste associated with these operations. Given the social sustainability of contracting food services out to local businesses, Grenfell should

devise a plan to work with their current partners to address this issue, rather than alienate them from the process. This may lead to these vendors increasing their sustainability practices in their off-campus operations, leading to increased benefits for the local environment. This option is discussed in the next chapter.

5.4.6 Communications

Two themes emerged under communications, the university structure and sustainability communications. The university structure poses a major challenge to sustainability implementation. Sustainability communications is another area where Grenfell can improve its sustainability implementation.

University Structure

Other participants noted that the organizational structure of universities themselves gives way to internal communication challenges, thus many of the communication challenges at Grenfell are likely applicable to other universities. Several participants noted the structure of the university as a challenge to overcome. One participant noted that it can be difficult for outside organizations to contact the university and vice-versa. Another participant noted the compartmentalization of operations within the university environment as a challenge, describing the typical set-up of a university:

> "The campus itself is, you know, the Bursar's office, housing, academic units, all of which are set up differently, operate differently, and all of us are very intimately tied to one another. But there's that fundamental thing where they're all different, they behave differently, they work differently, and yet they're expected to accomplish the same goal in the end. But getting those units to communicate is difficult because they do fundamentally different things. So, it's a constant struggle to figure out how to align things. So, something as fundamentally easy as a recycling program ends up involving a bunch of different units who aren't set up to talk to one another, yet have to, to get that goal achieved. Right. So, there is something fundamental about how the

> university is set up to miscommunicate and it's going to be difficult to get around those things."

This sentiment is well-reflected in the literature, with Velazquez et al (2005) identifying the organizational structure of the university as a barrier towards campus sustainability implementation. In the context of sustainability communications, a dedicated position towards campus sustainability may help to overcome some of these challenges. The person in this position would have to familiarize themself with the functions and language used in each department to appropriately tailor their communications efforts. This person can also help to bridge the gap between different departments by creating a single "go-to" person for answering and investigating questions related to campus sustainability.

Sustainability Communications

One participant noted a lack of celebration of sustainability initiatives on the Grenfell Campus website stating "if I look on the website, for instance, I'm not getting a lot of content. I know the public does not see Grenfell celebrate that, even though there are some great information coming out through social media recently - it's being celebrated that way." However, it is important to note that the sustainability page of the Grenfell Campus website[8] has undergone considerable improvements since this interview was conducted. The webpage has been updated to include a full list and links to the various sustainability efforts on campus. The improvements to the website indicate that this is an issue that was already on the radar of the communications department, further exemplifying Grenfell's active efforts to improve its sustainability profile.

[8] https://www.grenfell.mun.ca/campus-services/Pages/sustainability.aspx

One participant also mentioned the idea of branding Grenfell as a sustainable campus, though cautions that this can be a difficult proposal. As they explained:

> "Another one, which is kind of tricky. However, I will say institutions are sometimes uncomfortable about branding themselves as having certain specializations - because understandably, some colleagues and me being one of them from history, would not see themselves as prioritized within the institution. But Grenfell does have great strength in agricultural sciences and environmental sciences and environmental policy. Branding a university to say that this is what we're committed to and reorientating some resources to make that real is another way that you could promote sustainability. But that has to come from within - that's something that the schools also have to embrace. It's not from top-down administration because otherwise top down never really achieves what you want to. It's hollow. You need buy in for it."

As a sustainability culture develops on campus, branding could become a possibility. While some professors may not view their field as relevant for sustainability these views are not correct. No single field has a monopoly on the sustainability discourse and there is potential to learn from nearly any field. As one participant stated "so, what has produced our lack of sustainability? In some ways, it's been not tapping into the collective wisdom." History provides warnings that continued environmental degradation will lead to societal collapse. Social and cultural studies highlight the challenges faced by marginalized peoples in unequal societies. Business programs that emphasize sustainability help drive the systemic change needed for sustainability by instilling competencies for sustainability in future entrepreneurs. Foreign language programs broaden people's ability to communicate with others, making it easier to tap into the collective wisdom. As sustainability becomes more entrenched in the culture of Grenfell Campus, it is likely that more professors will see the contribution that their disciplines can make to the sustainability agenda, decreasing their feelings of alienation if the campus were to brand itself as sustainable. This is something that Grenfell should consider as buy-in for sustainability increases in the campus community.

5.4.7 Assessment & Reporting

Assessment & Reporting was the least discussed category in the Holistic Campus Sustainability Framework during the interviews, with only two participants noting the need for data to assess and report on current initiatives. This is unsurprising given that this category of sustainability implementation is currently underutilized in the higher education sector (Lozano et al., 2015). One participant questioned if Grenfell is obtaining information to verify their sustainability efforts, asking "Are we actually achieving what we set out to do? We're doing a lot of things, but are we actually measuring, verifying what we're doing?" Another participant noted that the campus has recently begun a sustainability audit using the Sustainability Tracking, Rating & Assessment System (STARS) developed by the Association for the Advancement of Sustainability in Higher Education (AASHE). Currently, the primary researcher for this paper is completing a portion of this audit as part of a graduate assistantship, though it is important to note that this assessment may take some time given the lack of human resources dedicated to sustainability on campus and the complexity of the STARS assessment.

Given the current lack of reporting on campus, this is an area where Grenfell can make considerable improvements. As previously discussed, some of this monitoring can be integrated with various course offerings on campus. Grenfell already has a Masters course dedicated to sustainability assessment that is offered irregularly, with one participant recommending that this becomes a permanent fixture with annual offerings. In addition to the sustainability assessment course, information related to waste management, water use, and energy use can be obtained through various undergraduate courses in the ENSU program. This will also help Grenfell in achieving its goal to

increase innovative teaching practices on campus by enhancing its experiential learning offerings.

5.4.8 Health & Social Wellbeing

Three themes emerged under the category of health and social wellbeing: COVID-19, Equity, Diversity, and Inclusion (EDI), and mutual respect. COVID-19 poses a challenge that is unique to the timing of the research, EDI is an area that appears to have some initial successes but still needs improvement, and the concept of providing everyone with respect, including those you disagree with, is a challenge faced by sustainability advocates in general.

COVID-19

Given the timing in which this research occurred, many discussions that fell under the category of health and social wellbeing were heavily influenced by the COVID-19 pandemic. The pandemic was noted as the major challenge in this area. Extended lockdown measures implemented to curb the spread of the novel coronavirus has led to a shift in remote learning at most universities across the world. This disruption in routine is causing many people to feel stressed, the Grenfell community included. Several participants noted that faculty, staff, and students are feeling overextended and exhausted, leading to a general sense of apathy within the community.

EDI

One participant noted that the campus can do more when it comes to equity, diversity, and inclusion:

> "I would say there's some initial successes, maybe some, we have an indigenization/Indigenous student affairs officer, but we need to do more. So, some initial wins and movements towards addressing being better at EDI."

In terms of improvements, there is a need for greater accessibility on campus. As one participant notes "we're not accessible enough in the Fine Arts building, that's a consequence of budget cuts years ago." While not brought up during these interviews, personal correspondence between the primary researcher and the Students with Disabilities Caucus reveals several areas on campus that are not physically accessible for those with mobility and vision issues, with the Forestry Centre being a particularly difficult building to reach in a wheelchair. Additionally, there is an elevator within the Arts & Science building that is often out of order and prevents wheelchair users from being able to access the dining hall when it is down. It's important to note that some accessibility improvements are difficult to implement in established buildings, so Grenfell should be diligent in ensuring that any new builds meet and exceed current accessibility standards. While there is still room for the campus to grow in this area, one participant noted that "Grenfell is known for being a pretty inclusive community," which provides opportunities to better tackle issues such as racism, sexism, homophobia, and ableism on campus.

Mutual Respect

Two participants identified another challenge that roughly falls under this area, which is the need to avoid guilt tripping those with other viewpoints, as this leads people to become defensive, rather than open to new ideas. One participant discussed an old commercial where a woman was being shamed for forgetting her reusable bags, expressing annoyance at this, stating "I mean, you set expectations and not ever blame people because people are just trying to get through the day. There's so much to worry

about, don't put guilt on top of it." Another participant echoed a similar sentiment, noting that shaming people creates defensiveness, rather than support:

> "And when you think about the resistance to sustainability in the in the culture. There are reasons why people deny climate science, for example, and you'll never get at that underlying stuff if you just simply call people names or treat them with disrespect then it just perpetuates the problem. People will just be resistant. It's like we're seeing now with masks, the anti-mask culture and the anti-vax culture, and people are going to dig in the more we try to just use shame to get them to do what we want, we have to have this open-hearted sense that we share what we have, but we also listen. It's incredibly, incredibly hard to do, but that's the work."

While there is evidence that negative moral emotions have the potential to motivate pro-environmental behaviour (Rees, Klug & Bamberg, 2014), they also have the potential to back-fire and create resistance. It has been found that shame "when co-occurring with a feeling of inferiority, has been linked with anti-social reactions such as withdrawal or denial of the issue" (Tangney et al. 1996 as cited in Rees, Klug & Bamberg, 2014). Thus, it is important to maintain a level of respect, even for those that are perceived as wrong, when engaging in these environmental discussions. One cannot inspire others to come to their cause by making them feel inferior. Furthermore, other research indicates that feelings of pride are a greater predictor of subsequent pro-environmental behaviours than shame. Bissing-Olson, Fielding & Iyer (2016) investigated how daily feeling of pride and guilt relate to individual pro-environmental behaviour and found that for people who perceive more positive pro-environmental descriptive norms, feelings of pride, not guilt, led to further pro-environmental behaviour during participants' daily activities. Furthermore, regardless of whether one perceives pro-environmental descriptive norms as positive or negative, guilt surrounding environmental behaviour did not have a direct effect on engaging in subsequent pro-environmental behaviours. Thus, it is important that sustainability efforts avoid using

shame tactics that result in a sense of inferiority, as this will lead to more resistance to the cause rather than acceptance.

5.5 General Summary

Given what is known about attitudes, behaviour, and the current rates of economic consumption, a strategy engrained in the systems-thinking perspective, rather than a bio-centric or anthropocentric focus, is needed within EfS strategies. The human economic system has encroached upon the biosphere, with scholars now proposing that humanity is bringing forth a new geological epoch known as the Anthropocene. The sheer size of the human economic system and population makes it impossible to address the issue of environmental degradation from an entirely bio-centric standpoint. It is human behaviour - which is arguably the most anthropocentric concept of all - that is causing contemporary environmental and social problems, so anthropocentric approaches that are engrained in the concept of *strong* sustainability are needed. Teaching all pillars of SD and how they impact one another to students helps to illustrate the system of interactions present within the planet, bringing forth a systems-thinking perspective to the conversation. Solely focusing on the impacts of human activity on the environment without mentioning the impacts of environmental degradation on the human socio-economic system fails to paint a true picture of the subsystems that interact on planet Earth – the anthroposphere is just as much a part of planet Earth as the biosphere, atmosphere, and geosphere. It is equally important to frame sustainability teachings in the context of human wellbeing, that a healthy planet and a just society enables humans to flourish to the full potential within the given ecosystem limits (Jackson, 2009). Eco-centric values are not universal, but everyone desires to have a healthy and happy life, which sustainability helps to enable.

An integrated approach to education that recognizes the influence of personal and contextual factors on human behaviour is needed for SD. Education must go beyond simply imparting knowledge about environmental issues to engaging students in activities that have potential to change behaviours that will lead to a more sustainable lifestyle for themselves and the planet. Teaching students about how they can do good for nature and the world while giving concrete examples through experiential and transdisciplinary learning processes will be much more effective than simply painting a fatalistic picture of the future. This approach to EfS can be accomplished via a systemic approach to campus sustainability. This approach appears to be in the initial stages of forming at Grenfell Campus and should be nourished and supported by senior administration. Grenfell has made considerable improvements in its sustainability profile in the past five years with the campus increasing the sustainability of operations, engaging more with the local community, and expanding its sustainability-focused course offerings. Despite these initial successes, there is still considerable room for the campus to improve. Grenfell is not currently engaging in campus sustainability in a holistic manner, with important initiatives such as waste management bring run on an ad hoc basis and there being a lack of dedicated staff and resources towards campus sustainability. The current implementation of campus sustainability is piecemeal, driven by budgets (or rather, a lack thereof), and is not particularly well-coordinated. Nevertheless, there appears to be the beginnings of a sustainability culture forming at Grenfell. Senior administrators have a healthy and holistic understanding of sustainability. Scarcity is forcing decision-makers to work with what they have, reducing the resource consumption of the campus. Community partnerships are

growing, benefitting both the campus and the local municipality. Graduate students are becoming attracted to Grenfell to research and study in the sustainability-focused programs, drawing more funding and status to the campus. Students have positive attitudes towards sustainability and express desire to be engaged with on-campus sustainability initiatives.

This research reveals that Grenfell is actively making efforts to improve its sustainability profile and to make considerable contributions to the vitality of its surrounding communities. Senior administrators have a holistic understanding of sustainability and appreciate the key role that universities play in sustainability transitions. While their vision may be constrained by the dire economic situation of the province, there is growing acceptance about the idea of looking at sustainable upgrades as investments rather than costs. While there are still members of the Grenfell community that do not have this high level of buy-in, it appears that the Grenfell community, on average, has a higher level of understanding regarding sustainability than the public. This can largely be attributed to Grenfell's wide array of sustainability-focused programming. These programs are attracting an increasing number of graduate students to campus and, as one participant noted, may become the drawing card for Grenfell in the future. Grenfell is well positioned to become a leader in the field of sustainability studies if its current initiatives are nurtured and expanded upon. It appears that the foundation is being built for Grenfell Campus to considerably increase its sustainability profile if it engages in a more coordinated approach to its initiatives. The following chapter provides recommendations on how Grenfell can achieve this.

6. Policy Recommendations

6.1 Overview of Chapter

The purpose of this section is to provide policy recommendations for Grenfell Campus to improve its sustainability efforts. As several policy recommendations cut across the different categories in the Holistic Campus Sustainability Framework, they are presented as a general list rather than by the category that they appear under. Policy recommendations are based on the substantial empirical findings in this research and on the literature review, and many recommendations in this section have been derived from participant suggestions and are expanded upon using references.

Policy Recommendation #1: Hire a Sustainability Coordinator

Several participants noted the need for a more coordinated approach to campus sustainability, with one participant suggesting that Grenfell Campus re-establish this position and hire somebody with expertise in sustainability. This participant noted that a graduate of the new TRSU doctoral program would be a qualified individual for this position, as the ideal candidate for this position would have a strong and holistic understanding of sustainability with the ability to think well into the future and engage in transdisciplinary processes. Given the breadth of functions within the university structure and the variety of departments that must work together to deliver the services that a university offers, an inter/transdisciplinary background would be a major asset for this position.

As sustainability implementation at Grenfell is relatively ad hoc in nature, the campus should prioritize hiring a sustainability coordinator to oversee the implementation of

campus sustainability and to coordinate actions with the sustainability coordinator of MUN. Having such a position will address the lack of resources dedicated to sustainability implementation on campus and can ensure initiatives operate in a more coordinated manner. This position may also help to ensure the longevity of campus sustainability initiatives by sitting as an ex officio member of the various student-driven sustainability initiatives on campus, ensuring that the knowledge that these groups gain is documented and passed on to future students. This position can help the campus develop a strategy to reach the fourth phase of campus sustainability implementation identified by Krizek et al (2011), whereby sustainability is fully realized and integrated into the campus community. Additionally, this position can include an education/research role: they can provide professional development seminars related to sustainability to educate staff and faculty on how they can incorporate sustainability into their everyday life, and they could assist professors in developing curricula that integrates experiential learning for sustainability with on campus operations, or within the greater community. The coordinator should also be involved in promoting campus-community partnerships related to sustainability to bring an extra level of expertise to these arrangements.

Policy Recommendation #2: Raise the Sustainability Committee's Position in the Campus Decision-making Hierarchy

As discussed in the previous chapter, the Grenfell Campus Sustainability Committee needs more credibility within the institution to achieve the goals that it has set forth. As one participant stated:

> "...if sustainability had the cred with the academics in the council, then maybe we would be taken seriously and they wouldn't think that we're just going around, having protests and sit ins so people won't burn tires, it's not just about

> that. It's about saving the world, saving money, and just looking at things from a through a different lens."

It's important to note that during this research the committee has improved its standing, and it now reports directly to the vice president of Grenfell Campus rather than the Campus Council. However, membership is still voluntary. The individual schools on campus should formally appoint representatives to sit on the committee, rather than have a faculty member volunteer. Formal appointments add a layer of legitimacy to the process and create the expectation that school representatives will need to sit on the committee to report its progress back to their individual schools. This added layer of credibility may allow the committee to better engage in establishing the strategic and policy framework for sustainability efforts on campus, activities which are typical to many university sustainability committees (Lozano et al., 2019).

Policy Recommendation #3: Systematically Review Current Policies for Sustainability

Non-academic, university-wide policies fall under the authority of the Board of Regents and the administration has control over their related procedures through the parent policy sponsor. While the Board of Regents has the ultimate authority over university-wide policies, any university employee with the support of their unit head can propose a new policy or amendments to current policies. Furthermore, individual academic/administrative units can enact their own internal policies if they adhere to the principles set forth in the "policy on policies". Thus, there are internal policies at Grenfell Campus that should be systematically reviewed to identify areas where sustainability themes are currently integrated and uncover areas where sustainability considerations are lacking. Grenfell Campus should hire a graduate research assistant

to review current policy documents and procedures for sustainability considerations. The results of this preliminary review should be received by the Sustainability Committee, who can review the results of the work and begin a consultation process within campus to enhance the sustainability of policies, as this is required under the "policy on policies" and is an important step in the policy cycle.

Additionally, Grenfell Campus could review the policy documents published by MUN to investigate if there are other policies apart from the purchasing policy that could take sustainability into consideration, so the campus can voice its concerns when it comes time for policies to be reviewed. While the purchasing policy stipulates that sustainability considerations should be made, it appears that there are no reports available on the MUN website that investigate the sustainability of purchasing at MUN, thus it is difficult to assess if this policy has been effective at ensuring the sustainability of purchasing. Simply stating that sustainability considerations are a part of a policy without monitoring if these considerations are actually being made is not a sufficient strategy for enabling sustainability transitions. As monitoring and evaluation are integral phases in the policy cycle, policies are merely words on a paper until they are truly implemented, monitored, and enforced.

Policy Recommendation #4: Integrate Coursework and Campus Operations

The 'whole-of-campus' approach to sustainability implementation is a complex but essential process for achieving campus sustainability (Lozano et al., 2019 and citations within). This approach integrates sustainability within the teaching, research, and operations of a university, transforming the campus into a living lab for sustainability.

The integration of sustainability teachings with campus operations is currently an area that is lacking at Grenfell Campus. The majority (75%) of respondents to the student perceptions survey indicated that they have not participated in a course that included experiential learning about sustainability. As the optimal pedagogical approaches for ESD are learner-centred, action-oriented, and transformative (Reickmann, 2018, p. 48), it is essential that Grenfell increases the amount of experiential learning opportunities offered on campus, which could be achieved by integrating coursework with campus operations.

There is considerable opportunity to begin this integration. There are already two professors on campus that are in the process of writing a proposal to include a campus waste audit as a part of an introductory Environment and Sustainability course. Data collected from this course could be used to inform a waste reduction plan for the campus, resulting in benefits for both the campus and students. Grenfell will receive high quality data regarding the composition of waste on campus that can help inform its waste reduction efforts for essentially free, as students will be paying to take this course, offsetting the costs associated with conducting the course. Students will also gain an opportunity to engage in experiential learning for sustainability within the first year of studies. Grenfell should approve this proposal and begin curriculum-operations integration through administering a campus waste audit. Grenfell needs more data related to its waste management practices and more experiential learning opportunities, and this proposal addresses both of those needs.

Implementing the waste audit within a course on campus should be the first step to these integrations. As the campus becomes more familiar with how these arrangements work in Grenfell's context it can expand its integrations into other course offerings. Much like the ANUGreen case study conducted by McMillin & Dyball (2009), Grenfell could engage in projects such as conducting analyses of the greenhouse gas emissions produced through campus travel, the cost and effectiveness of various carbon abatement schemes, the benefits of on-site composting, on-campus renewable energy generation, and campus carbon offsetting. As the campus grows such offerings it will become clear what studies and analyses are best suited to inform decision-making on campus. Those involved with such projects should work closely with Facilities Management to ensure that the data that they are collecting is what they need to inform their decisions, as this will result in both higher quality data for the campus and a more effective learning experience for students. In the future, these integrations could be facilitated by a campus sustainability coordinator who can use the data obtained from these courses to create annual reports on the campus's sustainability performance, which can help inform campus decision makers about future initiatives.

Policy Recommendation #5: Conduct Regular Environmental Audits

Grenfell should be continuously monitoring its environmental performance to ensure that its sustainability initiatives and investments are achieving their goal. As previously discussed, this aspect of campus sustainability implementation is currently underutilized by universities despite its numerous benefits (Lozano et al., 2015). Monitoring and evaluation are also an important aspect of the policy cycle, without

robust data it is difficult to get an accurate picture of the effects of the policy or if it is even truly implemented. Performing these audits also presents opportunities for curriculum-operations integration as some of the data that will need to be collected for this audit, such as the composition of the campus's waste stream, can easily be collected through various undergraduate courses on campus. Additionally, Grenfell has offered a Sustainability Assessment course at the graduate level in the past. As one participant suggested, this course should be offered on an annual basis, as this data can be used to contribute to continuous sustainability monitoring and evaluation at Grenfell Campus.

Policy Recommendation #6: Reduce Resource Consumption

Grenfell has made considerable efforts in increasing its waste diversion, and the next step for improving its waste management practices is to actively engage in reducing the amount of waste generated on campus. This recommendation ties into a previous recommendation to integrate coursework with on-campus operations, as one of the first steps to reducing waste on campus is to conduct a waste audit to gain an understanding of the campus's current waste composition. Without this data, reduction campaigns may not be targeting the right waste streams to reduce overall tonnage, resulting in wasted efforts. In addition to the waste audit, the campus can increase the number of waste streams that it currently recycles. The Grenfell Campus Waste Management Committee is actively addressing this issue by joining several free recycling programs offered by TerraCycle (Personal Communication). TerraCycle is a social enterprise that offers free recycling programs for hard to recycle materials, such as razor blades, cigarette butts, and cosmetics packaging, by partnering with brands, manufacturers, and retailers around the world (TerraCycle, n.d.). In addition to the free recycling programs that the

Waste Management Committee has registered for, Grenfell should also purchase zero waste boxes to recycle commonly used items on campus, such as disposable gloves, and install outdoor garbage bins on campus. Determining which boxes to purchase will be best informed by conducting a campus waste audit.

Policy Recommendation #7: Have a Familiarization Period for New Partners and Students

The biggest challenge identified in the current partnerships between Grenfell and the City is the notion of getting on the same page. As demonstrated in the discussion section, it is important that partners understand each other's context when engaging in these arrangements, as having this understanding results in the co-production of knowledge that is more valuable to all parties. At the beginning of each partnership a familiarization session should be held where project stakeholders come together to gain an understanding of each other's context. For example, when the EPI-Lab engages in a research project with the local municipality, researchers assigned to that project should meet with a representative from the City to gain an understanding of the research topic in the municipal context. As demonstrated in the discussion section, academics and municipal bureaucrats think about sustainability issues differently. This familiarization period can help get both parties on the same page so that the partnership results in a more usable and useful product in the end. This familiarization period can also enhance research and graduate programming at Grenfell, as creating a joint understanding of the sustainability issue at hand and collaboratively defining the research objective, questions, and success criteria are all major design principles of transdisciplinary research in sustainability science (Lang et al., 2012). Thus, including these principles in future partnerships would provide greater benefit to any PhD candidate in

Transdisciplinary Sustainability program that happens to be involved in these projects, as it would involve them in a hands-on transdisciplinary process.

In addition to having these familiarization periods for community partners, Grenfell Campus should include a sustainability familiarization session for all new students to campus. This period can teach students about the concepts of sustainability and SD, the importance of healthy ecosystems, and provide tips for incorporating sustainability in their own lives. This session should include an overview of the current sustainability efforts at Grenfell Campus, its sustainability goals, and how students can contribute to or hinder campus sustainability. This session should be a requirement for all students who attend Grenfell Campus.

Policy Recommendation #8: Dedicate a Portion of Research Output to Community

Grenfell Campus has made it clear that it intends to increase its collaboration with the local community by entitling its current strategic plan Committing to Communities. Grenfell should take this commitment one step forward to dedicate a portion of its research output to issues that are relevant to the local community, whether that be the City of Corner Brook or the western NL region. Given that Corner Brook is the most populous city on the west coast and only has one staff member dedicated to sustainability, there is not a large amount of human resources dedicated to tackling these issues within the region. Given this lack of human resources, Grenfell's ability to provide research on sustainability issues can greatly benefit local communities. Even something as simple as a jurisdictional scan or literature review on a local sustainability challenge can provide municipalities with usable information. For example, Grenfell

could research how various small towns across the country have tackled the issue of public transit and present the findings to the City. While the City cannot develop a new transit system based on this report, it does provide them with an idea of what has worked in other areas which can help to lead them down the right path.

Policy Recommendation #9: Enhance and Expand the Community Garden to Increase On-Campus Food Production

Many participants cited the community garden as a successful sustainability initiative on campus and expressed desire to see this program expand. Given that the provincial government has a goal to increase food production within the province by 20% by 2022 (Government of Newfoundland, 2015, p. 2), Grenfell Campus should seek funding related to community garden development and invest in expanding this program by adding more garden plots and fruit-bearing trees to campus. Grenfell should make it a long-term goal to expand on-campus food production so that a portion of the produce grown on campus can be diverted to the campus Food Bank and eventually to the cafeteria to reduce the cost of food for students, as access to healthy and affordable food is one of the most significant aspects of sustainability. Meeting this goal also presents an opportunity to include a sustainability demonstration project alongside the community garden by building a traditional NL-style root cellar. According to Harvey & Jarvis (2018, p.1) a root cellar is "a structure that is built all or partially underground and reinforced using either wood, rocks, or cement. Its primary function is the preservation of vegetables over the wintertime, keeping them cool while also protecting them from frost." Root cellars have a long-standing place in the province's history. According to Caddigan (1998, as cited in Harvey & Jarvis, 2018) due to low incomes in the fishery and isolation in outport communities, supplementary farming was crucial for

survival of Newfoundlanders in the past. As access to refrigeration was unavailable, root cellars were essential for preserving their bounties throughout the winter. Having a cellar present on campus would help to preserve a part of the province's cultural heritage while providing an example of a small-scale, in-the-box solution for sustainability by providing a zero-energy alternative to refrigeration.

Policy Recommendation #10: Decrease Waste Generated from On-Campus Food Services

Given that the federal government has a plan to eliminate single-use plastics by 2030, Grenfell Campus should work with its food vendors to find alternatives to their current practices, rather than simply putting this task solely on their vendors. The Atlantic Healthy Oceans Initiative (Ahoi), formed by a Grenfell alumnus, is a non-profit organization established in 2019 to "raise awareness about our changing oceans, and to facilitate actions to protect it and the people that depend on it the most" (Ahoi, nd). One of the projects that this organization is undertaking, the Zero-Plastic Waste Gros Morne Initiative, is aiming to help tourism and business operators in the Gros Morne region to reduce or eliminate their plastic waste by 2025. As the Environmental Policy Institute is already listed as a partner of this program, Grenfell can leverage its current relationship to create a similar program for the Bay of Islands region. This can help address local environmental sustainability while providing research and expertise to local businesses regarding waste reduction and eliminating plastics. By taking a leadership role in a similar project for the Corner Brook region, Grenfell will be actively providing a means to tackle this issue not only on campus but also within their community.

Policy Recommendation #11: Document the "Lessons Learned" from COVID-19

The pandemic was a major theme brought up during the interviews, with participants noting that faculty, staff, and students have experienced a gruelling, stressful term in fall 2020. Grenfell should not assume that this pandemic will be a one-off event. Research indicates that land-use change such as "habitat modification, road and dam construction, irrigation, increased proximity of people and livestock, and the concentration or expansion of urban environments all modify the transmission of infectious disease and can lead to outbreaks and emergence episodes" (Foley et al, 2005, p. 571). As the global environment continues to degrade, there is a high potential for more pandemics or epidemics in the future. Grenfell Campus should document the lessons that they have learned from the current public health emergency to better prepare itself for the next.

7.0 Limitations and Areas for Further Research

7.1 Study Limitations

There are several limitations of this study. The sample size for both the survey (n=100) and expert interviews (n=10) are relatively small and are potentially not representative of the population studied (students and faculty/staff at Grenfell Campus). This small sample size has to do with the timing of the data collection, which occurred during November and December of 2020, during the pandemic. As discussed in this thesis, the Fall 2020 school term was particularly challenging for the entire Grenfell Campus community, having the data collection procedures occur at the end of such a challenging term likely had an impact on both the survey response rate and the number of available participants for expert interviews. There is potential that the survey response rate may have been higher and that access to experts to interview would have been easier had contextual circumstances been different (i.e., if there was no global pandemic occurring at the time of data collection). Apart from this small response size, other limitations of this study include the limitations inherent in survey research.

Limitations of Survey Research: Survey research, especially when conducted online, has the tendency to produce poor response rates and low response rates restricts the generalizability of the results (Coughlan, Cronin & Ryan, 2008). To increase the response rate, the researcher sent the survey to the student body on three occasions during a 1-month period. The short timeframe for data collection was chosen to reduce the influence of longitudinal effects (such as completing their coursework) on the surveyed population. Additionally, given the self-selected nature of the voluntary survey, there is potential for selection bias, where students who are interested in

sustainability are more likely to respond to the survey. Additionally, as the researcher chose to phrase all questions with positive evaluative terms, rather than having a mix of negative and positive terms, there is a risk that this influenced the extremity of the results. The researcher chose to phrase the questions using positive evaluative terms as they require less cognitive resources to process.

7.2 Recommendations for Future Research

The final task for this thesis is to provide MUN and Grenfell Campus with recommendations for future research related to campus sustainability. Based on the knowledge gaps identified in this study, the researcher recommends the following areas for future research.

Budget Impacts on University Performance

Many participants expressed concerns with MUN's declining budget and how this will impact program delivery in the future. Additionally, the economic impact of MUN's activities on the province has already been studied and documented. It would be interesting to investigate if decreases in MUN's operating grant led to a decline in the economic performance generated by MUN activities. MUN should complete regular economic impact reports to investigate whether this phenomenon is occurring. These regular reports can also provide valuable information which MUN can include in its annual reports to the provincial government. In addition to these economic reports, MUN should also engage in longitudinal studies about how students perceive the quality of education and services delivered at MUN. If these studies reveal that students

perceive a decline in education and service quality as budgets decrease, it provides a good argument for having a well-funded university.

Review Environmental Education Curriculum in Newfoundland & Labrador

While this thesis focused on the role that the higher education sector can play in sustainability transitions, EE at the grade school level is still an incredibly important part of ESD/EE. The province's K-12 curriculum should be reviewed to identify courses where sustainability themes are currently being taught and where they could be better incorporated.

Review the Education Program at MUN

Research indicates that teachers need to develop the proper competencies in order to effectively teach about sustainability. The current course requirements and catalogue at MUN should be evaluated to assess the extent to which ESD competencies are being developed by student teachers. Revamping the curriculum to include more teachings about sustainability will have limited effectiveness if the teachers delivering the curriculum are uneducated on the matter.

8. Conclusion

This thesis investigated the current state of sustainability implementation at Grenfell Campus, MUN. It uncovered that students at Grenfell Campus appear to have positive attitudes and a high level of understanding of the concept of SD with students across all schools possessing positive attitudes. Faculty, staff, and administrators interviewed also have a holistic understanding of what it means to be sustainable and the Grenfell community on large appears to support sustainability initiatives. Grenfell is also providing benefits to its local community through numerous partnerships with the municipal government, educational institutions, and businesses within Western NL. While Grenfell still has a considerable amount of room to improve, numerous opportunities to do so have been identified. It appears that Grenfell has a good foundation to enable a culture of sustainability within its community.

For Grenfell to achieve a fully actualized sustainability culture its current initiatives need to be supported and expanded upon. This thesis presented recommendations for Grenfell Campus to achieve a holistic state of campus sustainability implementation, suggesting that Grenfell:

1. Hire a Sustainability Coordinator
2. Raise the Sustainability Committee's Position in the Campus Decision-making Hierarchy
3. Systematically Review Current Policies for Sustainability
4. Integrate Coursework and Campus Operations
5. Conduct Regular Environmental Audits
6. Reduce Resource Consumption
7. Have a Familiarization Period for New Partners and Students

8. Dedicate a Portion of Research Output to Community
9. Enhance and Expand the Community Garden to Increase On-Campus Food Production
10. Decrease Waste Generated from On-Campus Food Services
11. Document the “Lessons Learned” from COVID-19

This research has contributed to the literature on ESD and campus sustainability by providing a case study of a campus that is actively undergoing a sustainability transition. It has also added to the literature on sustainability attitudes by presenting a case where school of study did not have a significant influence on sustainability perceptions. This study also unveiled social issues that Grenfell Campus has faced during a global pandemic, providing the campus with valuable insights that can help them better respond to future public health emergencies. As sustainability transitions are an ongoing process and that a truly integrated campus sustainability strategy is difficult to achieve, Grenfell Campus should continuously monitor the effectiveness of its course offerings and sustainability initiatives through on-campus research and to develop sustainability policies that are backed up by corresponding budgets. This thesis can be used as the initial study in the needed processes of sustainability data collection at Grenfell Campus. While the results may not be applicable to all universities in the world, they have the potential to lead to recommendations that will greatly enhance the sustainability and vitality of the small pocket of the world that Grenfell Campus calls home.

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Appendix 1: Interview Guide

Semi-Structured Interview Guide
Faculty & Staff

This guide only represents the main themes to be discussed. Sample prompts are given but may be different depending on individual conversations. Non-leading and general prompts will also be used, such as "Can you please tell me a little bit more about that?" and "What does that look like for you".

Introduction:

The interview will begin with establishing rapport with the interviewee. The question "tell me a bit about your role/what you teach at Grenfell campus?" will be asked, this will not be aggregated into the responses for this research, it is simply to begin conversation.

Sustainability Perceptions

- **Prompt:** when you hear the term sustainable development, what does this mean to you?
- **Prompt:** what role, if any, do you feel universities in general should play in achieving sustainability?
- **Prompt**: In your opinion, what makes a university campus "sustainable"?
- **Prompt**: In your opinion, what are the three most important aspects of a sustainable campus?
- **Prompt**: In your opinion, what makes a campus "unsustainable"?

Integrating Sustainability at Grenfell Campus

- **Prompt**: What are the key sustainability issues facing Grenfell Campus over the next ten years?
- **Prompt**: In what ways has Grenfell Campus been successful in integrating sustainability in its operations/teachings?
- **Prompt**: What are three ways that can Grenfell Campus improve their sustainability efforts?
- **Prompt**: How can sustainability be integrated in Grenfell Campus? For faculty – how can sustainability be integrated into coursework/teachings? For staff – how can sustainability be integrated into campus operations?
- **Prompt**: what barriers, if any, do you see as preventing Grenfell Campus from engaging in sustainability initiatives?
- **Prompt:** Are there any barriers to integrating sustainability on campus that are out of Grenfell's control?

Grenfell Campus and Sustainability in Corner Brook

- **Prompt**: How can Grenfell Campus contribute to sustainability within the City of Corner Brook?

General concluding question: Is there anything else you would like to share about this topic?
Thank you for your participation!

Semi-Structured Interview Guide
City of Corner Brook Representative

This guide only represents the main themes to be discussed. Sample prompts are given but may be different depending on individual conversations. Non-leading and general prompts will also be used, such as "Can you please tell me a little bit more about that?" and "What does that look like for you".

Introduction:

The interview will begin with establishing rapport with the interviewee. For example: "Tell me a bit about your role at the City of Corner Brook?", Can you tell me about some sustainability initiatives by the City? "Can you talk about the current partnerships able to promote sustainability between Grenfell and the City?"

Sustainability Perceptions

- **Prompt:** when you hear the term sustainable development, what does this mean to you?
- **Prompt:** how do you envision sustainability in Corner Brook?
- **Prompt:** how do you envision Grenfell Campus as a sustainable campus?
- **What is in your opinion the most feasible and urgent sustainability project that the City should be involved in?**
- **Prompt:** In your opinion, what are the key sustainability issues that Corner Brook will be facing in the next 10 years?
- **Prompt:** what role, if any, do you feel universities in general should play in achieving sustainability in the city or on campus?
    - **In your opinion, what changes would you like to see at Grenfell Campus leading to sustainability?**

University-Community Partnerships:

- **Prompt:** Grenfell Campus and the City of Corner Brook are partnered through the CityStudio course, what other opportunities do you see for partnership between Grenfell Campus and the City?
    - **What city sustainability issues could be approached by this City Studio partnership?**
- **Prompt:** What are some challenges that you have observed when engaging in university-community partnerships?
- **Is there anything else on this topic that you would like to share?**
- **Thank you for participating in this research!**

Appendix 2: Survey

Title: Student Attitudes towards Sustainable Development
Researcher: Natasha Pennell, Master of Art in Environmental Policy (MAEP) student, Environmental Policy Institute, Grenfell Campus, nmp768@grenfell.mun.ca

Purpose of study:

The purpose of this study is to investigate the attitudes of Grenfell Campus students towards the concepts of sustainable development and education for sustainable development and to determine the effect of gender, program of study, level of study, (undergraduate or graduate) and year of study on these perceptions and to elicit students' personal experiences with sustainability at Grenfell Campus. The findings from this research will be used to complete my thesis for the Master of Arts in Environmental Policy entitled Education for Sustainable Development on a Small Campus: A Case Study of Sustainability Initiatives at Grenfell Campus, Memorial University of Newfoundland. The purpose of my thesis is to evaluate the effectiveness of sustainability education and communications at Grenfell Campus in order to provide recommendations for improvement. In addition, I hope that the data collected and my analysis will contribute new knowledge about sustainable development in academic settings and will inform academic decision makers about ways to advance toward sustainability.

According to the Brundtland report (1987) definition, sustainable development is "development that meets the needs of present generations without compromising the ability of future generations to meet their own needs."

What you will do in this study:

Your participation requires answering 28 questions and will take approximately 5-10 minutes. There are no obvious risks associated with this research and you are free to withdraw anytime by exiting the survey. All incomplete surveys will be deleted after 1 week since their last activity.

Confidentiality:

All results will be anonymous and confidential. Data will be stored on a password-protected device that is only accessible to the researcher. The data will be kept for a minimum of five years, as required by Memorial University's Policy on Integrity in Scholarly Research, after which it will be destroyed.

The proposal for this research has been reviewed by the Grenfell Campus-Research Ethics Board and found to be in compliance with Memorial University's ethics policy. If you have ethical concerns about the research (such as the way you have been treated or your rights as a participant), you may contact the Chairperson of the GC-REB

through the Grenfell Research Office (GCREB@grenfell.mun.ca) or by calling (709) 639-2399.

Consent:

By clicking the "I consent, begin the study" button below, you acknowledge that your participation in the study is voluntary and that you are aware that you may choose to terminate your participation in the study at any time and for any reason.

Thank you for participating in my research!

End of Block: Informed Consent

Start of Block: Demographic Data

Q2 What School are you in?

- ○ Arts & Social Science (1)
- ○ Fine Arts (2)
- ○ Science and the Environment (3)
- ○ Nursing (4)
- ○ Undeclared (5)

Q3 What is your level of study?

- ○ Undergraduate (1)
- ○ Graduate (2)

Q4 What is your gender?

- ○ Male (1)
- ○ Female (2)
- ○ Prefer to self-describe: (4)

_____

Q5 What year are you in?

- 1 (1)
- 2 (2)
- 3 (3)
- 4 (4)
- 5+ (5)

Q6 Do you live on campus?

- Yes (1)
- No (2)

End of Block: Demographic Data

Start of Block: Attitudes Towards Sustainable Development

Q7 This section will investigate your perceptions of issues related to the Three Pillars of Sustainable Development (Environmental, Social, Economic). Please indicated the

extent of your agreement/disagreement with the statements by using the following scale:

	0 Do not know (1)	1 Strongly Disagree (2)	2 Disagree (3)	3 Neutral (4)	4 Agree (5)	5 Strongly Agree (6)
7-1. Human actions are contributing to changes in our atmosphere and climate systems	○	○	○	○	○	○
7-2. Humans should limit impact on the biosphere to stay within its limits	○	○	○	○	○	○
7-3. “Maintaining biodiversity” means maintaining the number and variety of all living beings. This is essential for sustainable development.	○	○	○	○	○	○
7-4. Preserving and protecting the Earth’s life	○	○	○	○	○	○

support systems, biodiversity and renewable resources should have priority over economic growth						
7-5. Government economic policies should provide support for sustainable production even if it increases the national budget	○	○	○	○	○	○
7-6. People should make consumption decisions based on their needs, not on their wants	○	○	○	○	○	○
7-7. Government economic policies should promote fair trade in international exchanges	○	○	○	○	○	○
7-8. Government economic policies should hold companies that do not have sustainable development plans accountable	○	○	○	○	○	○

7-9. People who pollute the land, air or water should be held accountable for damage done to communities and the environment	○	○	○	○	○	○
7-10. A culture of peace based on principles of justice is essential for sustainable development	○	○	○	○	○	○
7-12. Respect for cultural diversity is necessary for sustainable development	○	○	○	○	○	○
7-12. Society should promote equal opportunities for males and females	○	○	○	○	○	○
7-13. A society is sustainable when it provides basic necessities, like healthcare, for everyone	○	○	○	○	○	○
7-14. The present generation has an opportunity to leave a better	○	○	○	○	○	○

world for future generations						
7-15. Communities should adopt sustainable development plans as a priority	○	○	○	○	○	○

End of Block: Attitudes Towards Sustainable Development

Start of Block: Education for Sustainable Development

Q8 As a student at Grenfell Campus, I have taken a course where I learned how to protect the environment. If 'yes' please indicate what course(s).

○ Yes (1) _____

○ No (2)

Q9 As a student at Grenfell Campus, I have taken a course in which sustainability/sustainable development was discussed. If 'yes' please indicate what course(s).

○ Yes (1) _____

○ No (2)

Q10 As a student at Grenfell Campus I have participated in a course that included experiential learning about sustainability. If 'yes' please indicate what course(s).

○ Yes (5) _____

○ No (6)

Q11 As a student at Grenfell Campus, I have participated in a research project that aimed to solve an on-campus sustainability problem.

- ○ Yes (1)
- ○ No (2)

Q12 I am interested in being involved with sustainability initiatives at Grenfell Campus

- ○ Yes (4)
- ○ No (5)

Q13
I support sustainability initiatives at Grenfell Campus

- ○ Yes (8)
- ○ No (9)

Q14. This section will investigate your views on education for sustainable development. Please indicated the extent of your agreement/disagreement with the statements by using the following scale:

	Do not Know (1)	Strongly Disagree (2)	Disagree (3)	Neutral (4)	Agree (5)	Strongly Agree (6)
14-1. Education for sustainable development should be a part of core curriculum at all education levels	○	○	○	○	○	○
14-2. Sustainable development requires access to good-quality education for everyone	○	○	○	○	○	○
14-3. Every person should receive education that teaches the knowledge and skills necessary for sustainable living	○	○	○	○	○	○
14-4. Universities should teach sustainability/ sustainable development courses as a priority	○	○	○	○	○	○
14-5. University courses should promote future-oriented thinking in addition to historical knowledge	○	○	○	○	○	○
14-6. University courses should promote	○	○	○	○	○	○

interdisciplinary teaching and learning						
14-7. University courses should promote the connection between local and global issues	○	○	○	○	○	○

End of Block: Education for Sustainable Development