

Environmental Education in Canadian Teacher Education

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ABSTRACT

Environmental Education in Canadian Teacher Education

Simone Hélène Hanchet

In the face of complex global environmental challenges, the concept of teaching and learning for environmental sustainability was first articulated over thirty years ago in the Tbilisi Declaration that proposed that environmental education (EE) become a vital part of all pre-service and in-service teacher education. The Decade of Education for Sustainable Development (2005-2014) reiterates the importance of reorienting teacher education toward sustainability. This study gauges whether, midway through the Decade- this objective is being met by Canadian pre-service teacher education programs.

Building on the 1977-78 study by John Towler and a follow-up 1996 study conducted by Emily Lin on this topic, a questionnaire was distributed in 2009 to all pre-service teacher education institutions across Canada. The survey findings reveal that, for three decades, the number of Canadian pre-service teacher education institutions offering EE courses has remained low. The report outlines key obstacles to the integration of EE into pre-service teacher education programs in Canada and suggests policy solutions. It argues that reorienting teacher education toward sustainability should be a policy priority not only within teacher-education institutions, but at federal, provincial, and municipal levels of government and within school boards and individual schools.

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Origins of the Project

My engagement in this project is motivated by two things: my deep concern about the health of our planet, and my belief that it is both possible and necessary for Canadian social values to shift in support of its health and renewal. I chose to focus on the potential role of formal education in fostering a shift in social values because I strongly believe that our education system plays a significant role in shaping our societal values, whether explicitly through curriculum and funding choices, or implicitly through what is omitted from curriculum, under-funded, or otherwise de-valued.

I chose to further narrow my focus to the education that primary and secondary school teachers receive because I believe that individual classroom teachers can do at least as much to inspire change as can curriculum reform. Changes to the curriculum are largely ineffective unless the teachers who will be implementing the changes in the classroom understand and support them.

My curiosity about the role that schoolteachers can play in facilitating a shift towards sustainability also emerges from my own personal experience as a young student. I attended primary school in the 1980's in Montreal, Quebec. In the fourth grade, our teacher asked us to do a project about an animal of our choice. I chose the blue whale. In the course of my research, I learned that the blue whale was an endangered species, and began to develop a crude understanding of what that meant.

As many children would, I became alarmed and disturbed that these beautiful, mysterious giants, who eat only the tiniest creatures and who communicate in strange songs, might vanish from the planet forever. I read everything I could about blue

whales. I rented documentaries about them. On the assigned day, I shared what I had learned with my class through an oral presentation. When I announced that the blue whale was endangered, my voice no doubt full of emotion, I expected some reaction from my teacher or classmates. There was none. I finished my speech. I got an A- on the presentation. I clearly understood the material, my teacher said, but lost marks because my voice was unsteady. And that was that. I sat down, deflated and confused.

It took me a long time to understand what was so deflating- and so confusing- about that particular experience. I now believe that I was reeling from having just taken part in my first (of many) purely academic exercises. That is, I was asked to learn strictly for the sake of knowing. This is typical of an education culture that, in word's of David Orr, "emphasizes theories, not values; abstraction rather than consciousness; neat answers instead of questions; and technical efficiency over conscience." (Orr 2004, p. 8)

In the case of my ten year old self, my genuine concern about the topic on which I was presenting was irrelevant to my teacher, who was no doubt genuinely concerned about her students' public speaking skills, as per the established requirements for my grade level. My teacher almost certainly did not share my concern about the status of the blue whale; nor did she have the tools to help me make sense of what I had learned or resources to help me take meaningful action.

Of course, not all my teachers were like that. Some picked up on my interests and fuelled them. Others managed to impart their own passions to their students. One school year, I had a teacher who loved his mother so much, and spoke of her so often, that we cried as though we knew her when she passed away that spring. One English

teacher spoke seven languages and would show us slides of all the places she had traveled, inspiring me to do the same.

Even while following a set curriculum, teachers have tremendous power to set the tone and shape the content of their students' classroom experience. I believe that they have one of the most important roles in society because of their daily interactions with the next generation. In addition to imparting formal lessons, these interactions present a myriad "teachable moments," or unplanned opportunities to convey lessons and ask important questions (Haney et al, 2002). To teachers who have an understanding of the global environmental context, many of these teachable moments represent opportunities to convey to their students useful ways of thinking about and interacting with the environment.

My focus on the preparation that teachers receive is therefore fuelled by my personal wish to see more teachers emerging into the school systems with a foundation that equips them to rise to the true magnitude of their task, which can be none other than that of preparing young people to meet the challenges of the coming age with courage, lucidity, creativity and appropriate skills. Emerging with such an education, a teacher would be prepared to respond appropriately to a child whose voice trembles when giving a presentation on the endangerment of the blue whale, for example. The education that teachers receive must prepare them to play a vital role in fostering new ways of thinking, understanding and being- ways that our earth can sustain.

This shift in teacher training has, in some cases, already begun. My purpose was therefore also to showcase those teacher training institutions in Canada that have made

significant progress and to identify and draw lessons from those cases in which innovation has been fruitful and in which new approaches have yielded successful results.

Chapter 1: Context

This thesis assesses the degree to which EE is currently integrated into Canadian pre-service teacher education and asks how teachers in this country might be better prepared to conduct EE with their students. This question relates directly to the sustainability of our society, and is urgent, given our current ecological crisis.

Globally, we are facing a set of immense challenges with respect to our natural environment. These have potentially drastic implications for human welfare. The current trend of environmental degradation is marked by changes in the global climate, habitat degradation and loss, species extinction, and pollution of air, water, and soil. The following section seeks to remind the reader of some of the key environmental issues currently before us. This section is not meant to be exhaustive by any means. Rather, its purpose is to underline the magnitude and urgency of the issues under discussion. Second, it calls the reader's attention to the complexity of these issues, as it is the task before educators, it will be argued in this paper, to prepare students to respond well to this complexity.

Human-induced Environmental Change

Climate Change

Scientists now tell us that the evidence the Earth is warming is unequivocal (International Panel on Climate Change, 2007 and Union of Concerned Scientists, 2008). Increases in global average air and sea temperature, ice melting and rising global sea levels globally and locally evidence this trend. Climate change alone poses serious threats to human civilization and to human health. In a recent interview, Dr Margaret

Chan, Director-General of the World Health Organization, put it thus: "The core concern is succinctly stated: climate change endangers human health... The warming of the planet will be gradual, but the effects of extreme weather events - more storms, floods, droughts and heatwaves - will be abrupt and acutely felt. Both trends can affect some of the most fundamental determinants of health: air, water, food, shelter and freedom from disease" (World Health Organization, 2008).

Habitat and Biodiversity Loss

Biological diversity, or biodiversity, refers to the variety of life on Earth and the natural patterns it forms. The biodiversity on earth today is the result of billions of years of evolution, shaped by natural processes and, increasingly, by the influence of humans. This diversity is often understood in terms of the wide variety of plants, animals and microorganisms. So far, about 1.75 million species have been identified, most of these small creatures such as insects. Scientists estimate that there are actually about 13 million species on earth, though some calculations range from 3 to 100 million (Convention on Biological Diversity, 2000).

Other forms of biodiversity include genetic diversity within each species and ecosystem diversity. In desert, forest, wetland, mountain, lake, river, and agricultural landscape, living creatures, including humans, form a community and interact with one another and with the air, water, and soil around them. It is this combination of life forms and their interactions with each other and with the rest of the environment - biodiversity- that has made Earth a uniquely habitable place in which humans may thrive (Convention on Biological Diversity, 2000).

The IUCN (formerly the World Conservation Union) 2007 Red List of Endangered Species reported at least 41,415 species threatened with extinction and that the total number of known extinct species had reached 785, with a further 65 species found only in captivity or cultivation. One in four mammals, one in eight birds, one in three amphibians, and 70% of the world's assessed plant species on the 2007 list are at risk of extinction (IUCN, 2007). It is estimated that between 10 and 30 percent of the world's mammal, bird and amphibian species are currently threatened with extinction (Millennium Ecosystem Assessment Board (2005).

In recent years, human induced activity has meant that species have been disappearing at 50-100 times the natural rate, and this rate is predicted to continue to rise dramatically. The species at risk of vanishing include some of our closest relatives, the great apes, as well as such charismatic animals as pandas, tigers, elephants, whales, and various species of birds (Convention on Biological Diversity, 2000). In addition to over-fishing and over-hunting, the decline of biodiversity around the globe is said to be caused primarily by habitat degradation, fragmentation, and destruction. These are precipitated by air, water and soil pollution, exacerbated by climate change, and propelled by deforestation, the filling of wetlands, and poorly-planned development. The world over, natural habitats are diminishing drastically in size and robustness from year to year.

For example, about 45 percent of the Earth's original forests are gone, cleared mostly during the past century. Despite some regrowth in some areas, the world's total forests continue to shrink rapidly, particularly in the tropics (Convention on Biological

Diversity, 2000). In 2000, over 40 percent of the Amazon forest cover was estimated to have been disturbed to some degree (Wilson 2002, p. 65). In addition, up to 10% of coral reefs – among the richest ecosystems on earth – have been destroyed, and one third of the remainder face collapse over the next ten to twenty years. Half of all coastal mangroves are also gone (Convention on Biological Diversity, 2000). Furthermore, according to the Food and Agriculture Organization (FAO, 2008), 19 percent of wild fish stocks globally are over-exploited, 9 percent are depleted, and a further 52 percent are already fully exploited.

The ongoing degradation of 15 of the 24 ecosystem services measured by the Millennium Ecosystem Assessment are very likely to reduce human wellbeing by increasing the likelihood of the emergence of new diseases, reduction in water quality, and depletion of fisheries (Millennium Ecosystem Assessment Board, 2005). Jane Smart, Head of IUCN's Species Programme, articulated this challenge thus: "Our lives are inextricably linked with biodiversity and ultimately its protection is essential for our very survival" (IUCN, 2007). For example, declining numbers of freshwater fish deprive rural poor communities not only of a major source of food, but of their livelihoods. The destruction of the great forests represents a devastating loss of biodiversity, including the disappearance of millions of species of which we are unaware, many of which are thought to represent potential cures to life-threatening human conditions.

Furthermore, the harmful effects of the degradation of ecosystem services (the persistent decrease in the capacity of an ecosystem to deliver services such as potable water, clean air, or food) are being borne disproportionately by the world's poor,

because poor people in rural areas tend to be more directly dependent on services from ecosystems (Millennium Ecosystem Assessment Board, 2005). This contributes to growing inequities and disparities across groups of people, and is “sometimes the principal factor causing poverty and social conflict” (*ibid*, p. 16).

Environmental Degradation and Human Security

In the past few decades, environmental degradation has been increasingly recognized as a threat to human security. The connection between natural resource scarcity and human conflict is attracting increasing attention in political and humanitarian circles. Resource-rich tropical forests, for example, are often a point of contention. Poor management and a lack of equity in the distribution of benefits lead to shifts in resource access and control, with the vulnerable forest-dependent communities suffering most. Resulting tensions can lead to armed conflict and war (IUCN, 2008 a).

Furthermore, climate change, it is thought, is likely to exacerbate resource-driven conflict. For instance, changing rainfall patterns are likely to make land that previously was most appropriate for pastoralism more appropriate for agriculture, pitting farmers against herders in a competition for scarce land. Such conflicts are most likely to occur in areas where farmers and herders have had a long history of interaction, such as parts of semiarid Asia (IUCN, 2008 a). The recent genocide in the Darfur region of the Sudan, for instance, has been linked to water shortages driven by human-induced climate change: “once the rains stopped, farmers fenced their land for fear it would be ruined by the passing herds. For the first time in memory, there was no

longer enough food and water for all. Fighting broke out. By 2003, it evolved into the full-fledged tragedy we witness today” (Ban 2007, p. A15).

In 2002, the United Nations High Commissioner for Refugees (UNHCR) released a report estimating that there were at least 24 million migrants who had fled their homes due to environmental stress, caused either by environmental degradation resulting from gradual processes such as desertification or sea level rise, or from natural disasters such as floods (UNHCR, 2002). Given current population growth rates, the number of people driven to migrate for environmental reasons, while difficult to assess, is likely to increase in coming years unless resource degradation and climate change are halted. Indeed, a recent report of the Forced Migration Review at Oxford’s Department of International Development states that “all evidence points towards climate- and environmentally induced migration becoming one of the major policy challenges of this century. Adequate planning for and management of this phenomenon will be critical for human security” (Morton et al 2008, p.5).

The Causes of Environmental Degradation

Climate change, habitat degradation, biodiversity loss, air, water, and soil pollution as well as many other forms of biosphere degradation are generally thought to be the result of the combined impacts of human population growth, increasing affluence and ensuing skyrocketing consumption, combined with technological advances. These interactions were summarized in the 1970’s by Ehrlich and Holdren’s IPAT formula, in which environmental impact (I) is said to be the product of population (P) – the number of people, affluence (A), – the amount each person consumes, and

technology (T) which decides how much space and resources are used and how much waste is produced to meet consumption needs. There has been subsequent debate on the relationship between the variables in this equation, further refining our understanding of environmental stress.

For example, Ehrlich and Holdren identified human population size and rapid growth as the most urgent IPAT factor. In 1972, Barry Commoner identified industrial production technologies as the dominant reason for environmental degradation, arguing that:

Most United States pollution problems are of relatively recent origin. The postwar period, 1945–46, is a convenient benchmark, for a number of pollutants— man-made radioisotopes, detergents, plastics, synthetic pesticides, and herbicides—are due to the emergence, after the war, of new productive technologies” (Commoner 1972 in Chertow, 2001).

Technological advances enable us to magnify our draw on the earth’s resources and thus increase our ability to pollute and degrade it. On the other hand, technological advances clearly offer the potential to mitigate our environmental impact (Chertow, 2001). Technological optimists such as the late Julian Simon argue that the pressures of the marketplace will generate technological solutions to all environmental challenges, offsetting population increase and increases in the standard of living (Simon, 1980). Although there remain serious problems with this position (see Daily and Ehrlich, 1992 and Cohen, 1995), the technology (T) component of the IPAT equation is now largely

regarded as distinct from the other two elements, population and affluence (Chertow, 2001).

The role of affluence (A) is twofold. Economic development is clearly associated with increased consumption. For instance, from 1950 to 1997, in tandem with overall world economic growth, the use of lumber tripled, the use of paper increased sixfold, the fish catch increased nearly fivefold, grain consumption nearly tripled, fossil fuel burning nearly quadrupled, and air and water pollutants multiplied several fold. The unfortunate reality is that the economy continues to expand, but the ecosystem on which it depends does not, creating an increasingly stressed relationship (Brown 1998 in UNESCO 2005 b, p. 10).

At the same time, however, it is now understood that extreme poverty (or the lack of affluence (A)) may also cause environmental degradation. Those who are very poor may be driven to destroy their immediate environment in order to survive, cutting down forests, allowing their livestock to overgraze grasslands, overusing marginal land; and crowding into congested cities. The cumulative effect of these changes “is so far-reaching as to make poverty itself a major global scourge” so that today’s environmental challenges can therefore be said to arise “both from the lack of development and from the unintended consequences of some forms of economic growth” (UN, 1987).

Education and the Environment

Setting aside the debate over the relative weights of P, A, and T, Ehrlich and Holdren’s equation fails to isolate an important element of our relationship with the biosphere: our knowledge and values. What we know about the world and what we

consider to be important affect our actions in personal, social, political and economic spheres. Mechanistic population models may be useful for determining the carrying capacity of ecosystems for certain species, but they fail to capture the range of possibilities presented by human culture and by our collective wisdom and values (Cohen 1995).

What we know and what we believe impact our decisions about family size (population), lifestyle (affluence), skills and production efficiency (technology) in a number of ways. Where we have the capacity to effect change, it is often our values that motivate us to do so, and our knowledge that gives us the necessary skills.¹ This paper considers education to be not only the transmission of knowledge, but also a process of learning that allows us to develop and to refine our principles, competencies, perspectives, and values. The challenge of achieving sustainability is therefore- at least in part- a challenge for the domain of education. Or, in the words of Orr (2004, p. 27): “the crisis we face is first and foremost one of mind, perception, and values; hence, it is a challenge to those institutions presuming to shape minds, perceptions, and values. It is an educational challenge.”

To address a small part of this challenge, this paper first asks to what degree EE is currently integrated into Canadian pre-service teacher education programs. The current status of EE in teacher education then informs a discussion about how teachers might be better prepared to foster awareness and understanding of environmental

¹ For these reasons, and at the risk of overstating this case, one might suggest that the I=PAT formula be replaced by an I=PAT/EE formula, to acknowledge the role that environmental education (EE) plays in our interactions with the environment.

issues as well as environmentally sustainable values with their students. Put another way, this paper addresses three sub-questions, summarized as *why*, *what*, and *how*. The *what* sub-question refers to assessing the extent to which pre-service teacher education programs are currently preparing teachers for this important task. Addressing this question constitutes the bulk of the current research, and is addressed in Chapter Three, Data and Chapter Four, Discussion. The question of *how* to improve teacher education in Canada constitutes the paper's Chapter Five, Recommendations and Chapter Six, Conclusion. The question of *why* teachers ought to be prepared to do so was addressed in broad terms in the above section and is considered in more detail in the following Literature Review.

Chapter 2: Literature Review

The concept of Sustainable Development, though not perfect, provides a useful conceptual framework for beginning to explore the relationship between human behaviour, values and the environment. The literature associated with the United Nations Decade of Education for Sustainable Development pertaining to 2005-2014 (henceforth referred to as the Decade) – a notion rooted firmly in Sustainable Development rhetoric – is therefore a useful point of departure.

This chapter outlines the Decade's implications for and recommendations on teacher education. As part of this discussion, it also draws on other relevant international agreements that have informed the Decade. To contextualize the discussion, the subsequent section offers a brief account of the history of environmental education in the West and outlines key debates and trends, including tensions between “environmental education” and “education for sustainable development.” The chapter concludes by pointing to the literature on and teacher training concerning the environment specifically. Within this is a very small body of literature that directly shaped the methodology employed in this study, and on which this study directly builds.

The Literature on the Decade (2005-2014)

At the time of writing, we are mid-way through the United Nations Decade of Education for Sustainable Development. In 2002, the UN General Assembly adopted resolution 57/254 to implement the Decade, and tasked the United Nations Educational, Scientific, and Cultural Organization (UNESCO) with leading it. A scheme for its

implementation was devised and presented at the 59th session of the UN General Assembly in 2004.

This International Implementation Scheme is the result of the compilation of over 2000 contributions from UN agencies, national governments, civil society organizations and NGO's, experts, and specialists. The Implementation Scheme sets out a broad framework for all partners to contribute to the Decade, outlines the challenge to which the Decade is trying to respond, and presents the kind of education that they argue will facilitate sustainable development (UNESCO, 2005 a). The Decade literature draws from the sustainable development discourse and the global conservation agenda encapsulated by Agenda 21 (UNESCO, 2005 a).

Sustainable Development Literature

The term Sustainable Development was defined at the United Nations World Commission on Environment and Development (known as the Brundtland Commission for its Chair, Gro Harlem Brundtland) as development that "meets the needs of the present without compromising the ability of future generations to meet their own needs" (United Nations, 1987). Sustainable development is generally conceived as having three constituent parts, which must be addressed in tandem: environmental, economic, and socio-political sustainability. Each is thought to interrelate and to depend upon the others. The idea of sustainable development has gained wide currency since 1987 and has made significant international headway, as demonstrated by the popularity of fair trade, organic food, and ethical investing (UNESCO, 2005 a).

Education in the Tbilisi Declaration, Agenda 21 and the Johannesburg Summit

The Decade also builds upon over thirty years of international thinking about EE (Appendix I). In 1977, the first Intergovernmental Conference on EE was held in Tbilisi, Georgia (USSR) under the auspices of UNESCO and UNEP. The Conference report affirms that EE “should be integrated into the whole system of formal education at all levels to provide the necessary knowledge, understanding, values and skills needed by the general public and many occupational groups, for their participation in devising solutions to environmental questions” (UNESCO 1977, p. 12).

The outcome of this conference was *The Tbilisi Declaration*, a text that identifies the aims of EE as follows:

1. To acquire an **awareness** and sensitivity to the total environment and its allied problems.
2. To gain a variety of experience in, and acquire a basic **understanding** of the environment and its associated problems.
3. To acquire a set of **values** and feelings of concern for the environment and the motivation for actively participating in environmental improvement and protection
4. To acquire **skills** for identifying and solving environmental problems.
5. To provide opportunities for active **involvement** at all levels in working toward resolution of environmental problems (*ibid*).

The 1992 UN Conference on Environment and Development in Rio, the “Earth Summit,” resulted in the production of Agenda 21, a forty chapter document outlining

the many areas of change needed to create a more sustainable world (UNDESF, 2005). Education, as described in Chapter 36, "Promoting Education, Public Awareness and Training," was identified as one area with high potential for advancing sustainable development because it "linked to virtually all areas in Agenda 21" (United Nations Department of Economic and Social Affairs 2005, Section 36.1.)

The first recommendation associated with education in Agenda 21 is therefore that all education be reoriented towards sustainable development:

Education is critical for promoting sustainable development and improving the capacity of the people to address environment and development issues... Both formal and non-formal education are indispensable to changing people's attitudes so that they have the capacity to assess and address their sustainable development concerns. It is also critical for achieving environmental and ethical awareness, values and attitudes, skills and behaviour consistent with sustainable development and for effective public participation in decision-making. To be effective, environment and development education should deal with the dynamics of both the physical/biological and socio-economic environment and human (which may include spiritual) development, **should be integrated in all disciplines**, and should employ formal and non-formal methods and effective means of communication (UNDESF 2005, Section 36.3, emphasis added).

While Agenda 21 focused on the process of orienting and re-orienting education in order to foster values and attitudes of respect for the environment, the Johannesburg Summit of 2002 broadened the focus of the mandate of sustainability-based education to include education about social justice and poverty alleviation (UNESCO, 2005 b). The Summit re-affirmed the educational objectives of the *Millennium Development Goals* and the *Education for All* Framework for Action and also proposed the Decade as a way of “signalling that education and learning lie at the heart of approaches to sustainable development.” (UNESCO 2005 a, p. 8)

Core Values of the Decade

Born of this global sustainable development discourse, the Decade presents education as a means through which societies may achieve the balanced elevation of the three pillars of environmental health, economic development, and social wellbeing. The Decade is founded on the broad principle that educational reform is essential to building more sustainable societies. It compliments efforts toward good government, enlightened policy, civic participation, and increasing collaboration between individuals, organizations, industry, and governments.

Not surprisingly, UNESCO defines the term “sustainability” broadly, pointing out that it relates to “ways of thinking about the world”, and arguing that it forms the social and personal practices that lead to:

- ethical, empowered and personally fulfilled individuals;
- communities built on collaborative engagement, tolerance, and equity;

- social systems and institutions that are participatory, transparent and just;
and
- environmental practices that value and sustain biodiversity and life-supporting ecological processes (UNESCO 2005 a, p. 10).

Based on this definition, educating for a more sustainable future includes improving the quality of basic education, reorienting education to address sustainability, improving public awareness, and providing training to many sectors of society. The Decade considers itself to be fundamentally about humankind changing its behaviour in many areas (UNESCO, 2005 b). The International Implementation Scheme for the Decade, approved by the United Nations General Assembly, focuses on education at all levels – from pre-school to university; in all sectors – formal, informal, and non-formal; and for all audiences – decision makers, managers, employees, and the general public (UNESCO, 2005 a).

This paper is concerned primarily with one of the four key thrusts of the Decade: reorienting and revising education to address sustainability. It is premised upon the belief that doing so in Canada will eventually create a shift in public understanding and awareness within this society, another one of the Decade's thrusts. UNESCO elaborates upon the goal of reorienting all education, pointing out that programmes should be restructured from nursery school to university to include explicitly the study and comprehension of problems linked to the social, economic, environmental and cultural sustainability of our planet, emphasizing interdisciplinary approaches (UNESCO 2005 a).

UNESCO Literature on Reorienting Teacher Education

As part of this broad educational shift toward sustainability, UNESCO identifies the need to focus on teacher education: “We cannot imagine how the people of all nations could move toward a more sustainable world without the contribution of educators from around the globe.” (UNESCO 2005 b, p. 11)

During the 1990’s, UNESCO identified teacher education institutions and teacher educators as key agents of change in reorienting education to address sustainability. In 1998, the Commission on Sustainable Development called for UNESCO to develop guidelines for reorienting teacher training to address sustainability. UNESCO responded by creating a *Chair on Reorienting Teacher Education to Address Sustainability* based at York University, Toronto. The Chair established a network of teacher education institutions in 28 countries to address this issue, and one outcome of their efforts was a set of *Guidelines and Recommendations for Reorienting Teacher Education to Address Sustainability* (UNESCO, 2005 b).

This UNESCO document makes several key contributions to the literature, three of which are particularly relevant to this study. First, it articulates the importance of focusing on teacher education as part of the shift towards sustainability. Second, it proposes principles that should define and guide education for sustainable development (ESD) initiatives. Third, it emphasizes that dialogue between educational institutions around the world is essential to foster new and share existing good ideas. In this spirit, the bulk of the *Recommendations* document reports on successful and diverse case

studies from around the world, drawing lessons learned and making recommendations (UNESCO, 2005 b).

The importance of teacher education is underlined in the introductory section of the *Recommendations* document and affirms the importance of this research paper's focus. Teacher training institutions, the Chair argues, fulfill essential roles in the global education community and as such "have the potential to bring changes within educational systems that will shape the knowledge and skills of future generations... [and] to serve as key change agents in transforming education and society, so [a sustainable] future is possible" (UNESCO 2005 b, p. 11).

Not only do teacher education institutions educate new teachers, the authors point out, but they update the knowledge and skills of in-service teachers, create teacher-education curriculum, provide professional development for practicing teachers, contribute to textbooks, consult with local schools, provide expert opinion to regional and national ministries of education, consult with and support local schools, and provide expert opinion to regional and national education ministries. A systemic, economically effective shift toward sustainability can therefore, they argue, begin with teacher education institutions (UNESCO 2005, b.)

The Chair on Reorienting Teacher Education defines education for sustainable development (ESD) according to specified design criteria for ESD projects. These guidelines stipulate that:

- ESD is locally relevant and culturally appropriate.

- ESD is based on local needs, perceptions, and conditions, but recognizes fulfilling local needs often has global effects and consequences.
- ESD engages formal, non-formal, and informal education.
- ESD is a life-long endeavour.
- ESD accommodates the evolving nature of the concept of sustainability.
- ESD addresses content, context, pedagogy, global issues, and local priorities.
- ESD deals with the wellbeing of all three realms of sustainability- environment, society, and economy.
- ESD is not imported from another cultural, economic, or geographic region.
- ESD is not “one size fits all,” but must be created to account for regional differences (UNESCO 2005 b, p. 16).

Many of the above principles suggest that ESD has an emphasis on locally-driven education projects. Indeed, the paper reports on a very wide range of projects initiated by teacher education institutions around the world that are considered, according to the above criteria, to be ESD initiatives. This range includes a Jamaican project aiming to address violence through a high school literature class, an in-service teacher training course focused on environmental education at a Zambian university, and the Sustainable Enterprise Academy, a seminar for senior level corporate executives in Canada aimed to help them address sustainability issues within their corporations (UNESCO, 2005 b).

From these case studies, the Chair offers specific recommendations about ESD content in initial teacher education. In sum, they recommend that ESD content should

be interdisciplinary, address both local and global sustainability issues, discuss social equity, identify content related to sustainability in existing school curricula and foster students' contemplation of their personal values and attitudes about sustainability. Furthermore, the *Guidelines* advocate for the use of pedagogical approaches that encourage higher-order thinking skills and decision-making, participatory learning, questioning, and decision-making processes related to lifestyle (UNESCO 2005 b and Shallcross and Robinson, 2007).

Although a chapter of the *Recommendations* document entitled "Challenges to ESD and Enablers" distills the lessons learned from the case studies presented, the authors ultimately "leave it to faculties of education to create their own guidelines and design criteria that will steer their efforts to reorient teacher education to address sustainability" (UNESCO 2005 b, p. 16). Key challenges discussed include a lack of understanding of ESD principles among faculty, disparate initiatives, lack of time and resources, and little encouragement to think outside the box, points that will be picked up on throughout this paper (UNESCO, 2005 b).

Environmental Education Literature

Unlike most education movements, ESD was initiated by people outside the education community – particularly from international economic and political forums (UNESCO 2006 , p. 13). And to a large extent, ESD policy is still shaped by those outside the education field. In contrast, the field of EE has been shaped primarily by educators, and unlike UNESCO's relatively contained and consistent ESD literature, the body of literature on EE is vast and divergent. The following section traces the development of

EE, pointing particularly to literature emphasizing the role of place and an interdisciplinary approach to education. It explores the research about the main challenges to integrating EE in the classroom. Finally, it explores and tensions between EE, ESD, and other sustainability education frameworks that arise from the literature.

A Brief History of Environmental Education

The purpose of this section is to place the current discussions and debates within the EE academic literature in the context of their historical roots. In part, this aims to dispel the illusion that EE is new, and simply a result of recent concern about environmental degradation (Palmer, 1998.) In fact, concern about environmental problems is but one relatively recent influence on the goals of EE. A brief exploration of its different forms and goals over the course of its evolution also informs the discussion of the following section, on tensions between the notions of EE and of ESD.

The evolution of EE mirrors changing perceptions of the environment. Its story begins in the Victorian era², at which time expanding industrialization urbanized a once-rural landscape, stimulating a new interest in the natural world. Over the course of its development, EE has incorporated significant influence of some of the great eighteenth and nineteenth century educators and educational philosophers including Goethe, Rousseau, Humboldt, Haeckel, Froebel, Dewey, and Montessori (Palmer, 1998.)

EE is often thought to have been “founded” in the UK with the work of Scottish biologist and botanist Sir Patrick Geddes (1854-1933). Geddes is regarded as the first to

² This paper acknowledges that there is a troubling Euro-centric bias in the literature on the history of EE, as indeed with most academic literature on the history of education. Unfortunately, addressing this bias lies outside the scope of the current research.

link quality of the environment and quality of education. He pioneered instructional methods that brought learners into direct contact with their environment. In 1892, Geddes opened what was perhaps the first field studies centre in the world, the Outlook Tower in Edinburgh (still standing). At this site, he pioneered the methods of "Civic and Regional Surveying," with its innovative ideas and urban field survey methods (Palmer, 1998.)

The term "environmental studies" evolved out of the nature studies movement and was well in use by the mid-1940's, largely in reference to a mixture of teaching elements of geography, history, and local nature study. The practice of field studies in biology, ecology, and geography continued to gather momentum. The establishment of the Nature Conservancy in 1949 was significant for the ongoing development of environmental teaching (Palmer, 1998.) By the 1960's, the nature study movement had taken root in North America. Marked by a trend toward learning through fieldwork under the guidance of biologists, ecologists, and geographers, the 1970s saw the spread of 'outdoor education' (Palmer, 1998.)

As environmental issues came to people's consciousness during the 1960s and 1970s, teaching about environmental conservation also became increasingly important. The 1970s saw also the dawn of the urban studies movement, extending the notion of environmental challenges to include those problems affecting ever-increasing urbanized areas. By the 1980s a wider vision of EE was generally employed, through both 'global education' and 'development education,' which had a political dimension. 'Values education' emerged as a process by which students are asked to clarify their own values

through personal experience. By the 1990s, 'Education for Sustainability' was emerging, and, most recently, as we have seen, ESD (Palmer, 1998.)

Today, EE has evolved into several different areas of specialization. In her review of 30 years of EE research and practice, UQAM researcher Dr. Lucie Sauvé (2005) puts it thus:

Despite their shared concern for the environment and their recognition of the central role of education in enhancing human-environment relationships, various authors (researchers, professors, educators, facilitators, associations, organizations, etc.) adopt widely differing discourses on environmental education, and propose diverse ways of practicing educative activity in this field. Each advocates his or her own vision—we may even identify different pedagogical 'chapels,' all distinct proponents of the right approach, the best program, the appropriate method (Sauvé 2005, p. 11).

Sauvé argues that within the broad field of EE or 'environment-related educations' there exist today fifteen currents of intervention, broken down roughly into those with a longer tradition and those that emerged more recently.

Table 1. Fifteen Currents in Environmental Education (Reproduced from Sauv� 2005, p. 13)	
Among those Currents with a Longer Tradition in Environmental Education	Among those Currents more Recently Emerged in Environmental Education
1. Naturalist Current	8. Holistic Current
2. Conservationist/ Resourcist Current	9. Bioregionalist Current
3. Problem-solving Current	10. Praxic Current
4. Systemic Current	11. Socially Critical Current
5. Scientific Current	12. Feminist Current
6. Humanistic/ Mesological Current	13. Ethnographic Current
7. Value-centred Current	14. Eco-Education Current
	15. Sustainable Development/ Sustainability Current

Ecological Literacy and Bioregionalism

Among these currents of EE, some are of particular interest to this study. One of the most prolific advocates of place-based education is Dr. David Orr, whose contributions to the field of EE make him “one of the great visionary educators of our time” (Stone and Barlow 2005, p. 85). Most notably, Orr contributes work with the concept of ‘ecological literacy,’ an expansion of the notion of ‘environmental literacy,’ a term coined by Roth in 1968 (Roth in Cutter-Mackenzie and Smith, 2003). Orr describes an ecologically literate person as someone who has “at least a basic comprehension of ecology, human ecology, and the concepts of sustainability, as well as the wherewithal to solve problems” (Orr 2005, Foreword). Expanding this concept outward, an ecologically literate society would be one that is able to sustain itself over time given the constraints of the biosphere.

Orr underlines the need for a radical transformation of mainstream education in North America in order to foster ecologically literate citizens. He argues that “all education is environmental education... [that] by what is included or excluded we teach the young that they are a part of, or apart from, the natural world” (2004, p. 26). Orr advocates for a new educational paradigm – one that emphasizes holism, systems thinking, and place. The environmental movement, he points out, has “grown out of the efforts of courageous people to preserve and protect particular places” (Orr 2004, p. 161). Without prolonged contact with natural places, children are unlikely to develop what Rachel Carson called a “sense of wonder” about these places, and are therefore unlikely to love, understand, or protect them as adults. Contact with the natural world, in contrast, “has a magical effect on the ecological imagination” and fosters ardent and articulate defenders of nature (*ibid*).

The field of bioregionalism emerged as a response to disillusionment with industrialization and to massive urbanization and is associated with a back-to-the-earth movement (Sauvé 2005). Education based on bioregionalism, often called “place-based education,” aims to develop a personal relationship with the local or regional environment and a sense of belonging to it. To understand nature and natural processes often occurs when we love these, a phenomenon termed “biophilia” by Harvard biologist E. O. Wilson. Orr employs Simone Weil’s (1971) language of roots to express the importance of personally relating to place:

I do not know whether it is possible to love the planet or not, but I do know that it is possible to love the places we can see, touch, smell, and

experience. And I believe, along with Simone Weil (1971), that rootedness in a place is “the most important and least recognized need of the human soul.” The attempt to encourage biophilia will not amount to much if we fail to decide to reshape these kinds of places so that we might become deeply rooted (Orr 1994, p. 147).

To foster ecological literacy, Orr argues that curricula at all levels must emphasise local places, particularly natural places, through interdisciplinary exploration. To complement this, he proposes a green revolution in the design and building of all places of learning. Underlying Orr’s educational philosophy is the belief that although the environmental crisis is a global phenomenon, it manifests at the community level as smaller problems, and can be intelligently addressed by these communities (Orr, 1994). Thus, many global environmental problems may be overcome, place by place.

Cross-Disciplinarity

Since the 1970’s, a body of literature has developed that asserts that EE is most successful when it is not treated in isolation, but rather, when it is integrated in a cross-disciplinary (inter-disciplinary, whole-school, or cross-curricular) manner (Summers et al. 2005). To foster an interdisciplinary approach to EE requires policy changes at many levels, including developing new EE curriculum, establishing an appropriate pedagogical approach (or, more likely, approaches), supporting new whole-school EE initiatives, providing EE education to in-service teachers, and including EE as part of pre-service teacher education programs.

For instance, it is argued that most standard courses might easily shift their emphasis to local place, such as courses in biology, chemistry, physics, home economics, geography, history, and physical education. What is more, school-based activities such as schoolyard gardens, river restoration, or community mapping initiatives can promote an interdisciplinary approach to problem-solving. Educators might foster affinity for place by supporting student work towards integrated and creative solutions to local problems. Program design, course content, the determination of core subjects, and decisions about which types of research to pursue affect the role of place in the learners' experience (Giesbrecht, 2008, Hutchison, 2004 and Orr, 2006). Because 'place' is not a topic in the traditional sense, advocates argue that the study of place should not be added to existing curricula, but rather, should be integrated into it at all levels.

Systemic Flaws of Mainstream Education

Several relevant critiques of the philosophical foundations of modern mainstream education in the West have bearing on the broader EE discussion. These critiques address a range of issues from race relations to gender identity. In general, this literature accuses educational institutions of promulgating and reinforcing an existing worldview that is considered to be harmful or unjust. Within the EE discourse, many authors have argued that the overall culture of modern schooling perpetrates the environmental crisis by reinforcing the status quo and that the introduction of EE into a school curriculum represents a fundamental challenge to the status quo. Authors also point to the increasing corporatisation of schools and the education process in North

America. Education, it is argued, increasingly seeks to “equip the young for employment in that great scam called the global economy” (Orr in Hutchison 2004, Foreword).

Stevenson (2007) argues that the way in which education occurs in Western countries is fundamentally antithetical to a sustainable way of living. Bowers (1997) further charges that mainstream education spreads a “culture of denial” that rejects the link between modernity and the problems that threaten humanity’s and ecology’s future (Bowers in Shallcross and Robinson, 2007). Bowers (2001) also applies this to teachers, arguing that teachers often lack a sufficient understanding of how modern values and behaviour patterns are connected to the ecological crisis and are often unaware of “the intellectual and moral double-binds of what is being taught in our schools and how it leads to environmental degradation” (Beckford 2008, p. 58). Modern education stands accused of denying that “consumerism threatens ecosystems, that there may be limits to technology’s ability to address negative ecological trends, and that modern societies can learn from traditional cosmologies” (Shallcross and Robinson, p. 137).

Structural Barriers to EE

In a related discourse, several authors contribute to our understanding of the structural barriers to the implementation of environmental programming within schools. These barriers, they report, include overcharged curricula, difficulty working across disciplines, lack of resources, lack of time, and lack of qualified educators (Barrett 2007, Robottom and Kyburz-Graber 2000, Hart 2002). Many authors report that because of these barriers, little EE is in fact taking place.

There is evidence that although some schools have begun to value and integrate place-based education, it is not yet integrated into the design of most mainstream K-12 curricula (Meichtry and Smith, 2007). A recent study conducted with K-12 teachers in Kentucky by Carr (2005) revealed that 67% reported incorporating environmental content into their teaching, but relatively few did so extensively. Furthermore, few teachers had received training related to environmental content within the past three years, but those who did were more likely to integrate it into their teaching (Carr in Meichtry and Smith, 2007).

One of the most frequent reasons given for not teaching about the environment was a lack of teaching materials and lesson ideas (Carr in Meichtry and Smith, 2007). Meichtry and Harrell (2002 in Meichtry and Smith, 2007) found in a needs assessment of K-12 teachers in the US that the three greatest needs of teachers, in order of frequency, were:

- a. training in the use of outdoor learning sites
- b. training in the alignment of curriculum with state standards
- c. availability and use of the curricula

In 1995, the Organization for Economic Cooperation and Development (OECD) undertook an in-depth study of EE policy development in five OECD countries— Australia, Austria, Finland, Germany, and Norway. The study found that teacher education about EE is the weakest point of EE programmes of all five countries and that “few teachers, or anyone else for that matter, think that teachers are well prepared for teaching environmental issues... the traditional disciplinary structure and pedagogical practice of higher education serve as impediments to EE, and higher education institutions are

located in a critical place to both produce and legitimise knowledge” (OECD 1995 in McKeown-Ice, 2000, p. 4).

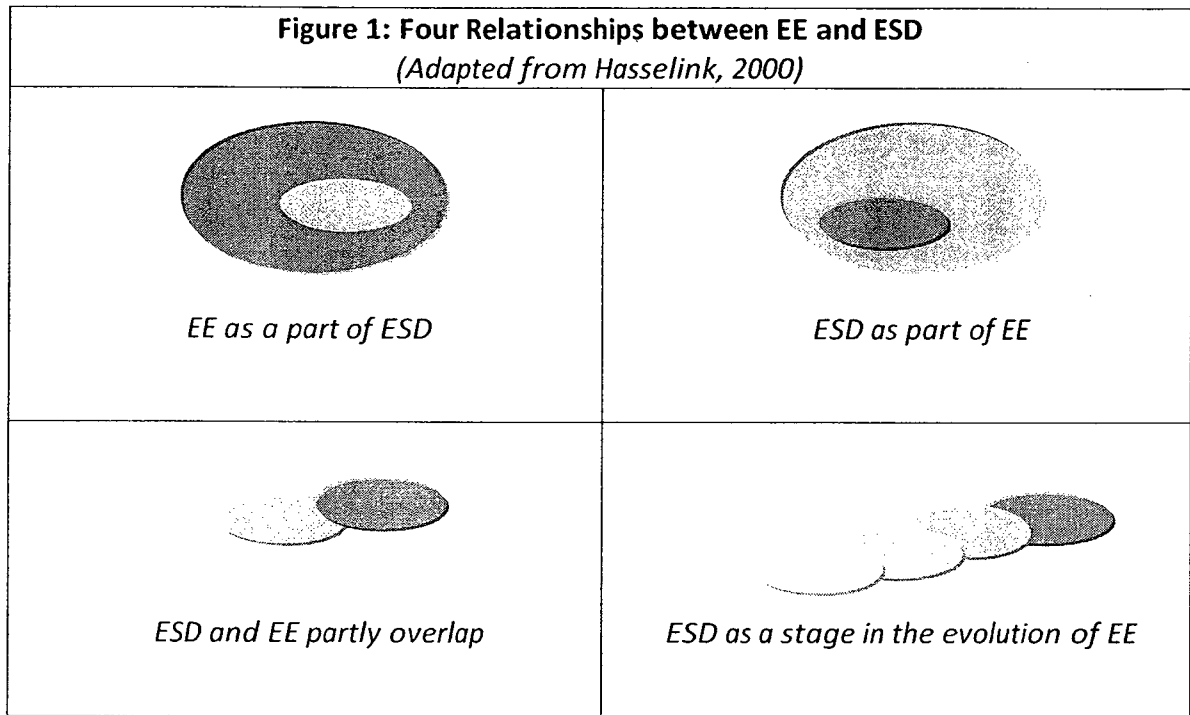
This discourse often portrays teachers as ‘part of the problem’ because they legitimate dominant cultural values. If teachers are to do more than replicate unsustainable cultural values, they argue, teacher education must be radically different (Hart 2002).

Tensions Between ESD and EE

As seen above, Sauv  identifies ESD as one of fifteen currents within EE. However, the relationship between ESD and EE is, as she and others discuss, not clear. There is a large body of literature expressing a range of perspectives about both the current and the ideal relationship between EE and the emergent field of ESD. (See Barryman and Sauv  2005, Bonnett 1999, Fien 2006, Sauv  2005, Sauv  *et al* 2007, Hesselink 2000, Jickling 2005, Jickling and Wals 2008, McKeown and Hopkins 2007, Robottom and Kyburz-Graber 2000, Shallcross and Robinson 2007.)

The ESDebate, a formal global online discussion between 50 invited experts from 25 countries, addressed the relationship between EE and ESD. Its results summarize many of the perspectives of those in the sustainability education field on the role and potential of ESD. Hesselink (2000) reports that many experts view ESD as the next generation of EE, evolved to include issues of ethics, equity and new ways of thinking and learning. He reports that other experts argue that ESD should be a part of good EE and that there is therefore no need to do away with EE. Still others suggest that EE is one small part of ESD. They argue that ESD is more comprehensive than EE by including

issues of development, North-South relationships, cultural diversity, and social and environmental equity. Figure 1, below, depicts these four relationships between EE and ESD, as articulated by the participants in the online discussion.



However, others take yet another position on the relationship (see Jickling 2005, Sauvé *et al* 2007, Jickling and Wals 2008) describing the sustainable development ideology as one that has gradually penetrated EE and “asserted itself as a dominant perspective” (Sauvé *et al* 2007, p. 29). Indeed, language in the official UNESCO documents about ESD indicates alignment with the first quadrant in Figure 2: ESD is conceived of as a broad framework, and established EE practices can play important roles in contributing to ESD. Critics of ESD warn that although it appears to have further institutionalized EE, it has also to some extent subsumed it as part of ESD’s ‘broader’ frame of reference.

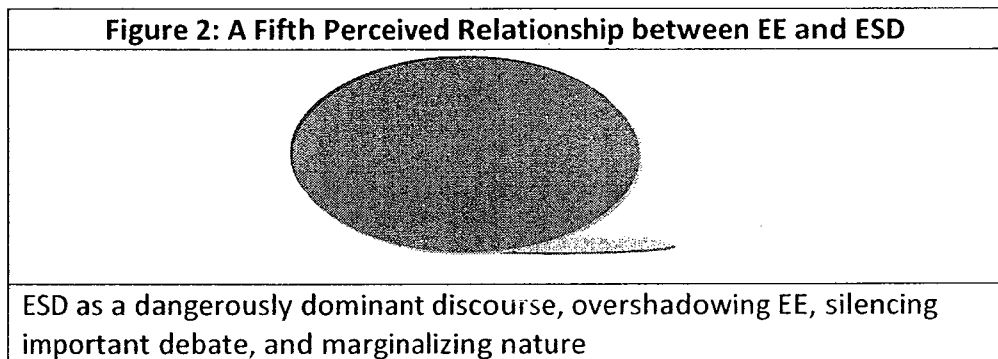
Sauvé (2007) points out, as evidence of this trend at the international level, that UNESCO replaced its International EE Program (1975-1995) by a program entitled Educating for a Sustainable Future (UNESCO, 1997), the goal of which is to contribute to the promotion of sustainable development. And while protection of the environment formed the core intent of the processes that led up to the Tbilisi Declaration, the process leading to both the Earth Summit and Agenda 21 added concern for economic and human development to environmental protection (McKeown and Hopkins, 2007).

Bob Jickling, Associate Professor at Lakehead University in Thunder Bay, Ontario and co-editor of the *Canadian Journal of Environmental Education*, warns that the emergence of ESD as a dominant discourse risks subjugating these myriad EE perspectives, including, for instance, aboriginal perspectives. The increasing dominance of the ESD discourse, he argues, is the result of potentially harmful globalizing forces and may serve to sustain present global inequities rather than to effectively challenge the status quo (Jickling, 2005). Sauvé *et al* (2007) further point out that despite a humanistic definition of education put forth in Agenda 21, ESD promotes an instrumentalist view of education and views the natural world as a set of resources rather than as having intrinsic value. Jickling (2005) further warns that ESD is only likely to further legitimize the status quo:

Proponents of education for sustainable development have not provided a satisfactory way of distinguishing, on educational merit, between diverse ideas such as 'education for creationism'... 'education for sustainable development', 'education for citizenship' and 'education for all'. Add these ideas to a growing

list of 'education *fors*' and education systems could be reduced to an enormous tug of war between competing interest groups. In such a contest we might appropriately speculate about whether neoconservative perspectives and economic interests- that is the status quo- would be most likely to prevail? (p. 253).

Critics such as Jickling argue against adopting ESD as a dominant paradigm, and call our attention to some of the flaws inherent to the sustainable development concept itself. To reflect these views, we might append a fifth illustration (Figure 2, below) to the four already depicted (Figure 1, above):



In response to authors critical of the ESD framework, McKeown-Ice (2007) argues that there are far greater similarities than differences between ESD and EE; that they are neither mutually exclusive nor in competition with one another. And in response to the concern that EE is being overshadowed by ESD, McKeown and Hopkins (2007), Co-Chairs of UNESCO's Decade, express anxiety:

When we hear that EE is becoming ESD, we feel concerned that the former could lose some of its uniqueness. For example, EE is known for the underlying concept that humans are part of nature. EE emerged out of environmental concern. In

contrast, ESD is centred far more on humans. Sustainable development was founded in a search for a balanced approach to environmental, social, and economic interests. In the end, it would be a pity to lose the worldview that humans are part of nature as EE becomes human-centred ESD. Such a loss would ultimately impoverish ESD. (p. 20).

Furthermore, the International Implementation Scheme for the Decade emphasizes that ESD is not a global imposition on countries or on education systems. Rather, it is meant to be an invitation to explore the themes and issues, the objectives and pedagogies that can make education locally relevant and culturally appropriate in the search for a better world for all (UNESCO, 2005 a.)

There is also a debate about nomenclature between those in favour of Education *about* Sustainable Development and those in favour of Education *for* Sustainable Development. The first- education *about* Sustainable Development may be seen as an awareness mechanism, and to some, does not go far enough toward implicating learners as potential agents of change (UNESCO, 2010). The second – education *for* Sustainable Development, taken up by UNESCO for the Decade – uses education as a tool to achieve sustainability and implies changes throughout the education system. This notion smacks, to some, of indoctrination.

Countering this critique, many authors argue that no education is free of values, and that all education seeks to accomplish something, which is why society invests in it (see Hart 2002, Bonnett 1999, Fien, 2006, and UNESCO, 2010). And since the purpose of any curriculum used by schools is “the achievement of certain desired end states and

virtues by their students” (Hart 2002, p. 1239), the question is in fact one of determining *which* end states, and *which* values to foster through education, and whether to do so explicitly or implicitly. What is taught in schools can never be neutral, because schools are, by their very nature and purpose, places of transformation (Hart, 2002).

In the context of EE (or ESD), what is omitted from curriculum conveys as much as what is included about our relationship to the Earth. For example, “to teach economics without reference to the laws of thermodynamics or those of ecology is to teach a fundamentally important ecological lesson: that physics and ecology have nothing to do with the economy. That just happens to be dead wrong. The same is true throughout all of the curriculum” (Orr 1991, p. 56).

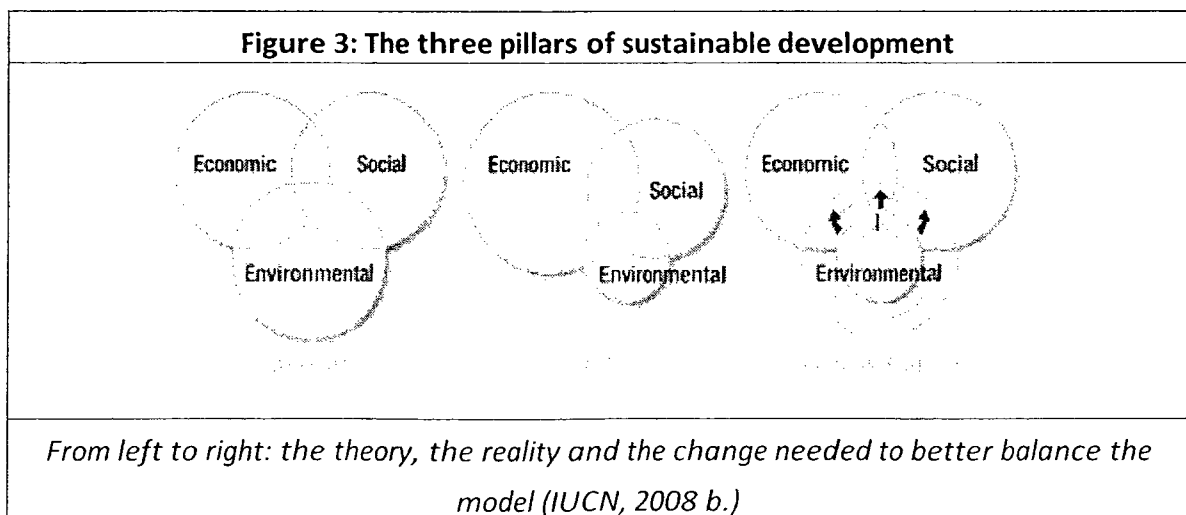
The Education Paradox

When we examine the link between education and sustainability globally, education presents us with a troubling paradox similar to that posed by Affluence in Ehrlich and Holdren’s IPAT formula. On the one hand, for example, educating women and girls has been shown to reduce fertility rates and therefore population growth, thus buffering against overpopulation. And of course, there are myriad other reasons why education is essential for human wellbeing: the majority of citizens of the planet live in circumstances that do not provide for basic needs, and education can help them to emerge from a cycle of poverty.

On the other hand though, more highly educated people, who in general have higher incomes, consume more resources on average than poorly educated people. The most “educated” nations leave the deepest ecological footprints, meaning that their

rate of per capita consumption is highest (UNESCO, 2006). Canada's ecological footprint per person is reported to be the 4th highest in the world, at 7.6 global hectares per person (the biocapacity available per person is estimated at 1.8 global hectares). If everyone lived as Canadians do, we would therefore need 4.3 Earths to support us (Global Footprint Network, 2010). Education can, in this light, be seen as a threat to sustainability. The question then becomes: *what kind of education is education for sustainability?*

The below schema by the IUCN represents one argument in favour of focusing sustainable development efforts on environmental sustainability in economically developed countries such as Canada. While economic and social considerations cannot be ignored, environmental sustainability remains the least robust of the three elements, and should therefore be enhanced. Authors in support of merging EE within ESD often share this perspective, arguing that EE is the least robust element of ESD, and therefore should be enhanced.



In economically developed countries such as Canada, it may make more sense for educators to choose to place a stronger emphasis on integrating EE than other components of ESD. Although the IUCN framework offers a useful (if somewhat simplistic) way out of the sustainability paradox that education presents at the global level, the ongoing debate about EE and ESD raises important questions about how education should be reoriented toward sustainability *in practical terms*.

Environmental Education (EE), Education for Sustainable Development (ESD), and Education for Sustainability (Efs), and Sustainability Education (SE) are often defined in relation to one another. In their efforts to communicate clearly, many authors writing in this field struggle to overcome “definition dementia” (Shallcross and Robinson 2007, p. 138), making the related literature unwieldy and, at times, nebulous.³ In order to avoid the entrapments of this complexity, this paper employs the term ‘environmental education’ (EE) to mean *education that fosters environmentally sustainable living*. It occasionally employs the term ‘sustainability education’ (SE) to designate this same thing. This paper acknowledges that such education could also be characterized as ESD or Efs depending on the context. The use of the term EE in this paper maintains consistency with previous studies on education that fosters environmentally sustainable living.

³ This is understandable when we recall that the term ‘sustainable development’ itself did not evolve out of a shared understanding of its meaning, but rather was invented to introduce a new and complex concept. In other words, the term ‘sustainable development’ preceded our common understanding of its meaning. What is more, that understanding has arguable not caught up with the term’s usage.

Studies About Pre-Service Teacher EE

Pre-Service Teacher EE in the United States

In addition to the literatures on ESD, EE, and their relationships, there exists a more focused set of literature addressing the role of teacher education in preparing educators for EE. For instance, McKeown-Ice (2000) gauged the extent to which pre-service teacher education programs in the United States were preparing teachers to teach about the environment. Her study surveyed 715 institutions of teacher education using a mail questionnaire. Some of her questions inspired the design of the questionnaire used by the current study.

McKeown-Ice's findings were, broadly, that even EE was rarely institutionalized in teacher education programs, and that even when it was institutionalized, it was done so spottily and inconsistently, often as the result of a particularly motivated faculty member or team of faculty members. The study found that few colleges and universities across the United States offered a major, minor, concentration, specialization, or even a course in EE. The most commonly reported barriers to EE's implementation in teacher education were limited course time and conflicts with other mandated course content within pre-service teacher education curricula (McKeown-Ice, 2000).

McKeown-Ice's study also establishes a useful distinction between (shallow) EE that deals with awareness, knowledge and persuasion and (deep) EE that encompasses the goals of participation and environmental action (*ibid*, p. 7). Her study found that far fewer institutions presented the goal of participating in EE than those that presented goals of raising awareness. Very few institutions presented environmental action

strategies that emphasized the goals of EE. In other words, even where EE was happening with teachers, it was found to be largely focused on raising awareness rather than on generating action or preparing teachers to generate action with their students; it was found to be “shallow” rather than “deep” EE. For these reasons, McKeown-Ice concluded that pre-service teacher education programs in the United States were not systematically preparing future teachers to effectively teach about the environment” (*ibid*, p. 10).

Pre-service Teacher EE in Canada

Canada’s primary and secondary school systems employ about 310,000 educators – primarily teachers as well as also principals, vice-principals, consultants, and counselors (Council of Ministers of Education, Canada, 2006), with approximately 18,000 new teachers graduating each year (Crocker and Dibbon, 2008). These educators represent a significant source of energy and potential for transformation. The following section summarizes the results of three studies conducted in the past thirty years on the role of EE in teacher education. Two of these were cross-Canada studies and a third focused solely on Ontario.

Unfortunately, in the Canadian context, it remains difficult to obtain a clear picture of Canadian efforts in EE. This is largely due to the absence of a single central national authority responsible for education matters. According to the Canadian constitution, education is strictly a matter for each province to govern, oversee, and finance. There is therefore no federal jurisdiction, involvement or funding for education. Each province has its own Department of Education, which has autonomy with respect

to curricula, standards, funding, teacher certification and teacher training. This system provides flexibility but has fostered a lack of national consensus regarding curricula, presenting obstacles to broad-sweeping educational reform (Towler, 1980-81).

In 1978 and 1979, Towler (1980-81) conducted a survey of Canadian pre-service teacher education in EE. Towler employs the following definition of EE in his questionnaire:

an integrated process which deals with people's interrelationship with their natural and man-made surroundings, including the relation of population growth, pollution, resource allocation and depletion, conservation, technology, and urban and rural planning to the total human environment. Environmental education is a study of the factors influencing eco-systems, mental and physical health, living and working conditions, decaying cities, and population pressures (Towler 1980-81, Appendix I).

Towler's results, based on a questionnaire administered to the entire population of 48 teacher training institutions in Canada "clearly indicate what is and is not happening in the area of teacher preparation for environmental education" (Towler 1980-81, p. 15). Key findings are that few Canadian institutions (43%) offered methodology courses on EE and that even fewer students enrolled in them. However, somewhat more students (60%) were enrolled in EE courses (though respondents at times defined EE to include science, social studies, and outdoor education) (Towler, 1980-81). Towler (1980-81) also collected data pertaining to the faculty involved in pre-

service teacher EE. He found that very few instructors, even those offering EE courses, were academically trained in EE or a related subject.

The study also brought to light some of the challenges associated with the development of EE as perceived by those within teacher education institutions. Lack of communication and coordination and lack of funding for EE initiatives ranked highest on the list of challenges. Tellingly, only about 20% of respondents were able to identify an exemplary EE program, indicating a low level of awareness of existing initiatives and suggesting poor coordination between EE efforts (Towler, 1980-81).

In 2002, Lin published a follow-up study to Towler's initial study, distributing almost exactly the same questionnaire and employing Towler's definition of EE. Lin's study covers the period from 1979-1996. Lin found that EE in Canada had not progressed greatly over the last two decades since Towler's study. EE continued to be a low priority in K-12 schools and in pre-service teacher programs. She found that a lack of communication among EE educators no longer ranked as a primary problem, as it had at the time of Towler's study but rather, the greatest reported barrier to implementing EE was the lack of financial support, with just over half of respondents indicating that fiscal constraints in recent years were one of the major obstacles in promoting and developing EE courses in their institution.

Furthermore, Lin found that the number of teacher preparation institutions offering courses pertaining to EE or environmental concerns had actually declined since the time of Towler's study. And when EE was being taught, it was usually the traditional forms of EE – ecology, conservation, outdoor education, and biology – that were the

major emphasis in most methodology courses across the nation. Her findings suggest that EE was still being viewed as narrowly focusing on knowledge, skills, and awareness about natural resources and their management and had not widened to adequately include socio-economic or political aspects of society. This trend, she argued, runs the risk of perpetuating scientific, “technical” solutions to environmental problems (Robottom 1983 in Lin, 2002). These findings indicate that teacher EE in Canada in the mid-1990’s was still what, to employ McKeown-Ice’s (2000) term, “shallow” EE in that it is *about* the environment, rather than actually being *for* it.

Lin concludes that the preparation of pre-service teachers remained at an inadequate and underdeveloped level in Canada. EE, she charged was “clearly not the priority at any level within the Canadian educational system” (*ibid*, p. 212). Unless significant changes were made, Lin predicted that EE’s low status would persist. She called for further funding for EE to support research and the development of methodologies and curricular resources and to increase the number of professionals involved in the field. She points to inflexible scheduling of discipline-dominated organizations of many teacher education programs as obstacles to the interdisciplinary, problem-solving, critical action aims of EE. Finally, at the faculty level, she points to a lack of awareness, interest, commitment, direction and leadership in EE.

Pre-Service Teacher EE in Ontario

Most recently, Beckford (2008) reported on the degree of EE provided within teacher education in Ontario based on a review of relevant policy documents. He concludes that “the teacher education goals set out in international agreements, such

as the Tbilisi Declaration of the UNESCO global initiatives on reorienting teacher education towards sustainability, are yet to be recognized in the province's educational policies... The dearth of teacher education programs in EE results in a teaching force that lacks the necessary competencies to effectively address the aims and goals of EE" (Beckford 2008, p. 56).

An overview of the Ontario curriculum documents for secondary schools, he reports, reveals that there is significant EE content, but that it is very rarely identified as such, and is scattered throughout the science and geography curricula rather than consolidated into specific courses with an EE focus. A review of teacher education programs in Ontario through publicly available course materials revealed that "EE was rarely included into the core teacher education curriculum and, rather, tended to consist of bits and pieces of unconnected ideas" (Beckford 2008, p. 57). These concerns raised by Beckford are taken up again in Chapter 5, Discussion.

Conclusion

By implementing a similar methodology to that of Towler (1980-81) and Lin (2002), the current study generates comparable data, allowing for an overview of the changes in EE in Canadian teacher education over the past thirty years. The results from the current questionnaire are compared against the key recommendations from the vast literature on reorienting teacher education towards sustainability. While far from homogeneous in its details, for the most part this literature advocates for preparing teachers to consider the economy, the environment, and education systemically, while simultaneously developing their critical and experiential knowledge and their fluency

with a range of pedagogies and an interdisciplinary approach (UNESCO 2002 and Beckford 2008). The recommendations emerging from the literature are compared against the current status of EE in Canadian teacher education and against existing pan-Canadian education policy documents. Opportunities for enhancement and change at all levels are identified.

Chapter 3: Methodology

To assess the degree to which EE is integrated into Canadian teacher education programs, primary data collection occurred through a questionnaire sent to all pre-service teacher education institutions in Canada. Findings were supplemented by additional internet research. Together, these data contributed to our overall picture of EE in Canadian teacher education and form the basis of the paper's policy recommendations and conclusions.

Certain strands of the literature – particularly those exploring barriers to integrating EE and ESD – are taken up again to interpret the findings from the questionnaire and to assess whether the Decade is impacting EE in pre-service teacher education. Finally, this research draws from the recommendations emerging from the recent ESD and EE literature on teacher education to develop a set of recommendations for those responsible for designing, implementing, or overseeing teacher education programs in Canada.

Questionnaire

The main tool for assessing the state of EE and ESD in Canadian teacher education institutions was a questionnaire sent to all 58 teacher education institutions in the country. The questionnaire was designed to directly assess the central question of this research: the degree to which EE is integrated into Canadian teacher education programs.

Questionnaire Design

The questionnaire draws primarily upon Towler's 1978-79 survey of Canadian pre-service teacher training programs, employing similar language and key definitions in order to compare the situation today with his results and those of Lin (2002) as baselines for analysis. It was also inspired by McKeown-Ice's more complete and nuanced 2000 survey of US pre-service teacher education programs.

The questionnaire employed five standard types of questions. The respondents were required to (a) answer yes or no questions, (b) rank items, (c) rate items on a scale, (d) provide a short answer, and (e) provide comments. The survey (Appendix II) was divided into eight sections as follows:

SECTION 1: Respondent Details, in which basic details about the person completing the questionnaire were solicited.

SECTION 2: Pre-service Teacher Education Program Background Information, which aimed to establish basic details about the program in question, such as the size of the program and whether it prepares students for teaching at the primary or secondary levels.

SECTION 3: Pre-service Teacher Education Program Objectives, in which Towler's definition of EE and UNESCO's definition of ESD were provided, and in which the respondent was asked to assess the degree to which their institution is aligned with these goals, as defined.

SECTION 4: Program Faculty and Staff, in which personnel training was assessed.

SECTION 5: Pre-Service Primary School Teacher Training, in which relevant program content for emerging elementary school teachers was solicited. (For example, optional and mandatory courses on EE, courses in EE methodology, etc.)

SECTION 6: Pre-Service Secondary School Teacher Training, in which the same information for high school teachers was solicited.

SECTION 7: Impediments to Integrating EE in your Pre-service Teacher Training Program, which drew out respondents' perceptions of the barriers to integrating EE into their respective programs.

SECTION 8: Looking Ahead, in which information required for a potential follow-up by telephone was solicited and in which planned changes to the program in question were gauged.

Questionnaire Distribution

The questionnaire was administered electronically to all Canadian primary and secondary teacher education institutions between January and March of 2009. The scope of this research included all universities that offer a Bachelor of Education (BEd) program and that prepare its graduates for teaching certification within their respective province. The research therefore excluded private institutions that prepare teachers to work in non-traditional school settings, such as institutions that educate Montessori, Waldorf, or private religious school teachers.⁴

⁴ Although it fell outside the scope of this research to explore how teachers are prepared to teach within these alternative education models, the education models themselves are briefly taken up in Chapter 6, Conclusion, as they provide useful examples of how education might be re-conceptualized.

A French version of the questionnaire was sent to all francophone universities, while an English version was used for all English universities. The questionnaire was electronically distributed to all 58 institutions in Canada that offer pre-service teacher education programs. Specifically, it was directed to Deans of Education, Directors of Teacher Education Programs, Assistant Directors of these programs, or Undergraduate Teacher Education Program Coordinators. The questionnaire was sent as an attachment to an e-mail, which specifically identified by name the people to whom it was directed, and mentioned the educational institution by name. Based on information about the recipients available from each university's website, as many personalized details as possible were integrated into the cover letter. The content of the e-mail requested that if appropriate, the questionnaire be forwarded to the most suitable person within the institution.

Based on the initial response rate of 15, the questionnaire was simplified and shortened in April, 2009 in hopes of yielding responses from recipients who may have initially been daunted by it (see Appendix II.) Key changes to the questionnaire included:

Modification	Rationale/ Objective
Reformatted entire questionnaire	To visually make the questionnaire appear less daunting
Simplified language	To make the questionnaire easier to understand
Provided a questionnaire overview	To convey the questionnaire's simplicity
Clarified that information from Section 1 (Personal Information) would not be reported in the research findings	Some respondents had expressed concern about confidentiality.
Merged Questions 5B and 5C from the original questionnaire into one question, Question 20, in the modified version	The distinction between EE and ESD was not clear enough based on the definitions used (Towler for EE and UNESCO for ESD.) Separate results obtained were therefore not useful for this question.

In April, 2009, this modified version of the questionnaire was sent to all institutions from which a response had not been received. In most cases, additional contacts at each university were included on the distribution list, in hopes of increasing the chances of reaching an interested or willing party. This effort yielded only three additional responses.

The results from the questionnaire were then tabulated and compared with the baseline studies conducted by Towler (1980-81) and Lin (2002). The results obtained from the questionnaire were supplemented by additional internet-based and academic research on Canada's teacher education programs. The results of this internet research, combined with the data yielded by the questionnaire, provide a portrait of the status of teacher education on environmental sustainability in Canada. These results are outlined in Chapter 4 and their implications considered in Chapter 5.

Response Rate

Of the 48 colleges or university teacher education institutions that Towler contacted in 1978-79, 40 responded. This constituted a “surprisingly high” response rate of 85% (Towler 1980-81, p. 13). Nearly twenty years later, in 1996, Lin (2002) obtained 35 responses out of 45 from the Deans or Department Heads contacted, yielding a 77.8% response rate. The response rate for this study was significantly lower, at 31%. Of the 58 Deans, Department Heads, or Program Chairs contacted, 18 completed and returned the questionnaire.⁵ Four factors may account for this lower response rate.

First, the current questionnaire was longer than both Towler and Lin’s original questionnaires. Its scope and purpose was expanded to include questions addressing Education for Sustainable Development. These additional questions and the introduction of this new element may have deterred potential respondents. Second, both Towler and Lin sent questionnaires by post while this questionnaire was sent via e-mail. E-mail was chosen so that respondents could complete and return the questionnaire more easily. The intention was to acknowledge that, in the past fifteen years, the majority of correspondence in Canada’s academic community has shifted from paper-based to electronic. Nonetheless, it may be that this decision negatively impacted the response rate.

Third, it is possible that Deans, Department Heads, and other Faculty members at Teacher Education institutions are under pressure to accomplish more work in less time now than previously. Anecdotal evidence suggests that time is a significant

⁵ In the case of one institution, four different people chose to respond separately to the questionnaire. Their four responses were aggregated so that their institution is only accounted for once in this study.

constraint. For example, one Associate Dean who chose not to complete the questionnaire responded as follows: “In the last month alone, I have been asked to send out research surveys to faculty members or BEd students from at least 6 people working on their theses from universities other than [this one]. I have been told that people are disregarding some of these surveys because it is too much to do on top of our other responsibilities. It is a dilemma. We want to help but when we get so many of them, something has to give.”

Furthermore, the majority of questionnaire respondents ranked ‘lack of time’ as the most significant constraint to their implementation of Environmental Education. It may therefore be reasonably speculated that those who did not respond to a questionnaire on this topic likely face at least the same level of constraint. Furthermore, a non-response may indicate not only time constraints, but a generally low interest in, and attention to, EE. The next Chapter addresses this challenge in greater depth.

Finally, the fact that the study was conducted by a student, rather than by an official body or a faculty researcher may have negatively impacted response rates, particularly in light of the time constraints facing Education departments. This possibility suggests the need for more formal, large-scale, funded study on this topic, a recommendation taken up in Chapter 5, Discussion.

A survey of academic research in the United States (Sheehan, 2001) revealed that the average response rate obtained for e-mail-based surveys from 1985-2000 was 37 percent. Furthermore, the study found that the average response rate for e-mail based surveys appears to have been steadily decreasing over time. A more recent study

by Cychota and Harrison (2006) focused on the response rates of surveys that target people in top management positions. The authors found that the average overall response rate from 1992 to 2003 was 28 percent and that, again, that rate has been steadily declining over time. Although lower than responses obtained by Towler or Lin, the 31 percent response rate obtained in the current study appears to be comparable with the average response rate for e-mail based surveys and to be slightly higher than that for surveys targeting people in top-level positions.

Chapter 4: Data

Introduction

Although the response rate to the questionnaire was low, the responses still provide a useful point of departure for assessing the current level of integration of EE in Canadian pre-service teacher education. This chapter describes the results obtained through the administration of the questionnaire and compares these findings with those from the two similar questionnaires administered previously on this topic in Canada – Towler’s 1978-79 study, and Lin’s 1996 study.

As outlined in the previous chapter, the current questionnaire was designed to generate data comparable with Towler and Lin’s findings. Although it added some new questions – particularly on ESD – it asked the same questions as both Towler and Lin asked, and used similar or identical wording. Interpreting the current data revealed that comparability over time came at some cost, as the wording of some questions was misunderstood by respondents, making responses difficult to interpret. Chapter 5, Discussion, picks up on this trade-off between comparability with previous studies and clarity, and suggests some ways in which a future questionnaire could be redesigned to address this challenge.

The results outlined in this chapter are further contextualized and interpreted in light of the relevant literature in the following chapter. The questionnaire also yielded information of a nature that is not available in the literature. Respondent comments about program priorities and the relative importance of EE, key challenges in implementing EE in pre-service teacher education institutions, their perceptions of

changes over time, and appropriate policy approaches moving forward combine to create a portrait of the range of opinions and concerns of pre-service teacher educators regarding EE in this country.

For the sake of simplicity, all references to the questionnaire throughout this chapter, as is the case throughout this report, employ the numbering system employed in the second (and final) version of the questionnaire distributed (Appendix II.)

Types of Environmental Education in Pre-Service Teacher Education Programs

Section 4 of the questionnaire asked about the ways in which institutions addressed EE with pre-service teachers. Question 15 asked respondents whether their respective teacher education program offered a course in the methods of teaching EE, and if so, what the emphasis of the course was. Question 16 asked whether the program offered a form of specialization in EE, such as a major, a minor, or a study stream. With slight modifications, these two questions were drawn directly from Towler (1980-81) and Lin (2002)'s questionnaires.

Question 17 asked what other ways the program addressed EE, such as optional courses or personal projects. This question, not present in the previous studies, was added to round out the picture of how EE is implemented in pre-service teacher education programs. Question 31 in Section 7 complements these questions by asking about plans for future implementation of EE in the respondent's program. Taken together, the responses to these four questions paint an overall picture of the ways in which EE is being integrated in Canada's teacher education programs and enable us to anticipate the future.

Specialization in Environmental Education

Internet research revealed that five of Canada's 58 teacher education institutions currently offer pre-service teachers an opportunity to specialize in EE through a minor or concentration. This represents 11.6% of Canada's teacher education institutions. Of the five institutions that offer such a specialization, three responded to the questionnaire administered by this study. Subsequent follow-up e-mails and phone calls specifically targeting the two outstanding institutions were not fruitful.

Of the three respondents indicating such a specialization, one reported offering a Minor in EE, one a degree in Outdoor Ecological Experiential Education, and one a minor in Outdoor Education. At the time of Lin's 1996 study, ten of the institutions (28.6% of respondents) indicated offering prospective teachers a sequence of courses leading to "a form of specialization" in EE. Lin does not distinguish in her reporting between the various forms of specialization, which may be interpreted quite broadly. The vagueness of Lin's reporting here likely accounts for the discrepancy between hers and current findings, as the current questionnaire solicited further details. This explanation is certainly more likely than the alternative – that fewer institutions offer such a specialization than did so in 1996.

Environmental Education Methods Courses

Nine respondents (44 percent) in the current study indicated that their institution offers a course on EE methods. It is possible that this number is somewhat inflated relative to the entire population of pre-service teacher education institutions in Canada, given that those offering such a course may have been more likely to respond

to the questionnaire. Furthermore, three of the respondents indicated that the methodology course offered was in fact part of a broader course, and not a separate EE methods course. Therefore, only six (or one third of) respondents offer separate methods courses relating specifically to EE. These results are consistent with earlier studies, as illustrated by the following table.

Table 3: Percentage of Institutions Offering a Methods Course on EE			
	1978-79 Study (Towler)	1996 Study (Lin)	2009 (Current Study)
Institutions offering a separate EE methods course	43	34.3	33
Institutions addressing EE as part of a broader course		17.15	17

Towler’s study determined that 43% of the institutions offered a course in the methods of EE in the 1977-78 academic year. However, Towler’s study did not distinguish between EE methods *offered as a separate course* and EE *addressed as part of another course*. Towler notes of his results that “as low as these figures are, there is reason to believe that they are somewhat inflated since some of the courses described as EE were more properly science, social studies, or outdoor education and did not pertain specifically to EE” (Towler 1980-81, p. 13.)

In 1996, modifications to Towler’s questionnaire allowed Lin to distinguish between these two groups (Lin, 2002, p. 203) and to determine that only 34.3 percent of institutions offered a separate course on EE methods, while an additional 17 percent included EE methods as part of another course. The current questionnaire made this

distinction as well, and obtained results virtually identical to Lin's. These results suggest that there has been no increase in the number of Canadian teacher education institutions that offer prospective teachers a course in the methods of EE since Towler's 1978-79 study.

Other Courses that Address Environmental Issues with Pre-Service Teachers

In addition to determining how many methods courses were offered, this study aimed to ascertain the other ways in which Canadian teacher education programs address environmental issues or ecological concerns with pre-service teachers, including other mandatory and optional courses with environmental or ecological content and other elements of learning such as individual projects and student-teacher practica.

To this end, Question 17 listed potential ways in which environmental topics might be addressed (mandatory courses, optional courses, individual projects, and practica) and asked respondents to identify all the ways that applied to their institution. Question 18 asked respondents whether there were other ways in which their program equipped emerging teachers to address environmental issues and to teach about these issues. Table 4, below, summarizes the optional and mandatory courses that address environmental issues or ecological concerns with pre-service teachers.

Table 4: Optional and mandatory courses addressing environmental issues			
	Institutions that address EE through an optional course	Institutions that do not address EE through an optional course	Total:
Institutions that address EE as a unit in a mandatory course	4	1	5
Institutions that do not address EE through a mandatory course	7	6	13
Total:	11	7	18

Five institutions (28 percent) reported that one of their mandatory courses addresses EE or ecological concerns. Three of these five institutions explicitly indicated that this mandatory course addresses EE as a unit within a course, and that EE or environmental concerns are not the focus of the course. Internet research revealed this to be the case for the fourth and fifth institutions as well. Therefore, no respondents' institutions offer prospective teachers a mandatory course that *focuses on* environmental issues or ecological concerns.

However, 11 respondents indicated that their institution offers an optional course that addressed EE or ecological concerns. Again, it is important to note that these courses were not necessarily focused on environmental issues. Respondents often clarified that environmental issues were addressed *as a unit* within courses. For example, respondents representing universities from Ontario specified that their provincial social studies curriculum includes environment and sustainability as core topics, and that environmental issues are therefore addressed as part of social studies teacher education courses. Respondents indicated that the following core or optional courses offered to pre-service teachers by their institutions addressed environmental or ecological issues in some way:

- Science (2 respondents);
- Physical education (1 respondent);
- Social Studies Methods courses (3 respondents);
- The "Canadian Values" section of a Foundations of Education course (1 respondent); and
- A course on indigenous peoples that considers the role of Traditional Ecological Knowledge in their society (1 respondent.)

Of the 11 respondents who indicated that their institution offers an optional course that addressed EE or ecological concerns, four (22 percent) had also indicated addressing EE as part of a mandatory course. The remaining seven respondents (39 percent) indicated that their institution addresses environmental issues through an optional course but does not do so through a mandatory course. One respondent (six percent) indicated his/her institution offered a mandatory course in EE but no optional course. In total then, 12 institutions (67 percent) were reported to offer either a mandatory or an optional course that addresses environmental issues in some way. Six respondents (33 percent) reported that their institution offers neither an optional nor a mandatory course addressing environmental issues.

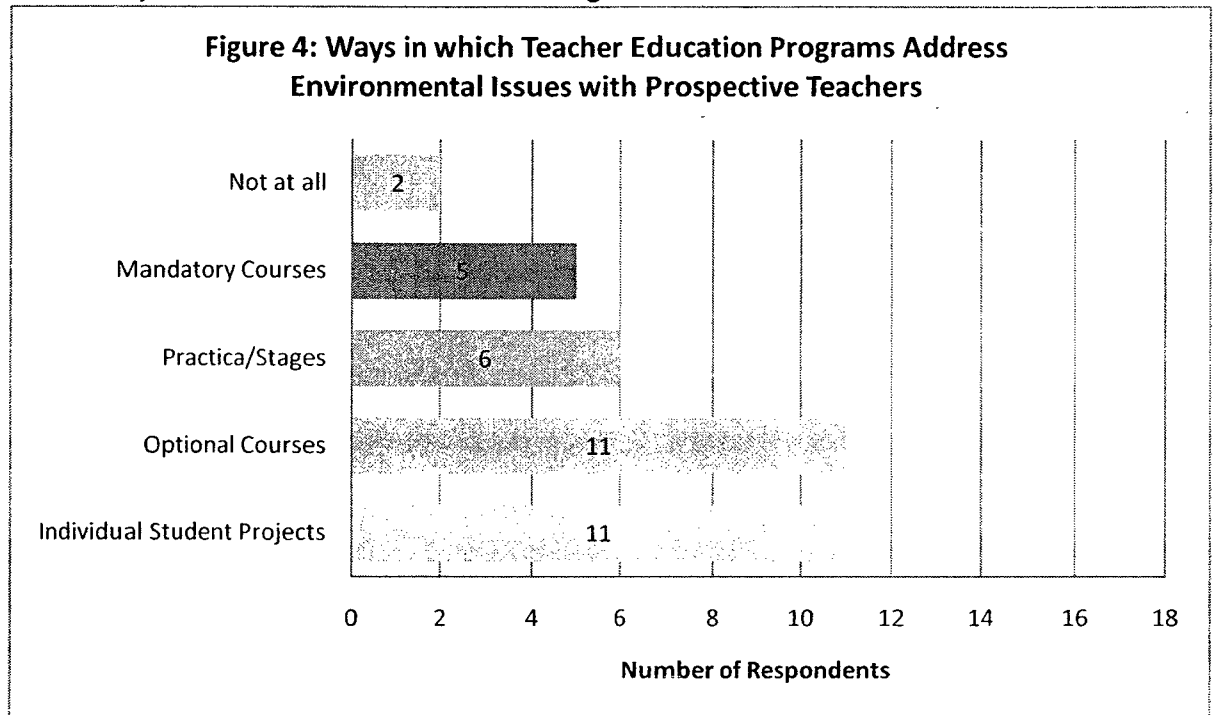
Future Courses that Address Environmental Issues

In response to Question 31 about plans to integrate an EE course in the future, only two respondents indicated that they anticipated the development of such a course in the near future. In contrast, 16 respondents indicated that no new EE courses are likely to be developed at their institution in the foreseeable future. Seven of these 16 respondents indicated that their institution already offers a methods course that addresses EE, either through an optional (three respondents) or a mandatory (four respondents) course.

Of the two respondents who indicated that a new course would be offered, one had also indicated that there were currently no mandatory or optional EE courses offered at their institution, but the other had indicated that an optional EE course was already offered at their institution. Therefore, we may assume that one additional

institution is likely to offer at least one course addressing EE in the near future, bringing the total number of institutions offering either a mandatory or an optional course that addresses environmental issues from 12 to 13 (representing an increase from 67 percent to 72 percent of respondents).

Other Ways in which Teacher Education Programs Address Environmental Issues



As indicated by Figure 4, above, the majority of opportunities for pre-service teachers to learn about environmental issues occur through optional courses and individual student projects (each indicated by 11 respondents, or 61 percent). Furthermore, six respondents (33 percent) indicated that their institution supports internships or practica that address environmental issues or ecological concerns. In response to Question 18, soliciting what other ways institutions addressed environmental issues with pre-service teachers (and asking them to identify *all* the ways that applied to their institution), respondents reported that their programs did so by

encouraging students to become involved in environmental challenges on campus and through guest lectures by visiting speakers (1 respondent each).

In total, sixteen respondents (89 percent) indicated that their institution addresses environmental issues in at least one of these ways (mandatory course(s), optional course(s), practica, individual student projects, campus initiatives, and guest lectures) while two respondents (11 percent) indicated that their teacher education program does not address environmental issues with pre-service teachers in any way whatsoever.

Because data on the wide range of possible ways of addressing EE in student teacher programs were not explicitly solicited by either Towler (1980-81) or Lin (2002), results from Questions 17 and 18 cannot be compared against previous studies. However, these findings suggest that pre-service teachers who are interested in learning about EE today have at least some opportunities to do so as part of most teacher education programs. However, because most of these opportunities are optional, the vast majority of pre-service teachers are still unlikely to be exposed to environmental issues or EE as part of their teacher education course unless they seek this learning out. This finding suggests that EE is still a 'special interest' topic rather than an essential element of pre-service teacher education.

Even when environmental issues are addressed in a mandatory courses (five institutions, or 28 percent), this is done as a unit in a course rather than as a course unto itself. In sum then, responses about the degree to which environmental issues and EE methods are integrated into teacher education programs indicate that EE is no more a

priority area for Canadian teacher education institutions today than it was at the time of Towler's 1978-79 study or Lin's 1996 study.

Methodological Approaches Employed to Address Environmental Education

Question 15 asked those respondents who had reported that their institutions offered a methods course that addressed EE (nine respondents) to rate each item on a list of methodological approaches that might be employed to convey EE course material. The purpose of this question was to determine what methods are primarily employed to address EE with pre-service teachers. Using a scale in which 1 = "continually" and 4= "never", the average responses for each methodological approach are indicated in Table 5, below.

Table 5: Frequency of Methods Used to Convey Environmental Concepts to Pre-Service Teachers	
<i>Methodological Approach</i>	<i>Average Rating</i>
Ecology	1.4
Sociology	1.6
Conservation	1.6
Outdoor Education	1.7
Political Science	1.8
Global Issues	1.8
Biology	1.8
Economics	1.9
Geography	2.0

At the time of Towler's study, EE courses were reported to employ primarily ecological, outdoor education, and biological methods (Towler 1980-81, p. 13). Lin reported over two decades later that conservation education, which was ranked fifth in Towler's study, had moved up to second rank (2002, p. 204). In the current study, conservation education received the second highest rating, after ecological methods,

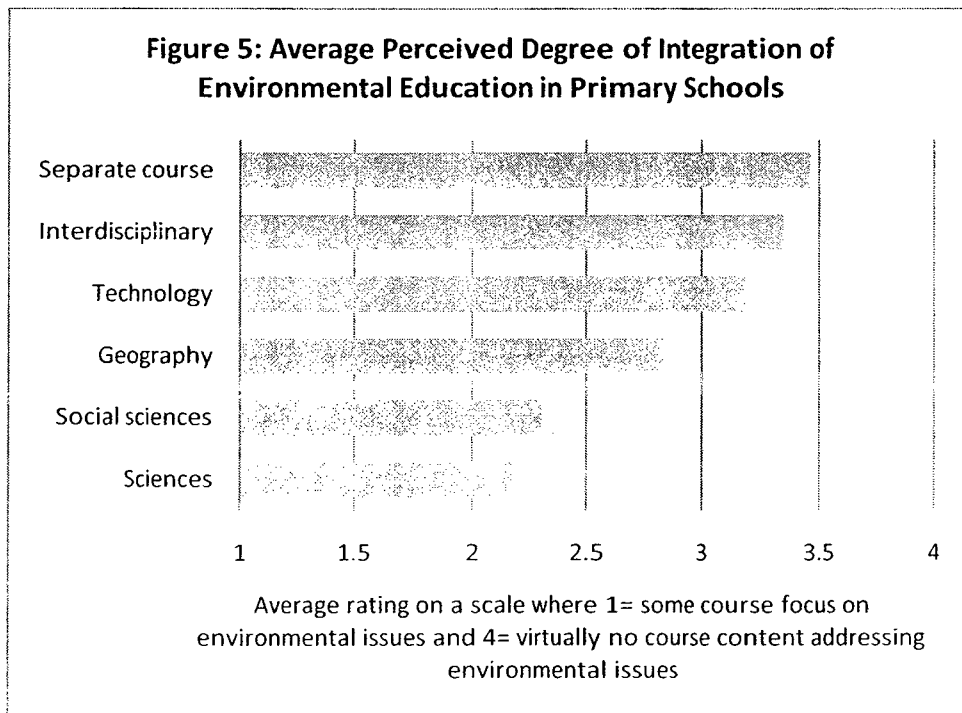
suggesting that conservation education has indeed emerged as a methodological focus for EE courses in recent years. Respondents also indicated employing additional teaching methods not listed on the questionnaire to convey EE to prospective teachers. These included arts, history, psychology, philosophy, ethics, and social justice (1 respondent respectively.)

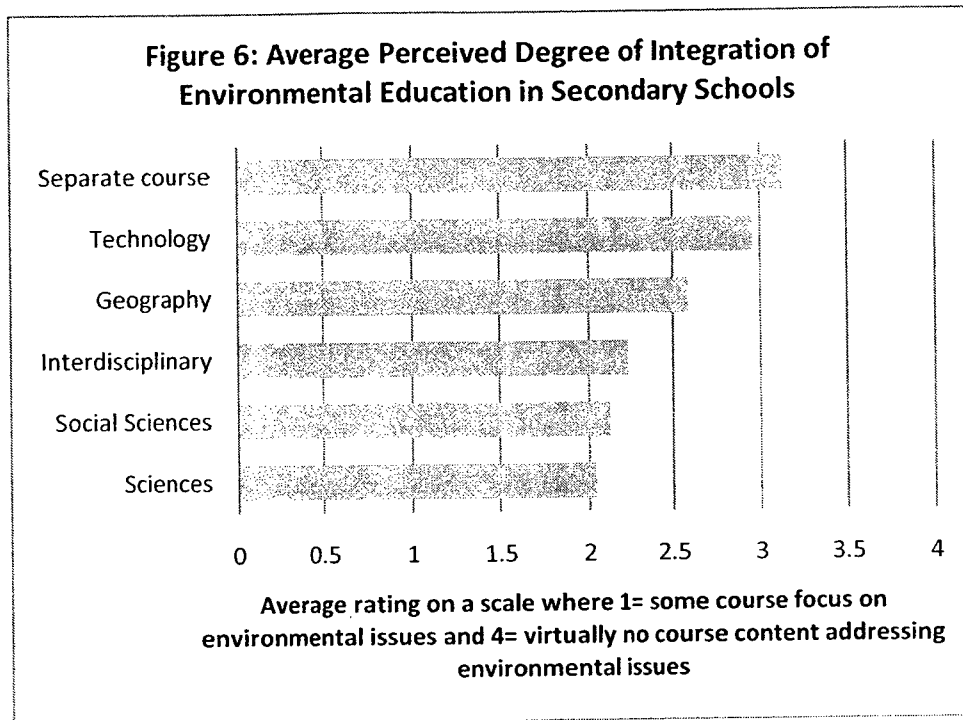
Overall, variation between responses to this question was minor. On a scale where 1= “continually” and 4= “never”, the average rating for the highest-rated methodological approach, ecological, was 1.4, while the average rating for the lowest-rated approach, geographic, was 2, a difference of less than one point on the scale. It can therefore be said that no one methodological approach for conveying environmental concepts to prospective teachers stands out and that all methods proposed are employed occasionally to frequently. This finding suggests a continued evolution away from a strict concern with the biogeophysical environment toward a more inclusive concern with sustainable development.

In light of the relatively low number of EE methods courses offered, the findings on the wide range of ways in which pre-service teachers may learn about environmental issues suggests a challenging imbalance. As at the time of Towler’s study, more prospective teachers today appear to be schooled in ecological content than in the strategies and techniques for assisting students to achieve the goals of EE (i.e. in EE methods) (Towler, 1980-81, p.15.)

Integration of EE into K-12 Schools

Because the content of mandated curriculum at the primary and secondary levels shapes the content of teacher education programs, this study aimed to gauge to what extent EE is included in mainstream education curriculum as well as to determine what courses it is typically integrated into. To this end, Question 20 asked respondents to assess the extent to which EE is incorporated into four elementary and secondary school subject areas: Sciences, Social sciences, Technology, and Geography for primary and secondary schools using a scale where 1 = 'a course focus on environmental education' and 4= 'virtually no course content addressing environmental issues.'





As indicated by Figures 5 and 6 (above) respectively, the average rating for all respondents for all four subject areas was 2.5 for primary schools and 2.4 for secondary schools. On average, respondents indicate that primary and secondary schools in Canada incorporate EE into schooling, but not to a great extent. At the primary and secondary levels, Science was rated as having only slightly more environmental content than other subject areas (2.1 for primary school and 1.9 for secondary school, only slightly above average in both cases.) This contrasts with Towler (1980-81) and Lin's (2002) findings that Science was rated by a wide margin to be the subject area with the greatest incorporation of EE. This finding further evidences the trend that EE today employs a wider range of methodologies. This is somewhat encouraging, for, as Hart (2002) points out, if we are to truly foster environmental sustainability, we must go "far beyond the simple addition of environmental science units to a science curriculum" (p. 1243).

The only significant difference between responses relating to primary and secondary courses concerned the integration of EE into interdisciplinary courses. At the primary level, these were rated on average at 3.3 on the scale from 1 of 4 (where a high rating indicates a low integration of EE.) At the secondary level, integration of EE in interdisciplinary courses was rated at 2.2 out of 4, meaning that secondary schools are more likely to offer an interdisciplinary course that addresses EE than are primary schools. This finding may be explained by the fact that there are generally more interdisciplinary courses offered at the secondary level than at the primary level, and that there is often more freedom at the secondary level for students to pursue a wider range of research topics of their own choosing.

At both levels, integration of EE was reported to be least integrated through a separate course. This category received average ratings of 3.5 and 3.1 out of 4 for primary and secondary schools respectively (again, on a scale where a high rating indicates a low level of integration.) These findings, coupled with the other data generated by Question 20, indicate that EE is not deeply integrated into mainstream Canadian education, and that this is equally true of both the primary and the secondary levels.

Priorities and Objectives of Pre-Service Teacher Education Programs

To further contextualize the findings about the ways in which EE is integrated into teacher education programs, several questions aimed to gauge the priorities and objectives of pre-service teacher education programs. These questions asked respondents to assess the success with which their program prepares teachers for EE, to

assess the extent to which EE is an institutional priority, and to identify the objectives of the program.

Program Assessments

Question 19 asked respondents to assess how well their institutions were enabling students to explore environmental issues and equipping them to teach about those issues. Only one respondent indicated offering prospective teachers a ‘very strong preparation.’ Nine respondents indicated offering a ‘somewhat strong preparation’ while four indicated offering a ‘somewhat weak’ preparation and two a ‘very weak’ preparation. Finally, two respondents abstained from responding to this question. Table 6 summarizes these findings.

Table 6: Respondents' Assessment of how well their Respective Programs Prepare Teachers for Environmental Education	
Very Strong Preparation	1
Somewhat Strong Preparation	9
Somewhat Weak Preparation	4
Very Weak Preparation	2
Abstained	2
Total	18

In Table 7, the various ways in which EE may be integrated into teacher education programs were ranked from most integrated (‘Specialization in EE’) to least integrated (‘Not at all’)⁶. Respondents’ ratings of their respective institutions were then compared with the highest level of integration of EE within each one those institutions.

⁶ Although many respondents selected more than one way in which their institution integrates EE, only the highest ranking of these is depicted in this Table. This simplification allows for a better comparison.

The table depicts the wide range of respondents' assessments of their respective institutions.

Table 7: Relationship Between Rating of their Institutions' Preparation of Teachers to Teach about Environmental Issues and Rating of Importance of Environmental Education

<i>Rating of Institution:</i>	<i>Very Strong</i>	<i>Somewhat Strong</i>	<i>Somewhat Weak</i>	<i>Very Weak</i>
Way in which EE is integrated:				
Specialization	X	XX		
Part of a mandatory course		XXX	X	
Optional course		XX	XX	X
Student projects, practica/ stages		XX	X	
Not at all			X	

For instance, institutions rated as 'somewhat strong', the second highest rating, range from those offering a specialization in EE to those that do not offer even an optional course. Those rated as 'somewhat weak' range from those offering a mandatory course that addresses EE to those offering absolutely no EE. Furthermore, the respondent who indicated that his/her institution provided a 'very strong preparation' in EE also indicated that EE was not included as part of any mandatory course offered, although it did offer a specialization in EE.

In light of the tremendous potential for course content and field work related to EE, it appears that many respondents overestimate the degree to which they are currently preparing emerging teachers to address environmental issues. In comparison, a few respondents appear to have underestimated their effectiveness relative to the majority of respondents. One respondent who ranked his/her institution as 'very weak' also indicated offering students an optional course in EE. More interestingly, two of the three institutions offering a major, minor, or specialization in EE (and thus the

'strongest' of respondents) rated themselves as 'somewhat strong' rather than as 'very strong.'

In sum, there does not appear to be a close correlation between respondents' ranking of their institutions' overall performance and their institutions' actual performance in this area according to the variables measured in this study. This wide range of institutional ratings suggests that respondents' assessment of their program's overall performance is not a good indicator of program effectiveness. Furthermore, it points to values hidden within the question itself. Responses to a question about how well an institution prepares teachers to engage in EE will inevitably depend at least in part on how important the respondent considers EE to be and what baseline of preparedness he or she consequently deems appropriate. In other words, a respondent who places little value on teaching about sustainability may rate his or her institution highly, while a respondent who is very concerned about sustainability may rate his or her institution poorly relative to how much the institution could be doing.

The Perceived Importance of Environmental Education

To further gauge the importance of EE for teacher education institutions, Question 12 addressed the overall importance of EE to the institution. Respondents were asked whether EE for prospective teachers was considered to be a top priority topic, a very important topic, a somewhat important topic, or not at all an important topic. Only two respondents indicated that their institution considers EE to be a 'top priority.' Six respondents indicated that this topic was 'very important,' nine that it is 'somewhat important' and one that it was 'not at all important' to their institution. As

depicted by Table 8, responses to Question 12 correlated positively with responses to Question 19, in which respondents were asked to rate their institution’s overall preparation of teachers for EE.

Table 8: Relationship Between Ways in which EE is Integrated into Teacher Education and Respondents’ Rating of their Institutions’ Preparation of Teachers to Teach about Environmental Issues

<i>Rating of Institution:</i>	<i>Very Strong</i>	<i>Somewhat Strong</i>	<i>Somewhat Weak</i>	<i>Very Weak</i>
Importance of EE:				
Top priority	X	XXX		
Very important		XXX	X	
Somewhat important		XXX	XXX	X
Not at all important			X	

Of the nine responses rating their programs’ success in this area as ‘somewhat strong’ (the second to highest rating), seven also rated EE as ‘very important’ (also the second to highest rating for this question) to their institution. One respondent indicated valuing EE less than he/she ranked preparing teachers to deliver it, while three institutions indicated valuing EE more highly than they ranked their institutions’ current delivery of it. In general though, we see that respondents’ opinion of their institutions’ performance in this area is closely aligned with how much they believe their institution prioritizes it.

It is worth recalling that Question 19 did not ask respondents to address *their own personal opinion* about the importance of EE, but rather solicited their assessment of the importance of environmental issues *to their teacher education program*. One might speculate that respondents’ own opinions about the importance of this issue would be higher than that of their institutions, given the respondents were often those within the institution most interested in EE. Thus, there might be a negative correlation

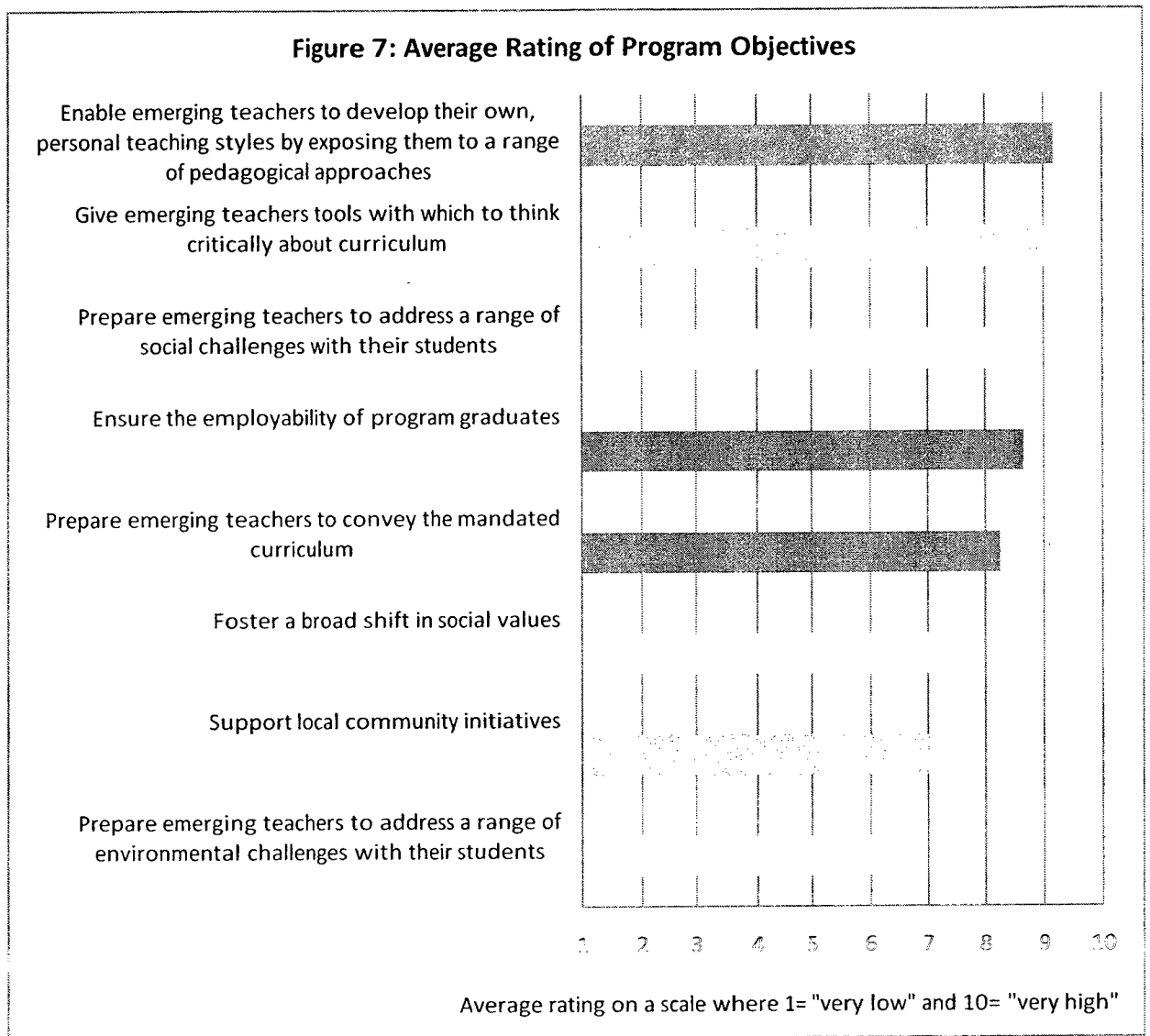
between their responses to such a question and their responses to Question 19, in which they were asked to rate the success of their institution at delivering EE content. In other words, a stronger personal belief in the importance of addressing EE in teacher education programs might correspond with a harsher assessment of the success of those programs.

Objectives of Teacher Education Programs

To further gauge the importance of EE for teacher education institutions, Question 14 addressed the overall importance of EE to the institution relative to a set of other potential objectives. In Question 14, respondents were asked to rate a set of objectives based on how they perceived them to pertain to their institution's pre-service teacher education program. The objectives reflect a range of philosophical approaches to education as seen in the literature. These include:

1. a pragmatic approach: 'to prepare emerging teachers to convey the mandated curriculum' and 'to ensure the employability of program graduates';
2. a focus on teaching styles: 'to enable emerging teachers to develop their own, personal teaching styles by exposing them to a range of pedagogical approaches';
3. a critical pedagogy perspective: 'to give emerging teachers tools with which to think critically about curriculum';
4. a socially transformative approach: 'to prepare emerging teachers to address a range of social {or environmental} challenges with their students' and 'to foster a broad shift in social values'; and

5. a community-based education model: 'to support local community-based initiatives.'

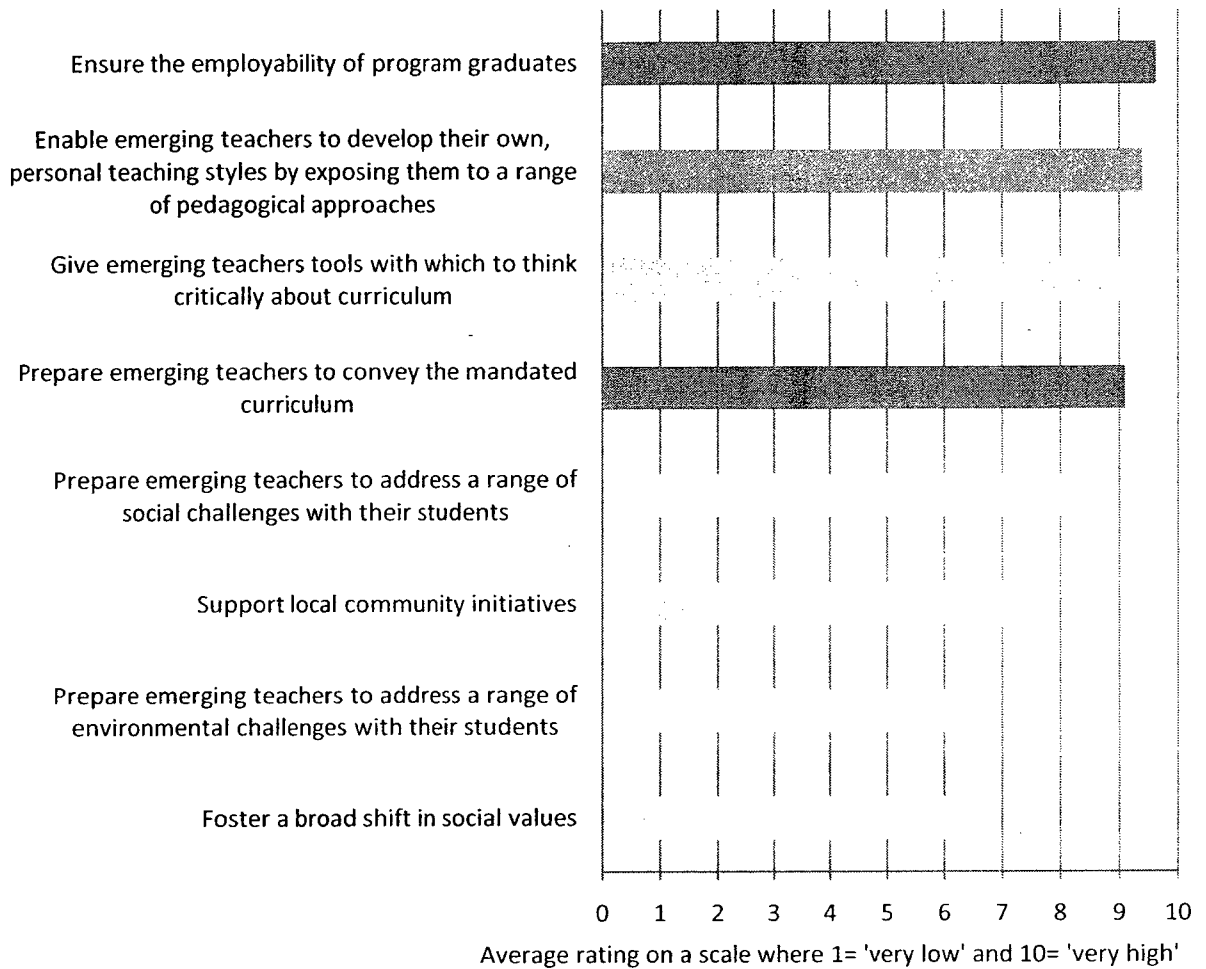


In Figures 7, 8 and 9, dark grey bar lines represent pragmatic objectives and lighter shades of grey represent socially transformative objectives. As Figure 7, above, illustrates, the respondents on average rated those objectives related to social transformation and community engagement less highly than more pragmatic objectives. On average though, all objectives proposed in the question – even the most socially

transformative – were rated at 6.9 or greater on a scale where 1 is ‘very low’ and 10 is ‘very high’ priority. In other words, teacher education institutions hold a wide range of goals. This suggests that these institutions see themselves not merely as training institutes, but as places of learning through which pre-service teachers can learn to make a positive contribution to their society.

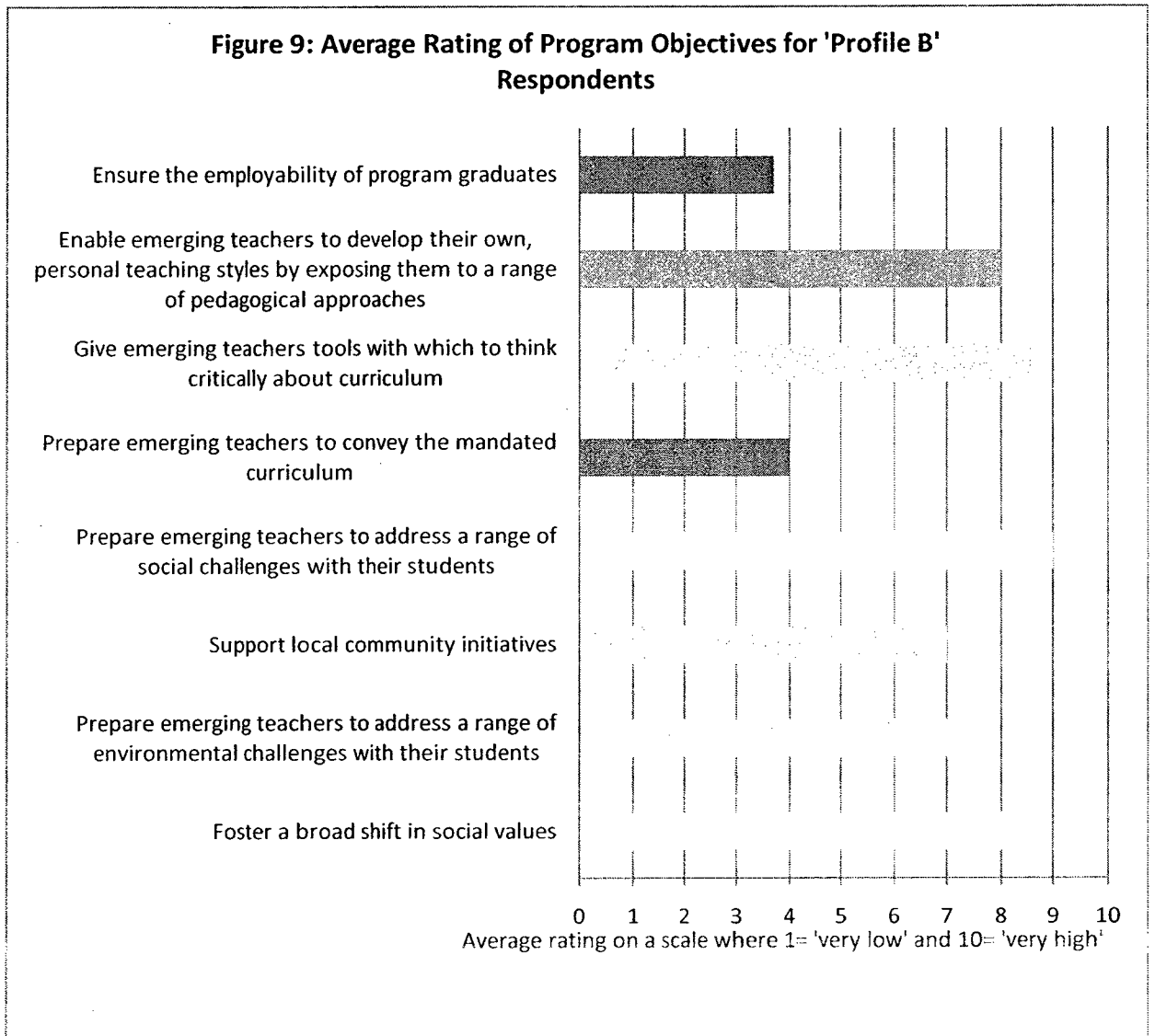
The average responses to Question 14 may be further distilled. Of the 18 respondents to this question, 15 were in close alignment with one another in terms of priorities identified, while the remaining three respondents demonstrated a distinctly different set of objectives. The majority of respondents, identified as ‘Profile A’ respondents in Figure 8 favour a more pragmatic approach. Within this sub-group, ensuring the employability of program graduates received a ranking of 10 by all but three respondents, for an average rating of 9.6. The importance of fostering a broad shift in social values received an average rating of 6.7, the lowest average ranking, while that of supporting local community initiatives received an average ranking of 7.1. The goal of preparing emerging teachers to address environmental challenges was rated by this group, on average, at 6.8. Preparing teachers to address a range of environmental challenges with their students was rated at 7.7 by this group, though one respondent rated this objective as low as ‘2.’

Figure 8: Average Rating of Program Objectives for 'Profile A' Respondents



Three respondents, identified as 'Profile B' respondents in Figure 9, indicated priorities that contrast sharply with 'Profile A' respondents. In this figure, the potential priorities of teacher education programs are listed in the order of priority for 'Profile A' respondents in order to facilitate comparison. Profile B respondents, on average, rated the pragmatic objectives of ensuring the employability of program graduates and preparing teachers to convey the mandated curriculum quite low, at 3.7 and 4.0, respectively. Among these three respondents, the highest priority was to prepare

teachers to address social challenges (9.0), followed closely by fostering a broad shift in social values and helping teachers to think critically about curriculum (each rated at 8.7).



While 'Profile A' respondents did not volunteer additional program priorities, 'Profile B' respondents also identified the following additional program priorities for their respective institutions:

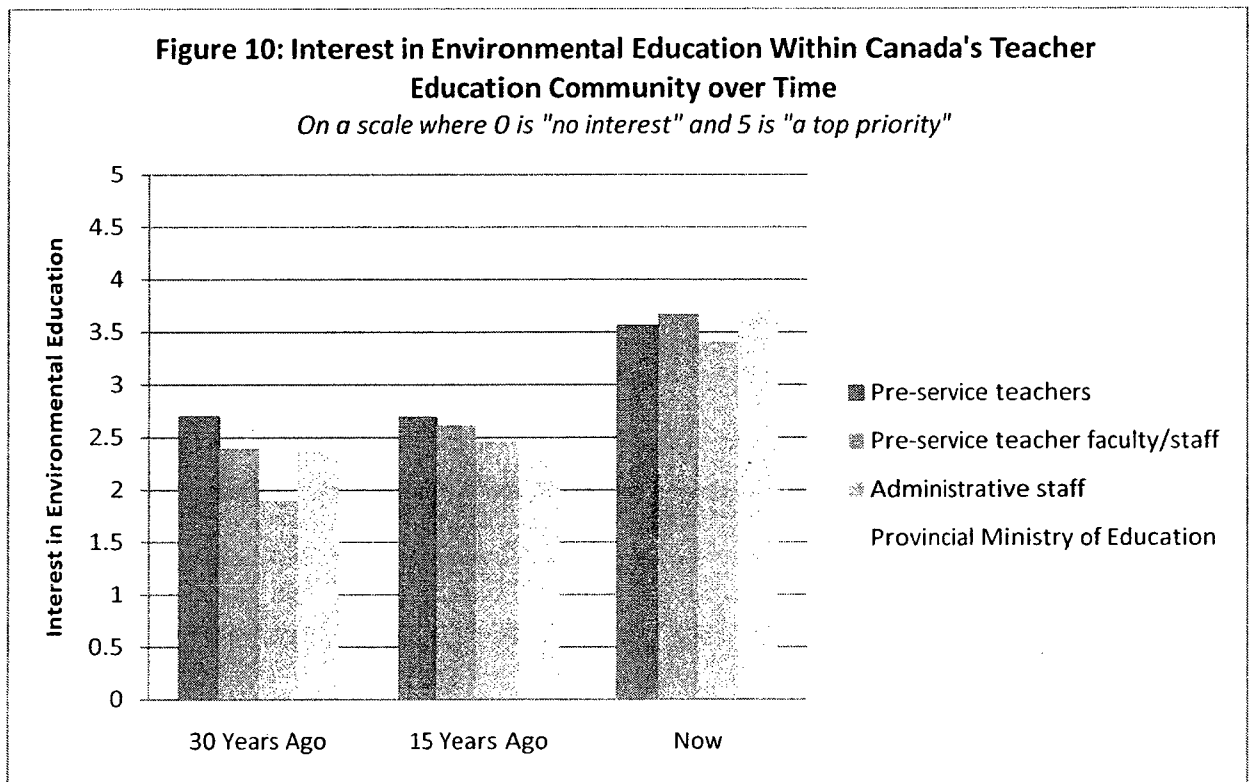
- Fostering equity for aboriginal peoples;
- Demonstrating sustainable design; and

- Developing awareness of career goals not necessarily associated with university for adolescents.

This very small sub-group of respondents ranked 'preparing teachers to address a range of environmental challenges with their students' at 7.7 out of ten, only slightly higher than the average rating of this objective by 'Profile A' respondents. The objective of 'preparing teachers to address a range of environmental challenges with their students' was ranked on average approximately one point lower than the objective of 'preparing teachers to address a range of social challenges with their students' by both Profile A and B respondents. This relative rating may suggest that EE is seen as *an aspect of*, rather than *less significant than* the goal of addressing social challenges. It also indicates that even amongst those few teacher education institutions that prioritize social transformation and community engagement, EE is not considered to be a top priority.

Interest in Environmental Education over Time

In Question 20, respondents were asked to gauge the level of interest in EE 30 years ago, 15 years ago, and today for four groups of constituents: pre-service teachers, pre-service teacher faculty/staff, department administrative staff, and provincial ministries of education. The purpose of this question was to obtain a broad indication of the relative interest in EE among these four constituencies, as well as to determine whether there has been a significant increase in interest in EE.



As Figure 10, above, indicates, respondents reported an increase in interest in EE over the past thirty years, especially in the last 15 years, for all four groups in question. On a scale of 1 to 5, the average reported increase in interest for pre-service teacher educators was approximately an entire point for all four groups (an increase of 1.07 for Ministries of Education, 1.3 for administrative staff, 0.95 for pre-service teachers, and 0.87 for pre-service teaching faculty.)

That pre-service teachers themselves should be perceived to have the highest interest is not surprising. As Beckford (2008) reports, this finding is aligned with Pandya's findings in an unpublished MA thesis from the University of Windsor that the attitude of pre-service teachers in Canada to EE instruction is generally positive, with the majority firmly believing that it is an important area to which they would like further exposure (Pandya in Beckford, 2008).

The perceived trend for the provincial Ministries of Education, the creators of provincial-level education policy, including curriculum development, is noteworthy. While the Ministries thirty years ago were estimated to have a relatively low interest on average (2.3 out of 5 compared to 2.7 for faculty members and 2.4 for pre-service teachers), their level of interest today was gauged to be on par with, and perhaps even slightly higher than, pre-service teachers and with faculty or teaching staff (3.7 compared to 3.7 and 3.6 respectively.) This finding is consistent with the rising attention paid to EE within the Canadian education policy literature. Administrative staff were rated as having only a very slightly lower degree of interest than pre-service teachers and university teaching staff and faculty members. In other words, the gap between the Ministry and Administrators has narrowed with respect to teaching staff and students.

The second part of Question 20 asked respondents to comment on any trends that they perceived. Their comments allude to the many factors influencing the levels of interest in EE and are compiled below:

- Sustainability has certainly gotten a lot of attention lately. Since curriculum is decided by the provincial government, their increasing focus has allowed this topic to increase in importance.
- Today, the students are very interested and practice sustainability. They demand it of their classroom and professors.
- Interest in the environment tends to be tied to the sense of urgency created in the media. However, those who were interested 30 years ago are still interested now and have taken on action oriented roles.

- The Harris years were the "dark ages" in Ontario.
- Little or no provincial leadership.
- The provincial government has come up with a policy document that mandates Environmental Education to be integrated in every subject. There was no such policy five years ago.

These comments suggest that a wide range of drivers contribute to (or prevent) an increasing interest in EE, including: provincial policy, media, students, and faculty members. Interestingly, there was no mention of influence from international trends such as the Decade in response to this question.

Priorities and Objectives of Pre-Service Teacher Education Institutions: Conclusion

Respondents' wide-ranging assessments of their institutions' effectiveness in preparing prospective teachers for EE likely reveals more about respondents' values than it does about the institution's actual performance. Encouragingly though, half of the respondents indicate that EE is either 'a top priority' or 'very important' to their institution – results that do correlate somewhat with their respective performance.

The overall objectives of teacher education programs were generally reported to favour a pragmatic approach, though a small minority of programs appear to take a socially transformative approach. In neither group is EE a top priority. Interest in EE is reported to have increased significantly over the past thirty years for many members of the education community – students, teaching staff, administrative staff, and provincial ministries of education. Respondents' comments on this upward trend underline that many factors combine to drive this increase in interest, including government policy,

public awareness, and the interests of students and faculty members. These optimistic results are tempered by the fact that 'preparing emerging teachers to address a range of environmental challenges' was rated as the lowest overall objective by respondents.

Faculty Backgrounds, Activities, and Knowledge

Section 5 of the questionnaire addressed the academic backgrounds of teaching staff involved in pre-service teacher education about EE. Based on the findings about the range of courses offered and methodological approaches employed to address EE with pre-service teachers, one would expect the academic preparation of faculty members currently teaching EE courses to pre-service teachers to also be quite varied.

Lin (2002) found that pre-service teacher candidates generally received their EE preparation from faculty members holding a degree in education or biology. To find out whether this had changed, Question 22 in the current questionnaire asked how many faculty members are currently involved in addressing EE, and Question 24 asked what the academic background of those faculty members was. Unfortunately, the results yielded from these two questions indicate that they may not have been clearly understood by respondents.

In over half the cases, respondents indicated more academic backgrounds (Question 24) than they indicated faculty members addressing EE (Question 23). This might indicate faculty members with multiple degrees or areas of specialization, but it appears more likely that respondents were outlining the academic background of *all* faculty members at their institution. This study therefore cannot determine whether the academic backgrounds of those teaching EE to pre-service teachers today has

broadened to include new areas of specialization since the time of Lin's study. This confusion is curious, as the question's wording was virtually identical to that used by Towler (1980-81) and by Lin (2002).

Question 27 addressed the activities in which faculty members of pre-service teacher education institutions were involved. Eight respondents, or 44 percent, reported having at least one faculty member involved in a funded EE project. The total number of faculty members participating in a funded research project on EE was reported to be fourteen. The total number of full- and part-time faculty represented by survey respondents was 835. This suggests that only 1.7 percent of all full-time faculty members at the institutions in question are engaged in funded research related to EE. Similarly, nine respondents, or half, indicated that at least one faculty member at their institution is involved in EE curriculum development for use in elementary or secondary schools. The total number of faculty members was estimated at thirteen, reflecting 1.6 percent of all full and part-time faculty members.

Towler found thirty years ago that only eight percent of respondents were involved in funded projects and that fewer than 30 percent were involved in curriculum materials design (Towler 1980-81, p. 14). At the time of Lin's study, 21.7 percent indicated such involvement. The increase since that time may be a testament not only to a rise in interest amongst academics within the education field, but also to increased government funding and support for such research. This is among the most encouraging results yielded, but it remains to be seen what impact this ongoing research will have on learning outcomes.

Knowledge of Environmental Education Projects

To assess how knowledgeable respondents were about exemplary EE projects in their geographical region, respondents were asked to identify the names of notable environmental projects and/or programs in Question 33. Five respondents, or 28 percent, were able to identify such a project or program in their geographic region. These results, when examined with previous findings, indicate that there has been little change over time. Lin found that 34.3 percent of respondents were able to answer this question (Lin 1996, p. 206), and Towler's investigation found that 20 percent could do so (Towler 1980-81, p. 15.)

As Towler points out, it would be erroneous to assume that this low number means that there are very few such projects; rather, it likely points to a lack of "attention and publicity presently being given to EE in Canada" (Towler 1980-81, p. 15.) It may also point to a lack of communication between education institutions and environmental groups and other community organizations. Finally, the low response rate may also indicate respondent fatigue, given that this was the last question on the questionnaire.

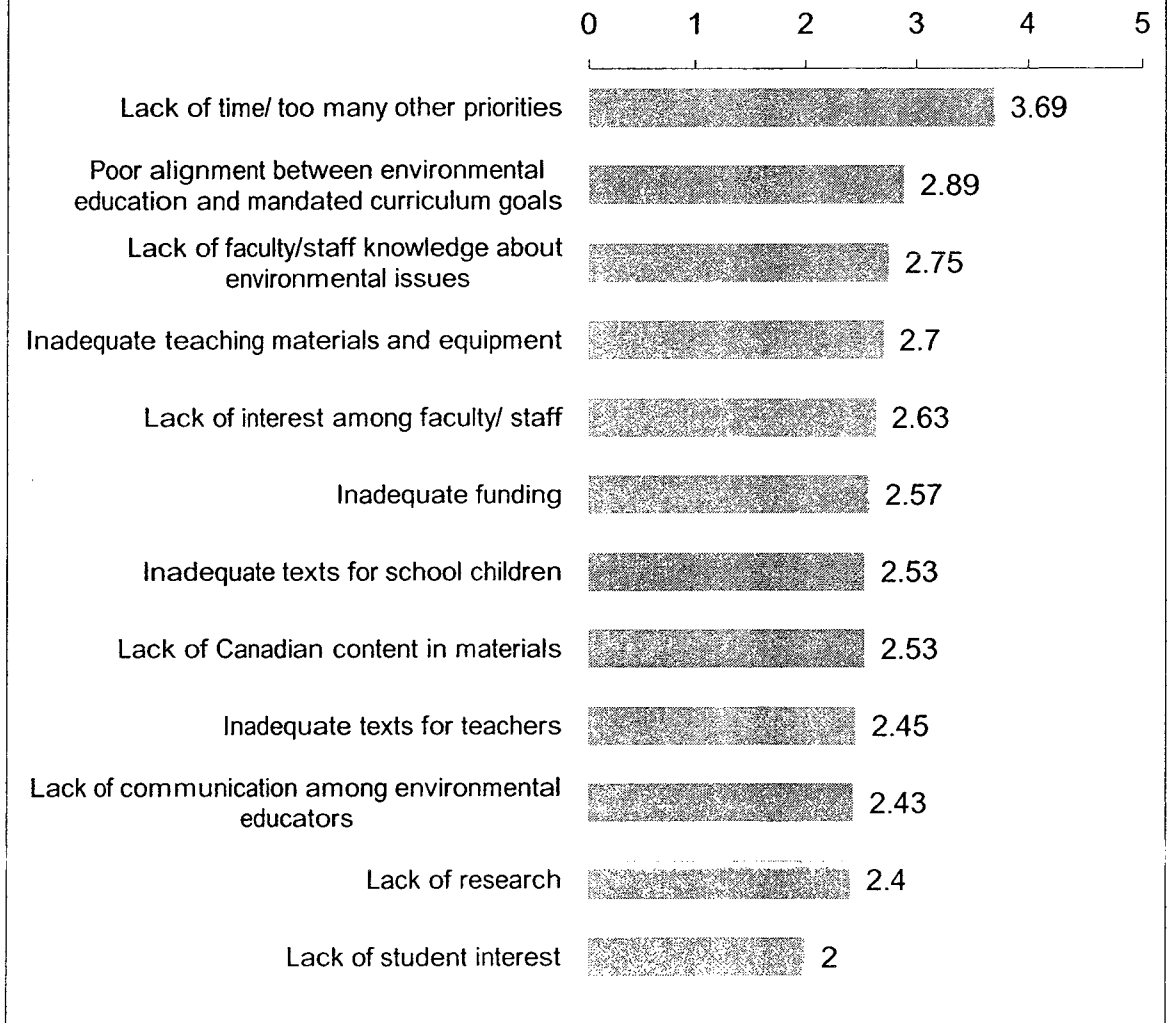
Obstacles to Teaching Environmental Education within Pre-Service Teacher Programs

Question 28 addressed impediments to integrating EE into pre-service teacher education programs. The results, depicted in Figure 11, below, indicate that the greatest obstacle was perceived to be a lack of time/ too many other priorities. On a scale where 1 signifies 'not a constraint' and 5 signifies 'a major constraint', respondents on average

rated this impediment at 3.7. That 'too many priorities' should be rated as the most significant obstacle is consistent with the findings from Question 14, addressing the priorities of pre-service teacher education institutions. Here, the average priority level for all eight objectives suggested by that question was 8.1 on a scale where 1= 'Very Low' and 10= 'Very High.' In other words, teacher education institutions were reported to have many 'high' and 'very high' priorities.

Figure 11: Average Rating of Impediments to Integrating Environmental Education into Pre-Service Teacher Education Program

on a scale where 0= not a constraint and 5= major constraint



In general, the obstacles associated with the preparation of pre-service teachers in both Towler's and Lin's studies remain obstacles in the current study. In addition to a 'lack of time/ too many other priorities', 'poor alignment between EE and mandated curriculum goals' and 'lack of funding' were also rated as significant obstacles (average

rating 2.9 and 2.6 out of 5, respectively.) Lack of student interest was rated to be the least significant obstacle in this study, with an average rating of only 2 out of 5.

At the time of Towler's study, 'lack of funding' and 'lack of communication among environmental educators' were ranked as the most serious factors to prohibiting the integration of EE into pre-service teacher education. Although these factors both ranked lower in the current study, a somewhat encouraging finding, they are still considered significant obstacles, with an average rating of 2.6 and 2.4, respectively.

As discussed above, Question 31 asked respondents whether their institution had plans to integrate a course addressing EE in the near future, and why or why not. Responses to the 'why not?' portion of this question provide further insight into the obstacles facing the integration of EE into teacher education. The responses are listed below:

- The program is currently too small.
- Too many practical and pedagogical issues that need to be addressed to make environmental issues important in the actual curriculum.
- Time constraints within program, and I see it as a component of any social studies course.
- Too many other priorities to address in the program; all we can do is whet the appetite of students and encourage them to deal with this important theme in their future classrooms.
- No room in the student schedule.

- Any new courses have a staffing component that requires extra funding. Our university, like most other universities [in the province] is in an economic crisis and funding to start a new course is not at all likely.
- Because we realize its importance globally and yet have not had the resources to do a good job of it.

The responses to Questions 28 and 31 combine to paint an overview of the obstacles to integrating EE in Canadian teacher education institutions. Responses suggest that the largest impediments are related to the institutional capacity of these programs - either program size, lack of funding, lack of time, or lack of expertise.

Impact of the Decade of Education for Sustainable Development on Canadian Pre-Service Teacher Education

Unlike the earlier studies, this study attempted to examine the extent to which UNESCO's Decade of Education for Sustainable Development (2005-2014) is impacting teacher education programs in Canada. The intention was to determine the extent to which the ESD policy changes called for at the macro-level (UNESCO) have translated into actions at the micro-level (individual teacher education programs in Canada).

Respondents' awareness of the Decade was gauged by Question 21: "*Were you aware that we are now in the United Nations' Decade of Education for Sustainable Development (2005-2014)?*" Eleven respondents (61 percent) replied affirmatively, that they were aware of the Decade, while seven (39 percent) indicated that they were not aware of it. Despite this somewhat high level of awareness of the Decade, responses to the follow-up portion of Question 21, "*If yes, in what ways, if at all, has the United*

Nation's Decade of Education for Sustainable Development influenced your program's goals or activities?" paint a less positive picture. Of the 11 respondents who indicated that they had been aware of the Decade previously, only two respondents (18 percent of those who indicated awareness of the Decade) indicated that the Decade has influenced their program's goals or activities in any way.

One respondent indicated that *"Students receive training on Education for Sustainable Development (ESD) in seminars and in curriculum and instruction courses. They are encouraged to participate in conferences and workshops dealing with ESD."* A second respondent cited *"optional seminars and workshops"* in response to this question. A third respondent indicated that although the Decade had not influenced their program's goals or activities, it did *"represent policy support for the continued expansion of Environmental Education programs"* in general.

The remaining seven respondents who indicated awareness of the Decade reported that their activities had not been impacted by the Decade. One respondent indicated that *"the College had initiated changes prior to the Decade being declared, and will likely continue after."* Five other respondents did not provide explanations for why the Decade had had no impact. Finally, one respondent articulated the opinion that the Decade *"...is based on a flawed ideology and as a result, received scant attention [and] when it comes up it is well critiqued."*

Of the seven respondents who indicated that they were not aware of the Decade, two indicated that they were unsure of its influence on their institution, while the remaining five indicated that it had no influence on their program's goals or

activities whatsoever. Overall, these results indicate that the Decade is perceived to have had very little direct impact on teacher education institutions in Canada. Its indirect role in fostering policy support for EE initiatives in Canada was acknowledged by only one respondent, suggesting that this role is either very minimal or is unacknowledged within teacher education institutions.

These findings suggest that awareness of the Decade amongst pre-service teacher education institutions is minimal, even though the Decade was already half over. Furthermore, its impact on teacher education programs is generally perceived to be very low. This finding suggests a troubling but not surprising disconnect between international education policy and Canadian teacher education programs.

Specialized Teacher Certification in Environmental Education

It is possible for a prospective teacher to major in nearly every traditional subject area, either in the process of acquiring a university degree, a teaching certification, or as part of an in-service program. The question of whether EE should become a certifiable area of specialization amongst teachers has been debated for some time (Towler 1980-81). Question 34 in the current study solicited respondents' opinions about teacher certification in the area of EE. It asked whether or not respondents were in favour of EE certification, and why.

Thirty years ago, Towler also found that Canadian educators were also fairly evenly split on this topic: 17 (53 percent) were in favour and 15 (47 percent) were against a special certification in EE. At that time, Towler noted that respondents seemed to be "miles apart in their positions, with each group emphatically stating its case" and

predicted that “it will be some time before there will be a national consensus on the importance of preparing teachers especially trained to teach EE” (1978-79, p. 14).

In the current study, seven respondents (39 percent) indicated support for EE specialization amongst teachers, and eleven (61 percent) indicated opposition to it. The rationales offered suggest that the time for national consensus on this issue has not yet come. Respondent comments are summarized in the two lists below:

Comments from Respondents in Support of Teacher Certification in Environmental Education

- I think it is critical for the future of our students.
- Important to have this credentialed and noted on transcripts.
- Would help recruit environmental activists into teaching.
- This is the only way to make significant progress.
- It is with some difficulty that we provide a program leading to OCT certification because practicum spaces are limited.
- It is crucial that we have subject specialists in this very important area.

Comments from Respondents Opposed to Teacher Certification in Environmental Education

- Everyone should do this as part of their science and social science studies teaching – don't think it should be left to the specialist.
- Science Education currently prepares Ontario teacher education students for environmental issues in an integrated manner which is consistent with the Ministry of Education's mandate to integrate EE in all subjects.

- It is not perceived as an important part of our mandate, which is to give future secondary teachers all the basic pedagogical knowledge and develop pedagogical skills they need to be efficient teachers.
- Certification is a provincial matter – elementary, secondary; possibly at second level, but there would have to be a demand for it.
- I don't favour specialized teaching certificates.
- The teacher certification in this province is not specific. Once one is certified, he or she can teach at any level, any subject.
- Stove pipe approach.
- We try to prepare well rounded teachers whose specialties in subject areas are prepared before they are selected for our program.
- Good teaching is good teaching- it is not topic specific in most domains where values and perceptions determine our "knowing". Public education is about the ability to ask good questions and seek answers to those questions, it is about understanding our world and our relationship to it, whatever they may be- it is not a topic.

The reasons listed in support of teacher certification in EE may be distilled into the following two essential arguments:

1. EE is very important and therefore worthy of certification; and
2. Certification would attract more teachers interested in environmental issues.

The reasons listed in opposition to teacher certification in EE may be distilled into the following essential arguments:

1. All pre-service teachers should learn about EE as part of an integrated approach to this topic;
2. Teachers are already learning about EE as part of existing pre-service teacher education to a sufficient extent; and
3. This topic is not important enough or there is no demand for it.

Summary of Findings

Overall, this research indicates that there has been no significant increase in the number of Canadian teacher education institutions offering prospective teachers a form of specialization in EE or a course in the methods of EE since Towler (1980-81) or Lin (2002) evaluated this question. However, this research signals that EE is currently being addressed through a wider range of courses and using a wider range of methodological approaches, both to prospective teachers across Canada and at the primary and secondary school levels. Whereas Towler and Lin both concluded that even those few teachers who were receiving training in EE were not being sufficiently prepared because they appeared to be receiving “only a narrow view of environmental education” (Lin 2002, p. 212), the current study notes a general shift away from such a narrow, biological interpretation of EE towards a broader and more social interpretation of the concept.

Today, pre-service teacher education institutions in Canada rely upon a wider range of methodological approaches to convey EE concepts to prospective teachers than previously- a trend that is echoed in primary and secondary school classrooms. However, there is no evidence that teachers are being prepared to address EE through

more appropriate EE methodologies such as community study, outdoor education, problem-based learning, and interdisciplinary learning.

Overall, these results suggest that prospective teachers in Canada who wish to become environmental educators today have opportunities to enhance their skills in this area through at least some of Canada's pre-service teacher education institutions. Despite some encouraging findings, there is little indication that a significant shift in the number of teachers receiving this preparation has taken place since the time of Towler's (1978-79) study. Most significantly, there has been little increase in the number of institutions offering a specialization in EE or a methods course on environmental topics since the studies of Towler (1980-81) or Lin (2002).

Lin concluded fourteen years ago that "environmental education continues to be a low priority in K-12 schools and teacher preparation programs [and to remain] at the fringe of most pre-service teacher training programs" (p. 212.) Unfortunately, this statement would seem to apply equally today. While some progress has been made, most prospective teachers in Canada today are still *not* being adequately prepared to engage in EE with their students, and EE is still generally regarded to be a low priority within Canadian teacher education institutions, with little projected change on the horizon.

Chapter 5: Discussion

Overview

These findings, when considered in the context of specific Canadian policy literature, contribute to an understanding of the overall direction in which Canadian pre-service teacher education has been moving – and the pace of that movement. Given the importance of this research topic, the first section of this chapter explores possibilities for future modifications to the questionnaire employed in the current study. The subsequent sections contextualize and interpret the results of the questionnaire by addressing the following two questions: (1) What are the key obstacles to the further integration of EE in teacher education programs? and (2) what policy approaches might foster further integration of EE amongst teachers?

Methodological Findings

Little has changed since Towler noted that “it is difficult to obtain a clear and comprehensive picture of Canadian efforts in environmental education due in part to the geographical distribution of the active agencies and largely because of the absence of a central authority responsible for educational matters on a national basis.” (Towler 1980-81, p. 11.) Given this challenge as well as other challenges encountered in the course of this study, a similar investigation on this topic might incorporate the following methodological modifications.

Use existing networks to solicit responses from all Teacher Education Institutions.

A comprehensive study of this scope should be conducted through a centralized institution such as the Canadian Commission for UNESCO or the Canadian Federation of

Teachers. These larger organizations have not only the resources to follow up more closely with each institution, but have the authority and status necessary to capture their attention and generate a higher response rate.

Working through these channels would also likely generate more responses directly from Program Directors and Department Deans within each Teacher Education Institution. In this study, Deans and/or Program Directors were asked to delegate the responsibility of completing the questionnaire to someone else within their department if they did not have time to complete it themselves. The result was that a range of respondents – Deans, Directors, senior faculty members, and newly hired lecturers with a particular interest in EE – were representing their institutions. This made some of their responses difficult to compare, especially those that pertained to their overall assessment of their respective programs. The responses of Program Directors and Deans would likely generate a more accurate overview of the importance of EE within each institution.

Distribute the questionnaire both electronically and by post. Both Lin and Towler distributed their questionnaires exclusively by post. The current questionnaire was distributed only electronically, on the grounds that e-mail is a more widely used and efficient means of communication today. While this remains so, a future study should contact potential respondents both by electronic and postal mail in order to increase the response rate. Further, the questionnaire should be re-designed so that can be filled out directly on-line.

Shorten and simplify the questionnaire. There are three elements of the questionnaire that could be eliminated to significantly reduce completion time. First, Section 2, Teacher Education Program Information, yielded results that could have been derived – perhaps even more accurately – from internet research on the institutions in question. This section should be eliminated from the questionnaire altogether as it contributed unnecessarily to deterring potential respondents.

Second, all mention of Education for Sustainable Development – not present on either Towler or Lin’s studies – should be eliminated, save perhaps Question 21, on the Decade and its impact. Findings generated by these questions were not ultimately useful because Education for Sustainable Development is not yet clearly or widely understood as a concept. The definition provided by the questionnaire – the definition used by UNESCO – did little but bring to light the breadth of what might be interpreted as Education for Sustainable Development. To determine the ways in which Education for Sustainable Development is being addressed requires a separate study and should not be tagged on to a study on EE, despite the interesting tension and overlap between the two concepts.

Third, Question 24, addressing the academic backgrounds of instructors, was likely quite time consuming for respondents. Several abstained from responding, possibly because of the time required to do so. Others simply wrote “I don’t know” in response to this question. For some of those who did respond, the question also generated confusion, as many respondents seem to have indicated the academic backgrounds for *all* teaching faculty at their institution, not only for those faculty

members teaching EE courses. The low response rate combined with evidence of confusion made the findings for this question unusable in the current study, and a future study should therefore either rephrase or exclude this question.

The same question – with identical wording – was employed successfully by both Lin and Towler, and allowed Lin to determine that the majority of faculty members teaching EE had been prepared in the fields of education and biology throughout the period 1979 to 1996 (Lin 2002, p. 205). Although it is not clear why the current study did not share this success, it is possible that given the modern time-crunch, respondents simply did not take the time to read the question carefully. As this challenge is unlikely to diminish, it would be wise to address the academic backgrounds of faculty through internet research rather than as part of a questionnaire.

The Comparability Trade-Off

Obviously, in a study attempting to gauge change over time, comparability with previous studies is essential. The current study encountered tension between maintaining comparability with the two previous questionnaires on this topic and ensuring clarity in the current questionnaire. In particular, Question 15, addressing the methods of teaching EE, was included in Towler's 1978-79 and Lin's 1996 studies, using almost identical language to ensure comparability. However, the question should be clarified, as it presupposes an understanding of what constitutes a 'methods' course and what constitutes an 'environmental education method.' The distinction between an 'environmental education methods' course and other courses relating to the environment that are part of the program needs to be made far more explicit.

Moreover, two other clear distinctions need to be made. First, a distinction between courses that address EE methods as *part of* their course, and courses in which environmental education methods are a *course focus*. Second, a distinction between courses that are *mandatory* and courses that are *optional* to pre-service teachers is necessary. Neither Lin nor Towler's studies addressed these important issues, and their subsequent analyses include some guesswork as a result. The current study foresaw and sought to address this ambiguity by adding question 17, asking respondents to select the ways in which each institution addresses EE at their institution. Its findings, combined with some respondents' comments, offset some of the ambiguity generated in response to Question 15.

Environmental Education in Canadian Pre-service Teacher Education

Despite the pressing need for more environmentally educated Canadians, this research indicates that pre-service teacher education programs are not adequately preparing future teachers to teach about environmental issues. This study has found that few current teacher education programs in Canada offer courses to pre-service teachers that foster the understanding and skills necessary to teach the goals of EE to school grade students, and that almost none offer any form of specialization in this topic.

Not only is this conclusion generally in keeping with the findings from previous studies in Canada (Lin 2002 and Towler 1980-81), but it echoes recent findings from the United States and Ontario. Rosalyn McKeown-Ice (2000) reported that few colleges and universities across the USA offer a major, minor, concentration, specialization, or

even a course in EE, and that few required EE experience in their coursework or field experiences. Beckford found that in Ontario, little progress has been made to infuse EE into preservice teacher education programs and that there is “little prospect of significant EE implementation” (2008, p. 57).

Recent reports and policy documents produced within Canada on this topic are also consistent with the findings from this study. For example, the Canadian Environmental Grantmakers’ Network reports that “teachers tend not to learn about environmental education during their teacher preparation courses (“pre-service” training) (CEGN 2006, p. 9). In their report to UNECE and UNESCO on Indicators of ESD in Canada, the CMEC highlights that “many teacher training institutions do not include information on ESD in teacher pre-service education.” This report goes on to characterize the limited progress in this area as follows:

“Some teacher training programs include information on issues related to sustainable development in specific courses, such as environmental education, outdoor education, or diversity and equality in the classroom.... The teachers’ exposure to the themes depends on which institution they are attending, which specialty they are following, and their individual interests” (CMEC 2007, p.35).

Addressing the Barriers to Integrating EE

In light of these somewhat discouraging findings, the following section takes up the question of the most significant barriers to the integration of EE, and suggests ways in which those obstacles might be – and are being – addressed. Fifteen years ago, Lin

concluded that the low status of EE was likely to persist unless barriers in institutional practices and organizations, barriers at the faculty level, and barriers encountered by instructors of pre-service teachers are addressed (Lin 2002, p. 212-213). This holds true today as well.

The barriers identified in this study are aligned with those reported in the literature, and include overcharged teacher education curricula, difficulty working across disciplines, lack of resources, lack of time, and lack of qualified educators (See Barrett 2007, Robottom and Kyburz-Graber 2000, and Hart 2002). Encouragingly, “lack of student interest” was rated to be the least significant obstacle in this study, with an average rating of only 2 out of 5. However, without an appropriate learning environment in which to cultivate that interest, the majority of teachers remain unlikely to become proficient environmental educators.

Taken together, the obstacles outlined in the following sections signal the need for an integrated shift toward sustainability of Canada’s entire education system. In addressing these obstacles, the following sections therefore discuss measures that might be taken not by teacher education institutions themselves, but by other actors, including schools, school boards, universities, and various levels of government.

Lack of Time/Too Many Other Priorities

This study found that the greatest obstacle to the integration of EE into pre-service education is *the lack of time/too many other priorities* faced by pre-service teacher education institutions. This obstacle is in part the result of the already overcharged primary and secondary education systems for which these programs are

preparing teachers. So long as we consider EE to be something to be “added onto” an already lengthy list of educational priorities, it will remain vulnerable to being squeezed out by topics with stronger roots in the educational culture or with stronger advocates (Lin 2002), making EE unlikely to take root within most teacher education institutions. As McKeown-Ice points out, when EE is not institutionalized, “its presence in the curriculum is at the continued employment of one person” (McKeown-Ice 2000, p. 9). In general, Canada’s already overcharged curricula leave EE in a precarious position.

Lack of Environmental Education Expertise

Lack of expertise in EE was reported to be an obstacle to its integration in teacher education. Furthermore, reports Beckford (2008) of the Ontario context, there are few opportunities for novice teachers to undertake EE teaching or to observe good EE practice during their pre-service experience in classrooms as part of stages or other in-school program elements. These shortcomings are in part the product of the inherited models of teacher education and reflect the relevance of the current study and the need for a different kind of preparation of pre-service teachers in EE.

The obstacles reported in this study evidence the gravitational pull that the institutionalized systems of educating teachers exert against change. For example, the largest obstacle to the integration of EE was found to be *too many other priorities* (and a corresponding *lack of time* for EE.) In other words, EE is not integrated into teacher education because it has not been integrated thus far, and therefore is perceived not to ‘fit’ into the existing structures and schedules. Furthermore, a lack of expertise in EE was found to be a major obstacle preventing the integration of EE into teacher education

programs. In other words, the lack of expertise in EE prevents the development of expertise in EE.

These two examples indicate that some of the most significant obstacles to integrating EE into pre-service teacher education are internal to the institutions charged with educating teachers. This suggests that pre-service teacher education programs could, by addressing their institutional inertia, foster significant change towards the deeper integration of EE in pre-service programs. The following sections consider changes that these programs can generate. Subsequent sections consider how provincial and federal government policy, including mandated curriculum, can contribute to a shift towards sustainability education. Finally, the role of international bodies are considered in light of UNESCO's Decade.

Recommendation: Add Environmental Education Methods Courses to Pre-service Programs

This study found that even when pre-service teachers are being educated about environmental issues, they are very unlikely to receive adequate training in the use of pedagogical tools appropriate to EE. As discussed in the Literature Review, researchers argue that EE requires a shift from a primarily didactic approach towards more interactive teaching strategies (Corney and Reid, 2007). Orr (1994) emphasizes that EE should not be "added" to existing curriculum, but rather, should be integrated at all levels, arguing for a deep transformation of the substance, process and scope of education at all levels. If, as he argues, "all education is environmental education," (p. 26) then it is education in its entirety that ought to be reconsidered. EE teacher

education must therefore prepare educators not only to teach *about* new aspects of the world, but to teach *in fundamentally new ways*.

Strapp *et al.* (1980) observed that one of the major problems with teacher education programs is that inexperienced teachers are usually left on their own to develop strategies for teaching about environmental issues (Strapp *et al.* 1980 in Lin, 1996.) It is not enough to know about nature, or to have an awareness of specific issues. EE methods call upon a range of pedagogical approaches, and these should be addressed as part of pre-service training. To address this challenge, the inclusion of more EE methods courses as part of pre-service teacher education is essential.

Action research is a process of enquiry that allows educators to question conventional approaches to education. This strategy, argue Corney and Reid (2007) is a methodology that complements the principles of ESD. In it, the teacher is both researcher and practitioner and is encouraged to critically question the relationship between practice and theory. As a professional development tool for EE, action research has been used for over two decades and has been the foundation of programs such as the OECD's Environment and Schools Initiatives (ENSI). The ENSI action research strategy engages and supports teachers in evaluating their work with students and contributing to environmental knowledge (Beckford, 2008).

Beckford (2008) argues for the development of teaching strategies that provide opportunities for prospective teachers to critique educational theories and practice, to investigate environmental issues, analyze environmental case studies, conduct environmental field research, and explore ecological concepts and principles. In his

view, EE pedagogy “should challenge the status quo in that it critiques the widely held and conventional orthodoxies that inform curriculum development, and environmental policy and planning” (p. 64). In this way, he argues, teachers may become agents of change.

Pre-service teacher education should therefore equip prospective teachers with more than an understanding of environmental concepts, principles, and policy (technical knowledge). These programs should provide emerging teachers with opportunities to critique learning theories and practice, to investigate the roots of environmental issues, including through case studies on campus or within the community, to conduct field research, and to explore ecological concepts and principles as a basis for engaging their future students.

The methods advocated for EE need not be restricted to an ‘EE methods course.’ Rather, they should be integrated throughout pre-service teacher education, fostering a shift towards greater emphasis on enquiry approaches that involve investigation of differing viewpoints and value positions, discussion and debate, and experiential or fieldwork activities. Furthermore, faculties of education should make EE a “teachable subject” and expose all teacher candidates to it to at least some extent. This recommendation echoes the 2007 Report of the Working Group on Environmental Education in Ontario (in Beckford 2008), that advocated that EE should become a requisite component of pre-service teacher education in all provinces.

Recommendation: Increase Interdisciplinarity within Teacher Education

Thirty years ago, the Tbilisi Conference report recommended that “educational and training institutions should have the necessary flexibility to enable them to include appropriate aspects of EE within existing curricula and to create new environmental curricula that meet the requirements of an interdisciplinary approach and methodology” (UNESCO 1977, p. 33). UNESCO (2004) paints ESD as “embedded in the whole curriculum, not a separate subject.”

Where an interdisciplinary and whole-school approach to education would serve well, EE in teacher education programs – when present at all – tends to be a small component in science, geography, and social studies units (Beckford 2008 and Lin 2002). The current study found that in Canada, teachers are learning about environmental issues as a unit in other courses, including social studies, science, and outdoor education.

This finding, however, is not evidence that Canadian teacher education programs are implementing the interdisciplinary approach to EE called for by the literature. There is an important distinction between addressing EE sporadically and non-systematically (the current case in Canada) and using EE as an overarching theme that guides pre-service teachers’ understanding of the interconnectedness of environmental issues, society, and economy. Teachers in Canada are largely not being systematically prepared to teach about these important connections. As part of their teacher education, prospective teachers should develop the ability to recognize opportunities to integrate EE into different academic disciplines that they might teach.

There are considerable challenges facing schools and teacher education programs attempting to respond to calls for prioritizing and implementing ESD holistically (Summers et al, 2005). The inflexible scheduling and dominance of traditional disciplines of current teacher education institutions can impede good EE, which is by its nature interdisciplinary, problem-solving, critical, and action-oriented. The limitations caused by the way in which teacher education programs are structured were also reported by the Organisation for Economic Cooperation and Development (OECD) in a study of EE policy in five OECD countries. The OECD concluded that “the traditional disciplinary structure and pedagogical practice of higher education serve as impediments to EE, and higher education institutions are located in a critical place to both produce and legitimize knowledge” (OECD 1995 in McKeown-Ice 2000, p 4).

Given the strong subject culture in schools, which is generally mirrored in teacher education programs, Corney and Reid (2007, p. 49) suggest that a “phased approach to including ESD in teacher education courses and developing the expertise of teacher educators seems more realistic.” The elimination of subject-based teaching would require an overhaul of the entire education system. Faculties of education could take the lead in developing whole-institutional approaches to curriculum change, but for the moment, the current discipline-based structure makes it necessary to integrate EE content and experiences from multiple perspectives.

Environmental Studies have gradually become incorporated into the Canadian academic context, with many universities now hosting a Department of Environmental Studies. However, a similar status has not been achieved at primary or secondary levels

of education in this country. Given the importance of reshaping our relationship to the biosphere, the study of the environment is arguably important enough that it should be considered a primary subject area, along with the more classical areas such as mathematics, physics, chemistry, biology, history, and languages (Corney and Reid, 2007).

Given the subject-centred nature of school curricula in many countries, including Canada, “identifying the roles and contributions of the subject teacher remains an important task” (Corney and Reid 2007, p. 37). Geography teachers might be singled out as particularly well-suited to the task of using the environment as a unifying theme. Geography bridges the natural and social sciences and explores the inter-relationships between people and their physical, economic and social environments, the field is well-positioned to foster interdisciplinary learning amongst student teachers. Furthermore, geography’s pedagogical focus on community investigation and problem solving (McKeown and Hopkins, 2007), on enquiry through fieldwork, and on students as co-constructors rather than passive recipients of knowledge also make it well suited to employing pedagogical approaches associated with ESD (Corney and Reid, 2007).

Geography departments in Canadian universities may contribute to teacher education programs, sharing not only subject knowledge (as they already do) but also appropriate pedagogical approaches, helping to address some of the structural challenges facing universities and colleges who are traditionally discipline-bound. Such a partnership might address a problem articulated by Kincheloe (2001, p. 673):

Geography as a discipline is in serious trouble. An important cause of some of geography's problems is the relative absence of philosophic inquiry into the nature of the discipline's roles in the educational process.... Few analysts have asked: Why should we teach geography? Why has geography been taught the way it has?... Into this unquestioning school climate, more and more teachers fresh from teacher education programs enter.

In response to Question 14 about other objectives of teacher education programs, only one respondent indicated that 'demonstrating sustainable design' was a program objective. Sustainable design on campus is an excellent example of how academic institutions can cultivate an affinity to place and foster interdisciplinarity through concrete action. By designing and upgrading educational facilities using sustainable technologies, teacher education institutions can support efficient energy consumption and waste disposal and ecologically sensitive building techniques. Campus greening promotes action-oriented interdisciplinary cooperation, often involving teams of students, professors, and administrators from diverse fields such as planning, finance, biology, education (Orr, 2003).

Recommendation: Engage in Curriculum Reform that Engages Teachers

Poor alignment with mandated curriculum goals was found to be a significant obstacle to the integration of EE in the teacher education setting in this study. In addition, several respondents who indicated that their pre-service teacher education program addresses EE indicated that they did so as part of teacher preparation for a government-mandated primary or secondary course. These findings suggest that if EE

were further integrated into curricula at primary and secondary levels, teacher education institutions would follow suit by more thoroughly preparing perspectives teachers to teach about sustainability.

Unfortunately, as UNESCO reports, “sustainable development has failed to find a place in most school curricula” (UNESCO C, 2005). A key element of reorienting education systems towards sustainability must therefore be curriculum reform. Environmental issues are arguably important enough that they should be considered a primary subject area, comparable to mathematics, physics, chemistry, biology, history, or languages (Corney and Reid, 2007).

Unfortunately, the gap between the narratives of ESD policy and the practice of teachers in Canada appears wide. This may be partly because “teachers’ expertise is little valued in the academic forum” (Kress 2000 in Hart, 2002). To begin to change this, teachers should be invited to engage more deeply with the philosophical underpinnings of the education system in which they will work. After all, it is teachers themselves who know what helps them to learn and who know what hinders their learning and professional development (Hart, 2002.) EE in pre-service teacher education must focus on teachers’ multiple roles – as “individual, classroom teacher, member of the school community, and member of society” (Filho and O’Loan 1996 in Beckford 2008, p. 63).

Despite the rhetoric about educational change, teachers ultimately construct their own meaning about the value of curriculum reform based on their own participation in that process and then employ teaching styles that correspond with their

own beliefs (Hart, 2002). Teachers should be deeply integrated into the process of reforming curriculum if that reform is to be implemented in a deep way.

With no federal mandate for education in Canada, the nature of consultation with teachers on curricular matters depends on provincial/ territorial mechanisms, with teacher involvement varying widely. Hart (2002) points to the pan-Canadian science curriculum development process initiated by the Council of Ministers of Education, Canada (CMEC) in 1993 as an example of policy that fell short of fostering change. One reason for this failure, he argues, is that the role of the Ministries of Education (i.e. to produce educational guidelines) “ends where teacher’s responsibility begins” (Hart 2002, p. 1243).

Because curriculum reform is complex and often produces few concrete examples of what reformed classrooms (or learning places) should look like, teachers often do not believe in educational reform (Lynch 1997 in Hart 2002). Furthermore, teachers’ values and beliefs – like those of most people – are deeply rooted and are often unaffected by persuasion or power (Hiller 1995 in Hart 2002). The alignment of teachers’ core beliefs with a curriculum’s conceptual framework is therefore essential if that framework is to take root in the teaching and learning environment.

Pre-service and in-service teachers can play a critical role in the very process of curriculum reform. One picture of what reorienting education towards sustainability might mean in practical terms comes from UNESCO’s *Educating for a Sustainable Future* (1997). The text draws on an example from the Toronto Board of Education, where a massive community consultation involving parents, students, staff and members of the

public, allowed the Board to reform its curriculum to more closely align it with what the community considered to be its educational priorities.

The resulting six graduation outcomes were: literacy; aesthetic appreciation and creativity; communication and collaboration; information management; responsible citizenship; and personal life skills, values and actions. These contrast with traditional curricular objectives in that they are broader, and motivated a movement away from the traditional core subjects of language, mathematics, history, and so on. Informed by a new vision of what the students ought to know, these traditional disciplines also underwent revision. Mathematics, for example, now addresses extremely large and extremely small numbers, including ppm (parts per million) and ppb (parts per billion) – a level of numeracy which is essential to environmental literacy. A health course now includes environmental issues such as cancer, allergies, and food additives as well as consumerism (UNESCO, 1997).

UNESCO reports that “Toronto had one great advantage in implementing its curriculum reform: well- educated and well-trained teachers” (1997). In the example at hand, the development of the curriculum itself directly solicited the ideas and opinions of thousands of teachers, and also constituted an informal training for those teachers. This training was reinforced by more formalized sessions and by systematic provision for teachers to upgrade their qualifications through university courses and other forms of education (UNESCO, 1997).

To prepare teachers for a high level of engagement with curriculum development and reform, teacher education programs might focus further attention on

developing at least two sets of complementary skills. First, they might prepare all teachers in critical pedagogy study by helping them to develop their ability to reflect on and critique curriculum. In this way, teachers may increasingly engage in shaping formal and informal curriculum. Encouragingly, the current study found that to 'give emerging teachers tools with which to think critically about curriculum' is generally considered to be a high priority for Canadian pre-service teacher programs. Further and more formal integration of this objective may yet be highly beneficial.

Second, it is essential that teachers should learn how their assumptions and implicit knowledge influence their roles as teachers. Pre-service teacher education programs might further encourage teachers to reflect on and to question their belief systems. Such a reflective ability to decode personal cultural experiences may empower teachers to move beyond the accepted role of teacher as cultural transmitter (Hart, 2002) and to embrace a more culturally transformative role.

With respect to EE in particular, teachers should be encouraged to examine and to question how they understand their relationship with the biosphere and "to develop images, metaphors, and skills to envisage and implement alternative cultural orientations" (Bamford 1999 in Hart 2002, p. 1243.) After all, part of what makes the sustainability challenge so difficult is that we are facing values that have yet to be conceived. To meet this challenge as a society, we are in need of our curiosity, imagination, and courage as we create new 'sustainable fictions' (Gough 1991 in Hart 2002, p. 1243). Teacher education has the opportunity to encourage pre-service teachers to question their environmental values and those of their society, and to

imagine relationships between people and the biosphere differently. This insight may enable teachers to take action to implement the changes they imagine, both in their future classrooms and through their contributions to curriculum reform more broadly.

Recommendation: Develop a Specialization in EE at all Teacher Education Programs

Research in Ontario suggests that many teachers lack the competence to teach EE effectively and that “in the absence of specialized teacher training [education] and expertise, there is likely a gap between the EE ‘intended’ in Ontario’s curriculum and that which is taught and received in the classroom” (Working Group on Environmental Education 2007, in Beckford 2008, p. 58). McKeown-Ice’s (2000) recommendation that in the United States “a valid and reliable EE teaching competency instrument must be developed and administered to pre-service teachers” (p. 10) seems to apply equally to the Canadian context. UNESCO’s *Guidelines and Recommendations for Reorienting Teacher Education to Address Sustainability* (2005 B) also suggest that teacher education institutions develop certified ESD courses that student teachers can incorporate into their search for employment.

Interestingly, only half of respondents in the current study indicated support for the idea of creating a specialization in EE for pre-service teachers. In their responses to Question 34, approximately five respondents warned against employing a ‘stovepipe approach’ to teaching about the environment. Indeed, we have seen that treating EE as an ‘add-on’ course or learning unit submits it to the risk of being squeezed out by other curricular demands on pre-service teachers’ time (Lin 2002) and limits its full integration

across the curriculum and that we must go “far beyond the simple addition of environmental science units to a science curriculum” (Hart 2002, p. 1243).

However, as UNESCO’s *Guidelines* point out, student teachers who have achieved an ESD certificate can be put in positions of influence within teacher education institutions and at the ministerial level in order to bring about further positive systemic change (UNESCO 2005 B, p. 43-44). In this way, specialization in EE need not be at the expense of overall systemic reform, but rather, may complement and even drive it.

To this end, the North American Association for Environmental Education (NAAEE) offers an Accreditation Program for state/ province EE certification. The accreditation program is based on six core competencies in EE identified as: Environmental Literacy, Foundations of EE, Professional Responsibilities of the Environmental Educator, Planning and Implementing EE, Fostering Learning, and Assessment and Evaluation. To date, no teacher education programs in Canada appear to have been accredited by the Association (NAAEE, 2010).

While EE should be integrated into all pre-service teachers’ education, a specialization in this field would likely have several benefits, not least of which would be the promotion of experts in sustainability education who can support its broader integration. This paper therefore strongly recommends that Canadian teacher education programs either seek accreditation from the NAAEE, or collectively develop their own national guidelines for EE in pre-service teacher programs. These guidelines would make a significant contribution to institutionalizing EE in departments of education across Canada.

Recommendation: Increase Access to EE Materials and Partnerships with EE Groups

There are many organizations promoting EE in Canada. The Canadian Environmental Literacy Project (CELP) offers open-access curriculum materials in support of teaching environmental studies in universities, colleges, and high schools in Canada. The focus is on materials that address Canadian issues within local, regional or international contexts. (See also Green Streets, Learning for a Sustainable Future, and Green Teacher for other examples of organizations that make EE projects, lesson plans, and ideas available to teachers and the public).

A recent report by the Canadian Environmental Grantmakers' Network indicates that most provinces have volunteer associations or networks of teachers that support EE through teacher professional development and networking (CEGN, 2006). The ministries and departments of education, the teacher associations and unions, and school boards, often in collaboration with non-profit organizations, provide in-service training of teachers on issues of sustainability.

For instance, the Canadian Network of Environmental Education and Communication (EECOM) is a charitable network with a mission to advance environmental learning. EECOM works with provincial groups and multiple sectors to support competency in educators, communicators, learners, and consumers (EECOM, 2010). Similarly, Learning for a Sustainable Future (LSF) is a charitable organization with a mandate to integrate sustainability education into Canada's education system. The Canadian Environmental Network links together more than 800 Canadian environmental groups.

All three of these groups have EE materials on their website available for teachers or pre-service teachers and provide hundreds of useful links to activities (CMEC and UNESCO, 2006). Other examples include Royal Roads University in Victoria, B.C., which hosts a website that serves a discussion forum and clearinghouse for EE at the postsecondary level. Quebec's Ministry of Sustainable Development, Environment, and Parks makes available activities related to sustainable development and education. In both Manitoba and Newfoundland and Labrador, provincial websites on ESD were made available in 2006 (CMEC and UNESCO, 2006).

A partnership between Environment Canada, Manitoba Education, Citizenship and Youth and Advanced Education and Training, and the NGO Learning for a Sustainable Future has established eight Provincial/Territorial ESD Working Groups. Their objective is to foster a culture of ESD in Canada by engaging leaders from provincial and territorial ministries, education (formal, non-formal, and informal sectors), business, and community organizations in order to advance ESD. So far, they have sponsored public forums, provided input to curriculum reviews, developed resources, planned conferences, and created web sites (CMEC, 2007). It is hoped that this partnership can continue to gather momentum.

Given that there appears to be a plethora of EE programs and activities accessible through a range of non-profit organizations and government bodies, it is somewhat surprising that respondents rated a 'lack of adequate EE teaching materials and equipment' as the fourth most significant barrier to the integration of EE in pre-service teacher programs. The perception of this challenge likely speaks to two other

significant limitations: the failure of schools and EE advocacy groups to coordinate effectively, and the poor alignment between EE activities developed and the mandated curriculum (found by this study to be the second most significant obstacle.)

EE groups have the potential to make important contributions to pre-service teacher education programs' efforts to reorient teacher education. For example, when courses for pre-service geography and social science teachers at Griffith University in Australia included use of support structures such as EE centres, student teachers indicated having enhanced levels of environmental sensitivity as well as increased confidence that they will apply EE strategies in their teaching careers. In the case of Griffith University, extensive visits to EE Centers were followed by on-campus workshops that concentrated on how student teachers could use these Centres as part of their school curriculum to complete assessment tasks on issues related to the sustainability of Australian river, coastal, bushland, and urban systems (Muller in UNESCO 2005 b, p. 48).

Given that many respondents in the current study indicated that their department's faculty/staff and financial resources were already strained (rating these as the third and sixth most pressing constraints to the integration of EE, respectively), more formal partnerships between pre-service teacher programs and EE centres in Canada may offer a resource-efficient point of departure for reorienting teacher education towards sustainability.

Finally, partnering with local environmental organizations through community partnerships "extends the classroom into the schoolyard and the community"

(Giesbrecht 2008, p. 28). The literature recommends that primary and secondary education should include a greater emphasis on localism in order to encourage students to explore their worlds through hands-on, participatory learning experiences and to encourage the belief that their learning is relevant and they are connected to their world. This argument applies equally to pre-service teachers: through community engagement, pre-service teachers may begin to develop their capacities to become “empathetic and active citizens” (*ibid*). Education through engagement at the local level provides a framework that invites learners to develop those very qualities through reflexive action. When integrated into the formal education process, community engagement may “call us to the higher principles of love and care.” (Giesbrecht 2008, p. 29.)

This study found that only 28 percent of respondents were able to identify an environmental projects and/or programs in their geographic region – evidence that there is a great deal of scope for further partnerships to evolve. This paper therefore strongly recommends that where they are not already doing so, pre-service teacher programs build close partnerships with local environmental groups in order to enhance teachers’ levels of environmental sensitivity and competence in EE. These partnerships should emphasize how EE content and pedagogy can be used by teachers to meet provincially-mandated curriculum guidelines. EE groups often work to develop content that is specifically tailored to fit into the mandated curriculum, and should continue to do so alongside teachers and pre-service teachers to ensure the maximum impact of their work.

Recommendation: Offer More High-Quality In-Service EE Trainings

Beckford (2008) notes that in general, EE is currently more likely to be offered through in-service programming than it is at the pre-service stage. The result is that EE is sporadic, short-term, and that teachers are poorly prepared to integrate a cross-curricular approach (Filho & O’Loan 1996 in Beckford 2008). However, Statistics Canada reports that for the 2005-06 year, there were over 313,000 full-time equivalent educators working in school boards or districts in Canada, 291,000 of whom were teachers (Statistics Canada and CMEC 2008, p. 22). Any efforts to reorient pre-service teacher education must be complemented by in-service teacher education programming that engages this huge population.

For example, the Swiss International Teacher Program partners with Florida Gulf Coast University to offer a one-month residential EE program for in-service teachers from around the world. Participants study and experience ecological, economic, and sociological dimensions of sustainability through community interactions, site visits, and ECOSYS – a computer simulation model (UNESCO, 2007). This intensive program was reported to have been deeply transformative for many participants, and to have had “a positive effect on participants’ understanding of ecosystems and the interrelationship between ecology, economics, and societal issues in dealing with issues of a sustainable environment, societies, communities, and families” (*ibid*, p. 13). Where resources permit, similar intensive study programs for in-service teachers in Canada are desirable.

A Call to Action for the Canadian Ministers of Education

Pre-service teacher education institutions can do a great deal to further integrate EE into their programs. The above sections have outlined recommendations that they might implement, including the integration of an EE methods course, the development of a certified specialization in EE, a greater focus on the methods of interdisciplinary teaching, the implementation of action research with teachers about EE, a greater emphasis on critical thinking about pedagogy and reflexive thinking about the role of values in the teaching process, preparation for and participation in much-needed processes of curricular reform, and partnership with existing conservation groups. To accomplish any of this, pre-service teacher programs need significant policy support at the level of the school board, the province, and the federal government.

Each of Canada's ten provinces and three territories has exclusive jurisdiction over education, as stipulated in Canada's Constitution Act of 1867. Pre-service teacher education in this country is provided by the postsecondary education sector in response to the curricular requirements of each province and with each institution devising its own program. The Council of Ministers of Education, Canada (CMEC) is comprised of the provincial and territorial ministers responsible for education. It provides a forum in which to discuss matters of common interest, to undertake educational initiatives cooperatively, and to represent the interests of the provinces and territories. CMEC purports to be "the national voice for education in Canada" (CMEC and CCUNESCO, 2006 p. 25). The following section explores CMEC's role in supporting EE as a gauge of national policy support for sustainability education.

Canada's provinces and territories work collectively on common objectives in a broad range of activities at the elementary, secondary, and postsecondary levels. The priorities of the CMEC may therefore be used to gauge the priorities of Canada's education systems overall. In 2003, the CMEC defined its three key priorities for the coming years to be *Aboriginal Education, Literacy, and Postsecondary Capacity (ibid)*. CMEC also reports the following policy and research priorities: Students with Special Needs, Healthy Schools, Technology and E-Learning, Teacher Training, Learning Outcomes, and Transitions.

Healthy Schools, a priority area in which one might hope for some mention of EE, ESD, community study, or outdoor education, are rather narrowly defined as schools that promote nutrition, physical activity, injury prevention, inclusion of health-related content in the curriculum, smoking cessation and healthier lifestyles (CMEC and CCUNESCO, 2006).

Teacher Training here refers to the need for "enhanced support, training, and resources" to help teachers meet the evolving demands of "socially-inclusive and competency-based education." It also refers to the re-design of pre-service teacher training programs as a collaboration between institutions, government, education professionals, and the public (*ibid*, p. 29). It makes no mention of reorienting teacher education towards sustainability, of the Decade, of ESD, or of EE.

Learning Outcomes refers specifically to enhancing student achievement (as measured by conventional benchmarks, such as standardized tests) and to reducing drop-out rates (*ibid*, p. 29). *Transitions* here refers to transitions from secondary school

to the workforce or to post-secondary education (*ibid*, p. 30). The priorities here appear to be meeting the economy's need for skilled workers while helping students to find work, rather than meeting society's need for responsible citizens.

For another example, CMEC's report entitled *The Education Systems in Canada – Facing the Challenges of the Twenty-First Century*, purports to “report on major reforms and innovations in the education systems” (CMEC 2008, p. 1) and yet includes no discussion about ESD or EE, or the environmental crisis. Its six page section highlighting the priorities for Canadian teachers and teacher training programs makes no mention of the need to reorient teacher education to address sustainability.

Learn Canada 2020

However, CMEC has included ESD as one of the eight activity areas in *Learn Canada 2020*, its framework to enhance Canada's education systems, learning opportunities, and overall education outcomes. CMEC articulates the objective of ESD as “to raise students' awareness and encourage them to become actively engaged in working for a sustainable society.” This is a relatively meek goal when compared with the educational change called for by the Decade. CMEC reports on its website to have created an ESD Working Group in 2008 to achieve the following four goals:

- Coordinate action to support and strengthen the implementation of ESD in all provinces and territories
- Develop a pan-Canadian ESD Framework for Collaboration and Action that builds on current activities for enhanced collaboration at the jurisdictional level

- Focus on encouraging activity in the elementary and secondary system, with the integration of sustainable development into curricula, development of ESD-related teaching resources and material, and the provision of pre-service and in-service teacher education and support in ESD concepts and practices
- Establish Canada as a leader in ESD, with this leadership demonstrated through reports on progress made towards these goals (CMEC a, 2010)

Unfortunately, no information about the ESD subgroup's actions or achievements with respect to the above goals is available at the time of writing. Based on the language in the CMEC's other publications and the apparent slow pace of progress with this initiative, it is clear that reorienting education towards sustainability is not a top priority for Canadian Ministers of Education.

Indeed, much of the language in Canada's national-level education policy documents pay little more than lip service to environmental sustainability and appears to reflect what some scholars warn (Jickling 2005 and Jicking and Wals, 2008) is the subversion of Canada's education systems to the (short-term) needs of its economy. Consider, for example, the articulation of the purpose of education, as extracted from the introduction to *Learn Canada 2020*: "Learn Canada 2020 reflects the educational priorities of Canadians. Ministers will engage key partners and stakeholders in reaching the stated goals and objectives... Ministers recognize the national interest in ensuring a

healthy economy and the importance of education for economic development” (CMEC 2008 B, p.2).

A Further Role for Other Pan-Canadian Organizations

The changes called for by the current study (and by much of the EE and ESD literature) appear to be at odds with the stated objectives of teacher education taken up by many pan-Canadian groups focused on education. The notion of ‘excellent education’ employed by the Society for the Advancement of Excellence in Education (SAEE), an independent non-profit education research agency with a mission to encourage excellence in public education through the provision of research to guide policy and practice, is a case in point.

In a baseline study of teacher education in Canada for the SAEE, Crocker and Dibbon provide an overview of teacher education programs and data obtained from surveys of representative samples of recent graduates, school principals and education faculty members. Based on the aggregated opinions of these three cohorts, the authors conclude that “greater emphasis should be placed on areas such as teaching students with disabilities or special needs, classroom management, child and adolescent development, computer technology and motivating students to learn. Overall, there appears to be support from all three groups for an increased focus on the more practical, technical aspects of teaching.” (p. x)

Again, nowhere in this lengthy report are EE or ESD mentioned, suggesting that the SAEE’s definition of excellence in education does not take into account whether students emerge from their educational experience good citizens of the Earth or not.

Clearly, if EE is to take root, our definition of excellence in education must be reoriented to include environmental considerations. While the SAEE has the potential to contribute significantly to this shift in thinking, its policy research displayed on its website appears to have entirely ignored the link between education and environmental sustainability (SAEE, 2010).

One of UNESCO's first steps in implementing the Decade was to obtain an early gauge of the activities in place or planned in member countries. To this end, UNESCO circulated a questionnaire requesting input on action plans, events, and major groups involved. In Canada, the response was compiled by the CMEC, with the assistance of the CCUNESCO (CMEC and CCUNESCO, 2006). A subsequent report on indicators of ESD was submitted the following year, including some discussion of the status of teacher preparation for ESD (CMEC, CCUNESCO, and Environment Canada, 2007). Together, these reports summarize the activities in support of ESD in each Canadian province up until 2007, and complement the findings from the current study. Selected highlights from these reports are included in Appendix III.

By briefly highlighting case studies on sustainability education from across Canada, these reports paint EE in this country as fragmented and inconsistent. Even when tasked by UNESCO with reporting on the state of ESD in Canada, CMEC equivocates: "much has been accomplished in ESD in Canada and much more remains to be done" (CMEC 2007, p. 53). While the Decade has "been cited in many of the [relevant] policies, projects, documents, websites, and resources" (*ibid*), the report provides no evidence that a shift towards sustainability education is taking place.

This report's modest conclusion that "more legislative support, a much broader integration of the full scope of sustainable development into the curriculum, the higher education sector, and teacher training institutions, and greatly enhanced inclusion of Indigenous perspectives of sustainability are all part of the efforts for the rest of the Decade" (*ibid*), falls just short of making a definitive statement: that the necessary shifts (towards more legislative support, etc.) are *not* in fact occurring on any large scale in Canada. If clarity of vision is to be obtained, CMEC and CCUNESCO, whose mandates include reporting on the status of EE in Canada's education system, must meet their moral responsibility to report clearly on this topic and to evaluate Canada's success with intellectual honesty.

An Increased Role for the Federal Government

EE in Canada is undermined by the absence of adequate support to conduct research, develop methodologies, reorient curriculum, design and produce curricular resource materials, and create incentives for new professionals to join the field. Although education is the jurisdiction of the provincial governments, the federal government could play a significant role in developing policy to support the emergence of EE in these ways.

For example, the Federal government's policy support for individuals in Canada to learn both official languages (another of the other "activity areas" under the Learn 2020 agenda). With funding from the Department of Canadian Heritage, CMEC implements a wide range of programs with the aim to develop official-language communities and to enhance official languages. These programs include not only research initiatives, but

financial support and capacity-building for schools, teachers, and community organizations undertaking actions aligned with the stated mandate. Included are two bursary programs – Explore and Destination Clic – that provide students with opportunities to study outside of their home region and to gain second language capacity. Through Young Canada Works, youth employment in a second language is subsidized (CMEC b, 2010).

In total, the Federal government spent over \$2 billion between the fiscal years of 2003-2004 to 2008-09 on promoting bilingualism in Canadian education (*ibid*, Section 1.3.4.). With a fraction of this institutional and financial support from the federal government, Canada could surely make tremendous strides toward EE. Not only could CMEC support research and adapt ESD to Canadian contexts, but it could disseminate information and directly support teacher education programs as well as school boards. Canada's official language policy provides an excellent example of what the federal government can do when it considers an educational goal to be of national policy priority.⁷ A similar level of commitment to ESD has yet to be seen.

Recommendation: Clarify the meanings of EE and ESD: An Opportunity for Reflection and Action

Only two (eleven percent) of respondents in this study indicated that the Decade had impacted the activities of their teacher education institution. These impacts were indicated to be indirect: ESD-themed conferences and a policy context supportive of EE.

⁷ In Canada, bilingualism is perceived as an issue of national identity and is protected by the Constitution. The environmental sustainability of Canadian society is at least as important to the nation's fabric and should therefore also be considered a federal matter.

No respondents mentioned having read or integrated the Guidelines (UNESCO, 2005 b), the Toolkit (UNESCO, 2006), or the Good Practices (UNESCO, 2007).

Sauvé's (2005) 15 "currents" within EE are a testament to the complexity and diversity within the EE pedagogical landscape. The EE literature is lush with debates about how best to promote sustainability, what the true purpose of EE is, and the appropriateness of the DESD as a tool for accomplishing EE (Sauvé, 2005 and Sauvé *et al*, 2007). The roles and potential roles of both EE and ESD remain the subjects of ongoing debate amongst practitioners and academics, and the very lack of agreement on a definition of ESD has "stymied efforts to move education for sustainable development forward" (UNESCO 2006, p.9).

Additional confusion may be brought on by other UN policy initiatives such as Education for All (EFA). In 2000, the UNDP, UNESCO, UNFPA, UNICEF and the World Bank, convened in Dakar and established the Dakar EFA Goals, an ambitious set of educational objectives for the year 2015. The goals include achieving universal free primary education by 2015, increasing adult literacy, reducing gender disparities, and improving all aspects of the quality of education, particularly in the global South. Oddly, the Implementation Scheme, also coordinated by UNESCO, makes no mention of ESD whatsoever. One might assume through reading that text that all education is by its very nature a contribution to sustainable development. This inconsistency adds further confusion to the topic.

A recent survey in Canada revealed that 53 percent of respondents were not familiar with the term 'sustainability,' and that as many as 70 percent could not define it

(Jickling, 2006). The result may be that companies and organizations are “talking to themselves and a small group of insiders when they use the term” (Hoggan 2006 in Jickling 2006, p. 101). The term “sustainable development” itself has to some extent been co-opted by industry and may no longer be relevant or meaningful to the public.⁸ Indeed, UNESCO (2005a, p.53) also admits that “in popular usage, the language of sustainability either trivializes or undermines the concept of ESD.” Although the language of ESD is often so inclusive that its meaning is diluted, the ESD texts call for radical change and for the transformation of all sectors of society, including the economy, in accordance of the principles of sustainability.

The most significant result of this lack of clarity may be that the Decade fails to ignite our collective imagination. If education is to succeed in addressing sustainability, it has to be “transformed rather than reformed” (Shallcross and Robinson 2007, p. 138). The need may be for, in the words of David Orr (2003, p. 350) “a positive strategy that fires up the public imagination” because the public “knows what we are against, but not what we are for. And there are many things to be stopped, but what should be started?”

The Decade’s failure, then, is not so much one of nomenclature or definitions. Rather, what is lacking in Canada is the development and dissemination of workable models for ESD, which can and should take a wide range of forms. The richness and depth of the complex field of EE must inform ESD and must be applied, as much as possible, to changes within schools, teacher education programs. Documents such as

⁸ One may argue that the term Sustainable Development has never been broadly meaningful, as it has been criticized for its vagueness since first coined. Philosopher Luc Ferry once remarked: “I know that this term is obligatory, but I find it also absurd, or rather so vague that it says nothing” (2007, p. 75).

UNESCO's ESD *Toolkit*- a text that highlights success stories from around the world, need to be adapted so that they are more relevant to the Canadian context.

Chapter 6: Conclusion

Summary of Findings

The World Summit on Sustainable Development in Johannesburg in 2002 helped decision makers around the world to realize that education must be reoriented to reflect a vision of sustainability, one that links economic well-being with cultural traditions and respect for Earth and its resources (Fien 2006, p. 4). As part of that shift, UNESCO has been calling for the reorientation of teacher education toward sustainability for nearly three decades. Teacher education faculties are potential catalysts of this change: they create teacher education curricula, educate new teachers, provide professional development for practicing teachers, consult with local boards, and often have influence with ministries of education (UNESCO, 2002). Not only does teacher education in EE equip teachers to effectively teach EE, but it also acts as a stimulus to the introduction of EE into the curriculum (Tilbury, 1995).

A study of teacher education programs in the US conducted by McKeown-Ice (2000) found that most schools there have few requirements related to EE, and that EE is largely not institutionalized. McKeown-Ice establishes a useful distinction between (shallow) EE that deals with awareness, knowledge and persuasion and (deep) EE that encompasses the goals of participation and environmental action (*ibid*, p. 7). The current findings suggest that where EE is taking place in Canada, it is shallow rather than deep.

In Canada, research on EE in pre-service teacher education programs is rare, with only two national studies conducted over the last three decades. Both Towler (1980-81)

and Lin (2002) found that very little progress had been made to advance the status of EE in teacher education in Canada. The number of Canadian universities offering EE courses to teachers had remained low and the level of priority granted relatively insignificant (Lin, 2002).

Building on these two studies, the current study gauged the extent to which Canadian pre-service teachers are being prepared to teach EE with their students today. Taken together, the results from these three studies indicate that over the past thirty years, there has been little change in the number of specializations in EE being offered or in the number of EE methods courses being offered to pre-service teacher.

Furthermore, the overall objectives of teacher education programs were reported to be primarily pragmatic rather than socially transformative in nature. EE today is addressed as part of a broader range of courses both at the teacher education level and in Canada's school systems, indicating some shift from previous studies, when EE was largely confined to biology, geography, and outdoor education courses. Although EE has long been categorized primarily as a scientific discipline (Beckford 2008 and Lin 2002), today it appears less limited by this past. However, to borrow from McKeown Ice's (2000) distinction, there is little in these findings that indicates that this broader integration of EE is "deep" rather than "shallow." Emerging teachers are not being systematically prepared to use the pedagogical tools necessary for fostering the cross-disciplinary, whole-school shift toward sustainability that is called for in the literature on EE, including the literature associated with the Decade.

Overall, pre-service teacher education in Canada still does not adequately prepare teachers to teach about the environment or to contribute significantly to social transformation toward sustainability. The most significant obstacle to its further integration was found to be a lack of time, or too many other priorities. In other words, EE remains outside the scope of the teacher education mandate and must therefore compete with other peripheral subjects for time and space (Beckford, 2008).

At the root of many of the other obstacles identified (poor alignment between EE and mandated curriculum goals, lack of faculty expertise about EE, inadequate teaching materials, etc.) is this perception amongst teacher educators that EE is a burden in an already demanding program (UNESCO, 2002). A shift toward sustainability education must therefore include significant curriculum reform, a process to which prospective teachers should be prepared to contribute.

To contribute to a shift toward sustainability education, teacher education programs should prepare emerging teachers to understand the goals of EE, the desired learning outcomes, the interdisciplinary approaches, and the appropriate pedagogical practices. Teacher education programs should include mandatory courses on the methods of EE and should prepare all teachers for interdisciplinary teaching, including through projects such as campus greening initiatives. Teacher education programs should agree upon a national accreditation for specialization in EE similar to that put forth by the NAEE in the United States.

Furthermore, teacher education programs should prepare teachers to engage dynamically with students about EE through interdisciplinary, enquiry-based and

participatory learning. Emerging teachers should be encouraged to reflect on the role of their own values in shaping their relationship with the environment and to critique conventional orthodoxies that inform curriculum (Beckford 2008, p. 64). When engaged in meaningful and reflective intellectual encounters, teachers are more likely to feel empowered to act upon goals that they find meaningful, and to create new communities of learners allied for systemic change (Lynch 1997 in Hart 2002).

In general, the reforms proposed require much more of teachers than do traditional curricula. Teachers will be challenged to be more actively involved in individual and collective activities and to play new roles. All of this underlines the need to focus on the level and type of education, training and support that teachers receive (UNESCO, 1997). The low status of EE at the pre-service teacher level will persist unless the barriers identified in this study are addressed – a challenge that requires significant support from all levels of government.

This paper strongly recommends that Canadian teacher education programs either seek accreditation from the NAAEE, or collectively develop their own national guidelines for EE. This would go far towards institutionalizing EE in Canadian departments of education and could catalyze many of the other changes called for. Furthermore, the federal government, particularly through the CMEC, may be well positioned to support efforts to institutionalize EE in teacher education and elsewhere throughout Canada's education systems.

The lack of adequate EE in pre-service teacher education should be considered a significant weakness, given the ubiquitous nature of environmental problems and the

critical turning point at which we find the biosphere upon which we depend. In addition to the policy recommendations made above, further research is necessary to continue to build a policy case in support of the reorientation of teacher education to address environmental sustainability, and in order to determine how best to do so.

Further Research

Great doubt: great awakening.

Little doubt: little awakening.

No doubt: no awakening.

— *Zen koan*

This study has revealed many more questions than it has answered. This final section is dedicated to identifying key areas for much-needed further research. First, researchers might gauge the extent to which Canadian teacher education programs address EE with pre-service teachers by modifying the current questionnaire as per the recommendations articulated at the beginning of the discussion in Chapter 4. Furthermore, while the questionnaire employed in this study was useful in assessing the overall inclusion of EE in Canadian teacher education, in the case of those institutions that have made EE a focus, telephone or in-person interviews with Program Directors or Deans would have generated useful details about how these programs operate, what partnerships they rely on to function, and what they perceive their main successes and challenges to be.

Moreover, this study was based on the premise that teacher education institutions shape the values of teachers, who in turn shape the values of the students in their classrooms. Soliciting accounts directly from pre-service teachers about their experiences would help researchers to further understand the teacher education process. Furthermore, a 2008 study by Crocker and Dibbon found that 55 percent of recent graduates from Canadian pre-service teacher programs had completed a consecutive rather than a concurrent degree, and thus had already obtained an

undergraduate degree by the time they began their formal teacher education. How well that previous degree prepared teachers for some elements of EE was outside the scope of this study, but may have bearing on their overall preparedness to engage in EE with their students.

Questions about the role that pre-service education played in shaping teachers' environmental knowledge, values, and teaching methods would allow researchers to gauge to what extent the formal teacher education process plays a transformative role in these areas – something that the current study could only assess indirectly. This line of enquiry might also provide a better gauge of how well-prepared emerging teachers are to address environmental issues with their students. Follow-up studies could track how likely they are to engage in sustainability education once in the classroom.

There is also a need to explore how research with teachers might actually penetrate teachers' attitudes in order to begin to understand resistances to change. Research methodologies that engage with pre-service teachers directly should be capable of pursuing social questions about how, for instance, they interpret and make sense of their own educational experiences (Hungerford and Bora, 2003). Each teacher's actions in the classroom are affected by the meanings constructed by that teacher (Hart, 2002) as well as by his or her value system. Further investigation with teachers into how they shape meanings and values is therefore strongly recommended.

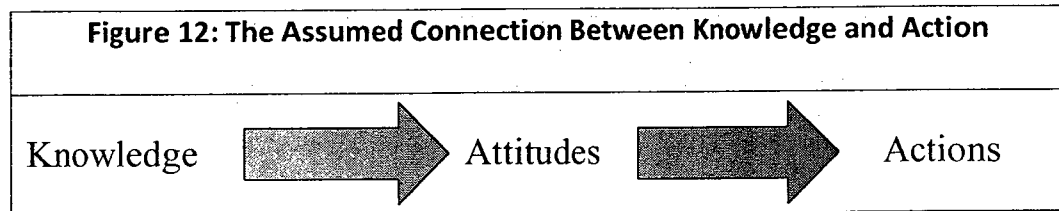
In addition, further research into interdisciplinary approaches to teaching is needed if we are to move from integrating EE as "isolated elements of a fragmented mosaic of knowledge" (Dlouha in UNESCO 2005 b, p. 52) to EE as a unifying theme that

connects all disciplines of learning. University-based research in the fields of pedagogical theory and practice as well as contemporary philosophy of education could support teacher education institutions and the broader education community in the significant task of shifting away from the bindings of traditional school disciplines towards a more ecological approach to learning.

For EE to achieve long-term success in Canada, there is a critical need for more rigorous research and empirical evidence about the impacts of EE on learners in general (Corney and Reid, 2007). Environmentally sustainable behaviours should by definition constitute one outcome of successful EE. And although what constitutes 'sustainable behaviours' remains a somewhat moving target, researchers must continue to ask which pedagogical approaches within the traditional realm of EE (and of outside it) are most successful in positively influencing teachers' implementation of the teaching strategies distilled by studies such as this one. The reality is that little is really known about the extent to which EE has been incorporated in primary schools, or how teachers' knowledge, beliefs, and practices influence learning outcomes (Cutter-Mackenzie and Smith, 2003.) The Canadian Journal of Environmental Education is well-positioned to apply much of the research findings in the EE field to assist not only teacher education institutions, but to help the Canadian government in meeting its commitments with respect to education (Jarnet, 1998.)

This paper, like the Decade itself and most EE initiatives, is founded on the belief that "education is the most effective means that society possesses for confronting the challenges and opportunities of the future. Indeed, education will shape the world of

tomorrow” (Manitoba Education and Training 1999, p. 4). In other words, we believe that education affects not only awareness, but behaviour, according to the following heuristic:



However, thirty years of environmental studies suggest that awareness of problems and acting for their resolution are not linearly correlated, or at least that awareness alone “does not work on a sufficiently wide scale to effect societal change” (Sterling 2001 in Shallcross and Robinson 2007, p. 138). Hart (2002) found that ethics, particularly those related to moral values, may be more important than knowledge in motivating teacher action in EE, but that the relationship between the three elements was far from clear.

Research into consumer habits also suggests that the correlation between awareness and action is low. Recent studies in industrialised countries show that only 5% of consumers have adopted a lifestyle compatible with sustainable development (UNESCO, 2005). Authors such as McKenzie-Mohr (1996) argue that many programs that aim to change human behaviour fail because they do not pay adequate attention to the psychological factors that contribute to behavioural change. Several studies document that “education alone often has little or no effect on sustainable behaviour” (McKenzie-Mohr 1996, p. 2).

Researchers must respond to these critiques. To do so, they must begin to establish empirical assessment standards against which to measure the EE performance of educational institutions. Evidence linking specific methods with specific behavioural outcomes would be useful in building a policy case in support of a shift towards sustainability education. Findings could be presented to academic boards and funding agencies (most notably, provincial and federal governments) to help generate much-needed institutional support for EE. Broadly speaking, it is time for the EE and ESD discourse to shift its focus from normative 'shoulds' to empirical 'dos'.

To this end, Cutter-Mackenzie and Smith (2003) have adapted the earlier research of O'Riordan, Orr (1992), and others about the notion of 'ecological literacy' to distil a set of measurable learning outcomes for EE. These outcomes (or others) might be used as a common baseline to assess the success of EE and to gauge the preparedness of educators' knowledge about it in future studies.

Re-imagining Mainstream Education

We must look at the world with new eyes. We must look at ourselves differently. We are freer than we think... We can redream the word and we can make the dream real. (Ben Okri, The Famished Road, p. 498)

This thesis contends that our schools currently represent one of the greatest failures of imagination of our society. In recognizing our collective failure, we may also perceive the opportunity and an imperative to re-imagine our education system entirely. If we could begin again, what knowledge, skills, and ways of relating to the world would we wish to promote? What values would we wish to impart? What types of

questions would we encourage learners to ask? What types of relationships, behaviours, attitudes, and values, and knowledge would be the measures of success?

Because EE, when “properly conceived [...] incorporates a philosophical position and an alternative worldview that could/should/must transform the nature of teaching and schooling” (Hart 2002, p. 1246), the following section suggests areas from which educators might draw new insights about the relationship between education, the environment, and human happiness. Each of these philosophical and pedagogical approaches casts the role of the teacher differently and has implications not only for the inclusion of EE in Canada, but for changing teacher-student relations and reframing the role of education.

Aboriginal Perspectives

Principle 22 of the Rio Declaration states that “Indigenous people and their communities and other local communities have a vital role in environmental management and development because of their knowledge and traditional practices. States should recognize and duly support their identify, culture and interests and enable their effective participation in the achievement of sustainable development” (United Nations, 1993).

Aboriginal traditions and cultural values have an important role to play in contributing to a shift towards sustainability. The principle that present generations should meet their own needs without compromising the ability of future generations to do the same – introduced only with the Brundtland Commission’s Report (World Commission on Environment and Development, 1997) in the Western World – has been

an integral part of many Aboriginal cultures, including teaching and learning traditions, for centuries (Beckford 2008). Aboriginal perspectives reject the kind of “vulgar anthropocentrism” in which the natural environment reduced to a set of resources meant to be managed (and exploited) for the benefit of humans (*ibid*, p. 62).

In Canada, there is an opportunity to draw from the traditional education models of Aboriginal communities. Although there is a risk of romanticizing Aboriginal worldviews, the fact remains that they have a perspective to share about the natural world that is “undeniably fundamentally different from mainstream society” in Canada (Beckford 2008, p. 62). For instance, Aboriginal epistemologies promote the view that schools are only one part of a larger and more complex learning ecosystem. Learning that takes place “out on the ice, in the bush, in the home, or in the community is no less valuable than” than formal schooling (*ibid.*)

‘Alternative’ Schooling

Research about the so-called ‘alternative’ school models is surprisingly lacking from the discussion and literature on EE and ESD. The pedagogical approaches developed Rudolf Steiner (Austria), Jiddu Krishnamurti (India), William Kilpatrick (United States), and others may offer rich insight into how education can foster creative thinking, environmental responsibility and social awareness in students and teachers. Each of these educational approaches places special emphasis on learners’ relationships with Place and with Life itself, and each conceives of the purpose of education differently, and applies pedagogical methods that reflect its unique philosophy of education.

Waldorf education, developed by Rudolph Steiner, places a strong emphasis on establishing a healthy relationship with nature, using children's natural "mood of wonder" as a point of departure throughout their schooling (Clouder and Rawson 2003, p. 93). These 'alternative' educational approaches might, if applied at a grander scale, contribute to a societal shift towards ecological sustainability. Waldorf education also prioritizes developing the creative and artistic abilities of learners (*ibid*). The importance of creative thinking, largely ignored in the EE and ESD literature, seem to be particularly crucial: with complex environmental challenges before us, we desperately need solutions, which inevitably require new ways of seeing things.

Indian philosopher Jiddhu Krishnamurti (1895-1986) put forth a "completely new approach to the postulates of education" (Krishnamurti Foundation Trust 1974, p. 7). According to this approach, an emphasis is placed on developing acute critical thinking skills. Learners are encouraged to question authority and social norms and are guided in the methods of meditation, introspection, and critical investigation. Speaking to a group of teachers at a Krishnamurti Learning Centre in Andhra Pradesh, India, Krishnamurti summarized his vision of education thus: "It is our purpose in places like [here] to create an environment, a climate, where one can bring about, if it is at all possible, a new human being" (*ibid*, p.53). The process of education, in Krishnamurti's view, is to promote healthy relationships: "To live is to be related. There is no right relationship to anything if there is not the right feeling for beauty, a response to nature, to music and art, a highly developed aesthetic sense."

When we talk about a total human being, we mean not only a human being with inward understanding, with a capacity to explore, to examine his inward being, his inward state and the capacity of going beyond it, but also someone who is good in what he does outwardly. The two must go together. That is the real issue in education – to see that when the child leaves the school, he is well established in goodness, both outwardly and inwardly (Krishnamurti Foundation Trust 1974, p.54).

While Krishnamurti was developing his learning centres in India, a continent away, American pedagogue William Kilpatrick (1871-1965) was advocating for similar principles in education in the United States. Kilpatrick condemned education that takes as its goal any end external to the learner. Rather, Kilpatrick argued that the only goal educators can accept is one that values personality. Education, he argues, should produce learners who are able and disposed to think and decide for themselves, to think freely without the warp of prejudice, and to decide unselfishly, preferring the social good to any merely private good or gain. The purpose of character education is to develop learners' capacity for independent, critical thought and ethical reasoning (Kilpatrick, 1951).

Character education would appear to be necessary for the success of ESD. As Beirsto (2009) points out, character education “should empower students to question authority and norms, as well as the adults who represent them, when necessary” (p. 6). Being able to dissent when ethical reasoning dictates is not only a basic attribute of good character but may also be “an absolutely essential characteristic for a generation

that must break set with the deeply entrenched behaviours of the past in order to survive" (*ibid*).

It is therefore the final recommendation of this paper that researchers systematically explore how the pedagogical principles taken up by 'alternative' educations, including Aboriginal education approaches and the visions of Steiner, Krishnamurti, Kilpatrick, and many others, might invigorate the reorientation of education towards sustainability. Furthermore, Canada's teacher education programs might be well-served by integrating the study of these 'alternative' education models into their programs.

Concluding Remarks

We may hope that ongoing research will catalyze changes in educational paradigms; that the energy and commitment of educators, coupled with strong and creative policy support at all levels (UN, national, provincial, school board, and school) will allow a culture of sustainability education to take root in Canada. We may further hope that that culture may succeed in promoting critical thinking about our relationship with the planet and may generate new ideas and encourage more ecologically responsible behaviour.

But we must remember that there are other forces as well. After all, for the 10% of the Earth's population that uses well over 90% of its resources (including most Canadians), the drive to consume appears to be much greater than the drive to sustain (Brown 2005 in Jickling and Wals, 2008). Orr (2003) cynically likens any potential success in EE to walking North on a Southbound train.

A great deal hangs in the balance. DESD's most recent conference in Bonn in March, 2009 was attended by 700 participants from 150 countries. Canada was reportedly the only country not to send a government representative to this meeting (Bell, 2009.) Speaking at that conference, keynote speaker Graça Machel remarked:

If we are to avoid meeting again in 2015 and being forced to admit to our continuing failure to fulfill our promises to our children, we need to be more decisive, strategic, sustained and meaningful in our actions and we need to take those actions now... I hope that when we meet again in 2015, it is because we can look our children in the eye and at ourselves in our mirrors, knowing that we have at last moved from rhetoric to significant action and fulfilled our promises of access to good quality, sustainable education to our children and each other (UNESCO, 2009.)

In light of the tremendous challenges of the day, a refocusing of the education of teachers on sustainability is not sufficient to bring about ecological sustainability, but it is likely necessary. As Wilke (1985) points out, "if teachers do not have the knowledge, skills, or commitment to environmentalize their curriculum it is unlikely that environmentally literate students will be produced by K-12 schools" (p. 1) (Wilke in Lin 2002, p. 200.)

And in his remarks on the Bonn Conference about the Decade, Bell (2009) puts it thus:

The challenge of sustainability needs to be addressed technologically, economically, and politically. However, it would seem that changes brought about

in these areas may buy us time, but that without fundamental changes in human values, the question of the sustainability of the human project will remain. The response to the current challenge must therefore be considered philosophically, spiritually, creatively too. It is the role of educators.

Educators have a key role to play in bringing about a paradigmatic shift. When enough individuals adopt sustainable behaviours, these behaviours become social norms. Once such a shift is underway, “politicians, sensing a parade, will rush to get out in front and embed the necessary conduct in law and policy” (Beairsto p. 6, 2009.) Only common citizens can bring about such a shift and can turn the tide toward sustainable living. It is the purpose of education to empower students to become responsible citizens of the biosphere, and it is the difficult role of Canada’s teachers to guide and to inspire them in this process. Success or failure will depend on the efforts of teacher educators, and the support that they receive from school boards, from ministries of education, and from the federal government.

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Appendices

Appendix I: International Environment-Related Education Documents Considered

International Environment-Related Education Documents Considered in this Paper (Adapted from Palmer 1998, p. 6 and Sauvé 2007, p. 35)			
Year	Place/ Organization	Event	Document
1948	IUCN, Paris, France	First use of the term "Environmental Education"	
1972	Stockholm, Sweden UN	Conference on the Human Environment	<i>Declaration of the United Nations Conference on the Human Environment</i>
1975	Belgrade UNESCO/UNEP	International Workshop on Environmental Education (Founding of UNEP and IEEP)	<i>The Belgrade Charter</i>
1977	Tsibli, USSR UNESCO	Intergovernmental Conference on Environmental Education	<i>Tbilisi Conference Report and Tbilisi Declaration</i>
1980	IUCN, UNEP, WWF	World Conservation Strategy	
1987	UNESCO/UNEP	Educational Congress on Environmental Education and Training, Moscow. World Commission on Environment and Development-	<i>Our Common Future (the 'Brundtland Report')</i>
1991	IUCN et al.		<i>Caring for the Earth: A Strategy for Sustainable Living</i>
1992	Rio de Janeiro UN	UN Conference on Environment and Development (the 'Earth Summit')	<i>Agenda 21</i>
1994		International Conference on Population and Development, Cairo, Egypt	
1997	Thessaloniki UNESCO	International Conference on Environment and Society- Educating for a Sustainable Future: A Transdisciplinary Vision for Concerted Action	<i>Final Report and Thessaloniki Declaration</i>
2002	Johannesburg UN	World Summit on Sustainable Development	<i>The Johannesburg Declaration on Sustainable Development</i>
2005-2014		Decade of Education for Sustainable Development	<i>DESD International Implementation Scheme</i>

Appendix II: Questionnaire and Introductory Letter

Department of Geography, Planning and Environment
Concordia University
1455 de Maisonneuve Ouest
Montreal, Quebec
H3G 1M8

Dear Sir/Madam,

I am currently conducting a survey of Canadian teacher education programs as part of my Master's Thesis in Public Policy and Public Administration (geography option) at Concordia University. My research explores how best to equip emerging teachers with the skills and knowledge necessary to address environmental issues with their students.

The purpose of this questionnaire is to assess the degree to which, and determine the ways in which, Canadian teacher education institutions are preparing primary and secondary school teachers to address environmental issues with their students.

I would be delighted if you would take the time to complete this questionnaire on behalf of the teacher education program for which you are responsible. If appropriate, I ask that you please pass it on to the person in your department best equipped to complete it. The questionnaire, attached as a Word document, should take 10 to 15 minutes to complete.

I would like to stress that the present research is being conducted according to the ethics standards of Concordia University. As such, all personal information that participants disclose will remain confidential. Furthermore, my thesis will be written to ensure the anonymity of all participants. Should you have a complaint concerning any aspect of this research, you may contact Dr. David Greene, Chair of the Department of Geography, Planning and Environment at Concordia University, at the above mailing address or at green@alcor.concordia.ca.

Should you agree to do so, **I ask that you return your completed questionnaire to me by replying to this e-mail (simone.hanchet@mail.mcgill.ca) or by faxing it to: (514) 395-4505.** I would, of course, appreciate a response at your earliest convenience so that I can assimilate survey results in a timely manner.

I will share the results of my findings, along with my analysis of the current status of preparedness of teachers to address environmental issues, with the various Ministries of Education in Canada and with the Canadian Commission for UNESCO. I would be very happy to share my findings with you as well, should you indicate an interest in them.

With gratitude and in the hope of a response,

Simone Hanchet
Masters in Public Policy and Public Administration (geography option), Candidate

QUESTIONNAIRE OVERVIEW

(This questionnaire contains 35 questions distributed over seven short sections. Not all questions will apply to your institution. The estimated time of completion is 10-15 minutes.)

SECTION 1: Respondent Details (5 questions)

SECTION 2: Teacher Education Program Information (6 questions)

SECTION 3: Program Goals (3 questions)

SECTION 4: Environmental Education and Education for Sustainable Development (3 questions)

SECTION 5: Teaching Faculty (6 questions)

SECTION 6: Impediments to Teacher Environmental Education (2 questions)

SECTION 7: Next Steps (6 questions)

SECTION 1: Respondent Details (5 questions)

(Please note that this section is solely for the researcher's reference. The information provided in this section will **NOT** be reported in the research findings.)

Your name: _____

Your professional role/title: _____

Your office phone number: _____

Your e-mail address: _____

University (or college)'s name: _____

SECTION 2: Teacher Education Program Information (6 questions)

Pre-service teacher education program name: _____

For what levels of teaching does your program prepare teachers? (Check all appropriate.):

Primary/ elementary school

Middle school

Secondary/ high school

Does your program offer (check if appropriate.):

A concurrent degree (teaching certificate integrated with Bachelor's Degree)?

If yes, years of full-time study required to obtain concurrent degree: _____

A consecutive degree (teaching certificate subsequent to Bachelor's Degree)?

If yes, years of full-time study required to obtain consecutive degree: _____

Approximate number of students in the 2009 graduating class: _____

Approximate number of faculty members associated with the program:

Full time: _____

Part time: _____

Do you have anything to add to describe your pre-service teacher education program?

SECTION 3: Program Goals (3 questions)

Definition 1: John Towler, a researcher conducting a similar study in Canada in the 1970's, defined **Environmental Education** as "an integrated process which deals with people's interrelationship with their natural and man-made surroundings, including the relation of population growth, pollution, resource allocation and depletion, conservation, technology, and urban and rural planning to the total human environment. Environmental education is a study of the factors influencing eco-systems, mental and physical health, living and working conditions, decaying cities, and population pressures."
(Towler, John. "A Study of Canadian Pre-Service Training in Environmental Education." *The Journal of Environmental Education* 12, 1980-1981.)

Definition 2: UNESCO defines **Education for Sustainable Development** as: the integration of the goals and values of sustainable development into all aspects of education and learning... Education for sustainable development is about learning to live in a world where people all have sufficient food for a healthy and productive life, to assess, care for, and restore our planet, to create and enjoy a better, safer, and more just world, and to be caring citizens who exercise their rights and responsibilities locally, nationally, and globally (UNESCO, 2008.)

In your view, relative to other content required in pre-service teacher education, environmental education (as defined above) for prospective teachers is considered to be a:

(Check one.)

Top priority topic _____

Very important topic _____

Somewhat important topic _____

Not at all important _____

In your view, relative to other content required in pre-service teacher education, Education for Sustainable Development (as defined above) for prospective teachers is considered to be a: (Check one.)

Top priority topic _____

Very important topic _____

Somewhat important _____

Not at all important topic _____

Please rate on a scale of 1-10 the following goals to reflect those of your program, where 10 is "a very high priority" and 1 is "a very low priority."

Ensure the employability of program graduates _____

Prepare emerging teachers to convey mandated curriculum _____

Enable emerging teachers to develop their own, personal teaching styles by exposing them to a range of pedagogical approaches _____

Give emerging teachers tools with which to think critically about curriculum _____

Prepare emerging teachers to address a range of current and future social challenges with their students: _____

Support local community initiatives _____

Foster a broad shift in social values _____

Other _____

Additional Comments:

SECTION 4: Environmental Education and Education for Sustainable Development (7 questions)

Does your institution offer a course in the *methods* of teaching environmental education (Y/N)? _____

If yes, please indicate course titles or provide links to descriptions: _____

If yes, approximately how many students are enrolled in the course(s) in the 2008-2009 academic year? _____

If yes, please rate often the instructor includes the following areas in the methods course(s) concerned with teacher environmental education using a scale from 1-4 in which 1= continually 2= rather frequently 3= now and then and 4= never.

Ecological _____
 Conservation _____
 Sociological _____
 Global Issues _____
 Politics _____

Biological _____
 Geographical _____
 Outdoor Education _____
 Economics _____
 (Other) _____

Does your pre-service teacher education program have a sequence of courses leading to a form of specialization in environmental education? (e.g., a major, a minor, or a study stream (Y/N)? _____

If yes, what is it called? _____

If yes, approximately how many students are registered in it in the 2009 graduating cohort? _____

Does your program address environmental issues or ecological concerns with pre-service teachers in the following ways (check those applicable):

Mandatory courses _____
 Optional courses _____
 Individual student projects _____
 Practicum/ stage placements _____
 Core curriculum training _____

In what other ways does your program prepare emerging teachers to address environmental issues and equip them to teach about these?

In your overall opinion, how well does your program both enable students to explore environmental issues and equip them to teach about these issues? (Check one.)

very strong preparation _____
 somewhat strong preparation _____
 somewhat weak preparation _____
 very weak preparation _____

Please rate the extent to which environmental education is incorporated into the elementary and secondary schools with which you work on a scale where:

- 1 = course focus on environmental issues
- 2 = some course content focuses on environmental issues (a course unit, for example.)
- 3 = some exploration of environmental issues within the course
- 4 = virtually no course content addressing environmental issues

Course	RATING (1-4) for Elementary Schools	RATING (1-4) for High Schools
Sciences:		
Social sciences:		
Technology:		
Geography:		
As a separate course:		
Interdisciplinary:		
Not at all:		

(Other)		
:		

Were you aware that we are now in the United Nation's Decade of Education for Sustainable Development (2005-2014) (Y/N)? _____

If yes, in what ways, if at all, has the United Nation's Decade of Education for Sustainable Development influenced your program's goals or activities?

SECTION 5: Teaching Faculty (6 questions)

How many faculty members or teaching staff members in your department are involved in teaching courses in *environmental education*?

Full time: _____ Part time: _____

How many faculty members or full-time teaching staff members in your program are teaching courses directly related to *education for sustainable development*?

Full time: _____ Part time: _____

What academic background do these instructors have? (Please indicate the **number of faculty members** possessing the following degrees.)

Degree in	Number of faculty teaching Environmental Education
<u>environmental education</u>	
<u>education</u>	
<u>sciences:</u>	
<i>biology</i>	
<i>chemistry</i>	
<i>physics</i>	
<i>ecology</i>	
<i>environmental sciences</i>	
<u>social studies</u>	
<u>International development studies</u>	
<u>geography</u>	
<u>history</u>	
<u>Canadian studies</u>	
<u>economics</u>	
<u>philosophy</u>	
<u>other:</u>	

Please rate the overall interest in environmental education of the following members of your program's academic community 30 years ago, 15 years ago, and today on a scale where: 1= no interest 2= a mild interest 3= some interest 4= a great interest 5= a primary interest.

Pre-service teachers (your students)
30 years ago (1979): _____
15 years ago (1994): _____
today (2009): _____

Teacher-preparation faculty/staff
30 years ago (1979): _____
15 years ago (1994): _____
today (2009): _____

Program administration
30 years ago (1979): _____
15 years ago (1994): _____
today (2009): _____

Provincial ministry of education
30 years ago (1979): _____
15 years ago (1994): _____
today (2009): _____

Please comment on any trends that you perceive:

Are any members of your faculty involved in ...
Funded projects in environmental education (Y/N)? _____

If yes, please specify the number of faculty involved and the project title(s):

Developing curricula or materials in environmental education for use in elementary or
secondary schools (Y/N)? _____

If yes, please specify the number of faculty members and curricula title(s).

Research in environmental education (Y/N)? _____

If yes, please specify the number of faculty members and research title(s).

SECTION 6: Impediments to Teaching Environmental Education (2 questions)

Please rate the following impediments to integrating environmental education as part of
your pre-service teacher training program on a scale where: 1= not at all a constraint and
5= a major constraint.

Inadequate texts for teachers: _____

Inadequate texts for school children: _____

Inadequate funding: _____

Inadequate teaching materials and equipment: _____

Lack of research: _____

Lack of Canadian content in materials: _____

Lack of communication among environmental educators: _____

Lack of interest amongst faculty/staff: _____

Lack of faculty/staff knowledge about environmental issues: _____

Poor alignment between environmental education and mandated curriculum: _____

Lack of student interest: _____
Lack of time/ too many other priorities: _____
(Other) _____ :

Please add any further comments you may have about impediments to integrating environmental education into pre-service teacher education programs. _____

SECTION 7: Next Steps (6 questions)

What, if any, environmental education projects, programs, or policy shifts are currently underway within your department? Would you be willing to refer me to materials related to these initiatives?

If there is presently no environmental education course in your institution, are there any plans to implement environmental education courses into your pre-service teacher education program in the near future (Y/N)? _____ Why or why not?

Is there a faculty member (yourself or another) who might be willing to speak with me further about your program's treatment of environmental issues?

Name: _____
Position: _____
E-mail: _____
Phone number: _____

If you know of an exemplary project or programme in environmental education in your area, would you please indicate the name of this programme here?

Do you favour teacher certification in the area of environmental education (Y/N)? _____
Why or why not?

Do you have any additional comments about the way your pre-service teacher education program addresses environmental issues and prepares its students to teach about environmental issues?

THANK YOU VERY MUCH FOR YOUR TIME AND FOR YOUR
INVALUABLE ASSISTANCE.

*Please e-mail your completed questionnaire to simone.hanchet@mail.mcgill.ca
or, if it is easier for you, please fax it to the attention of Simone Hanchet at:
(514) 395-4505.*

Appendix III: Extracted Highlights from the Report to UNECE and UNESCO on Indicators of Education for Sustainable Development (CMEC, CCUNESCO, and Environment Canada, 2007).

- In Manitoba, the Department of Education, Citizenship and Youth's ESD priorities focus on teacher professional development. Grants are available for educators to collaboratively plan, develop, and implement sustainability-focused curriculum units and teacher training workshops.
- In Alberta, Inside Education offers professional training sessions between one and ten days in length to enhance teacher understanding of environmental topics.
- In Prince Edward Island, curriculum reform to include specific outcomes and learning opportunities related to sustainability, stewardship, and the environment.
- In Newfoundland and Labrador, incorporation of specific, long-term outcomes into school curriculum on sustainability, including a new environmental science course.
- In Saskatchewan, ESD included in the curriculum for science, history, and social studies. The province was to begin implement the *Pan-Canadian Science Framework*, which encourages students to engage in SD projects in their communities.
- In Ontario, curriculum revisions to include ESD in Science and Technology and Social Studies courses at the primary level and in Science and World Studies at the secondary level.
- In Nunavut, where 85% of the population is Inuit, the education system aims to incorporate Inuit Qaujimajutuqangit (translated as 'that which is long known by Inuit)- a community-based process to raising children that incorporates concepts of stewardship and environmental well-being.