

Greening the Grenfell Curriculum: Environmental Learning as Part of Undergraduate Degree Requirements

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Introduction

College and University campuses all over the world are viewed by the public as institutions of innovation, problem solving, and a training ground for future leaders. With these expectations, higher education institutions should be leading the way in sustainability and environmental awareness initiatives. Such initiatives may occur in the form of public engagement activities, student/staff committees, research projects, curriculum, etc. All of which can aid in creating a sustainable campus environment which permeates beyond campus boundaries by creating educated advocates for sustainability and environmental awareness. Lindsay Cole stated that campuses all over need to be “reconstructed as engaged social institutions that function as critical, reflective knowledge and capacity building centers for the next generation of engaged global citizens” (2003, p. 6). It is key that we look beyond the basics of education and develop a sustainability ethos which permeates all aspects of campus life. Thomashow refers to sustainability ethos often, stating that it “calls attention to what we learn, how we live, and how we respond to a planetary environmental challenge” (2014, p. 153). Some examples of these planetary environmental changes include; global climate change, global warming, habitat fragmentation, biodiversity loss, environmental degradation, and air, water, and land pollution (Brundtland, 1987). These environmental issues are considered direct consequences of human activity, and as social leaders, institutions of higher education have a responsibility to address these failings and provide future leaders with a better understanding of how to respond to these challenges.

An important step in creating Thomashow’s sustainability ethos is to include environment, resource management and sustainability in university curriculum to ensure that the next generation are bringing an improved awareness to effectively address global issues. If university students of all disciplines and backgrounds are to embody a sense of environmental awareness, maybe it is necessary that campuses begin to incorporate it as a part of their necessary course requirements. Ideally, to foster widespread adoption of the sustainability ethos, universities should develop a set of specific courses focused on environmental sustainability. In doing so, students will be given the option to choose from a list of environmental classes which focus on a wide range of ideas. If students are provided with knowledge and an appreciation for the environment and sustainability, campus sustainability ethos will thrive and spread through all university programs. As a result, universities will be sending knowledgeable graduates out into various fields to promote positive environmental behavior.

Here at the Grenfell Campus of Memorial University, we often pride ourselves on our image as the environmental or sustainable campus. We are situated within the scenic west coast of Newfoundland and offer several programs in the field of environmental studies and sustainable resource management. Keeping this overall theme in mind, this research project will be focused on the possibility of including environment, resource management and sustainability in all fields of study at Grenfell College. To do this, I propose the idea of making environmental learning part of the undergraduate degree requirements for all Grenfell students, regardless of their program of study. This will be done through an inventory of classes offered at Grenfell to provide an

“Environmental Curriculum” category, which could fall under general education requirements of all undergraduate degrees. This would provide all Grenfell students with a background in environment, resource management, and sustainability.

For the purpose of my research I have posed two research questions. I aim to identify; which of the courses currently offered at the Grenfell Campus could form the basis of the new “Environmental Curriculum” category which could be adopted campus wide, as well as how providing students with basic environmental knowledge promote environmental sustainability both on campus and beyond.

Methods

Case Study Analysis

The case study method is an approach to research that facilitates exploration of a phenomenon within its context using a variety of data sources. This ensures that the issue is not explored through one lens, but rather a variety of lenses which allows for multiple facets of the phenomenon to be revealed and understood (Baxter & Jack, 2008). This process is done in a number of ways. According to Hancock & Algozzine, “case study researchers often review existing documents or create and administer new documents from which to gather information related to the research questions” (2006, p. 57).

For the purpose of my research topic, a number of articles, research papers, and text books were reviewed and relevant information was gathered to offer insight and provide evidence to support the growing concern that environmental education is necessary in higher education institutions. Each document reviewed was chosen to reflect my research purpose, as well as my proposed research questions. Along with these, I have reviewed and analyzed official websites of colleges and universities throughout North America which provide examples of how environmental sustainability and related classes can be effectively included as required courses for undergraduate degrees. Colleges and universities presented are also chosen based on their commitment to campus and community sustainability. Each example will be identified as a case study and analyzed to better understand how Grenfell can utilize their efforts and capitalize on their progress.

My research process is aimed at reviewing Unity College (Unity, Maine), and Northland College (Ashland, Wisconsin). In reviewing and comparing a number of campuses throughout North America, Unity College and Northland College were chosen because I believe they best exemplify the inclusion of environmental learning as general education requirements. In analyzing these cases, campus curriculum and requirements are compared and examined for the possibility of a similar curriculum layout at Grenfell Campus. Relationships between cases are explored to gain insight into how Grenfell can benefit from the curriculum format at other University campuses and ultimately used to develop a working framework for Grenfell. It is important to note that in analyzing the case studies presented, information has been gathered from official college websites. While this is effective in collecting information on course requirements and programs offered, I cannot say conclusively that each campus provides a sustainability ethos which permeates all aspects of student life.

Literature Review

Global Environmental Issues

There are many global environmental issues that we face every day as human activity causes the planet to change in a number of destructive and harmful ways. Issues such as climate change, global warming, habitat fragmentation, biodiversity loss, environmental degradation, and air, water, and soil pollution must be effectively addressed to ensure a healthy and sustainable planet. As these issues become more evident, there is an increasing need for people to become aware of these effects, and how to mitigate negative changes. By including environmental learning as a core education requirement at Grenfell Campus, students will be provided with a basic knowledge of the following issues.

Climate Change and Global Warming

Climate change and global warming are two major environmental issues which should be included in college and university curriculum. Since the industrial revolution in the 1700s, human activity has made a huge contribution to climate change and global warming by adding CO₂ and other heat-trapping gases into the atmosphere (EPA, 2017). Emissions from burning fossil fuels is drastically increasing the rate at which our climate is changing as well as the global average surface temperature of the planet. The main greenhouse gases (GHGs) linked to these changes include; carbon dioxide (CO₂), methane (CH₄), and nitrous oxide (N₂O), amongst others (EPA, 2017) (Figure 1). Global warming poses a serious threat to human and natural systems. According to a report by the National Academy of Sciences, “Global warming is closely associated with other climate changes and impacts, including rising sea levels, increases in intense rainfall events, decreases in snow cover and sea ice, more frequent and intense heat waves, increases in wildfires, longer growing seasons, and ocean acidification” (2010, p. 1-2). Average global temperature projections show additional warming of 1.1 to 6.4 °C during the 21st century (The National Academy of Sciences, 2010) (Figure 2). Projected impacts of future climate change include:

- Water availability will decrease in many areas that are already drought-prone and in areas where rivers are fed by glaciers or snowpack;
- A higher fraction of rainfall will fall in the form of heavy precipitation, increasing the risk of flooding and, in some regions, the spread of water-borne illness;
- People and ecosystems in coastal zones will be exposed to higher storm surges, intrusion of saltwater into freshwater aquifers, and other risks as sea levels rise;
- Coral reefs will experience widespread bleaching as a result of increasing temperatures, rising sea levels, and ocean acidification (The National Academy of Sciences, 2010).

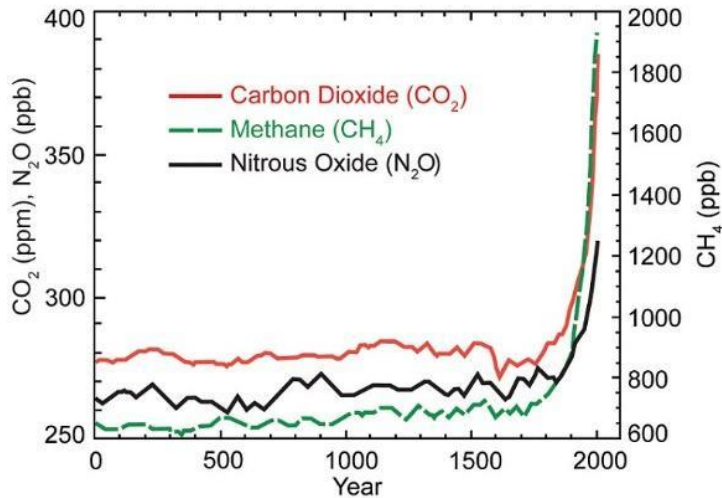


Figure 1. GHG Concentrations in the Atmosphere. Illustrating the increase in GHG concentrations in the atmosphere in the last 2,000 years. (U.S. National Climate Assessment, 2014).

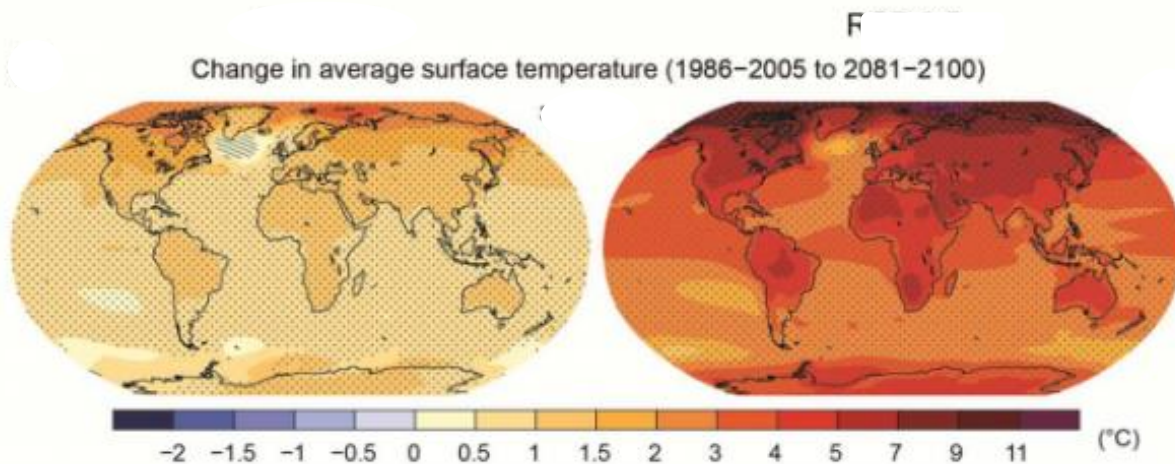


Figure 2. Change in Average Surface Temperatures. Illustrating multi-model mean results for different greenhouse gas concentration scenarios of annual mean surface temperature change (Climate Central, 2014).

Historically, efforts by the Canadian government to mitigate climate change and global warming have been largely inefficient. At the time of the Earth Summit in 1992, Canada was considered to be a leader in the environmental movement. It was at this time that Canada signed the UN Framework Convention on Climate Change (UNFCCC), and was the first G7 nation to ratify the treaty (Hrvatín, 2016). Unfortunately, Canada's standing as a global leader did not last. In 2002, Parliament ratified the Kyoto Protocol which was designed to set greenhouse gas emission reduction targets. Canada's target was to reduce greenhouse gas emissions by 6% from 1990 levels between 2008-2012 (UNFCCC, 2008). Following this, national emissions increased by over 30%, and Canada officially withdrew from Kyoto in 2011 (Hrvatín, 2016). The Copenhagen Accord is another example of Canada's failed climate change agreements. In signing the accord in 2009, Canada agreed to reduce greenhouse gas emissions by 17% below 2005 levels by 2020 (UNFCCC, 2009). However, in 2014 Environment Canada released a report stating that Canada would not

meet its agreed target, and that emissions may actually increase by 2020 (Environment Canada, 2014). Most recently in 2015, Canada signed the Paris Agreement which states their goals as;

- to strengthen the global response to the threat of climate change by keeping a global temperature rise this century well below 2 degrees Celsius above pre-industrial levels and to pursue efforts to limit the temperature increase even further to 1.5 degrees Celsius
- to increase the ability of countries to deal with the impacts of climate change, and at making finance flows consistent with a low GHG emissions and climate-resilient pathway (UNFCCC, 2017).

Since coming into the Paris Agreement, the Canadian government has still granted the approval of the Trans Mountain pipeline, as well as Enbridge's Line 3 pipeline (Tasker, 2016). Given the countries unfortunate climate change mitigation history, it is evident that there needs to be a fundamental change in environmental awareness.

Habitat Fragmentation and Biodiversity Loss

A second area of focus should include habitat fragmentation and loss of biodiversity. Habitat fragmentation and loss of biodiversity are two destructive environmental issues as a result of human activity. Habitat fragmentation can be defined as a process during which "a large expanse of habitat is transformed into a number of smaller patches of smaller total area, isolated from each other by a matrix of habitats unlike the original" (Wilcove et al. 1986, p. 237). This may occur in the form of roadways, pipelines, fences, towns, subdivisions and other development, mining, drilling, forest harvesting, energy development and associated infrastructure. These activities have in many cases led to the extinction or endangerment of many plant and animal species. Human-modified landscapes leading to habitat fragmentation not only interferes with wildlife trying to adapt to climate change, but it also separates subpopulations, increasing the chances of a species falling into an extinction vortex. This means that a subpopulation who cannot connect to each other may become isolated breeding populations, ultimately becoming a smaller population and quite possibly becoming extinct (Dearden et al., 2016). Related to this concern, the Business of Global Warming (2012) stated that;

Studies over the last two decades have demonstrated that more biologically diverse ecosystems are more productive. As a result, there has been growing concern that the very high rates of modern extinctions - due to habitat loss, overharvesting and other human-caused environmental changes - could reduce nature's ability to provide goods and services like food, clean water and a stable climate (para. 6).

As human population continues to increase, these issues are becoming more evident and the stability of core ecosystems is being pushed to its limits (Holling, 1973). A recent and very prominent example of this can be seen in the recently approved development of major pipeline projects in Canada. The proposed Trans Mountain Expansion Project will span 1,150 km from Burnaby British Columbia to Edmonton Alberta, while the Line 3 Pipeline Replacement Project is the largest pipeline project in Enbridge's history spanning 1,659 km from Hardisty Alberta to Superior Wisconsin (Tasker, 2016). These physical structures create large wildlife barriers, threatening species with significant habitat fragmentation.

Environmental Degradation

Another area focus area of the proposed curriculum should provide knowledge on environmental degradation. Overpopulation and overconsumption are the two primary drivers of global destruction (Smith, 1993). According to an analyses performed by Gerland et al. “There is an 80% probability that world population, now 7.2 billion people, will increase to between 9.6 billion and 12.3 billion in 2100” (2014, para. 1). As the population continues to increase, essential resources are becoming more vulnerable to overexploitation and pollution. Anthony (2004) stated that “Rising consumption and the development of ever more powerful technologies magnify the negative impact of overpopulation on the biosphere” (p. 173). Issues such as deforestation (Figure 3), soil erosion and water shortages are examples of how human life is pushing the planet beyond its means to support such rapid consumption. As a result of human activity, tropical countries with the greatest loss in forest coverage due to deforestation average a net loss of 8.2 million hectares per year (Folmer & Kooten, 2006). Demand for water is also projected to grow by more than 40% by 2050, with an estimated 1.8 billion people living in countries or regions in which water is scarce, and two-thirds of the world population may be living in conditions that cannot meet the need for clean water (Eliasson, 2014). It is evident that better management efforts must be taken to effectively address these issues and ensure the overall health of ecosystems and the human population.

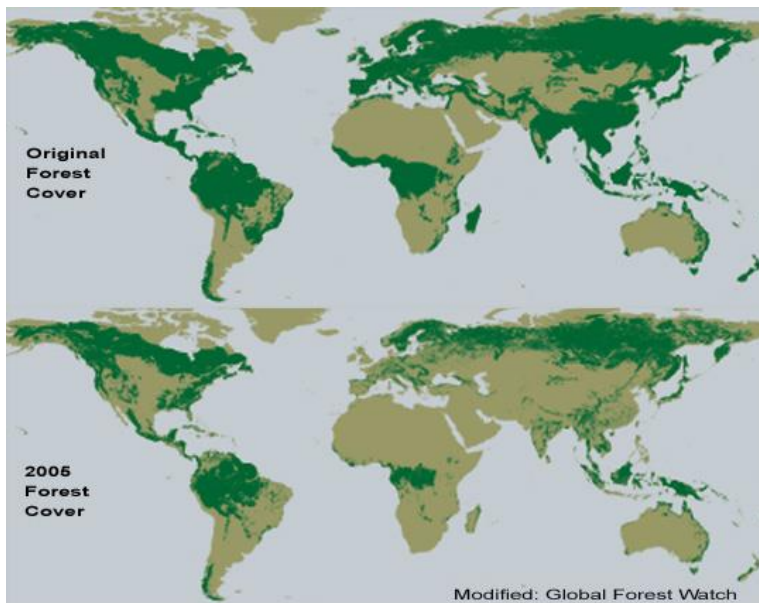


Figure 3. Global Deforestation. Illustrating diminishing global forest cover (Global Greenhouse Warming, 2017).

Air, Water, and Land Pollution

Lastly, the proposed environmental curriculum should provide knowledge and awareness of air, water, and land pollution. Industrial, recreational and domestic activities have contributed largely to the pollution of air, water and land. Exhausts from various uses of transportation are one of the

main contributors in releasing chemical substances into the air. Vehicles and planes run off fossil fuels which generate exhaust gases that are released into the air. Engines used in manufacturing factories, power generation stations, refineries, mining operations, as well as some home equipment also produce toxic chemicals (Pehoiu, 2008). These chemicals contribute to severe environmental issues such as biodiversity loss. For example, as stated by Feng and Li (2005, para, 1), “it has been discovered long ago that air pollution has an influence on forest ecosystems throughout the temperate regions of the world”. Air pollution also has severe and extremely harmful effects on human health, which is affecting quality of life. Again, Feng & Li state that “Globally, urban air pollution is responsible for significant mortality every year, mostly as a result of heart and lung diseases” (2015, para.1). The air quality in China is so severe as a result of extremely high levels of coal emissions (Figure 4) that it is becoming a world-wide concern (Feng & Li, 2015). Water pollution involves releasing chemical, biological or physical substances into a body of water. These are things which alter the waters chemical composition, temperature, or microbial composition to such an extent that harm occurs to resident organisms or to humans (Lloyd, 1992). This occurs as a result of pollution through sewage water contamination, industrial wastewater in the form of tailing water from mining/milling, radioactive wastes, oil spills, atmospheric deposition, and other forms of runoff (Schwarzenbach et al. 2010). This will have direct effects on all living things. “With respect to human health, the most direct and most severe impact is the lack of improved sanitation, and related to it is the lack of safe drinking water, which currently affects more than a third of the people in the world” (Schwarzenbach et al. 2010, p. 110).

Land and soil pollution occurs as a direct result of many human activities. Some examples of these include energy production (coal mining, natural gas extraction, nuclear plants and oil refineries), agricultural practices, logging and clearcutting, waste management and landfills, as well as accidental disasters. Each of these examples displace soil, create erosion, introduce chemicals to the land, and disrupt plant and animal species (Pepper et al. 2011).

Addressing Global Issues with Education

While it is evident that these issues occur, we are not efficiently addressing them. There is an ever-growing need to educate the next generation of decision makers on sustainability issues to ensure innovating thinking in the face of climate change, global warming, habitat fragmentation, biodiversity loss, environmental degradation, and pollution. With the inclusion of

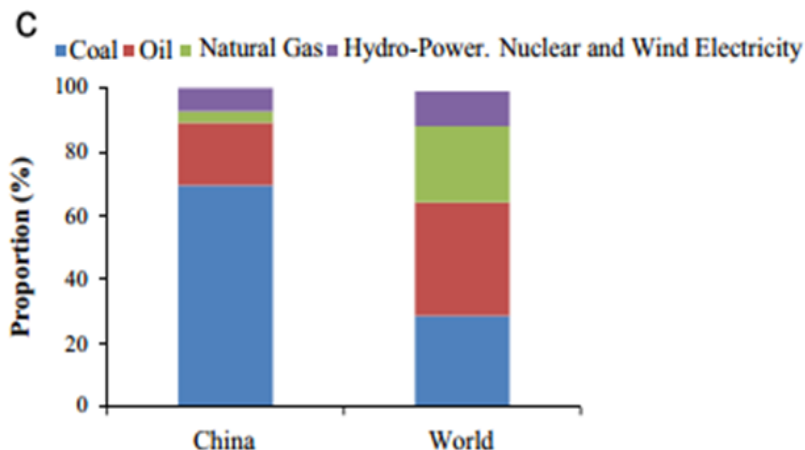


Figure 4. Energy Consumption in China. Comparison of energy consumption structure between China and the world (Kanada et al. 2013).



Figure 5. Soil Pollution. Soil erosion in abandoned farmland in southern Arizona that results in a gully (Pepper et al. 2011, p. 248).



Figure 6. Soil and Water Pollution. Acid mine drainage from gold mine in South Dakota (Pepper et al. 2011, p. 245).

environmental awareness in the general education requirements at the university level, we have a greater chance of creating leaders who may someday enforce pollution prevention and cleanup measures.

Sustainable Development and Environmental Awareness

The environmental issues mentioned previously are as Marshall et al. (2011) states, “challenges to the integrity of the planet on which humans, along with all other creatures, are dependent” (p. 4). As the planet continues to change, it is essential that we practice sustainable development, as well as spread environmental awareness through whatever means possible. As stated by Baker (2006), the term ‘sustainable development’ “came into the public arena in 1980 when the International Union for the Conservation of Nature and Natural Resources presented the *World Conservation Strategy*” (p. 18). It was first defined as “development which meets the needs of the present without compromising the ability of future generations to meet their own needs” (World Commission on Environment and Development, 1987). Even in the face of global warming and climate change, people all too often disregard the impact our daily routine is taking on the planet. All over the world people are living beyond the planet’s capacity to support us. The implications of this are already being felt, and if we are to allow nature to replenish itself, we must create a world of environmental stewards by educating people on the topic. In a study aimed at examining the effects of adding environmental awareness to the junior high level, Cetin & Nisanci (2010) say that;

“Environment is of vital importance in establishing human relations based on trust, a prerequisite for a healthy society, and ensures the protection of natural cultural and aesthetic environment. Improving environmental awareness and sensitivity will help individuals live in a healthier and safer environment, which is only possible by raising

qualified individuals who receive environmental education (p. 1830).”

By creating leaders in the environmental movement, we can make advances toward eco-friendly technology and sustainable development. Dunphy et al. (2007) stated that;

As change agents and change leaders, we are only one source of influence in a complex changing reality. Nevertheless let us not underestimate the potential transformative power that we represent...Change leadership involves owning our own power and using it responsibly and responsibly (p. 322).

Working with communities to promote sustainable development and spread awareness of environmental issues helps to lay the foundation for global environmental activism, and ultimately global change.

Inclusion of Environmental Learning at Higher Education Institutions

In referring to sustainability, M’Gonigle & Starke (2006) said “it starts from a simple, but logical, realization: we cannot have a sustainable world where universities promote unsustainability. But neither can we change the university without also changing the world; the two are intertwined” (p. 12). To move toward an ecologically sound society, higher education institutions must be heavily involved in the process (Wang et al. 2013). As Thomashow said in *The Nine Elements of a Sustainable Campus*;

“A college or a university is an ideal venue for addressing the global climate crisis. What better place is there to conduct environmental research, to develop curricular approaches, to construct policy mechanisms, to convene multi-sector collaborations, and to implement sustainable solutions? (2014, p. 2).”

He uses the term “sustainability ethos” as a campus goal for sustainability. The term “ethos” “refers to the character, the disposition, the morals, and the values that motivate an ideal” (Thomashow, 2017, p. 7), and when combined with “sustainability”, it conveys resilience, conservation, and ecological awareness. Ultimately, sustainability ethos “refers to a spirit of creative innovation in support of civic responsibility and ecological resilience” (Thomashow, 2014, p.7). He uses this idea of a sustainability ethos as the basis of how to organize a campus. In doing so, he developed what he believes are the nine elements which make up a sustainable campus. Amongst these nine elements is campus curriculum. His idea regarding this is to expand curriculum to “ensure that everyone who has a learning experience on campus is considering how his or her actions affect the earth” (2014, p. 11). In doing so, students will carry their knowledge and experiences into their careers and impose similar values on their families. Ultimately, this inclusion of environmental learning at the college/university level will create stewards and activists who promote environmental sustainability.

Case Studies

Institutions of Higher Education with Sustainability and Environmental Degree Requirements

In reviewing a number of university and college campuses throughout North America, I have selected two cases which I believe best exemplify the inclusion of environment, resource management and sustainability in undergraduate degree requirements. These examples include Unity College (Unity, Maine), and Northland College (Ashland, Wisconsin).

Case Study #1: Unity College - Unity, Maine

Unity College offers over 20 diverse areas of study all grounded in the liberal arts and sustainability science (Unity College, 2014). They state their mission by saying that “Through the framework of sustainability science, Unity College provides a liberal arts education that emphasizes the environment and natural resources. Through experiential and collaborative learning, our graduates emerge as responsible citizens, environmental stewards, and visionary leaders” (Unity College, 2014, para. 2). All students who attend Unity College, regardless of which major they pursue, “have a general education requirement of five interdisciplinary core courses that all focus on “ecoliteracy”, plus a capstone Environmental Stewardship course in which all students are required to demonstrate the knowledge, skills, and commitment necessary to be responsible citizens” (Rowe, 2002, p. 4). This is achieved through the Environmental Citizen Curriculum which is the foundation for learning at Unity. This curriculum forms the core of all undergraduate degree programs on campus which emphasizes communication and innovative thinking. Unity College states that their Environmental Citizen Curriculum enhances learning in five fundamental ways, which include;

1. Grounding each of our degree programs in a broad liberal arts base
2. Integrating the humanities and social sciences into scientific disciplines that address environmental problems
3. Engaging students in the fundamental questions at the center of sustainability science, focusing on the dynamic intersections of nature and society
4. Providing students with the communication and critical-thinking skills that meet the demands of a marketplace in search of environmentally literate professionals
5. Preparing students for the central task of moving knowledge into action (Unity College, 2014, para. 3).

They also break their ideal outcomes down into three primary components, or spheres. These include;

1. The individual: students will become resourceful individuals, displaying integrity, effective communication and reasoning skills, and a dedication to sustainability and learning.
2. The community: focuses on the transformation of students into engaged citizens and leaders who welcome diversity, work well with others, respect tradition and differing points of view, and help encourage a productive, communal way of life.
3. The environment: students will have both an extensive knowledge of the sciences, social sciences, and humanities, as well as an understanding of how these disciplines connect to and inform environmental issues (Unity College, 2017, para. 4).

Upon completion of the Environmental Curriculum requirements, students can specialize in their chosen major. In providing all students who attend Unity College with this training, students will gain the ability to effectively apply their knowledge to environmental issues and raise awareness in the face of challenges.

Case Study #2: Northland College – Ashland, Wisconsin

Northland College is a liberal arts college with an innovative focus on environment and sustainability (Northland College, 2017). They state their vision by saying that “Northland College will be the nation’s preeminent liberal arts college focused on the environment, preparing students and other stakeholders to lead us toward a more sustainable, just, and prosperous future” (Northland College, 2017, para. 3). To reach their aspired goal, they have included a required environmental component to their curriculum for all undergrads. They combine “green skills” with a liberal arts education to provide students with a broad-based education (Northland College, 2017). If a student wishes to receive a bachelor degree from Northland, they must fulfill the requirements for the “General Education: Liberal Education for the Environment & Society” program. This program is designed to assure Northland students develop;

- foundational skills in written communication and mathematics;
- a breadth of disciplinary learning characteristic of a liberally educated individual;
- an understanding of diversity, inequality, prejudice, and discrimination; and
- an understanding of natural systems and the complex relationships between human endeavors and the natural world (Northland College, 2017, para. 2).

The program is broken down into two categories; Liberal Arts Curriculum, and Environmental Curriculum. In an overview of the program, the Environmental Curriculum portion is further broken down into four categories which include;

- Environmental Narratives: Courses in this category focus on narratives that individuals and cultures have created to describe, understand, and justify their relationships and interactions with the natural world.
- The Science of Environmental Issues: Courses in this category emphasize a scientific perspective on the environment.
- Communities, Policies, and Management of Environmental Issues: Courses in this category focus on the role that communities, governments, organizations, or groups play in environmental issues.
- Environmental Applications: Courses in this category integrate intellectual inquiry with emotional, social, or physical engagement in nature or environmental issues (Northland College, 2017).

To successfully complete the Liberal Education for the Environment and Society Program, students must earn at least 30 credits overall. This liberal arts curriculum, with its unique focus on the environment and sustainability, prepares students to address problems head on.

Research Findings

Every day we depend on biodiversity and healthy ecosystems for clean air, fresh water, medicine, food, and many other resources. As educational leaders, colleges and universities have a responsibility to address issues of global climate change, global warming, habitat fragmentation, biodiversity loss, environmental degradation, and pollution which threaten these ecosystems by providing students with environmental education. Unity College and Northland College are two great examples of how campuses can work to broaden the educational spectrum to include environment, sustainability and resource management. By including these topics as general education requirements for all undergraduate degrees, they open a window of opportunity to spread the importance of sustainability to those who may not have been aware of it prior to this learning

experience. Both case studies presented have environmental learning at the core of their campus curriculum which forms the basis for all learning. Each college has a curriculum category based exclusively on environmental learning providing students with scientific and social perspectives on the environment. Both colleges also emphasize three components of learning. First they focus on developing students into resourceful individuals, then into engaged citizens within their communities, then broaden this to include knowledge of global environmental issues. In doing so, they provide experiential learning that places emphasis on communication and innovative thinking that students can apply to real world situations.

Recommendations

In reviewing and analyzing campus curriculum requirements at both Unity College and Northland College, I believe that Grenfell Campus can develop a similar working framework to effectively include environmental learning in all fields of study. I propose the idea of making environmental learning part of the undergraduate degree requirements for all Grenfell students, regardless of their program of study. To do this, I have completed an inventory of courses currently offered at Grenfell to provide an “Environmental Curriculum Requirements” category to fall within the Grenfell Campus Core Program Requirements (Table 1). The courses chosen focus on some environmental, sustainability, or resource management aspect. Material may be covered in the form of a science or social science to include a wide range of course options. The list presented is extensive, as it shows all courses which meet the standards previously mentioned.

Table 1: List of classes currently offered at Grenfell Campus which could meet the Environmental Curriculum Requirements.

Course Subject	Course Number and Name
Anthropology (ANTH)	3083: Cultural Crisis and the Environment
Biology (BIOL)	2600: Principles of Ecology
Chemistry (CHEM)	3261: Atmospheric Chemistry
Earth Sciences (EASC)	1000: Earth Systems 1002: Concepts and Methods in Earth Sciences
Economics (ECON)	3080: Natural Resources and Environmental Economics 3085: Issues in Ecological Economics
Environmental Science (ENVS)	1000: Introduction to Environmental Science

	<p>2261: Survey of Environmental Chemistry</p> <p>2360: Geological Hazards and Natural Disasters</p> <p>2369: Introduction to Soils</p> <p>2370: Global Environmental Change</p> <p>2371: Oceanography</p> <p>2430: Energy and the Environment</p> <p>2450: Meteorology</p> <p>3072: Comparative Marine Environments</p> <p>3110: Taxonomy of Flowering Plants</p> <p>3130: Freshwater Ecology</p> <p>3131: Impacted Terrestrial Ecosystems</p> <p>3210: Environmental Analytical Chemistry I</p> <p>3211: Environmental Analytical Chemistry II</p> <p>3260: Industrial Chemistry</p> <p>3470: Transport Phenomena</p> <p>4069: Fundamentals of Soils Systems</p> <p>4131: Environmental Restoration and Waste Management</p> <p>4132: Analytical Ecology</p> <p>4133: Conservation Biology</p> <p>4230: Aquatic Chemistry</p> <p>4240: Organic Chemistry of Biomolecules</p> <p>4249: Environmental Organic Chemistry</p> <p>4479: Groundwater Flow</p>
Environmental Studies (EVST)	<p>1000: Introduction to Environmental Studies</p> <p>2000: Introduction to Mapping, Remote Sensing, and Geographical Information Systems</p> <p>2210: Outdoor Environmental Pursuits I</p> <p>2220: Outdoor Environmental Pursuits II</p> <p>3001: Environmental and Resource Management</p> <p>3210: Expedition</p> <p>4000: Environmental Impact Assessment</p>
Geography (GEOG)	<p>1050: Geographies of Global Change</p> <p>2102: Physical Geography</p> <p>2425: Natural Resources</p>

	4405: Outdoor Recreational Resources
History (HIST)	3030: Environmental History
Humanities (HUMN)	3020: Humanities and the Environment
Philosophy (PHIL)	2561: Environmental Ethics
Political Science (POSC)	3550: Politics and the Environment 3731: Environmental Policy
Religious Studies (RELS)	3880: Religion, Worldviews and the Environment
Sustainable Resource Management (SRMG)	2000: Sustainable Resource Management I 2001: Sustainable Resource Management II 3000: Regional Planning and Management 3001: Environmental Planning and Management 3002: Biodiversity 4000: Remote Sensing, Image Interpretation, and Resource Management 4001: Renewables and Non-Renewable Energy Sources 4002: Risk Assessment and Management 4003: Environmental Law
Tourism (TRSM)	2000: Tourism and Sustainability 3010: Issues in Ecotourism 3100: Resource Valuation and Tourism Activity Impact Assessment

In compiling this list, I have included a variety of course levels, ranging from first to fourth year courses. It is made up of 60 courses in total which are currently offered at Grenfell Campus. For the purpose of the Environmental Curriculum Requirements category, this list may be condensed to provide students with choices more suitable for all fields of study. For example, Environmental Science 4249 “Environmental Organic Chemistry” involves concepts of organic, biological, and physical chemistry, and requires three other Environmental Science prerequisites. Courses such as these may be too extensive for core program requirements, but have been included to present a full list of what Grenfell has to offer.

For a student to complete the Environmental Curriculum Requirements, I recommend that they must acquire at least 6 credit hours from courses in the above list throughout their undergraduate degree. This will allow students of all fields of study to achieve a better understanding of environmental issues, and increase their awareness of how human activity is impacting our planet.

Discussion/Conclusion

To quote M’Gonigle & Starke again, “it starts from a simple, but logical, realization: we cannot have a sustainable world where universities promote unsustainability. But neither can we change the university without also changing the world; the two are intertwined” (2006, p. 12). It is key that universities and colleges look beyond the basics of education and develop a campus

curriculum which encourages environmental awareness. By providing the tools and space for learning, higher education institutions are effectively allowing students to show interest and become involved in environmental and sustainability initiatives.

After examining the curriculum offered at Unity College and Northland College, it is evident that environmental learning can effectively and efficiently form the basis of all learning at a college or university campus. If Grenfell can adopt a similar framework, we can ensure that all students who learn and study here have a general awareness of how his or her actions affect the earth. Ultimately, the goal of the proposed Environmental Curriculum Requirement for the Grenfell Campus is to develop a greater awareness among students, and send knowledgeable graduates out into various fields to promote positive environmental behavior and decision making, as well as help foster similar values on their families, friends, coworkers, and even future students. This inclusion of environmental learning at the college/university level will create stewards and activists who promote environmental sustainability both on campus and beyond.

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